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Understanding the role of the Tanzania national health insurance fund in improving service coverage and quality of care

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ABSTRACT

Health insurance is one of the main financing mechanisms currently being used in low and middle-income countries to improve access to quality services. Tanzania has been running its National Health Insurance Fund (NHIF) since 2001 and has recently undergone significant reforms. However, there is limited attention to the causal mechanisms through which NHIF improves service coverage and quality of care. This paper aims to use a system dynamics (qualitative) approach to understand NHIF causal pathways and feedback loops for improving service coverage and quality of care at the primary healthcare level in Tanzania. We used qualitative interviews with 32 stakeholders from national, regional, district, and health facility levels conducted between May to July 2021. Based on the main findings and themes generated from the interviews, causal mechanisms, and feedback loops were created. The majority of feedback loops in the CLDs were reinforcing cycles for improving service coverage among beneficiaries and the quality of care by providers, with different external factors affecting these two actions. Our main feedback loop shows that the NHIF plays a crucial role in providing additional financial resources to facilities to purchase essential medical commodities to deliver care. However, this cycle is often interrupted by reimbursement delays. Additionally, beneficiaries' perception that lower-level facilities have poorer quality of care has reinforced care seeking at higher-levels. This has decreased lower level facilities' ability to benefit from the insurance and improve their capacity to deliver quality care. Another key finding was that the NHIF funding has resulted in better services for insured populations compared to the uninsured. To increase quality of care, the NHIF may benefit from improving its reimbursement administrative processes, increasing the capacity of lower levels of care to benefit from the insurance and appropriately incentivizing providers for continuity of care.

1. Introduction

Increasing equitable access to health services and improving financial protection is a high priority on the global agenda, and universal health coverage (UHC) (World Health Organization, 2010) is part of the United Nations sustainable development goals. Low-and-middle income countries (LMICs) are currently implementing various strategies to strengthen their health systems to move closer towards UHC (Jaca et al., 2022). One of the main health financing strategies LMICs are using to tackle both dimensions of UHC is implementing and scaling up the coverage of health insurance programs.

Current evidence suggests that health insurance can improve access to services in LMICs (Spaan et al., 2012; van Hees et al., 2019; Erlangga et al., 2019) by reducing financial barriers and improving quality of care. In Sub-Saharan Africa (SSA), quantitative studies in Ghana, Ethiopia, and Rwanda have shown that health insurance had a positive impact on service utilization and drug prescriptions (Blanchet et al., 2012; Garcia-Mandicó et al., 2021; Wang et al., 2017; Saksena et al., 2011; Tilahun et al., 2018). However, the effect of health insurance on catastrophic health expenditures is mixed (Woldemichael et al., 2019,

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Kusi et al., 2015; Raju and Younger, 2022; Salari et al., 2019). The impacts of health insurance do not appear to be equitably distributed with the wealthiest households more likely to enroll and benefit from health insurance (Woldemichael et al., 2019, Osei Afriyie et al., 2022; Barasa et al., 2021; Chirwa et al., 2021). Furthermore, there is an ongoing debate on the quality of services provided health insurance schemes (Alhassan et al., 2016). For instance a study conducted in Gabon, found that stock out of drugs and shortages of equipment were a significant barrier to quality maternal healthcare, even for insured patients (Sanogo et al., 2020).

This underscores the need to address issues of accessibility and quality in health insurance programs to ensure outcomes that are more equitable for all beneficiaries, regardless of their socioeconomic status. However, little attention has been paid to understanding the causal mechanisms by which health insurance can increase service coverage or improve the quality of care. Recognizing the dynamic and complex nature of health systems, there is a growing need to adopt a comprehensive approaches to identify factors that can significantly influence the implementation of system-wide interventions (de Savigny et al., 2017; Cassidy et al., 2021), such as health insurance programs. This shift to a broader perspective is essential for gaining insights into the operational dynamics of health insurance initiatives, and can guide the development of effective purchasing arrangements that optimize provider behavior.

Tanzania has two major public health insurance schemes targeting specific groups: the National Health Insurance Fund (NHIF) and the Improved Community Health Fund (iCHF). The iCHF is a voluntarily scheme that targets the informal sector-majority of the insured populations fall in this category (NHIF, 2018). The NHIF was established by an Act of Parliament in 1999 as a mandatory social health insurance scheme for public employees (THE UNITED REPUBLIC OF TANZANIA, 1999). In 2013, NHIF expanded membership for other population groups on a voluntary basis. However, coverage has remained limited, with only approximately 7 percent of the population covered by NHIF (Lee et al., 2018). The scheme is financed through a fund consisting of monthly contributions from self-employed individuals, employees, and employers, grants, donations, and income from investments made by the national health insurance fund board. Those in the formal sector contribute 3 percent of their monthly salary and equal matching by employers (THE UNITED REPUBLIC OF TANZANIA, 2016). There is also a voluntary scheme for those in the informal sector through annual premium contributions, which vary by age and number of beneficiaries.

The health insurance program covers employees and their families-spouses, parents, and four legal dependents (biological or adopted children). In 2021, the government adjusted the age of dependents that can be covered to children still in education from 18 to 21 years of age. Retired contributors and their spouses are covered as well. The scheme offers comprehensive services under its benefits package, which includes outpatient and inpatient services, medicines, diagnostic tests, surgical care, dental care, optic care, and physiotherapy care. NHIF has a mix of service providers as its accredited providers. These providers include public and private health facilities, faith-based organizations, diagnostic centers, and pharmaceutical outlets, which comprise pharmacies and accredited drug-dispensing outlets (ADDOs). NHIF uses a fee-for-service to reimburse healthcare providers.

Since the establishment of NHIF, there has been little published evidence about its contribution to improving service coverage and quality of care in Tanzania. The few studies on the scheme were conducted primarily in urban areas (Musau et al., 2001; Kumburu, 2015; Silvia, 2013) and since their publications, NHIF has undergone numerous reforms, including digitalizing its information and claim management systems, loan program to help providers improve their infrastructure and gatekeeping measures on accessing its benefits package. In addition, NHIF is positioning itself to manage the administrative structures of the single mandatory health insurance that the Government of Tanzania seeks to unify existing insurance schemes and extend coverage to all Tanzanians.

As Tanzania strives to establish a single mandatory health insurance, it is imperative to consider complexities of the insurance's influence on the health system. By understanding and analyzing the causal mechanisms through which NHIF enhances service coverage and quality of care, we can address the limitations of the current approach and effectively shape future reforms. In this study, our primary objective is to unravel the complex mechanisms that contribute to the influence of the NHIF in improving access to and quality of care at the primary care level. To achieve this goal, we employ a comprehensive analysis of primary data collected through stakeholder interviews, using causal loop diagrams as a tool for visual representation and interpretation.

2. Methods

2.1. Settings

The qualitative interviews were conducted in rural and peri-urban settings in Tanzania. The health system in Tanzania operates in a decentralized system and its referral system is organized in a pyramid structure (Kapologwe et al., 2020). At the base of the pyramid is primary health care consisting of the community, followed by dispensaries, health centers, and district hospitals. District hospitals are followed by regional referral hospitals, zonal hospitals, specialized hospitals and finally the National Hospital. The two rural sites were Bahi and Chamwino districts in the Dodoma region. Kibaha is a peri-urban area district in Pwani region. We selected these districts because of their experiences implementing various health insurance schemes including NHIF.

2.2. Study population and participant selection

Using the already established network between Ifakara Health Institute and NHIF, we used purposive sampling to identify relevant participants based on their roles within NHIF and their contribution to the implementation of NHIF. Next, we used snowball sampling to identify other participants. Study participants included policymakers at the national level and implementers such as regional and district coordinators of NHIF, in-charges of health facilities, NHIF focal persons at health facilities, and health providers. We focused only on primary care facilities as NHIF benefit packages differ across primary health care and higher-levels of care. The inclusion criteria for health facilities was NHIF accreditation status. We included both public and private health facilities. We conducted interviews with 32 stakeholders in the initial CLDs and expert validation of the CLD with seven stakeholders (Table 1).

2.3. Data collection and analysis

In-depth interviews were conducted from May to July 2021 using a semi-structured interview guide. The questions focused broadly on the sufficiency of resources overall (financial, medicines, medical supplies, workforce, and infrastructure) for service delivery and the role of NHIF in improving these resources, service utilization and the quality of care. We piloted the interview guide during the research assistants' training. All the appropriate revisions were made to the interview guides, which were translated into the local language of Kiswahili before data collection commenced.

Qualified research assistants conducted the interviews after they were trained on the study tools and reminded about human research ethics. The first author supervised the study and provided constant consultation and reflections with the field team. The interviews were conducted in Kiswahili at the preferred location of participants, which was mostly the respondent's workplace. The interviews lasted an average of 43 min. After the interviews, the Kiswahili audios were simultaneously transcribed and translated into English text.

We used inductive content analysis to analyze the collected data. Two team members independently reviewed transcripts and derived a

Table 1
Categories of respondents involved in the study.

Initial CLDS		
Level of interview	Respondents	Number of interviews
National level	NHIF technical managers	3
	MOH leads	2
Regional level	NHIF Coordinators	1
District level	NHIF Coordinators	3
	Council health management team members	4
Health facility level	In-charges of health facilities	9
	Other healthcare workers	7
	NHIF focal persons	3
Total		**32**
Validation of CLDs		
Level of interview	**Respondents**	**Number of interviews**
National level	NHIF technical managers	2
	MOH lead	1
Regional	NHIF coordinator	3
District	NHIF coordinator	1
Total		**7**

list of codes and relationships, which they discussed until a consensus was reached. Findings were grouped into three hierarchical categories-main ideas (domains) with corresponding themes and sub-themes. ATLAS.ti V.8.0 was used to support the data management process.

After completing the coding and analysis, a summary of key findings was produced. These key findings were used to develop a causal loop diagram, a system dynamic tool (de Savigny et al., 2017) that helped visualize the complex network of feedback loops within the health system that have influenced the implementation of the NHIF for improving service coverage and quality of care. To link the findings to feedback mechanisms and identify dominant themes, Kim and Anderson's purpose text analysis was adapted (Kim and Andersen, 2012). This involved four steps.

1. Causal links were identified using the themes and key findings generated. This process was iterative and ended only when each causal link was corroborated from other transcripts.
2. Following this, the causal relationships were transformed to word-and-arrow diagrams to represent an interaction. Arrows indicate the direction of the causal relationship, positive (+) and negative (−) signify the polarity of the relationships. A positive relationship implies that with all things being equal, a positive change in the cause variable will result in an increase in the effect variable. A negative relationship implies that a positive change in the cause variable will result in a decrease in the effect variable, with all things being equal. Delays in the influence of a cause variable over the effect variable was depicted using two lines through an arrow.
3. When a causal link indicated a reciprocal relationship, a feedback loop was created. Each feedback loop was assessed in terms of whether it was a reinforcing (R) or balancing (B) loop. A reinforcing loop signifies a positive or intensifying behavior and a balancing loop signifies a negative or stabilizing behavior.
4. All the feedback loops were assembled into a CLD to create a visual model using Vensim PLE software.
5. The initial CLDs created were shared with additional stakeholders in a stakeholder meeting to validate the extent to which the CLDs reflected their experience of implementing NHIF.
6. Based on the inputs from the stakeholders, final CLDs were created. In the interest of presenting a more reader-friendly and clear CLDs, smaller loops within each domain were presented first.

3. Ethical considerations

Ethical clearance was obtained from the institutional review board of the Ifakara Health Institute (IHI/IRB/No: 6–2021) and the National Institute for Medical Research (NIMR/HQ/H.8a/Vol.IX/3684). Participants provided written informed consent to participate in the interview and have the interviews audio recorded.

4. Findings

Three main domains emerged as NHIF's roles. The domains are: 1) increasing access to high-quality services for families 2) improving service provision capacity 3) governance structures for improving service coverage and quality of care.

5. Domain 1: role of NHIF in increasing access to high-quality services for families

The mechanisms that result in changes in access to service coverage for NHIF beneficiaries are presented in Figs. 1 and 2. Fig. 1 shows the role of NHIF in beneficiaries receiving services through its benefit package. The high financial contribution allows the insurance to have a benefit package that permits beneficiaries to receive timely care and increased choices in different providers compared to those using iCHF (Fig. 1, R1).

> *"If you look at the NHIF you can be treated anywhere, and its scope is huge and with many services. CHF itself has some restrictions because even its contribution is 30,000/ = Tzs [12.93 USD] per year for one household with six people, so taking that amount is about 5000 Tzs [2.16 USD] per person per year, which is not enough to treat a person in a year. So NHIF benefits a lot even though it is expensive."* (Stakeholder 5).

However, the scope of benefit entitlement are dependent on the financial viability of the insurance fund, which is dependent on the cost of services beneficiaries are utilizing (Fig. 1, R1). Participants observed that cost containment measures such as gatekeeping and restrictions on the benefits package, has decreased some beneficiaries' perception of the quality of care using the insurance.

> *"No one should be subjected to restrictions when it comes to receiving service. The aim is to protect the insurance scheme from people doing forgery that is accepted, but no one should be limited to receiving the service. At first, the situation was good but we are starting to see signs that raise concerns for example the way we have started to be told not to get sick more than 3 times in a month. This has begun to cast doubts."* (Stakeholder 9).

The quality of care using health insurance is closely tied to access to needed services. One crucial element affecting beneficiaries' perceived quality of care under the insurance is the availability of drugs in facilities-a major challenge in facilities (Fig. 1, R2). To mitigate the frequent drug stock out in facilities, NHIF has expanded the number of private pharmacies that are accredited with the organization. However, beneficiaries' ability to receive medication is still contingent upon the availability of such pharmacies in their local area. For those in rural areas where these outlets are scarce, they may have to contend with long distances and high travel costs to reach towns with more providers.

> *"Another thing you find someone has been prescribed medication and we don't have. We filled out a form for him so he can get the medicines from a drug shop but they are complaining it cost them time or fare and sometimes one can go to more than one drug store."* (Stakeholder 7).

Another crucial mechanism influencing the quality of care using the health insurance is beneficiaries' understanding of their benefit entitlements (Fig. 1, B1). Participants suggested NHIF providing clear information to beneficiaries about their entitlements can improve their comprehension of the insurance program, and the health insurance

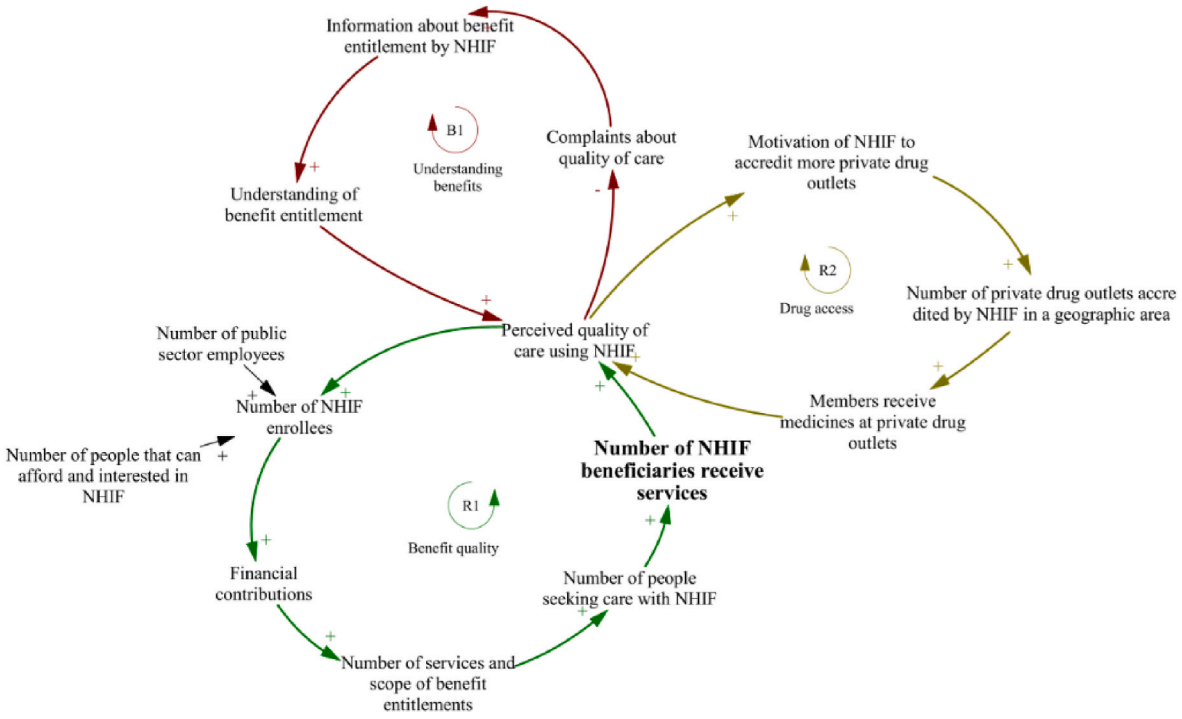

Fig. 1. Mechanisms in which NHIF influences beneficiaries receiving services using the insurance.

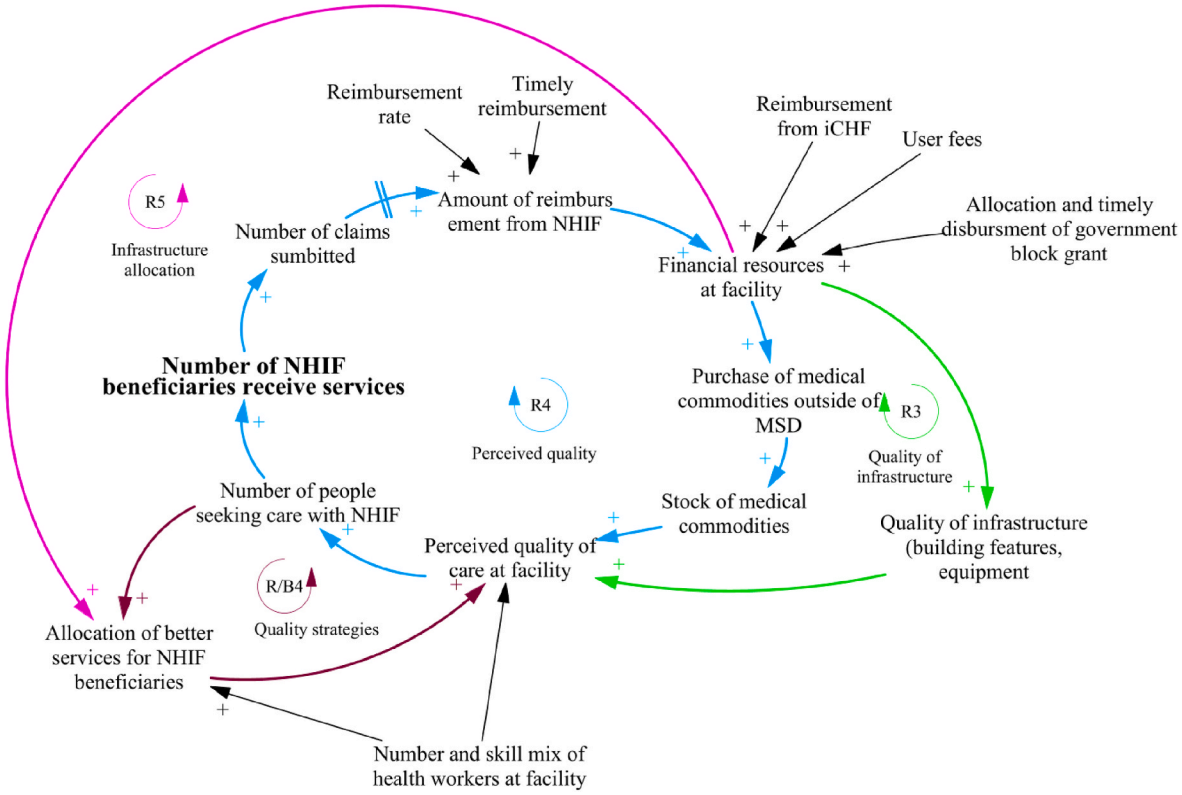

Fig. 2. The role of NHIF in beneficiaries' care seeking.

could do more to educate its beneficiaries.

> "We are requesting when your patients come to join the insurance I do not know what kind of agents they will use but they should tell them if you join this package it covers 1, 2, 3 and does not cover 1, 2, 3 … be open. If you can't help us, give us the leaflets so that when a patient comes to shout at me I give him a leaflet." (Stakeholder 13).

Fig. 2 presents mechanisms of NHIF's role in where beneficiaries seek care. Beneficiaries' perception of quality of care at a specific facility determines whether they seek care there. Their perception of quality of

care at a facility is influenced by the quality of infrastructure (Fig. 2, R3), and the number and skill mix of health workers which depends on and reallocation of health workers to other facilities (Fig. 2, B2) and the recruitment of competent health workers (Fig. 2, B3), which is dependent on government budget. The perception that higher-level facilities have a high quality of care because of the number of specialists, better infrastructure and sufficient medical commodities has led (Fig. 2, R4) to increased demand for services at these facilities than lower-level health facilities (dispensaries and health centers).

> *"If you look at the influx of fund members going to the higher level hospitals, one of the main reasons is my prospect of getting care I will get in bigger facilities than the lower centers. One of the reasons is infrastructure, medical equipment and access to medicine. At higher levels, there are enough specialists in various areas, diagnostic equipment is available, service delivery facilities are available, and medicines are available. So, comparing high and low levels in terms of health insurance members the biggest influx is at the higher because, whatever s/he expects, s/he is going to it there."* (Stakeholder 25).

To increase the number of beneficiaries seeking care at their facilities, providers have created different strategies to allocate better services to them in order to improve their perception of the quality of care at their facilities (Fig. 2, B4). These strategies include short waiting times, better facility infrastructure, and dedicated staff for members.

> *"NHIF members like to be treated as special. Luckily, the old labor ward building was not used so we decided to have a certain team of staff who will be serving the NHIF members. We relocated them to that building. So, when NHIF member comes he/she has to go to that building."* (Stakeholder 9).

However, facilities' ability to allocate better services for members depends on their financial resources. Hence, facilities with more staff and financial resources enable them to direct some of these resources to NHIF beneficiaries and attract them.

6. Domain II: NHIF's role in improving service provision capacity

The mechanisms that result in the changes in the supply of services are shown in Figs. 3–5. Fig. 3 shows the role of NHIF in improving the structural capacity of facilities. The 'NHIF reimbursement' loop (Fig. 3, R6) is a virtuous cycle of growing action where facilities obtain reimbursement from NHIF for the services, which increases their financial resources to purchase medical commodities and improve the quality of their infrastructure through rehabilitation (Fig. 3, R7) and increase their capacity to deliver services. This revenue from NHIF is crucial as they face challenges with their other sources of funding, such as irregularity of government block grants, low user fees, and low reimbursement rates from iCHF. According to NHIF guidelines, facilities are required to allocate a percentage of their reimbursement towards rehabilitation, medicines and medical supplies to enhance their capacity to deliver services. The ability of facilities to use NHIF revenue to purchase medicines and medical supplies outside of the government's medical stores department (MSD) is critical, as frequent drug stock-out is a major challenge. However, delays in reimbursement, a common problem, disrupt providers' ability to procure medical commodities necessary for service delivery.

> *"The last payment I did a thorough follow up because the delay was too much. They say if you file a claim we should be paid within three months but that was over that time. Now when the delay is too much you start failing to buy medicines and reagents on time."* (Stakeholder 9).

Facilities' capacity to provide services is also dependent on the number and skill mix of health workers at the facility which is

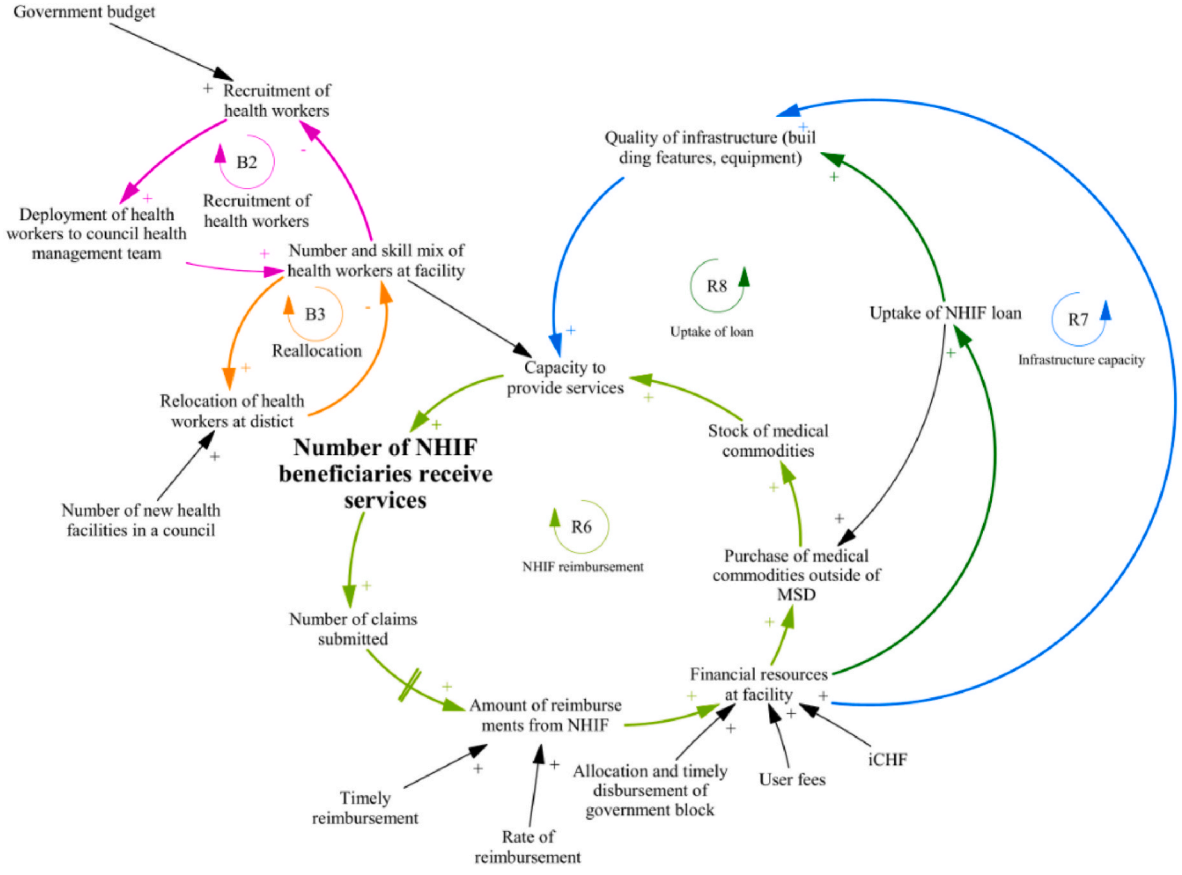

Fig. 3. The mechanisms in which NHIF changes the structural capacity of providers.

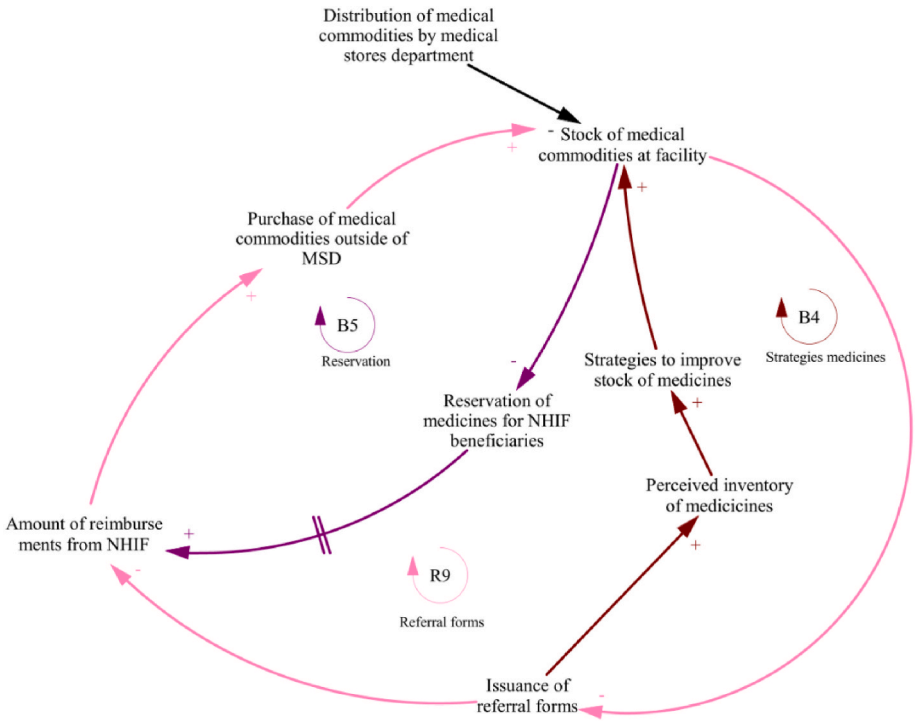

Fig. 4. Mechanisms in which influences the stock of medicines at facilities.

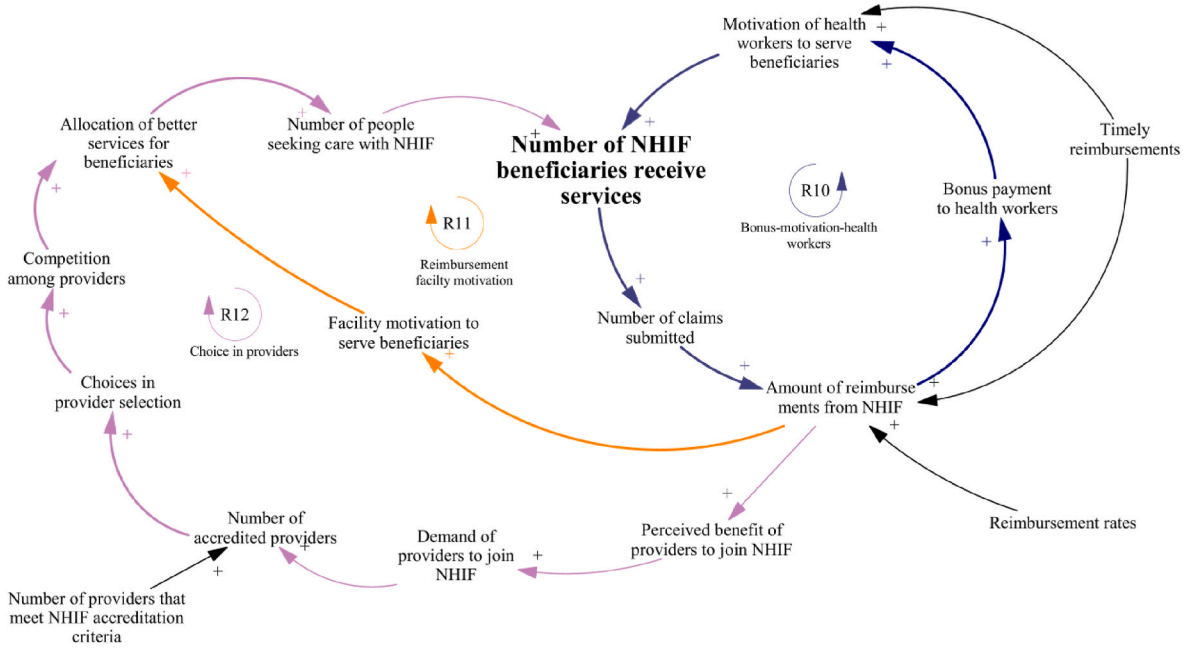

Fig. 5. Further mechanisms in which NHIF influences service provision for its beneficiaries.

dependent on deployment of health workers (Fig. 3, B2) and relocation of health workers (Fig. 3, B4).

The NHIF has also established a loan program to help providers improve their infrastructure (Fig. 6, R8) and procure medical commodities, which is another mechanism to enhance their capacity. However, the uptake of the loan program has been low, especially among public facilities, due to poor knowledge and attitudes towards the loan and financial resources. Despite this, larger hospitals with greater financial resources have been able to take advantage of the program to expand their facilities and purchase new equipment, which has boosted their capacity to deliver services.

Fig. 4 presents detailed mechanisms in the role of NHIF in the stock of medicines at facilities. Facilities having sufficient stock of medicines decreases the need to issue referral reforms to drug outlets, which allows them to earn higher reimbursement from NHIF (Fig. 4, R9). The opportunity to gain more resources from NHIF through beneficiaries receiving medicines directly from facilities creates two actions. One action is developing strategies to improve stock of medicines at facilities to decrease issuance of referral reforms to private pharmacies (Fig. 4, B4).

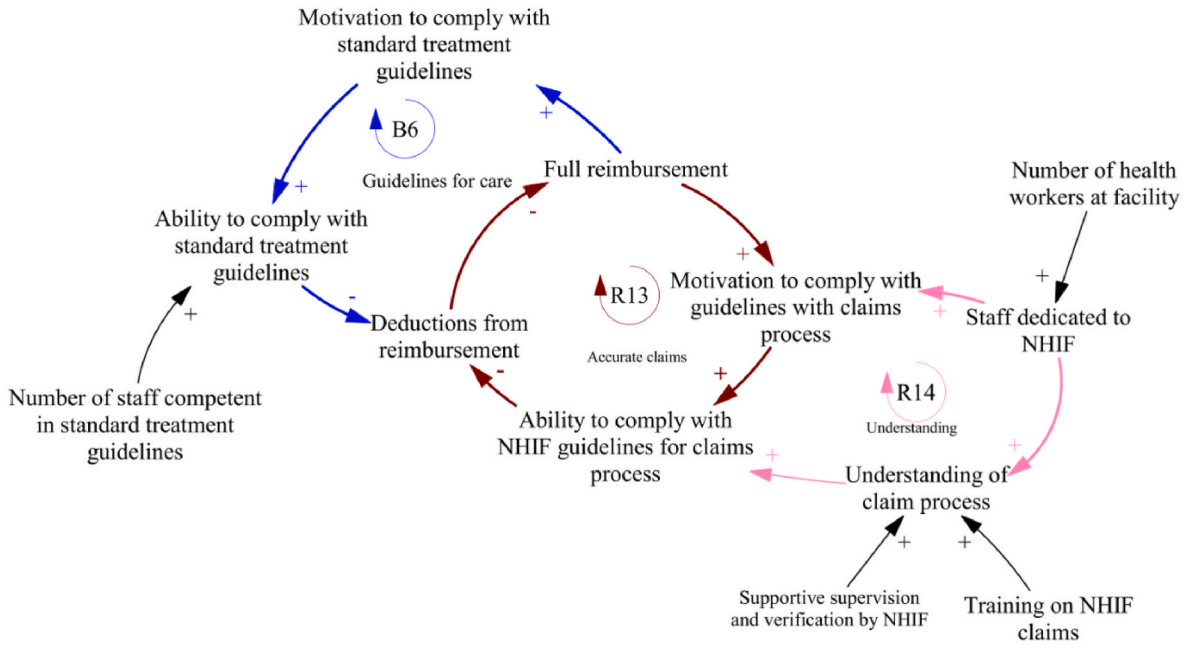

Fig. 6. Mechanisms in which NHIF ensures adherence to guidelines and impact quality of services.

"Right now, we are improving further by making sure they [NHIF beneficiaries] get medication. In the past, when certain drugs are out of stock you fill out a 2C form [referral form] and he is supposed to go and get the drug from a drug shop. Now the challenge that came up, the drug shop that was providing this service stopped providing that service. But also, it was challenging for customers to go to town just to pick one item. So, we started tracking how many 2C forms were given out per month. Why is that so? So, we look at the things that are missing and make sure *they exist … so that has improved a lot."* (Stakeholder 12).

The second action is reserving drugs for NHIF beneficiaries who, through their use of services, enables providers to gain more financial resources (Fig. 4, B5).

"At times there are medicines put aside for NHIF clients because they are so committed to us. We do not have bad intention but because of the commitment that the NHIF shows." (Stakeholder 23).

Fig. 5 shows the other avenues in which NHIF influences facilities in the service provision for its beneficiaries. The bonus motivation loop (Fig. 5, R11) is a virtuous cycle of growing action where bonus payments from NHIF reimbursements increase health worker motivation to exert effort in serving NHIF clients. However, health worker motivation to serve NHIF clients is sustained by timely claims reimbursement.

A patient without health insurance pays on the spot and you can deposit to the account and do anything with it but with NHIF, it takes up to three months to be paid. With this delay, it holds you back to use the money while you have used drugs and even reagents. The staff who do that work are not motivated … the delays demoralize them." (Stakeholder 7).

The amount of NHIF reimbursement providers receive also motivates them to serve NHIF beneficiaries and develop strategies to allocate better services to them (Fig. 4, R10).

"The portfolio of the fund has been a major source of revenue for the respective facilities. In that sense, the facilities are always looking for ways to improve the service for the fund members to protect this portfolio, which provides huge revenue to the facility. For example, others have reached a stage that fund members get a separate area in order to access the services. This is to improve the service for the fund members in order to protect the group that brings huge revenue to the facilities." (Stakeholder 25).

The choice loop is another virtuous cycle of growth (Fig. 5, R12) where NHIF members having choices in provider selection create competition among providers. This competition then stimulates facilities to create strategies to allocate better services to beneficiaries and increase their perception of their quality in order to attract them. Again, facilities' ability to develop these strategies is dependent on their overall capacity to provide services.

7. Domain III: NHIF's role in the governance for improving service coverage and quality of care

The mechanisms that NHIF plays in the governance for improving service coverage and quality of care are presented in Figs. 6 and 7. Fig. 6 shows a crucial pathway to improve the quality of care by providers, which is through financial incentives for full reimbursement by adhering to the Ministry of Health's standard treatment guidelines for treatment and prescription of medicines (Fig. 6, B6).

Before NHIF can receive information about the services facilities provided, providers must submit claims. The 'accurate claims' loop illustrates a virtuous cycle of growing action where health workers' ability to comply with NHIF guidelines for accurate claims decreases deductions from reimbursement to receive full reimbursement (Fig. 6, R13). However, this cycle is sustained by health workers' understanding of the claims process and having staff dedicated to NHIF claims process who are trained in the claim process by NHIF (Fig. 6, R14). Health workers' understanding of the claims process is also increased during continuous supportive supervision, which is determined by NHIF's ability to supervise.

The 'bonus claims-motivation' loop (Fig. 7, R15) is a virtuous cycle where bonus payments to health workers motivate them to complete claims on time for timely reimbursement, which also depends on the capacity of NHIF to verify claims on time. The claims process at facilities is considerably time-consuming and encompasses different administrative steps, so to enable timely claims, facilities need to have adequate health workers to allocate some to the claims process (Fig. 7, R16).

"For us the task becomes difficult because it depends on the facility staff. We have to process claims and then send claims at the same time we have other responsibilities to perform. We don't earn a lot of money to allow us to hire other people to process the claims. For small health facilities like us,

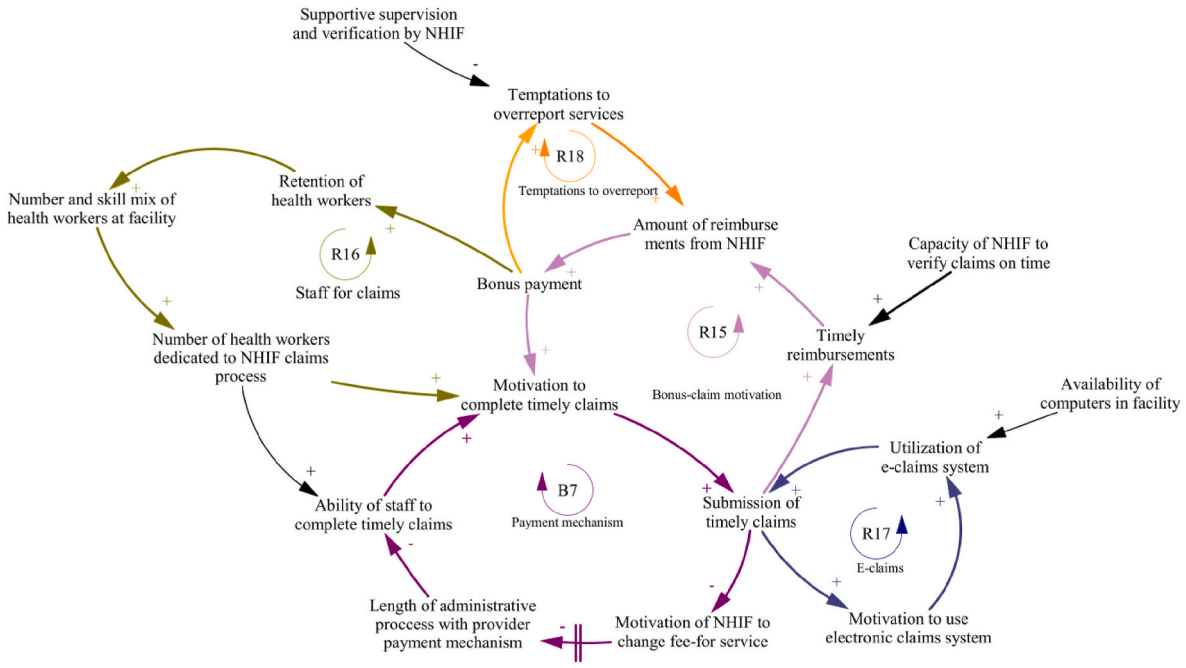

Fig. 7. NHIF governance structures for monitoring service provision.

it is difficult. For example, I process claims but still I have other responsibilities, which are my main responsibilities that put me here and that is to provide care to patients." (Health facility stakeholder 21).

The health insurance has introduced an electronic claims system to reduce the burden of the claims process and increase timely submission (R17). However, this cycle can only be initiated and sustained through the availability of computers at the facility.

"There was a time we complained we do not have computers to use when we want to fill the forms. So they (NHIF) gave one computer to us and they installed the system for us. It has helped us to find out if a client is active but also we use it to fill patient information and the service one [patient] received." (Stakeholder 23).

The 'payment mechanism' loop (Fig. 7, B7) is a balancing cycle of stabilizing behavior whereby health workers' ability to complete claims on time is dependent on the administrative process with the fee-for-service payment mechanism that requires detailed information on services provided. The tedious claims process and its negative influence on timely submission have motivated NHIF to consider moving to other payment mechanisms, such as capitation.

"As we add members, we are looking at the possibility of doing a mixed kind of payment mechanism, perhaps a capitation mechanism, which can be used for primary level centers to ensure that it reduces the long chain of involvement. Capitation is going to be similar to the budget that you have. It means it will be according to the catchment area of the population of the respective area and the facility will be given a specific rate. It doesn't involve a long process like the fee for service system." (Stakeholder 29).

The bonus payment from NHIF can tempt health workers to over-report services they provided, particularly with the fee-payment mechanism, and receive more reimbursement from NHIF (Fig. 7, R18). However, close monitoring and verification by NHIF coordinators can mitigate this challenge.

"There are some people who lie. They may say they are offering certain services but they do not. Through supervision, they follow up. (Stakeholder 30)."

8. Discussion

The aim of this paper was to understand the role of Tanzania's NHIF in service coverage and quality of care at primary care facilities by using CLDs. The use of CLDs helped to understand the pathways in which the system (beneficiaries and providers) responds to the health insurance and how their feedback affects service coverage and quality of care overtime.

On the beneficiaries/demand side, we observed that in the CLD, beneficiaries' ability to receive services under the insurance is a critical leverage point (Loop R1) for service coverage and perceived quality of care in using the health insurance. Beneficiaries had a higher perception of quality of care using NHIF due to its comprehensive benefit package, especially also when compared to the iCHF, the insurance for the informal sector. Whereas NHIF includes the private health sector to alleviate the challenges in public health facilities, iCHF does not, and its beneficiaries are restricted to primary and secondary health facilities in the region they registered for the health insurance. With ongoing discussions to have a merger of schemes under the single national health insurance, the interests of those benefiting from NHIF need to be managed carefully as examples from Indonesia, Thailand, and Turkey have shown the critical role of public sector employees in the establishment of a single national health insurance (Bazyar et al., 2021).

The study findings also underscore the importance of the initial benefit package designs by health insurance schemes on quality of care. The recent cost containment measures through restrictions on the benefit package is perceived to have affected individuals' access to care and quality of care using the health insurance. Quantitative studies from the United States and Taiwan found that demand strategies such as cost-sharing reduced utilization for essential medicines ultimately had adverse consequences (Liu and Romeis, 2004; Chandra et al., 2021). The predicament of NHIF's financial sustainability is a lesson for other countries in SSA that are considering implementing national health insurance schemes to be cautious in designing their benefit packages as it can disrupt the virtuous cycle of perceived quality of care and long-term consequences of reduced uptake by voluntary members. It may be better to increase and expand benefits than impose restrictions in the future (Ochalek et al., 2018; World Health Organization, 2021).

Individuals' perceived quality of care with using the health insurance

was also dependent on whether they received services from NHIF providers in their geographical location. Since the study period, the insurance have ceased urban health facilities from issuing prescription forms to private pharmacies to motivate them in ensuring adequate stock of medical commodities. This will ensure that health facilities particularly those in the public sector gain full reimbursement and the insurance does not reimburse private pharmacies who have higher payment rates. More importantly, the unequal distribution of private pharmacies and hospitals in rural areas have limited access to NHIF benefits for rural populations, leading to disparities in accessing high-quality care. The benefit design not covering transportation for referrals or the coordination of referrals by providers in rural areas was reported by participants to deter individuals from accessing care at higher levels of care or incurring higher indirect medical costs. This finding is consistent with studies from Ghana, Malawi, and Uganda, which reported that even after new financial protection policies to increase coverage, transport cost was still a barrier to accessing care for rural populations (Aikins et al., 2021; ABIIRO et al., 2014; Kakama et al., 2020). To improve integrated continuum care for those in rural areas, NHIF could incentivize lower-level health facilities appropriately to coordinate referrals to higher levels of care or other service providers (Tsiachristas, 2016).

Beneficiaries' perceived quality of care at health facilities (Loop R4) is also another critical advantage point for improving quality of care. The perception that lower levels of care-primary care facilities have poor quality of care due to drug shortages, limited infrastructure and workforce, have led to bypassing these facilities to higher levels of care. Hence, their participation in the health insurance is lower than higher-levels of care and do not have the opportunity to receive reimbursements and have adequate inputs for quality of care. A quantitative analysis of the 2016 claims data found that five hospitals in Dar es Salaam, the capital city of Tanzania, accounted for 30% of the total claims (Durizzo et al., 2022). The potential unforeseen consequence of higher-level facilities benefiting more from the insurance may perpetuate the issue of bypassing lower levels of care.

Additionally, the intention to improve beneficiaries' perceived quality of care and increase their utilization have created unintended consequences by skewing aspects of facility resources for insured groups rather than the entire population. Already, findings from our study and others in Tanzania have found that public health facilities struggle with high-quality facility infrastructure and physical environment and need to address these to improve the quality of care for all (Renggli et al., 2019; Yahya and Mohamed, 2018; Solnes Miltenburg et al., 2018). Additionally, financial barriers are the main reason for low health insurance uptake, and the least poor are more likely to enroll in health insurance, particularly NHIF (Umeh, 2018; Amu et al., 2022). Further, given that public health facilities and NHIF receive public subsidies (Mtei et al., 2012), investments in infrastructure targeting NHIF members could drive inequities in health care benefits. Furthermore, although NHIF has differential premium rates, according to the study findings, the scheme is still expensive for many Tanzanians, and most vulnerable groups cannot afford it. Alternatively, those in the informal sector can enroll in iCHF; however, our findings and others suggest that the scope of services and benefits from iCHF are unequal to NHIF (Osei Afriyie et al., 2021; Mselle et al., 2022).

The findings also identified that reimbursement delays could undermine virtuous cycles to improve quality of care. As the other funding sources are irregular and insufficient, timely NHIF reimbursement is crucial for budgeted medicines, medical consumables, and other essentials health facilities have planned to purchase. To reduce delays, NHIF has introduced a digital claims management system, but not all health providers have yet to implement the system. NHIF could support more providers to introduce the new electronic system to improve the efficiency of claims submissions and reduce deductions in NHIF transfers due to errors in claims completion. Another inhibiting factor for delays is the fee-for-service payment mechanism. The findings from this study and others show that fee-for-service is cumbersome administratively, especially for primary healthcare facilities (Lee et al., 2018; Ikegami, 2015). There have been discussions for years to introduce new provider payments such as capitation and global budgets, but NHIF has yet to implement them. Upcoming reforms on the provider payment system could introduce capitation through a pilot phase in selected districts before a national rollout (Andoh-Adjei et al., 2018). The administrative processes of NHIF must be streamlined and highly functional to support the single national health insurance that is anticipating more Tanzanians to enroll in health insurance.

While the findings of this study contribute to the understanding of NHIF's role in service coverage and quality of care, there are several limitations. One, we did not include NHIF beneficiaries outside of the health system. As majority of the stakeholders we included were public sector employees, they are also mandatory members of the insurance and their perspectives may be different from voluntary members who are outside of the public health system. Their views may have been useful in gaining a deeper understanding of NHIF's role in service coverage and quality of care. Second, the generalizability of the findings to represent the role of NHIF in service coverage and quality of care among other providers (private providers and high-level public facilities). Due to limited resources, the study included mostly public providers, as there are the majority in the country. In addition, high-level facilities were excluded, as there are differences in the benefit package for these facilities and primary health care facilities, which is the greater share of health facilities in the health system.

9. Conclusion

The results presented here suggest that the NHIF has great potential to improve access to services and quality of care. However, in order to have these positive impacts, the NHIF might benefit from improving its reimbursement administrative processes and revising the design of its incentives to providers to ensure all health facilities benefit from the scheme. In addition, the NHIF may have to reexamine its gatekeeping measures to ensure that these mechanisms to reduce overuse and contain budgets do not reduce health. Addressing these challenges will be crucial as NHIF positions itself to lead the country's single national health insurance to provide access to high-quality care for all Tanzanians.

CRediT authorship contribution statement

Doris Osei Afriyie: Conceptualization, Data curation, Formal analysis, Methodology, Visualization, Writing – original draft, Writing – review & editing. **Pei Shan Loo:** Formal analysis, Visualization, Writing – review & editing. **August Kuwawenaruwa:** Formal analysis, Writing – review & editing. **Tani Kassimu:** Formal analysis, Writing – review & editing. **Günther Fink:** Conceptualization, Formal analysis, Methodology, Supervision, Visualization, Writing – review & editing. **Fabrizio Tediosi:** Methodology, Visualization, Writing – review & editing. **Sally Mtenga:** Data curation, Formal analysis, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Data availability

The data that has been used is confidential.

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