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Fragmentation of payment systems: an in-depth qualitative study of stakeholders' experiences with the neonatal intensive care payment system in Iran

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Abstract

Background Iran's fee-for-service (FFS) payment model in neonatal intensive care units (NICUs) is contentious due to the involvement of multiple stakeholders with differing interests, leading to increased costs, fragmentation, and reduced quality of care. This study explores the experiences and challenges of stakeholders with the NICU payment system and considers alternative payment methods.

Method A qualitative research approach was used, involving key informant interviews with stakeholders at various levels of the health system. Data were collected between March 2022 to September 2023 using a purposive sampling method with a snowball strategy. The transcribed data were analyzed using an inductive thematic approach in MAXQDA, with themes and sub-themes emerged and assessed by two independent coders. Four trustworthiness criteria were applied to ensure the quality of the results.

Results The study involved 23 participants with diverse NICU payment backgrounds, identifying issues related to service accessibility, rising costs, neonatologists' income, and service quality. Stakeholders held differing views on the best payment model: health insurance executives favored a prospective payment method, faculty members favored supported modified FFS or per diem, and neonatal specialists expressed concerns about low tariffs and delayed payments.

Conclusion Iran's NICU payment system is unsatisfactory and requires urgent reform. Although stakeholders disagree on the best approach, reforms must be evidence-based and collaborative, addressing structural and cultural issues within the health system. The identification of an optimal payment system is essential for supporting neonatal care, benefiting newborns, families, society, and the broader health system.

Keywords Neonatal intensive care unit, Payment system, Challenges, Qualitative study, Stakeholder experience, Iran

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Introduction

The first month of life is a crucial period for the health and survival of children, yet many infants die or experience complications during this time, especially in low- and middle-income countries [1]. Infants requiring intensive care in neonatal intensive care units (NICUs) are more likely to be readmitted to the hospital, which significantly affects both the quality and cost of their care [2]. The length of stay in the NICU depends on various factors such as gestational age, birth weight, and respiratory disease. Notably, longer stays are often linked to poorer care quality [3].

In Iran, NICU services face some challenges, including a high infant mortality rate, poor coordination between services, inadequate resources, a shortage of skilled staff, and insufficient transport systems [1, 4, 5]. Addressing these issues requires significant reforms in the healthcare sector, though this task is complicated by the country's complex public-private healthcare system, which leads to fragmentation, duplication, and inefficiency in the delivery and financing of healthcare services especially for vulnerable groups like newborns. The Ministry of Health and Medical Education (MoHME) and affiliated medical universities regulate, fund, and provide primary healthcare, medical education, and research. Public hospitals operate under a fixed budget, based on historical spending patterns [6]. Meanwhile, the private sector, financed by out-of-pocket payments (OOP) and supplementary insurance funds, charges higher fees and requires co-payments, particularly for specialized and hospital-based care [7].

Stakeholders are essential to the successful adoption and implementation of policy reforms, as their involvement ensures that the diverse needs and priorities of all groups are considered for fair and effective policy outcomes [8]. Healthcare reform is a process aimed at changing policies to enhance health outcomes [9]. One critical aspect of such reform is the provider payment system, which influences how healthcare providers deliver and improve their services [10]. By selecting appropriate payment models, policymakers can create incentives that align provider practices with health system goals [11, 12].

Since 2014, Iran has implemented various health system reforms under the Health Transformation Plan (HTP) to improve care quality, equity, and universal health coverage. While the HTP has yielded some positive outcomes [13], its long-term sustainability and impact remain uncertain [14, 15]. One major challenge not addressed by the HTP is the continued reliance on fee-for-service (FFS) payment mechanisms, which dominate the healthcare system. FFS has been linked to overuse, fragmentation, and poor quality of care [16]. Reforming these payment methods is crucial to improving the overall performance of the health system [17].

FFS, while widely used, remains a controversial payment method in healthcare due to its association with increased costs and decreased care quality [16]. Alternative payment models could potentially lead to more efficient and effective care delivery [18]. However, FFS persists in Iran due to resistance from healthcare providers, who fear reduced revenue, and the gap between policy knowledge and implementation [18]. Understanding the specific challenges related to FFS in the NICU sector and exploring alternative payment methods are key to reform efforts [19]. Although previous qualitative research has investigated broader hospital payment systems in Iran, few studies have specifically focused on NICUs [17, 20]. Gaining insight into stakeholders' perspectives on NICU payment models could provide valuable guidance for policy decisions. Therefore, this study aims to investigate the experiences and challenges of beneficiaries and explore alternative payment methods for NICU care in Iran.

Context of health financing, NICU care and payment system in Iran

Iran's health system is funded by the government, health insurance, out-of-pocket payments, private insurance, and other sources [16]. In 2021, total health expenditure accounted for 5.77% of Iran's GDP, and direct out-of-pocket payments constituted 37.06% of the total current health expenses [21, 22]. Health facilities in Iran are classified into primary, secondary, and tertiary levels, with different funding mechanisms [6]. Public hospitals operate under fixed budgets and FFS payments, while private hospitals rely solely on FFS payments [23]. The disparity in medical tariffs between the public and private sectors has led to income inequality and the prevalence of dual practice [16].

A shortage of hospital beds, particularly in NICUs, poses a significant challenge to healthcare access and quality for neonates and their families. Based on a World Bank report in 2017, Iran had 1.6 hospital beds per 1,000 people, below both regional and global averages [24]. Additionally, the unequal distribution of special care beds and the high occupancy rates of these units exacerbate access issues [25]. NICU beds are also unevenly distributed across the country [26, 27], and the demand for hospitalization has surged, with admission rates rising by 32% from 2012 to 2017 [28]. NICU patients typically have longer hospital stays, with an average stay of 5 to 9 days, particularly for male and older infants [29]. Sepsis, a life-threatening condition, is one of the leading causes of newborn hospitalization in Iranian NICUs [30, 31]. Preventive measures, routine evaluations, and close monitoring are necessary to manage this condition. Preterm mothers often experience high levels of stress in the NICU and require support and education

from healthcare providers, especially nurses and doctors. A study found that NICU stress levels were significantly higher for mothers (9.7 out of 11) than fathers [32].

The cost of infant care in Iranian NICUs varies according to the infant's health status, type of delivery, and level of care. In the NICU, bed care accounts for 70% of costs, while medical services, including blood sampling, oxygen therapy, and device connections, contribute 30%. Additional services such as surgeries, blood exchange, and counseling incur further charges. The daily visit fee for resident doctors contributes 30% of the total NICU fee, though this fee is waived if no resident doctor is available.

Methods

Study design

This qualitative study employed a thematic analysis approach, based on key informant interviews (KII) conducted from March 2022 to September 2023 with stakeholders involved in the NICU system. The KII method was used to gather descriptive data on the insights, perceptions, and experiences of individuals directly engaged with NICU payment systems in Iran [33].

Participants and setting

A purposive sampling method combined with a snowball strategy was used to recruit participants knowledgeable about NICU payment methods. Participants were selected based on their expertise, including NICU care providers (physicians, nurses, administrators), payers (insurance companies or government agencies), and policymakers involved in NICU payment policy development and implementation. Inclusion criteria required participants to have at least five years of experience in neonatal settings and payment systems.

Primary respondents were identified through professional databases including MoHME, the Iran Medical Council, the Iran Nursing System Organization, the Iran Hospital Association, and the Iran Health Insurance Organization. The subsequent participants were recruited through referrals from the primary respondents. The rationale for selecting these key informants was that they could provide diverse and valuable insights into the challenges and alternative payment methods for NICU care in Iran. The identified informants were contacted via email and invited to participate in the study. Most stakeholders' email addresses were obtained through searches of their published articles or other online sources. For those whose email addresses could not be found, a snowball sampling method was employed to obtain their contact numbers, and they were reached by phone. The email outlined the study's purpose, objectives, methods, and ethical considerations. It also included a consent form and a demographic

questionnaire, which respondents were asked to complete and return if they agreed to participate.

Data collection

Semi-structured interviews served as the primary data collection tool, conducted either in person, by phone, or via video call depending on the participants' preferences and availability. The interview guide was adapted and modified as new issues or questions emerged during the interviews. Each interview lasted between 30 and 60 min and took place in a quiet setting. Data collection spanned from March 2022 to September 2023. Saturation was reached after interviewing 23 participants, as no new information or themes emerged beyond the 18th interview. To ensure consistency, the interview questions were standardized for all participants. The interviews began with a general question about the common payment methods used in NICUs and how these methods function. This initial question was followed by probing questions to further explore participants' experiences and perspectives. The specific probing questions can be found in Appendix A of our manuscript. To ensure the confidentiality of participants, a coding system was implemented to protect their identities. Each participant was assigned a unique code that replaced their personal information throughout the data collection and analysis process. At the start of each interview, explicit consent was obtained to record the audio. Audio recordings were made only with the participant's consent. For those who did not consent to audio recording, their interviews were not recorded. Instead, detailed notes were taken during the interviews to capture their responses.

The audio-recorded interviews were transcribed verbatim shortly after each session to ensure accuracy and capture the nuances of the participants' responses. This process required listening to the recordings multiple times to ensure that all details were accurately captured. To address potential preconceptions and biases, the researchers employed member checking. This process involved allowing participants to review and confirm the accuracy of their transcribed interviews and the researchers' interpretations. Additionally, the study was conducted before reviewing the existing literature.

Data analysis

Thematic analysis with an inductive approach was applied based on the six steps proposed by Braun and Clarke (2006) [34]. Data were coded and organized using MAXQDA software (version 2020). The analysis was carried out by the first author (ZO) and two independent coders (VYF and MNM). Data analysis consisted of six stages: (1) Familiarizing with the data by listening, reading, and noting the main topics and issues, performed by two of the authors (ZO and VYF); (2) Coding the data by

labeling the significant features of the data related to the research question; (3) Generating themes by reviewing the codes and identifying broader patterns or themes that captured the essence of the data; (4) Reviewing themes by checking them against the coded extracts and the entire data set, followed by discussion with the research team; (5) Defining and naming themes by further refining them, examining overlaps and relationships between the themes and sub-themes, and considering how they represented the different perspectives and experiences of the participants. The researchers finalized the themes and sub-themes using concise and informative labels that reflect the codes; (6) Reporting findings by integrating the themes with relevant quotes from the data to support their interpretations.

Trustworthiness

The quality of this qualitative study was ensured by following the four criteria of trustworthiness proposed by Lincoln and Guba: credibility, transferability, dependability, and confirmability [35]. Credibility was achieved by conducting member checks, in which the transcripts and preliminary findings were sent to the participants for verification and comments. Their feedback was incorporated into the final analysis. Transferability was enhanced by providing a detailed description of the research context, participant characteristics, methods, and themes. Purposive sampling was used to select participants who were representative of the target population and could provide rich and diverse information. The varied domains of experiences and views of the participants were also illustrated. Dependability was ensured through a coding-recoding strategy, where data were coded once, and then compared and corrected with another researcher (VYF). After a two-week interval, the data were coded again, and inter-coder and intra-coder reliability were calculated. An audit trail was conducted by inviting an external reviewer, an expert in qualitative research related to payment methods (MN), to examine the data, codes, themes, and interpretations. Confirmability was enhanced through triangulation with multiple researchers (three coders and two peer reviewers) involved in data collection and analysis. The team included both a NICU specialist and professors in health policy and health economics. Transferability was achieved by providing a detailed description of the NICU care, payment system, and healthcare context in Iran. This helped readers evaluate whether the study's findings could be applied to similar settings. Our study highlighted the payment system challenges of NICU services, financial burdens, and reimbursement complexities in Iran's health system. By outlining participant characteristics and their diverse experiences, the study ensured rich data, enhancing its applicability to other contexts. Purposive sampling

further supported the relevance of the findings to similar healthcare systems.

Ethics considerations

Ethical approval for this study (Reg. No. 400001171) was granted by the ethical committee of Kerman University of Medical Sciences, with approval code IR.KMU.REC.1401.452. Participants provided consent for their interviews to be recorded, transcribed, and used for research purposes. To protect the respondents and their organizations, quotes were anonymized. Each participant was assigned a unique code to replace their personal information throughout the data collection and analysis process. All audio recordings and transcriptions were securely stored in locked files, accessible only to the research team.

Results

The study involved 23 participants from various backgrounds in NICU payment systems, including seven individuals involved in insurance issues, nine faculty members, two neonatal specialists, one hospital manager, 2 nurses, and 2 representatives from the MoHME. The majority of participants (19 out of 23) were male, with an average age of approximately 46.3 years and around 15.9 years of work experience (See Table 1).

The study identified four main themes and fifteen sub-themes from the respondents' experiences regarding the current payment method for NICU care in Iran. In addition, two sub-themes related to alternative payment methods were extracted. These themes and sub-themes offer insights into the challenges, inefficiencies, and possible reforms within the NICU payment system (see Table 2).

Service accessibility

Service accessibility in NICU refers to the extent to which NICU services are available, affordable, adequate, and acceptable to patients and their families, regardless of their location, income, insurance status, or disability. This theme emerged from four subthemes: potential unavailability, financial barriers, service gaps, and insurance gaps. Potential unavailability was frequently noted in connection with the scarcity of NICU beds and the limited availability of NICU specialists. One participant noted:

“The MoHME decides how to allocate ICU beds based on what each city needs. But then you have politics getting in the way. Some parliament members push for more ICU beds in their areas, even if they're not really needed” [Faculty members P18].

Table 1 Demographic characteristics of the interviewees

Setting	Position	Experience	Gender	Age	Type of Organization Location	Education	Interviewee	
Hospital	Neonatologists	38	Man	62	Governmental	Subspecialty	P1	
	Neonatologists	13	Female	46	Private	Subspecialty	P2	
	Nurse	8	Female	30	Governmental	M.S	P3	
	Nurse	16	Female		Private	PhD	P4	
	Hospital Manager	22	Man	52	Governmental	Neonatologists	P5	
Basic Health Insurance	General Manager	10	Man	43	Governmental	PhD	P6	
	General Manager	25	Man	54	Governmental	PhD	P7	
	General Manager	16	Man	47	Governmental	PhD	P8	
	Head of the Insurance Research Institute	22	Man	45	Governmental	PhD	P9	
	Assistant Consultant in Health Insurance Treatment	17	Man	48	Governmental	PhD	P10	
	Strategic Purchasing Officer	8	Man	43	Governmental	PhD	P11	
	Strategic Purchasing Officer	5	Man	41	Governmental		P12	
	Faculty member	Professor of Community Medicine	19	Man	51	Governmental	PhD	P13
	Health Policy	14	Man	42	Governmental	PhD	P14	
	Health Policy	31	Man	55	Governmental	PhD	P15	
	Health Policy	5	Female	41	Governmental	PhD	P16	
Faculty member	Health Economics	10	Man	43	Governmental	PhD	P17	
	Health Economics	9	Man	40	Governmental	PhD	P18	
	Health Service Management	12	Man	46	Governmental	PhD	P19	
	Health Service Management	11	Man	43	Governmental	PhD	P20	
	Health Service Management	27	Man	56	Governmental	PhD	P21	
	Ministry of Health and Medical Education (MOHME)	Supreme Council of Insurance: Head of Health Insurance Evaluation and Monitoring Group	13	Man	45	Governmental	PhD	P22
		Neonatal Health Department: Head of Department	16	Man	47	Governmental	PhD	P23

Providers highlighted the financial barriers for patients and explained that NICU services are often prohibitively expensive due to long-term stays and high medical tariffs. One of the participants declared that:

“The government subsidizes and helps with health insurance, but it just doesn’t cut it for the private sector. The public sector is overcrowded, while the private sector is expensive. So, patients end up paying more and waiting longer” [Health insurance executive P7].

The insurance gaps refer to the lack of comprehensive and universal insurance coverage (poor breadth and depth) for NICU services. As depth refers to the range of services available while the breadth of coverage is used to describe the proportion of the population that is covered. These gaps result in increased out-of-pocket payments and financial problems for patients and their families. One specialist remarked:

“Some institutions pick up most of the insurance costs, so parents are not really worried about how

long their baby stays in the NICU. But health insurance doesn’t work like that—why can’t all insurance be like this?” [Neonatal specialist P5].

Service gaps mean that there is a shortage of NICU facilities in many maternity hospitals, requiring high-risk transfers, which can lead to complications or death.

“Babies needing NICU care often start out in hospitals without NICU units or the right equipment. They have to be transferred to other hospitals, which is very risky and takes a lot of time. Unfortunately, many of them end up dying or getting infections during the transfer” [Health insurance executive P9].

Rising cost factors

The rising costs of NICU services are mainly due to how much money is needed to keep things running. This increase is driven by issues like inefficiencies, manipulation of supplies, lack of proper monitoring of outputs, and a disorganized system structure. The theme of rising cost factors comes from four subthemes: inefficiency,

Table 2 Participants' experiences with challenges and alternative payment methods in the neonatal intensive care unit payment system

Experiences and challenges		
themes	subthemes	Codes
Service accessibility	Potential unavailability	Low number of NICU beds in the country
		Shortage of NICU beds in the private sector
		Shortage of specialist neonatologists
		Failure to employ senior NICU nurses
	Financial barriers	The difference between public and private tariffs
		High cost due to equipment and nursing
		Low economic access for parents
		High Out-of-pocket payments and financial risk in private hospitals
		Increase out-of-pocket payments with outsourcing in NICU
	Insurance gaps	Lack of full insurance coverage for NICU care
		Removing some drugs from the insurance package
	Service gap	Coverage policies Heterogeneity of health insurers
		lack of NICU facilities in maternity hospitals
High workload of neonatologists due to faulty referral system		
Rising cost factors	Inefficiency	Lack of post-discharge supports
		Extended stay due to Payment method type
		Failure to manage the length of stay in NICU
		Lack of standardized guidelines and protocols for NICU admission and discharge
	Supply factors	Reducing efficiency with outsourcing of NICU care
		High autonomy of doctors
		Overtreatment
		Lack of awareness of costs
		Induce demand
		Lack of responsiveness of the care team
	Output monitoring and control	Manipulation in manual coding
		Financial risk for insurance
		The health system sets, implements, and controls its regulations
		Untargeted supervision
System organization	Few observers	
	Lack of regulatory infrastructure	
	Payment under the table	
	Lack of communication or coordination between perinatal care and delivery department	
	High frequency of visits to specialist doctors	
	Readmission of the patient	
Lack of infrastructure for pregnancy care packages		
Defective referral system		

Table 2 (continued)

Experiences and challenges		
themes	subthemes	Codes
Income consideration of neonatologists	Payment delays	Payment of doctors' wages as desired
		The hospital's use of the doctor's fee is the reason for the delay
		Delay in payment to the hospital by the insurance - time of payment
	Payment mismatch	Deprivation of doctors from income (non-payment of 30%)
		Improper payment distribution of doctors in the morning, noon and evening
		Unfair distribution of income in the hospital
	Provider dissatisfaction	Tariffs are unfair as a result of currency fluctuations
		Lack of interest of the neonatal field among medical students
		Dissatisfaction of the providers with the low salary
	Unclear tariff structures	Inconsistency of the current payment method with the facts
		Low tariff compared to other countries
		Tariff manipulation in favor of special experts
NICU services cost more than the tariff		
Conflict of interest in the professional tariff		
Failure to evaluate the feasibility of tariffs		
Quality of service delivery	Quality indicators and standards	Variety of private and public sector tariffs
		Deep diversity gap between different specialties
		Failure to pay attention to service quality indicators
	Quality outcomes and risks	Indications are tasteful
		Non-examination of external control by insurance (non-supervision)
		Threatening the health of the baby with additional services
	Quality improvement and barriers	Prolonged separation of mother and baby with long hospitalization due to payment method
		Buyer's dissatisfaction with ungraded services
		High work pressure of nurses
		Dissatisfaction of nurses
		Reuse of equipment
		Lack of communication between obstetrics and gynecology department
Proposed Alternative methods by respondents	Payment methods	Lack of resources in the hospital
		The excesses of doctors
		Lack of pediatricians
		FFS by modifying tariffs
		FFS by imposing fines
		Per diem + quality indicators
	Fixed payment to physicians	Per diem + considering the number of procedures
		Per diem plus classification based on the complexity of care of care
		The fixed payment should be made regardless of the services provided
		Fixed salary plus a percentage of hospital profits
		Combining fixed salary with performance incentives
		Diagnosis Related Group (DRG) for a package of services

supply factors, output monitoring and control, and system organization. Inefficiency refers to the issue of some hospitals performing unnecessary tests or treatments, increasing costs. In other words, it means that resources and time in NICU services are often wasted due to unnecessary treatments, mistakes, and delays.

"Hospitals are adding extra services just to make a profit and feel safe. They end up testing or treating

patients unnecessarily. Honestly, they make more money from medical procedures tariffs than from hoteling and actual patient care" [Faculty members P21].

Supply factors pertain to the practices of certain health-care providers who may deliberately inflate and manipulate the demand for NICU services. This can occur through the generation of unnecessary referrals or the

prescription of specific treatments aimed at augmenting their financial gain.

“Some NICU specialists basically run the NICUs themselves. They charge the same rates and keep patients in longer, pocketing the money instead of the hospital. This really hurts quality and drives costs up” [Faculty members P15].

Output monitoring and control refer to the insufficient supervision of NICU services, which contributes to elevated error rates, increased costs, and higher mortality rates. This lack of effective oversight allows for the persistence of inefficiencies within the system, ultimately compromising patient safety and care quality.

“One of our biggest issues is that the MoHME plays two roles: they’re both guardian and the operator of health care. They set the rules and then play by them themselves” [Health insurance executive P8].

System organization pertains to the absence of a structured framework and effective coordination of NICU services, which results in the duplication and redundancy of care delivery. This disorganization exacerbates inefficiencies and can lead to suboptimal patient outcomes within the neonatal intensive care setting.

“Doctors and residents just don’t feel accountable for prenatal care. I really wish there was a family midwife who could be with pregnant women through their entire pregnancy and delivery—even if they needed a C-section or NICU care” [Health insurance executive P6].

Income consideration of neonatologists

Neonatologists face challenges with income due to payment delays, mismatched compensation, dissatisfaction with pay levels, and lack of transparency in tariffs. The theme of income considerations for neonatologists emerged from four subthemes: payment delays, payment mismatch, provider dissatisfaction, and unclear tariff structures. Payment delays refer to the prolonged periods that neonatologists experience before receiving remuneration for their services, which can adversely affect their financial stability. It also is caused by various factors such as lack of funds, defective financial procedures, and improper distribution by insurance companies or hospitals.

“Hospitals provide services daily, but the insurance companies take ages to pay them back” [Neonatal specialist P2].

Payment mismatch highlights discrepancies between the actual payments received and the expected compensation for the services rendered, leading to potential financial strain. Moreover, neonatologists highlighted that the variation in payment among different sources or sectors contributes to inequities and injustices among neonatologists.

“Pediatric departments just aren’t profitable. Kerman has had the same number of pediatric beds for 40 years. The rates for pediatric care are so low that they can’t even build a children’s hospital. They have to rely on other hospitals. The money comes from specialties like eye, ear, bone, and brain care” [Neonatal specialist P1].

Provider dissatisfaction reflects the frustrations and challenges neonatologists face due to these financial issues, which may impact their job performance and commitment to patient care. Provider dissatisfaction refers to the discontent experienced by neonatologists regarding their income levels and the existing payment system. This dissatisfaction stems from a perceived misalignment between their compensation and the skills, expertise, and workload they contribute to neonatal care. Many neonatologists feel that their financial remuneration does not adequately reflect the complexity and demands of their work, leading to concerns about professional recognition and the sustainability of their practice.

“Low tariffs are hurting everyone, including the doctors. They feel forced to see more patients at once, and with these low rates, some doctors might resort to questionable practices” [Neonatal specialist P1].

Unclear tariff structures refer to the ambiguity surrounding the fees and charges associated with NICU services. This vagueness creates confusion and uncertainty among providers regarding the cost structure and reimbursement processes. As a result, such opacity can foster mistrust between neonatologists and healthcare administration, leading to dissatisfaction among providers.

“The country’s tariff system is just a mess. The Ministry of Health plays favorites with some specialties over others” [Health insurance executive P10].

Quality of service delivery

Quality of service delivery reflects how well NICU services meet the expectations of patients and providers regarding clinical and service quality. This theme of service delivery comprises three subthemes: quality

indicators and standards, quality outcomes and risks, quality improvement and barriers.

Quality indicators and standards refer to the criteria used to evaluate and monitor the quality of newborn care. Some participants declared that there are no clear standards for NICU admission or discharge, affecting patient outcomes.

“We really lack clear and measurable criteria for admitting and discharging patients. Infants in special beds need to go through post-care. If a baby goes home directly from the NICU, it likely means they were in the wrong place” [Health insurance executive P12].

Quality outcomes and risks refer to the effects of newborn care quality on the health and well-being of newborns and their families.

“The payment method drags out NICU stays, and longer stays mean more risks and stress for both the infants and their mothers” [Health insurance executive P10].

Quality improvement and barriers refer to the factors and solutions that enhance the quality of newborn care.

“Using breathing aids for over 10 days can lead to infections, damage to the septum, and just really poor quality of care” [Nurse in Charge of NICU Unit P2].

Proposed strategies by stakeholders

Options of payment models

We explored potential alternative payment methods to address the aforementioned challenges. Respondents proposed various payment models for providers, but did not reach a consensus on the optimal approach. The health insurance executives advocated for a prospective payment method to balance the risk between the providers and the payers. Most faculty interviewees preferred the current payment method, albeit with modifications. Neonatal specialists, expressing unfamiliarity with various payment models, primarily raised concerns regarding low tariffs and delayed payments.

“DRG is a payment method that could really boost hospital services in Iran. It pays a fixed amount for each patient, which helps cut unnecessary costs and admissions. But we need the right software, coding, and monitoring to make it work” [Health insurance executive P6].

They mentioned several options. **The first option** involves retaining the existing FFS payment method, with either adjusted tariffs or the introduction of penalties for over-utilization. **The second option** proposes a per diem payment model for hospital accommodations, with adjustments based on quality indicators, the number of procedures performed, or the classification of care complexity.

“One respondent mentioned a simple jaundice case that could’ve been treated at home with a device, but the baby ended up in the NICU for three days and was charged 20 million rials. They suggested we need a fairer payment system. We should categorize and grade treatments based on what’s needed—like with DRG—so grade 1 needs an advanced NICU, grade 2 goes to a NICU post, and grade 3 can go to a regular neonatal ward. Right now, we’ve merged all these departments in hospitals, but we’re still giving them all the same NICU tariff, just to bring in revenue” [Health insurance executive P9].

The third option includes fixed compensation for doctors, regardless of the services rendered, a fixed salary supplemented by a share of the hospital’s profits, or a combination of a fixed salary with performance-based incentives. A faculty member at a medical university endorsed this option, stating:

“I work at a university, and I get paid 20 million rials. Well, let’s pay the doctors the same. You can’t throw 20 or 30 million rials at their education and then expect the hospital to operate while paying them too. The hospital needs to look at its profits and losses and give them a fair 5% profit—that’s the way to do it” [Faculty members P18].

The fourth option involves a bundled payment method, such as a Diagnosis-Related Group (DRG) system, which encompasses a predefined set of services tailored to meet the specific healthcare landscape of Iran. One respondent elaborated on the potential implementation of the DRG system in Iran, stating:

“If we’re going to adopt Australia’s or America’s DRG, we’ll need software that can categorize which group each patient falls into. We need info like demographic details, disease diagnosis using ICD10, and treatment procedures. We’ve got demographic info and ICDL, plus treatment procedures in relative value. To use Australia’s DRG here, we’ll have to map our coding to theirs. It means we’ll need to link our codes to theirs. After that, hospitals can start using this coding, but we also need to keep track of

primary and secondary diagnoses. As long as hospitals don't have incentives to assign higher codes, we'll run into issues with readmissions, which need monitoring too. It's possible, but it'll take a lot of effort to avoid up-coding and ensure we provide high-quality services" [Faculty members P17].

Discussion

This study examined the perspectives of health system experts in Iran regarding the challenges posed by the current payment method in NICU services and potential modifications. We identified four main themes related to these challenges: service accessibility, rising cost factors, income considerations of neonatologists, and quality of service delivery. Additionally, several sub-themes emerged, reflecting diverse experiences. Although various payment models were discussed, there was no consensus among respondents.

Service accessibility

We explored the challenges related to access under the existing payment model. Our findings revealed issues such as financial barriers, service gaps, and insurance gaps. These challenges are particularly pertinent to the NICU setting, reflecting the unique needs and limitations of neonatal care. However, it is essential to note that similar issues have been identified in the broader healthcare landscape. A scoping study examined various aspects of healthcare payment reform across different services, highlighting critical issues such as the need for new infrastructure, limited funding, recruitment of additional human resources, and unequal distribution of healthcare providers [36]. This broader perspective underscores systemic issues affecting healthcare delivery, which also indirectly impact NICU services.

A qualitative study has emphasized the geographical disparities in healthcare access and the high out-of-pocket payments resulting from hospital payment structures in Iran [20]. Another study indicated that access to quality healthcare is constrained in specific regions, such as Mazandaran province, due to inadequate NICU distribution [1]. Some hospitals possess additional resources, such as ventilators, that others severely lack. By comparing our NICU-specific findings with the broader healthcare challenges identified in other studies, we observe common themes that underline the urgent need to enhance access, resource allocation, and infrastructure throughout the healthcare system.

Rising cost factors

The challenge of rising cost factors emerged from four sub-themes: inefficiency, supply factors, output monitoring and control, and system organization. A previous

study examining hospital payment methods in Iran identified similar challenges, including weaknesses in clinical guidelines and prescription recommendations, discrepancies in payments between public and private sectors, expensive monitoring methods employed by third-party payers, inadequate monitoring of physician performance, and the induced demand/moral hazard phenomenon [20]. Another qualitative study highlighted various factors influencing induced demand in hospitals, which included poor monitoring, the FFS payment system, limited oversight by health insurance companies [37]. The educational focus of health centers, providers' interests, and gaps in patient information. In addition to these findings, our study identified specific organizational issues, such as poor communication between perinatal care and delivery departments, frequent visits to specialists, patient readmissions, inadequate infrastructure for pregnancy care packages, and a dysfunctional referral system. Furthermore, the existing payment method does not incentivize providers to deliver high-quality and efficient services, as it neglects quality indicators, levels of care, procedure counts, and NICU length of stay. A study conducted in Iran in 2018 revealed that 31.4% of infants were irrationally prescribed surfactants, attributed to the absence of standard coding, lack of evidence-based guidelines, and inadequate monitoring and evaluation [38].

Income of neonatologists

Neonatologists face substantial income challenges stemming from difficulties in receiving fair and timely remuneration for their services. This theme encompasses subcategories such as payment delays, mismatches, provider dissatisfaction, and unclear tariff structures. A systematic review identified critical features of payment systems influencing healthcare provider behavior, including payment rates, adequacy of payments to cover service costs, payment timeliness, schedules, performance requirements, and accountability mechanisms [39]. Our results, similar to the review, underscore the necessity for timely and fair payment systems, with specific emphasis on the challenges faced by neonatologists in Iran.

Income disparities can also lead to informal payments [40]. A qualitative study categorized reasons for informal payments in Iran into four themes, including economic factors such as improper tariff valuation of services, failure to adjust tariffs in line with inflation, insufficient stakeholder participation in tariffs determination, and tariff inconsistencies across public, private, and charitable sectors [41]. Implementing a payment system that addresses these challenges ensuring timely and equitable remuneration, reducing discrepancies, and enhancing fee transparency could improve neonatal physician satisfaction and elevate the overall quality of NICU services.

Quality of service provision

Our findings concerning the quality of service provision indicate that the current payment method may endanger infant lives by prolonging hospitalization or necessitating additional services. Other identified issues include equipment reuse, neglect of service quality indicators, and subjective treatment indications. Qualitative studies in Iran have underscored the lack of oversight and quality control in services, with no correlation between existing payment mechanisms and service outcomes. Additionally, the absence of performance-based pay and the dual practices of physicians and nurses further compromise care quality [20]. These findings highlight the urgent need for a payment system prioritizing quality and efficiency in service delivery.

The current FFS payment method for NICU services in Iran is inefficient, failing to account for the complexity and diversity of NICU care. This model imposes a substantial financial burden on both payers and patients, particularly within the private sector. It does not incentivize providers to deliver quality and efficient services, neglecting quality indicators, levels of care, procedure counts, and length of stay in NICU cases. Significant tariff discrepancies among specialized groups create incentives for doctors to stimulate demand [42]. Furthermore, the NICU typically has high profit margins, leading to significant pressures to increase referrals and maintain patient volume [43]. Consequently, both providers and payers express dissatisfaction with this payment method, which can jeopardize the quality and accessibility of NICU services.

Implications for policy and practice

Given the challenges identified, it is imperative to modify the payment methods for NICU service providers to achieve the triple goals of neonatal special care: improving newborn health, enhancing family experiences, and reducing costs [43].

Change in payment method

The payment methods for NICU services in Iran are influenced by the perspectives of respondents from diverse backgrounds and the overarching structure of the health system. Respondents—including insurance executives, academics, and neonatal specialists—hold varied opinions, interests, incentives, and expectations regarding NICU care, shaped by their roles, experiences, knowledge, and values. For instance, insurance executives may advocate for payment methods that mitigate financial risk for payers, whereas academics may favor methods that adjust tariffs based on care quality or complexity. These differences highlight the trade-offs and challenges inherent in striving for efficiency, quality, equity, and sustainability within the health system. The health system's

structure also significantly impacts NICU payment methods, influenced by factors such as the types and levels of healthcare services provided by public and private sectors, health financing sources and mechanisms, provider payment methods and criteria, and the policies governing the healthcare sector [44]. These factors can create conflicting incentives and constraints for the provision and financing of NICU services.

If we categorize the proposed payment methods from the study group along a spectrum, maintaining the current model with tariff modifications lies at one end, while a prospective payment method that balances the risk between provider and payer, incentivizing cost control and quality improvement, sits at the other end. This prospective model should be designed according to the diagnosis, severity, and resource utilization of NICU infants. Although prospective payment methods can prevent or limit necessary hospital treatments, they also risk negative outcomes such as early discharges or upcoding. For instance, Japan transitioned from FFS to prospective payment systems (PPS) in 2003, capping NICU reimbursements based on birth weight, and allowing lower-birth-weight infants extended NICU stays [45]. Similarly, in Germany, DRG payments based on birth weight lead to increased upcoding [46]. The risk of upcoding is heightened in premature infants, as their reported birth weight may be intentionally underreported to secure higher payments [46].

Furthermore, detecting manipulation can be challenging since premature infants often lose weight post-birth. In addition to modifying the payment method, respondents noted the importance of entitlement types. We found that entitlement choices impact resource allocation, birth weight criteria, and other clinical variables. Therefore, focusing on clinical outcomes or processes, such as infection rates, mortality, health outcome improvements, or needs-based stratification, is crucial for determining NICU care reimbursement.

Political commitment

Our research indicates that while policymakers and experts acknowledge the need to reform the current payment system for NICU services, a consensus on the optimal payment model remains elusive. This lack of agreement may stem from insufficient political will, inadequate support from the MOHME, and poor coordination between the MOHME and insurance companies [18]. We recommend that involved stakeholders form a multi-sectoral and multidisciplinary team, incorporating policymakers, insurance executives, academics, neonatal specialists, and relevant groups such as patients, families, and civil society organizations. This collaborative team should work collectively to design, implement, and evaluate NICU payment reforms using a participatory

and evidence-based approach. Such collaboration would align interests and goals while considering the best available evidence, contextual factors, and relevant examples from existing literature to develop a realistic and feasible reform plan.

Organizational management of change

Normative pressures can create barriers to payment reform [36], including resistance to change, organizational inertia, provider unresponsiveness, and conflicts of interest. These barriers align with the body of existing literature on healthcare reform challenges. In South Korea, the government faced resistance from healthcare providers who feared that reducing FFS arrangements would threaten their income and professional autonomy [18]. Despite persistent efforts, the government was unsuccessful in limiting FFS arrangements. In contrast, Taiwan managed to limit FFS arrangements by investing in analytical capacity to collect cost data, learning from past experiences, and implementing well-considered policy proposals [18]. To minimize resistance to reform at both individual and institutional levels, the most effective strategy is to involve stakeholders at every stage of the process. While some resistance may stem from organizational inertia, conflicting interests are often the primary drivers.

Leadership and governance

In addition to normative pressures, leadership, and governance play a crucial role in facilitating payment reform. Mimetic pressures arise from the influence of leaders [36], innovators, and reform champions, who drive and inspire the reform process. A lack of strong leadership is frequently cited as one of the main obstacles to successful payment reform [36, 47]. Effective implementation of payment reform requires governments to demonstrate the political will to overcome provider resistance. For example, in 2012, the Dutch government introduced a bundled payment method for maternity care, strongly supported by the Ministry of Health through the creation of a special payment infrastructure [47].

Limitations and strength

This study is subject to several limitations. One significant limitation arises from the reliance on a single data collection method, which may introduce bias and subjectivity into the responses. To mitigate this limitation, the study adopted a qualitative approach that included interviews with multiple stakeholders from various roles within the NICU. By ensuring a diverse representation of perspectives, the research aimed to minimize the potential for bias inherent in a single method. Additionally, some specialists were unable to participate due to their demanding schedules, which may have affected the

comprehensiveness of the data. While interviews were conducted with multiple participants and appointments were scheduled in advance to mitigate this limitation, the absence of certain key stakeholders could still impact the findings. Furthermore, the broad and open-ended nature of the interview questions may have constrained the specificity and depth of the responses, making it essential to interpret the study's conclusions with caution and validate them through further research employing diverse methods and data sources.

A key strength of this study is its pioneering role in exploring the challenges of the payment system related to NICU services, an area characterized by high costs, complex procedures, and significant financial burdens on families and insurers within the Iranian healthcare system. This focus is particularly important given the limited resources available for NICU care in Iran. By examining the perspectives of various stakeholders involved in the NICU, the study offers valuable insights into the existing challenges and operational realities of the payment model. By capturing a range of viewpoints, the research provides a nuanced understanding of the complexities faced in the NICU setting within the healthcare system.

Conclusions

The current payment system for NICU services in Iran is suboptimal and requires reform. However, there is no consensus among experts on the best approach to take. A value-based payment model that accounts for the diagnosis, severity, and resource use of NICU infants could be a more effective alternative, but it may also have unintended consequences, such as encouraging early discharge or upcoding. Key factors in determining the appropriate payment model include entitlement types and whether to focus on clinical outcomes or processes. Reforming the payment system is a complex process that requires significant changes in both the health system and the organizational culture. Collaboration among policymakers, insurance executives, academics, neonatal specialists, and other stakeholders including patients, families, and civil society organizations is essential to ensure the alignment of interests, the use of evidence-based practices, and the development of feasible policy solutions. The payment structure for NICU services in Iran has far-reaching implications, influencing not only the health and well-being of newborns and their families but also the efficiency, quality, equity, and sustainability of the healthcare system. Addressing this issue is crucial for advancing the goals of neonatal special care and ensuring a more equitable and effective healthcare system.

Supplementary Information

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Supplementary Material 1

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Author contributions

The study was conceptualized and structured by Z.O., MNM, and VYF, who also played a significant role in gathering, analyzing, and interpreting the data, as well as in the composition of the manuscript. Z.O. was involved in the data-gathering process. The analysis and interpretation of the data were further supported by Z.O., M.N., R.G., M.H., and VYF. The manuscript was reviewed and received the final approval from all contributors.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Prior to conducting the interviews, an interview guide was disseminated via email to individuals expressing interest in the study concerning payment methods in Iran. Upon their review and subsequent agreement with the content, interview schedules were mutually agreed upon. Informed consent was obtained from all individual participants involved in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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