

# Healthcare Professionals' Perspectives on Telecare Follow-up for Premature Infants: A Qualitative Content Analysis

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## ABSTRACT

**Background:** Premature infants often encounter different challenges due to their underdeveloped systems at birth and require specialized care to survive. Telecare usage as a follow-up tool is a proper line to increase infants' health by reinforcing parents' competency to care effectively during the post-discharge period. However, there is controversy about telecare for post-discharge infant care. This study aimed to investigate and compare the experiences of nurses and physicians about post-discharge telecare usage in premature infants.

**Methods:** This qualitative study employed conventional content analysis. Semi-structured interviews were conducted with 30 nurses and 25 physicians using purposive sampling. The participants were recruited from three neonatal intensive care units (NICU) affiliated with Isfahan University of Medical Sciences, Iran, from October 2022 to February 2023. All participants had at least two years of experience providing teleconsultation care for premature infants through a web-based national social media platform. The interviews aimed to explore participants' experiences with teleconsultation. Data collection spanned five months, and the analysis was guided by Granheim and Lundman's method to extract core concepts until data saturation was reached, meaning no new information emerged from further interviews.

**Results:** The findings demonstrated two main components, including the challenges and benefits of telecare. Both nurses and physicians generally agreed on the usefulness of telecare, but they differed in opinions regarding infant safety and trust in parents' understanding of telecare monitoring.

**Conclusion:** The study highlighted safety concerns and parental internet literacy levels related to telecare follow-up, advocating for its integration alongside traditional care. Valuable insights were provided for policy-makers in managing post-discharge care for premature infants, emphasizing the need for further exploration into long-term impacts and parental adherence to telecare protocols.

**Keywords:** Premature, Infant, Remote Consultation, Physicians, Nurse Clinicians, Qualitative Study

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## Introduction

Premature infants often experience difficult situations, with a high possibility of complications in the post-discharge period, such as respiratory and nutrition difficulties that increase the readmission rate, especially in the first two weeks of discharge (1). Early intervention to follow-up on their problems by their parents and educating them on the pathway to manage the situation has been associated with a reduction in rehospitalization rate, lower parental stress in caring, and continuing therapeutic communication between care providers and parents (2). The lack of consistent relationships based on parents' participation in the post-discharge period is a serious gap in the health system (3, 4).

Telecare services have the potential to alleviate this challenge by remote monitoring and supporting parents in the management of premature infant health conditions and the delivery of appropriate caring interventions (5). The proper adoption of telecare as a novel option for post-discharge follow-up is in debate (6). The Telecare approach to care is recommended to optimize infants' health by reinforcement of caring competency in parents (7). However, telecare professional activities vary by health provider views (8). According to post-discharge policies, direct referral to care centers is dominant in follow-up in the health system (9). The few qualitative studies that explored the impact of the telecare approach on neonatal nurses consider it a crucial component of the healthcare system (4, 10, 11). The existing studies focused on reporting positive outcomes in parents, including improvement of parents' satisfaction and stress reduction during the post-discharge period. Still, the direct impact on infants is unclear, and there is no consensus among health providers on using telecare as a safe pathway for parents' infant care monitoring (12, 13). A qualitative Gurd study in 2013 reported nurses' viewpoints on telecare intervention. The finding demonstrated both reluctance and motivation in their feedback, which was needed to clarify the conflict (11). On the other hand, there are misconceptions

about physicians' views of telecare as a direct way to attain responsibility during premature infants' treatment process. Its emphasis on examining infants' health in closed in-person situations led to comparing different health providers' views (11, 14-16).

In Iran, telecare is the primary step. Telecare development encounters several challenges, including reliable internet connectivity, training healthcare professionals and parents on telehealth tools usage, and safeguarding patient information privacy and security. In this situation, post-discharge follow-ups for premature infants usually focus on in-person referrals (17, 18). Studying hidden aspects of post-discharge telecare, understanding telecare planning pros and cons, and identifying healthcare shortcomings are essential to address gaps. Teleconsultation for premature infants improves healthcare access in remote areas or for geographically dispersed specialist care. Since there is currently no established telecare program specifically tailored for teleconsultation care for premature infants within clinical centers affiliated with Isfahan University of Medical Sciences, this program was initially developed as part of a thesis project, aiming to address the challenges in providing comprehensive care to premature infant's post-discharge. The lack of research exploring the perspectives of nurses and physicians regarding teleconsultation care for premature infants after discharge highlights a significant knowledge gap within healthcare systems. By illuminating their experiences, this research can support the importance of establishing and improving telecare follow-up initiatives for premature infants. The present study aims to compare the experiences of nurses and physicians with the telecare approach in the post-discharge follow-up of premature infants.

## Methods

### *Study Design and Setting*

This study adopted a qualitative conventional content analysis approach according to the Graneheim and Lundman

analysis method (19) using individual interviews in three neonatal intensive care units affiliated with Isfahan University of Medical Sciences, Isfahan, Iran, from October 2022 to February 2023. The telecare follow-up program investigated in this study was developed as part of a thesis project focused on enhancing post-discharge care for premature infants. Subsequently, a comparative study was conducted to explore the experiences of nurses and physicians involved in implementing this program.

### *Participants and Sampling*

The participants were selected using purposeful sampling among nurses (n=30) and physicians (n=25) who had working experience in teleconsultation care through web-based national social media from two

hospital centers (Al Zahra and Shahid Beheshti hospitals) as main centers for neonatal care services. In this study, participants had at least two years of experience providing teleconsultation care for premature infants through a web-based national social media platform as volunteer members within a hospital teleconsultation group. The exclusion criteria for this study was participants who stopped sharing their experiences during the study. The participants varied in age, sex, job positions, education levels, and work experience, aiming to include a wide range of diversity in the selection process (Table 1).

### *Tools/Instruments*

In-depth semi-structured interviews were performed to collect participants' viewpoints about post-discharge telecare follow-up

**Table 1:** Demographic characteristics of participants

Participants	Nurse/ Physician	Educational level	Marital Status	Gender	Age	Work Experience	Job Positioning
P1	Nurse	BS	Married	Female	28	5	Nursing Staff
P2	Nurse	MS	Single	Female	44	14	Nursing Staff
P3	Nurse	MS	Single	Female	46	17	Nursing Staff
P4	Physician	Fellow	Married	Male	47	16	College teacher
P5	Nurse	BS	Married	Female	42	18	Nursing Staff
P6	Nurse	BS	Married	Female	47	14	Nursing Staff
P7	Physician	Fellow	Married	Male	50	17	College teacher
P8	Physician	Fellow	Married	Male	52	20	College teacher
P9	Physician	Resident	Married	Female	46	12	Nursing Staff
P10	Nurse	PhD	Married	Female	41	14	College teacher
P11	Nurse	PhD	Married	Female	43	18	College teacher
P12	Physician	Resident	Single	Female	30	6	Nursing Staff
P13	Nurse	MS	Married	Female	40	12	Nursing Staff
P14	Nurse	MS	Single	Female	38	15	Nursing Staff
P15	Nurse	MS	Married	Female	46	13	Nursing Staff
P16	Physician	Resident	Single	Male	47	15	Manager
P17	Nurse	BS	Married	Female	30	9	Nursing Staff
P18	Nurse	BS	Married	Female	32	10	Nursing Staff
P19	Physician	Resident	Single	Female	30	9	Nursing Staff
P20	Nurse	MS	Single	Female	35	12	Nursing Staff
P21	Nurse	BS	Married	Female	49	16	Nursing Staff
P22	Physician	Resident	Single	Male	30	7	Nursing Staff
P23	Nurse	BS	Single	Female	28	4	Nursing Staff
P24	Nurse	BS	Married	Female	39	19	Nursing Staff
P25	Physician	Flow	Single	Male	49	22	College teacher
P26	Nurse	BS	Married	Female	31	2	Nursing Staff
P27	Nurse	BS	Married	Female	33	8	Nursing Staff
P28	Physician	Resident	Single	Male	30	10	Manager

in premature infants. The interviews were conducted with questions like: "What was your view about telecare usage in premature infant follow-up? The probing questions were discussed gradually to clarify the details, including "How do you think about telecare usage?", "How does it help?" "What do you think about advantages?", "Have you ever thought about the challenges?", "What is your idea to improve it?", and "Is there anything else you want to add?". The participants were free to speak about their views according to their willingness.

**Rigor** - To ensure reliability, the author mentored nursing students in neonatal care units and developed trust with personnel. Rigor was maintained by allocating appropriate interview time and summarizing conversations. Credibility was established through working relationships and discussions among researchers. The study employed various strategies to enhance transferability, including selecting participants from different healthcare settings, documenting the research process, and providing detailed descriptions of quotes. Confirmability was ensured by involving colleagues to confirm concepts and including direct participant quotes. Overall, the study aimed to provide a comprehensive understanding of the context (20).

### Data Collection

The interviews were carried out in participants' office work at the hospital. The corresponding author conducted the interviews face-to-face with the participants. The study's objectives were explained, and written informed consent for participation and voice recording was obtained separately. The interviews were conducted post-participants' work shifts, ensuring minimal disruption to their professional responsibilities. Moreover, the researcher scheduled interview sessions based on participants' preferences, fostering a conducive environment for open discussions. This approach respected the participants' time constraints and facilitated a deeper exploration of their experiences and perspectives regarding premature infant

telecare follow-up. The mean time of the interviews was about 30-40 minutes.

### Data Analysis

After the third interview, the analysis was started using Graneheim and Lundman's methods. This method was conducted to clarify unfamiliar concepts that required more investigation, including 1) transcribing the whole interview immediately after completion, 2) reading the whole text to arrive at a general understanding/gist of the content, 3) determining the meaning units and primary codes, 4) categorizing similar primary codes into more comprehensive categories, and 5) determining the main theme of the categories (19). We transcribed and studied the interviews to extract the main meaning units. Then, we coded them and created subcategories and main categories. The first author supervised the process, and we reached a consensus.

**Ethics** - The study was approved by the Ethics Committee of Isfahan University of Medical Sciences, Isfahan, Iran. All of the participants filled out a written consent form. They were assured of data confidentiality and had the right to withdraw from the study.

### Results

The study explored the nurses' and physicians' viewpoints on post-discharge telecare usage in premature infants' follow-up. The participants' characteristics demonstrated that most nurses and physicians were between 31 to 45 years old and had working experience in a practical setting of more than six years. A total of 2455 codes were engendered through 65 interviews (Table 1).

After the content analysis of the interviews, *telecare as an adjunct to a face-to-face visit* emerged as the main category, with two subcategories (components) of challenges (17 codes) and benefits (20 codes), as shown in Table 2.

### Telecare as an Adjunct to a Face-to-face Visit

#### 1. The Challenges of Telecare

Telecare faced challenges such as physician

**Table 2:** Content analysis of the interviews (main category and subcategories)

<b>Main Category:</b> Telecare as an adjunct to a face-to-face visit
<b>Component 1:</b> The challenges of telecare (17 codes)
<ul style="list-style-type: none"> <li>• Telecare performance under the supervision of physicians</li> <li>• The parents' comprehension level in caring management</li> <li>• Difficulty in management of the emergency</li> <li>• Lack of possibility of physical examination</li> <li>• Legal problems</li> <li>• Lack of supervision system</li> <li>• Doubt in its safety for premature infant's follow-up</li> <li>• Problems in drug prescription</li> <li>• Lack of closed monitoring for growth and development parameters</li> <li>• Feasibility of Internet access</li> <li>• Parental involvement in digital literacy</li> <li>• Data ownership in virtual space</li> <li>• Parents' inattention to face-to-face follow-up of infants' medical affairs</li> <li>• The inability to accurately diagnose</li> <li>• The need for an educated health provider</li> <li>• Concern about internet disruption</li> <li>• Expensive server foundation provision</li> </ul>
<b>Component 2:</b> The benefits of telecare (20 codes)
<ul style="list-style-type: none"> <li>• Possibility to guide parents</li> <li>• Providing access to the care team</li> <li>• Supportive assistance of parents at home</li> <li>• Possibility of access to educational content at home</li> <li>• Lack of transportation problem</li> <li>• No time restriction</li> <li>• Decreasing psychological pressures on parents</li> <li>• Decreasing crowd of the hospital visit</li> <li>• Aid in the diagnosis of abnormal situations before dangerous events</li> <li>• Continuous monitoring of infants' health by parents' reports</li> <li>• A cost-effective solution</li> <li>• Feasible and accessible</li> <li>• Having different communication options</li> <li>• Shifting conventional policies to modern technological policies within the healthcare system</li> <li>• Creating a complementary system for discharge follow-up</li> <li>• A desirable communication method according to young parents' willingness</li> <li>• Providing service for parents in far distances</li> <li>• Safe on sudden outbreaks</li> <li>• Capacity to share positive and negative feelings</li> <li>• Online rapid response and receiving feedback</li> </ul>

supervision, emergency management, legal concerns, and a lack of a monitoring system. There were also doubts about remote care's safety for premature infants, drug prescription issues, and growth monitoring. Concerns existed regarding accessibility, data ownership, parental inattention, and diagnostic limitations.

#### 1.a. Telecare Performance Under the Supervision of Physicians

One of the key challenges is ensuring

telecare performance under the supervision of physicians. Physicians must oversee and guide the telecare process to ensure accurate diagnosis and treatment.

*"Telecare should be conducted under the supervision of the baby's doctor, as different approaches to treatment can confuse parents and disrupt the treatment process." (P28)*

#### 1.b. The Parents' Comprehension Level in Caring Management

Another challenge is the disparity in

parental understanding levels regarding care management. It is essential for the success of telecare that parents comprehend and execute the recommended care plans.

*"Parents with low learning levels may not understand guidance and could cause harm." (P11)*

### 1.c. Difficulty in Management of the Emergency

The difficulty of managing emergencies is a critical concern, as telecare may not provide immediate and hands-on assistance in urgent situations.

*"In emergencies, immediate and close physical intervention is necessary, which is not possible with telecare." (P4)*

### 1.d. Lack of the Possibility of Physical Examination

The lack of the possibility of physical examination presents a significant limitation in telecare, impeding the ability to assess certain medical conditions accurately.

*"Assessing the baby's skin color, lung sounds, abdominal distension, and reflexes are essential but challenging in telecare." (P12)*

### 1.e. Legal Problems

Legal issues related to telecare implementation must be resolved to ensure compliance with regulations and standards.

*"In traditional visits, there are established legal systems for addressing medical errors, but in telecare, written rules are still lacking." (P19)*

### 1.f. Lack of supervision system

The lack of a supervision system is a notable challenge, as it may lead to monitoring and follow-up care gaps.

*"In telecare, the supervision system is unclear, unlike the critical regulatory position emphasizing health givers' feedback and address to ensure quality services." (P41)*

### 1.g. Doubt in its Safety for Premature Infant's Follow-up

Doubts regarding the safety of telecare for

premature infants' follow-up emphasize the need for thorough evaluation and validation of its suitability for specific populations.

*"Caring for a premature baby online is not possible. They are vulnerable and need close monitoring by a nurse and doctor. Telecare could endanger the baby." (P 8)*

### 1.h. Problems in Drug Prescription

Problems in drug prescription highlight the complexities of remote medication management.

*"We can't prescribe medication electronically after online visits, so parents have to go in person for a paper prescription, which is a significant problem." (P8)*

### 1.i. Lack of Closed Monitoring for Growth and Development Parameters

Telecare encounters challenges in closed monitoring for growth and development parameters, which is crucial for pediatric care.

*"Even doctors, as parents, are concerned about their baby's weight and growth when seeking a referral, but it is not possible to measure accurately through telecare." (P7)*

The feasibility of internet access and parental involvement in digital literacy are challenges that affect the accessibility of telecare services, which are mentioned below.

### 1j. Feasibility of Internet Access

*"Telecare aims to reach people in various locations, but some remote areas lack internet access due to weak signals and limited equipment." (P5)*

### 1.k. Parental Involvement in Digital Literacy

*"Some low-educated parents only use basic mobile phones for calls and are not familiar with internet and mobile features. Internet usage seems to be limited to educated parents." (P9)*

### 1.l. Data Ownership in Virtual Space

Data ownership in the virtual space raises concerns about privacy and security.

*"Mothers often share videos to seek*

*advice on breastfeeding and sometimes send pictures of their infant's genitals for diagnosing skin issues. But is it safe to share private information online?" (P12)*

### *1.m. Parents' Inattention to Face-to-face Follow-up of Infants' Medical Affairs*

Parents' inattention to face-to-face follow-up of infants' medical affairs is challenging, which may arise with increased reliance on telecare.

*"I'm concerned that parents expect the entire treatment and care process to be done through telecare, despite the limitations for screenings and clinical tests." (P7)*

### *1.n. The Inability to Accurately Diagnose*

The inability to accurately diagnose in video consultations highlights limitations in diagnostic capabilities. *"In video consultations, it's difficult for physicians to accurately diagnose compared to face-to-face visits where they can take a history, assess tests and sonography, and adjust their diagnosis based on the baby's symptoms." (P29)*

### *1.o. The Need for an Educated Health Provider*

The need for an educated healthcare provider is essential to guide parents and ensure the quality of telecare services.

*"Specialized personnel are needed to care for premature infants, as well as to provide specialized human resources for telecare on the Internet." (P15)*

Reliable and cost-effective infrastructure is crucial for telecare services amidst concerns over internet disruption and expensive server provision.

### *1.p. Concern about Internet Disruption*

*"Internet connections are crucial for telecare; any disrupted connection between the parents and the treatment team will hinder the process." (P25)*

### *1.q. Expensive Server Foundation Provision*

*"Telecare development requires expensive*

*telecare equipment and robust servers, which demand substantial financial resources from health systems." (P53)*

## *2. The Benefits of Telecare*

The study revealed that telecare in healthcare services provides numerous advantages to parents. These include access to professional guidance and resources from the convenience of their own homes, promoting ongoing learning, and early detection of abnormal situations. Regular health monitoring of infants, supported by reports, is cost-effective and easy to access through telecare. It provides a complementary system for post-discharge follow-up and extends its reach to remote locations.

### *2.a. Possibility to Guide Parents*

Telecare allows healthcare professionals to remotely provide real-time guidance and support to parents in managing their child's health and well-being.

*"After a baby's discharge, parents face many challenges in infant caring, which can be easily guided with telecare." (P2)*

### *2.b. Providing Access to the Care Team*

Telecare enables constant communication between parents and healthcare professionals, providing quick access to medical advice and updates, thereby enhancing overall care quality.

*"The care team stays in touch with parents while the baby is in the hospital, but after discharge, parents need to go to the doctor's office or hospital for any issues. Telecare helps re-establish this connection." (P25)*

### *2.c. Supportive Assistance of Parents at Home*

Telecare provides remote healthcare assistance for parents at home, fostering a supportive environment for their child's well-being in familiar surroundings.

*"Telecare provides peace of mind for parents. Many mothers feel more comfortable when they have someone to chat with, as they need support more than education." (P6)*

#### 2.d. Possibility of Access to Educational Content at Home

Telecare provides parents with educational content on their child's health conditions and home care practices.

*"Telecare facilitates continuous hospital education through e-learning resources for parents, improving infant care learning."* (P12)

#### 2.e. Lack of Transportation Problem

Telecare enables medical support and advice from home, eliminating travel to healthcare facilities.

*"Many families have difficulty traveling long distances for periodic examinations of their babies. Telecare provides a solution to this issue"*. (P32)

#### 2.f. No Time Restriction

Telecare operates without time constraints, allowing parents to seek assistance or guidance at any time. This promotes flexibility and responsiveness in addressing the child's healthcare needs.

*"To be visiting at the hospital is very time-consuming; parents sometimes have to wait two to three hours for their infant visit. Telecare helps to save parents time"*. (P45)

#### 2.g. Decreasing Psychological Pressures on Parents

Telecare supports parents by providing continuous guidance and reducing stress associated with managing a child's health condition.

*"After discharge, parents may worry about small issues and call for help. Telecare reduces anxiety by assisting if something goes wrong."*(P15)

#### 2.h. Decreasing Crowd of Hospital Visits

Telecare minimizes hospital visits, reduces exposure, and provides remote healthcare access for parents.

*"Hospitals get crowded with too many patients, which wastes time and energy. We should only go for emergency and vital cases. Telecare can help reduce unnecessary visits and overcrowding."* (P18)

#### 2.i. Aid to the Diagnosis of the Abnormal Situation Before Dangerous Events

Telecare detects and diagnoses issues early, preventing health risks and emergencies.

*"Many times, we can provide assistance in caring for a baby without needing to go to the hospital. For instance, there was a situation where a baby was choking, and we were able to guide the mother over the phone on what to do. It was successful, and the baby did not require hospitalization."* (P16)

#### 2.j. Continuous Monitoring of Infants' Health by Parents' Reports

Telecare enables continuous health monitoring of infants by healthcare professionals through regular health reports provided by parents, allowing for prompt intervention if any concerns arise.

*"In the case of infants with special high-risk conditions, you can regularly check the health status of the infant with telecare and monitor the danger signs."* (P8)

#### 2.k. A cost-effective Solution

Telecare is a cost-effective solution compared to traditional healthcare methods, making it affordable for parents seeking quality healthcare for their children.

*"Caring for a premature baby is expensive for parents. Telecare can provide affordable care services to the family."* (P13)

#### 2.l. Feasible and Accessible

Telecare is a practical and easily accessible healthcare option, ensuring parents can readily connect with healthcare professionals without significant barriers.

*"Telecare in its simplest form requires a mobile phone and the Internet, which most parents, especially young parents, have access to."* (P2)

#### 2.m. Having Different Communication Options

For flexible remote healthcare, telecare offers multiple communication options, including calls, messaging, chat, video, and media sharing.



*“Telecare offers many communication options, from calls to video monitoring for babies. You can observe and hear their breathing and receive photos and videos of their skin color and posture.” (P22)*

### *2.n. Shifting Conventional Policies to Modern Technological Policies within the Healthcare System*

Telecare contributes to modernizing healthcare policies, integrating technological advancements to improve efficiency and effectiveness in delivering healthcare services.

*“Moving toward modernization is inevitable as many countries have changed face-to-face referral policies to telehealth policies.”(P8)*

### *2.o. Creating a Complementary System for Discharge Follow-up*

Telecare provides post-discharge follow-up support for parents as their child transitions from hospital to home.

*“Post-discharge follow-up can be made more coherent by telecare strategies.” (P35)*

### *2.p. A Desirable Communication Method According to Young Parents' Willingness*

Young parents prefer telecare as it aligns with their lifestyle, increasing their engagement in healthcare communication..

*“Young parents spend a majority of their time on social media and are highly inclined to join virtual groups. Telecare aligns with their interests.” (P5)*

### *2.q. Providing Service for Parents in far Distances*

Telecare overcomes geographical barriers to extend healthcare services to unavailable parents, providing access to quality medical guidance.

*“We are always concerned about infants' families living in remote villages and their access to specialized care services. Telecare could facilitate covering these populations.” (P29)*

### *2.r. Safe on Sudden Outbreaks*

Telecare is a safe alternative to seek

medical advice during outbreaks or emergencies without risking exposure to crowded healthcare settings.

*“During COVID-19, telecare was seen as a safe way to monitor patients. It could be used again in similar situations.” (P52)*

### *2.s. Capacity to Share Positive and Negative Feelings*

Telecare allows parents to share their emotions with healthcare professionals, fostering a supportive relationship and addressing physical and emotional aspects of caregiving.

*“Many care groups welcome mothers of infants because they need to share their concerns, experiences and positive feelings.” (P15)*

### *2.t. Online Rapid Response and Receiving Feedback*

Telecare provides timely online feedback and support from healthcare professionals, contributing to an efficient healthcare system.

*“Telecare provides reciprocal communication between parents and care team with no time restriction and provides fast responses.” (P24)*

## **Comparison of Nurses' and Physicians' Experience**

Nurses and physicians strongly agreed on telecare usage in the post-discharge follow-up of premature infants except for two cases, including “Infants safety” and “Parents comprehension level for telecare monitoring.”

The nurses emphasized face-to-face visits as a safe way for infant follow-up, and the physicians recognized telecare as a safe strategy.

*“Premature babies are super fragile. You might think they're fine one minute, but then they can rapidly get worse. I don't think telecare is a good idea for them.”(P3)*

*“I check up on my patients through WhatsApp to ensure they're doing alright. It's been working great, and there haven't been any issues. If I have any concerns, I can always ask them to come for a check-up.” (P25)*

Parents' comprehension level of telecare monitoring was another challenging issue.

*"To effectively educate parents in the hospital, it is essential to assess their comprehension. Despite supervision, some individuals may make mistakes, so telecare is not foolproof." (P14)*

*"The best people for infant care are the parents; they are receptive to guidance and follow the advice diligently with dedication. We should trust them. (P9)*

## Discussion

This study investigated nurses' and physicians' viewpoints on using telecare for post-discharge follow-up of premature infants. Telecare was found to have benefits but also presented challenges and prerequisites. The conflictive issues were identified as safety and parents' comprehension levels. The interest in novel telecare strategies for post-discharge follow-up of premature infants coupled with the different challenges. The nurses and physicians mentioned telecare foundation restrictions that affect telecare quality. The telecare supervision system faces significant problems, including legal and ethical issues such as data ownership of internet users, extensive access to internet lines, expensive equipment, and the human resources needed for providing services. These global issues have engaged health systems similar to those in Vermeulen's study, which reported that providing parallel and concurrent components of telecare services is a complicated issue (21).

Telecare's technological and political infrastructure deficiency inevitably seriously affects the healthcare system. Robust telecare foundation services are essential to ensure quality assurance. On the contrary, another study that focused on telehealth presents a more skeptical perspective, highlighting concerns about the effectiveness and sustainability of telehealth services. This study argued that despite claims of transformative potential, an overreliance on telecare may disrupt traditional healthcare delivery and doctor-patient relationships. A study suggests that despite established technological and political

foundations, there may not be significant improvements in the health system. The adaptability of telehealth to diverse healthcare needs, potential inequalities in access, and its long-term impact on patient care quality are raised as concerns (22).

The second challenge in this category is the internet literacy of the target population. Parents who are regular telecare users need basic internet literacy to communicate and share information. As per the Chang study, which examined parents' technological literacy, it was found that most parents were frequent internet users with limited health literacy. The study mentioned that the willingness to use technology for communication was high and did not differ based on health literacy. The findings indicated that parents with lower education levels used the Internet as a source of information across various domains (22). In contrast, another study emphasized that the internet literacy of the target population is a significant barrier to effective telecare utilization. This study could argue that parents, as consumers of telecare, require a higher level of internet literacy than initially assumed (23). Contrary to these findings, another study described this research as possibly indicating that many parents face challenges navigating online platforms and effectively utilizing technology for health-related communication. Low health literacy is linked to a lower willingness to use technology for communication. To ensure equal access to telecare services, it is essential to address internet and health literacy together. However, low competency in this area should also be noted. To act in extended domains, a solid focus on parents' empowerment for internet performance is not an obligative issue (24).

Telecare usage for post-discharge follow-up of premature infants poses practical limitations in emergency events management and physical exams. Despite these challenges, nurses and physicians report adequate satisfaction with telecare services. Ansary and Martinez found that advancements in technology and real-time patient-provider

relationships will soon solve the challenge of virtual physical exams, leading to increased telecare acknowledgment among users (25). Every year, telecare service coverage is increasing despite restrictions. More than 60% of all healthcare institutions and 79% of all hospitals in the USA use telemedicine to support patients (25, 26). Another study suggested that while telecare is convenient, it may depersonalize healthcare interactions and hinder technology adoption. It is crucial to balance virtual and traditional healthcare approaches, given the skepticism about their effectiveness in addressing diverse patient needs (27).

The advantages of using telecare for post-discharge follow-up of premature infants, according to the widespread opinions of participants, highlighted various benefits. Telecare follow-up was seen as supportive of the experience of nurses and physicians. It allows for continuous monitoring of the infant's health under the supervision of parental care at home, reducing parental anxiety, providing caregiving guidance, and addressing parents' concerns and questions. In a study that examined parents' perspectives during a video consultation, the findings aligned with those of nurses and physicians. Becoming confident with infant care and having a supportive lifeline were two concepts that emphasized parents' request for assistance (28). Contrary to the findings, parents who struggle with infant care may not seek help or feel confident with increased support. Some may view asking for help as a sign of weakness. It is crucial to encourage parents to seek assistance when needed (29).

Nurses and physicians highlighted the benefits of telecare for the health system. These include reducing referral crowds, cost-effectiveness by lowering readmission rates, and providing a safe strategy during outbreaks. One study examined the effectiveness of telehealth programs in health services and reported that the average annual savings per patient was \$1,280 and there was a significant impact on the length of hospital stays, reducing from 11.5 days to 6.5 days after one year of

telecare monitoring. These outcomes were found to be the most cost-effective.

The findings indicate that traditional policies should be replaced with telecare policies as a new approach to the health system (30). However, a different study showed that telehealth programs in health services did not result in significant cost savings and had minimal impact on the length of hospital stays. It's important to note that telecare programs may not be universally applicable, as outcomes can be influenced by factors such as healthcare context, patient population, and regional variations (31). Telecare supports global equity by providing benefits such as reaching rural and remote populations, saving parents' time, being cost-effective, and offering easy access without transportation challenges, as highlighted by participants in this study.

In a study by Schumacher, telehealth barriers were examined, and the potential of telehealth was mentioned (32). Telehealth has been implemented as a rapid solution to the COVID-19 pandemic, but it provides excellent opportunities to develop equity, especially for families in low-income categories. Telehealth can promote healthcare equity, but limited access to technology, digital literacy disparities, and socioeconomic barriers may hinder its effectiveness. Quality of care and exacerbation of health inequalities are also concerns. A comprehensive approach is needed to address these gaps (32-34).

According to our findings, infants' safety provision by telecare and parents' comprehension level for telecare inclusion were controversial issues in nurses' and physicians' viewpoints. Nurses expressed concerns about the high risk of infant safety incidents with telecare follow-up, while physicians confirmed telecare as a safe approach. In a study conducted by Monteagudo, it was found that misconceptions about technological systems led to safety concerns regarding telecare services. The study also discussed the existing human errors in the traditional health system and proposed an improved structure (35).

Telecare services are a complement to traditional in-person services. Identifying patient safety risks is essential to minimize harm. Nurses and physicians disagree about telecare's safety and effectiveness due to concerns about infant safety, parental understanding, technology misunderstandings, identifying risks, opinions on mistakes, and the role of telecare in healthcare.

Nurses mentioned identifying parents' comprehension level as a prerequisite of telecare follow-up inclusion. On the contrary, physicians have observed that parents are the primary caregivers for infants and have emphasized the importance of trusting them. Physicians encourage increased communication with parents in situations where they were previously trained. Effective communication, whether in-person or through telecare, relies on trust between the patient and healthcare provider to achieve positive results (22, 36, 37).

The study examined the opinions of nurses and physicians regarding telecare for premature infant follow-up. It emphasized introducing telecare alongside traditional services, providing valuable insights into integrating technology in critical healthcare domains. Despite having the mentioned strengths, this study also had some limitations. The study was based on the perspectives of nurses and physicians as core members of the health system. For reliable generalizability of the findings, it is better to explore multidisciplinary team viewpoints to clarify the hidden aspect of the telecare concept as a follow-up method. On the other hand, the telecare system is implemented to spread in the target society, and the beliefs may change according to constant telecare usage as an ingredient part of the health system.

### Limitations and Suggestions

Although this study obtains critical perspectives from nurses and physicians about the advantages and disadvantages of telecare for premature infants, its generalizability is restricted to a particular geographical location in Iran and an online social media

format. Moreover, the design of the current research ignores the long-term consequences and parental compliance, which implies that further studies are required to address this issue before broad clinical use.

### Conclusion

The study addressed safety concerns and parental internet literacy levels related to telecare follow-up for premature infants, highlighting its role as a complementary service to traditional care. The findings offer valuable insights for policy decision-makers in the post-discharge care of premature infants. Future research should explore the long-term impact of telecare on health outcomes and developmental milestones, as well as factors influencing parents' adherence to telecare protocols and the barriers they may face.

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### Authors' Contribution

ASH, MN, AE, and HZ were involved in the study conception, design, and manuscript drafting. ASH wrote the first draft of this study, and MN reviewed it. ASH and MN provided the study design in coordination with AE and HZ. AE and HZ were responsible for coordinating the study. ASH was responsible for the description and data analysis. MN reviewed and participated in analyzing the data. ASH was responsible for delivering and implementing the intervention. All the authors approved the final manuscript.

### Ethical Consideration

The study was approved by the Ethics Committee of Isfahan University of Medical Sciences, Isfahan, Iran (IR.MUI.NUREMA.REC.1400.055). All participants filled out written consent and were assured of data

privacy. They were also informed of their right to withdraw from the study.

### Availability of Data and Materials

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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### Conflict of Interest

The authors have no conflict of interest.

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