

Exploring the post-conflict reconstruction of an effective health system  
in Sudan

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Abstract

Exploring the post-conflict reconstruction of an effective health system in Sudan

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The study examines the Republic of Sudan's national health system during the 2019 transitional period to generate recommendations for the post-conflict era, focusing on leadership and governance, financing, and health workforce. The study is exploratory qualitative research that collected primary data through semi-structured in-depth interviews with previous and current key stakeholders in the health system. The results indicate that political instability and in-fighting during the transitional period significantly influenced all of the health system building blocks. Healthcare financing was characterized by inefficient use of resources which was linked to the limited capacity of national systems. Additionally, the system failed to adequately retain essential workforce and massive brain drain was underway. The recommendations for leadership and governance focused on strengthening coordination and ensuring peace and political stability. For financing, it highlighted the need to adopt sustainable financing modalities, and finally for Human Resources for Health (HRH) it was deemed imperative to provide a holistic incentives package. In the end the current collapse of Sudan's health system on many fronts and the extent of destruction necessitate starting to explore salvaging what remains functioning and planning ahead for the rehabilitation and reconstruction to provide the essential and basic needs.

## Introduction

Since gaining independence, the Republic of Sudan has been plagued by a turbulent political history of short-lived democracies destabilized by military coup d'état, violent civil wars, and armed conflicts. The 30 years old regime of Omer Al-Bashir ended by popular protests and was followed by a joint power-sharing agreement established in August 2019 between the transitional military council and a civilian political coalition. This facilitated the establishment of a transitional government in September 2019<sup>1</sup>, that worked towards the forgiveness of Sudan's international debt, removal of sanctions, resource mobilization for the country's economic and social reforms, and reintegration of Sudan into the international community.

Prior to this, in April 2019, a coalition of Sudanese health professionals' civil organizations and unions from within the country and abroad conducted sector-wide consultations and endorsed priority policy reform and strategic actions for Sudan's 1-year transitional plan for the health sector. These alternative policies addressed crosscutting social issues and provided specific recommendations for health system reform<sup>2</sup>.

The epidemiologic profile of the country is marked with a significantly high maternal mortality rate at 295 per 100,000 live births<sup>3</sup>. In 2022, the infant mortality rate was recorded at 39 deaths and then jumped to 51.6 deaths per 1,000 lives<sup>4</sup>. UNICEF reported that almost 4 million children under-five are projected to suffer from acute malnutrition in 2024, with 730,000 estimated to suffer from life-threatening severe acute malnutrition<sup>5</sup>. The health sector is burdened with outbreaks of emerging, and reemerging infectious diseases, such as dengue fever, measles, and malaria cases doubling in number from 2021 to 2022<sup>6</sup>. It also struggles with recurrent cholera outbreaks that are exacerbated by climate change shocks and conflict. The fragility of Sudan's health system is further clear when it is examined through the WHO's health system building blocks framework<sup>7</sup>.

The current conflict between Sudanese Armed Forces (SAF) and the Rapid Support Forces (RSF) in Sudan<sup>8</sup> has drastically undermined and devastated the healthcare system's landscape and the context on which the 2019 recommendations were made. Several health officials suggested a need to update the 2019 recommendations to address the current situation in Sudan. This assessment was designed to explore new ideas under the direction of these officials.

I conducted an exploratory qualitative research study to provide recommendations to rebuild Sudan's health sector. The study drew on lessons learned during the transitional period and the current state of the health system during the conflict. Even though the 2021 military coup<sup>9</sup> limited tangible progress during the 2019 transitional period, there is potential to draw upon lessons learned during that brief redesign period when Sudan started to rebuild the health sector. Examining this rebuilding process provides an opportunity to evaluate healthcare reconstruction decisions and processes at that time. Additionally, the widespread damage and destruction to both the rural and urban health systems' infrastructure provides an opportunity to study broad

scale health system reconstruction<sup>10</sup>. By examining the experiences and perceptions of Sudanese healthcare leaders during that transitional time, I aimed to develop recommendations that could help plan for an effective and resilient national health system that could provide equitable healthcare services to both urban and rural Sudan.

## Methodology

### *Study Design Overview*

I conducted an exploratory qualitative research study using semi-structured individual interviews with key stakeholders in Sudan’s health sector. The study is grounded in the WHO’s building blocks framework, taking into consideration the clear and convenient nature of the framework, and its proven ability to generate reliable evidence for actionable policy recommendations<sup>121314</sup>. The study’s scope is limited to three priority building blocks (health workforce, financing, leadership and governance) to ensure the resulting recommendations are actionable given the constrictions imposed by the current political instability and violent conflict in the country (Figure 1).

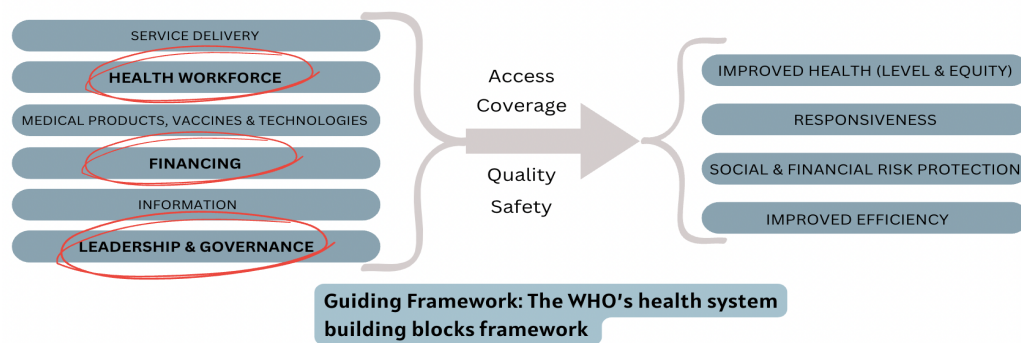


Figure 1

### *Data Collection*

I conducted 14 individual interviews with previous and current actors in Sudan’s health sector. Participants were purposively recruited to participate in interviews if they had a key role in Sudan’s health sector activities as defined as: 1) involvement in federal or state level translation of the transitional government’s commitments towards the health sector, 2) employment with an international agency that closely collaborated with the ministry of health during the political transition, or 3) currently held leadership position in the health sector. Participants were selected to capture a diverse range of experiences with Sudan’s health sector, and to draw from both institutional memory and vast technical expertise in employing the WHO building block framework within Sudan’s health system. Participants were identified

and recruited based on previous professional relationships in Sudan's Federal Ministry of Health, and through a personal mentor's recommendations. Potential participants were initially contacted through email and text message via the WhatsApp messaging platform.

Interviews were conducted via zoom to account for the displacement of Sudanese health professionals across states within Sudan and internationally to different countries. Early interviews focused more heavily on capturing detailed insights from participants with experience on the technical level, while later interviews sought to gain a more holistic perspective of the health sector from participants who held leadership positions and had significantly more years of experience in the health sector. Interviews were conducted using a semi-structured guide, developed based on the WHO building blocks framework and review of national policy documents and reports such as health sector alternative policies during the 2019 transitional period<sup>2</sup>, Sudan's national health sector recovery and reform strategic policy plan, both of which use the WHO building block framework<sup>15</sup>. The interview guide was designed to elicit the following from participants: 1) contrast/compare key lessons from the transitional period with the previous health sector, and 2) share recommendations for future reconstruction. The guide was iteratively refined throughout data collection to optimize participant responses and fill in gaps in understanding health sector design considerations. Interview questions alternated between examining the transitional period vs. eliciting recommendations for the post-conflict era. Interviews were audio recorded and transcribed verbatim by the research team. All participants provided oral consent on record to participate, have their voice recorded, and be quoted in any presentation of results. All participants had the opportunity to review the transcript from their interview to confirm accuracy.

### *Data Analysis*

I used a thematic analysis approach to characterize health sector recommendations according to the three priority WHO building blocks of health workforce, financing and government and leadership. Analysis focused on extracting concepts to guide the reconstruction of health system through critical examination of the factors that shaped the transitional period, and the contextual changes as a result of the war that will need to be incorporated when exploring reconstruction. The use of the three WHO health system building blocks facilitated focusing on key issues important in understanding health sector design, eg, governance, finance, and human resources. An initial codebook was developed deductively based on the framework employed by the study and the interview guide, with the intention of identifying key considerations within each of the health system building blocks. Additional codes were developed inductively through reviewing transcripts and identifying concepts not captured in the initial codebook. Codes were designed to capture opportunities, challenges, and influential factors. Consensus coding was conducted by the author and a Research Assistant by coding a transcript, discussing code application, and revising the codebook. Following established

agreement in code application, all transcripts were coded by the author using the revised codebook, with minor iterations made as new transcripts were coded, the coded transcripts were then reviewed by the Research Assistant. Memos were drafted by the research team during the coding process to track emerging concepts. ATLAS.ti was used to support data analysis. Figure 2, in the appendix, includes example codes, code descriptions and code categories. Code application frequencies across transcripts were evaluated through development and review of code-document tables. Comparison of factors influencing health system structures, designs and strategies were evaluated by comparing code application across and within transcripts. Results were summarized to identify themes related to the lessons learned during the transitional period and recommendations for post-conflict reconstruction.

## Ethical statement

This study was reviewed and approved by the author's thesis committee. It was deemed exempt from requiring Institutional Review Board (IRB) approval by the University of Washington Human Subject Division. All participants were fully informed about the study and provided their consent through an on-record oral consent procedure.

## Results

A total of 25 potential participants were approached as key informants for this study with a total of 17 participants initially agreeing to participate and eventually a total of 14 interviews were conducted.

Overall, when comparing responses between participants, those with more years of experience focused on addressing the root causes of social injustice in Sudan while those with less experience in terms of years focused on salvaging what is left of the system and planning for a resilient and sustainable health system for the future. In reflecting on the efforts and actions taken to rehabilitate the health system during the transitional period, most participants agreed that the political context was favorable to foster change. However, political context also interfered with and negatively influenced the stability of the health sector's governing body. The political change attracted a high influx of traditional and non-traditional donors, with remarkable flexibility in funding modality and drafting joint plans and strategies. The system struggled to manage how national and international funds were allocated to the health sector, which resulted in a skewed focus on Khartoum related to resource mobilization and utilization and HRH retention policies. The system's limited capacity to equitably manage funding and resources led to poor management of the health workforce and inability to implement policies that met diverse healthcare workforce needs.

In considering what the health system might look post conflict, the majority of participants emphasized the need to conduct a comprehensive assessment to determine the full impact of the conflict on the current health system. In considering what an initial health system might include, several participants felt that limited financial resources would generate a need to prioritize supporting only high impact, or urgently needed, interventions. Participants had mixed opinions on whether the health sector would be able to regain and redistribute internally or externally displaced healthcare workers. Surprisingly, participants explored the idea of a centralized health system, noting its current decentralization on paper but not in practice. Those favoring health system centralization reflected on the need to centralize control to ensure proper governance of the fragile system, while those critiquing the centralized system rationed that the states and localities differ in their contextual needs. Finally, the participants specifically evaluated the healthcare system in relation to the WHO building blocks, and outlined how they were envisioned during the transition period as well as recommendations for reconstruction post conflict. Below are the detailed results stratified by building blocks.

## Building Block 1: Leadership & governance

### Transitional Period Reflection

When considering the impact of the transitional period on leadership and governance, three major concepts were prominently touched upon by the participants. Firstly, the political context had a contrasting impact on the leadership and governance of the health system. It opened the door for aspiring policies and recovery plans but the politically driven high turnover rate at the leadership level obstructed any real implementation. Secondly, the political atmosphere of openness facilitated commitments to improve the health sector by different Sudanese societies and international donors. Sudanese professionals and civilians made initiatives and set up priorities and potential policies well before the transitional period started. Finally, the magnitude of the change in the state's governance and the counter-revolution efforts destabilized the system, where political in-fighting and conflicts obstructed the technical work of the ministry and lowered the morale of change supporters.

*"In terms of challenges, first thing, the political contestation that was happening was a major challenge for me" – P11, 5 years of experience*

The commitment to improve health indicators in Sudan was supported by international partners and donors, who expressed their readiness to cater to the needs of the health sector through working to support the ministry's priorities and utilizing national systems.

Some participants criticized policy dialogues and actions for being centralized on the federal level.

*“The transitional government was not different... it was entirely focused on Khartoum as well... You got that feeling, that sometimes policy directions just happen like that” –P11*

However, a previous Director General of the Ministry of Health in Blue Nile State confirmed that the rehabilitation plans on the state level were based on a combination of the federal ministry’s policy direction & pressing needs of the state.

*“Both at the same time, definitely. We had priorities we already suffered from... “ –P8, 14 years of experience*

When it came to executing governance over and within the health sector, under the influence of the unstable political atmosphere, participants noted that significant milestones were achieved during the COVID-19 pandemic era in regards to coordination and efficient service provision. But these achievements and intersectoral collaborations were not sustained following the height of the pandemic. Health sector partners and donors participated in major coordination forums but fragmentation persisted in communication and coordination, particularly on the local level.

Following the 2021 military coup, the international community severed contact, funding, and support to national institutions, it instead resorted to relying on International Non-governmental Organizations (INGOs). This “No-contact” policy with the government severely impacted coordination achievements and efforts.

*“... at the very beginning there was a great influx of donors that supported Sudan. Suddenly when the coup of 2021, everything stopped abruptly.” P3, 12 years’ experience*

In regards to ownership and donor coordination, one participant commented that the international community fell short in terms of actionable commitment to strengthen and support local capacity and national systems and meaningful engagement of the government.

*“On the part of the partners, there was no proactivity at all to address the issues meaningfully, I think the tokenistic dealing with issues like ownership” –P11*

## Post-conflict Reflection

Participants highlighted the importance of peace and political stability as key for any successful rehabilitation efforts in the health system. It was also noted that greater political engagement in high-profile issues, such as outbreak control, can lead to improved responses by leveraging multi-sectoral collaboration and whole-of-government approaches to managing health crises. One of the most significant recommendations for the post-conflict era in regards to leadership and governance was coordination. Nearly all participants emphasized the importance of effective coordination to manage the limited resources allocated to the health sector, and some touched on utilizing and improving previously successful models for strengthening coordination, with particular focus on strengthening local capacity.

*“Some of the practices we had at the MoH were actually successful in terms of multi-sectoral cooperation... in terms of the health sector partners coordination forum for partners coordination”  
–P6, 10 years’ experience*

Participants indicated the general direction for future policies formulation being more inclusive of local levels. They also felt a need to develop more appropriate tools for organizational system management and institutionalization of Standard Operating Procedures (SoPs) and Terms of References (ToRs). As several noted, the war context has changed the map of the health system as a whole. To overcome implementation barriers that were faced during the transitional period, one participant suggested focusing on monitoring, evaluation, accountability, and learning. A general emphasis was placed on reviewing existing frameworks and policies and assessing their gaps or the need to develop more contextually appropriate plans and tools for accountability.

## Building Block 2: Healthcare financing

### Transitional Period Reflection

When examining how financial resources were mobilized and allocated, inefficient use of national and donor resources was linked to limited capacity of the national systems to accurately identify the gaps, and how to best utilize available resources. Inefficient resource use was also linked to the weakness of the system as a whole and its underdevelopment.

*“The reform on health finances in general was not properly established, and there weren’t clear criteria on how health resources to be defined” –P2, 32 years’ experience*

Several participants alluded to the fact that despite initially having 10 priorities as a transitional government, there was a lack of a unified strategic direction of the transitional government as a whole and how that translated on the ground in sectors such as health. External challenges were faced in achieving its alternative policies and making progress towards pre-determined priorities.

One participant observed that resource mobilization was centered in Khartoum based on political directions, while underserved states and communities heavily relied on international community support.

*“The transitional government was not different from any postcolonial government in Sudan, it was entirely focused on Khartoum as well... so the focus on services, resources... This translated to resources as well, how much you invest in specific areas. Much of these underserved communities their focus, you feel, was entirely reliant on the international community and support from international NGOs and UN agencies” –P11*

Participants from both federal and state level noted that limited national financial resources and inappropriate allocation to the local level created implementation barriers. One participant confirmed that not accounting for implementation costs or inflation when drafting policies and interventions created challenges implementing planned services. For example, economic

inflation following the COVID-19 pandemic significantly reduced the value of the budget increase that had been provided to support improvements of healthcare centers at state and local levels.

*“After COVID19, there was a huge inflation, and when we came back to continue with what we were doing, the national insurance fund gave us money to work on 2 centers... These 2 centers cost us 16 billion from 8 billion for 11 centers, it became 16 billion for only 2 centers” –P8, 14 years of experience*

The participants narrated the process of developing the basic benefit package and efforts that were exerted to mobilize national and international funds to support the National Health Insurance Fund (NHIF) to provide services. This was met with obstacles related to financial capacity and the difficulty of retaining healthcare providers in these facilities. The financing scheme of health insurance was criticized from different points of view. The failure of the purchaser-provider model is apparent in the current collapse of the insurance system as it lost significant sources of income from public servants' contributions and limited amounts allocated from the government for social support to poor families. The resource scarcity was a big factor in the current failure of the MoH to provide services or retain workforce. This is further complicated by the ministry's lack of effective governance over the NHIF. Another criticism was directed at the unique financing scheme of the health insurance in Sudan. Emphasis was placed on the insurance fund having its own healthcare-providing centers and the need to revise it to hold providers accountable to the ministry's standards.

*“... considering the crisis that happened in this conflict with everyone losing their jobs and the health insurance lost its revenue so now they have liquidity problem and facing bankruptcy.” –P11*

*“So, in this model in Sudan, we have health insurance having their own facilities providing health services. Who is accountable for whatever services that you are providing... We need to revise our model; we need to have a stable atmosphere when it comes to staff” –P3, 12 years' experience*

## Post-conflict Reflection

When considering a reformed healthcare system post conflict, the majority of participants thought financial resources should be allocated according to targeted priorities in each health system building block. Emphasis was placed on restraining from ambitious reconstruction plans and instead focusing on the most pressing needs. They described this process as starting with strengthening early surveillance, investing in building local capacity to respond to emergencies, and focusing on primary healthcare services.

*“I think we need to focus on the rehabilitation and rebuilding of the PHC, and the emergency medicine” –P1, 26 years' experience*

One participant indicated the need to explore alternative funding sources through collaboration with the private sector, in addition to gaining access to technological innovations and

advancement. Some respondents called for the ministry's complete governance and control over the National Health Insurance Funds (NHIF). However, this was not something all participants agreed upon. Some indicated that while the current governance by the Ministry of Social Development is not necessarily ideal, transferring governance to the federal ministry will jeopardize the link between the purchaser and provider. Other recommendations focused on increasing the public tax for the health insurance fund to increase the coverage and quality of services, as well as revising the services covered by the benefit package to include Mental Health and Psychosocial Support (MHPSS) & other contextually relevant healthcare services.

*"I think way forward in order to be able to make sure that you try to somehow expand contributions to health insurance from the general taxes of the country and at the same time to somehow integrate this health insurance with the ministry" –P11*

*".. we don't know how people's behaviors changed after this devastating war. It should be considered; it would be challenging but because mental health is very important." –P3, 12 years' experience*

Finally, participants recognized how much Sudan's health sector depends on direct service provision through humanitarian actors and the related impact this has on the country's health system. They reflected on the difficulty for the national government to monitor direct provision of service and subsequently hold service providers accountable, particularly in remote areas. In contrast, one participant viewed the heavy reliance on humanitarian aid as an opportunity if funds were used efficiently to develop the system parallel to providing emergency and primary healthcare services.

*"... we have to keep an eye on the system on the long run we will come to realize we will become dependent on these humanitarian direct service provision for a very long time." –P7, 22 years' experience*

### Building Block 3: Healthcare workforce

#### Transitional Period Reflection

Several respondents noted the failure to allocate sufficient resources to support public servants and health workers. Lack of financial support is reflected in low retention rates, limited redistribution to underserved states, and failure to absorb recent medical graduates into the system. The public sector's failure to provide decent living wages was further complicated by higher wages and better working conditions from the private sector or international organizations. This in turn fueled the high turnover rates and internal brain drain of healthcare workers. The high turnover rates were also attributed to the instability of the health system during the transitional period as a result of the influence of the political context on efforts to allocate adequate funds towards HRH retention.

*"I think the biggest factor is money. If people are not paid enough vs. what they do, especially good capacities, you will not be able to retain them. They will just leave" –P3, 12 years' experience*

*"But to be honest, HRH is about having the good financial incentive for staff, then secondly providing them a chance to grow within their jobs, and providing training opportunities" –P4*

When it comes to HRH redistribution, factors such as unsuitable infrastructure and overall working environment were key influences on health workforce willingness to relocate.

*"... almost 40% of these facilities are not functional because of various factors including healthcare workers, no water and electricity supply among other factors" –P4*

In addition, participants also mentioned that professional development was not effectively linked with redistribution to underserved areas. One participant referenced a published paper that identified supervision and professional development as top priority for HRH to redistribute to rural areas instead of concentrating in Khartoum and urban cities.

When asked about recent graduates' absorption into the system, the majority of participants didn't consider themselves to be informed enough about any absorption policies. Few reflected that during that period all efforts related to HRH and their retention were marked with hesitancy and unclarity in policy directions.

*"I don't have any idea about it, and I think this is one of its failures. If it was actually effective people would know about it" –P11*

## Post-conflict Reflection

When examining policy recommendations to enhance the retention and equitable redistribution of the healthcare workforce, participants described mapping HRH based on specialization and geographic distribution as a priority strategy.

*"I think sooner or later there need to be some sort of inventory of human resources conducted to see who is where, and who has left the country and so on and that can guide better policy planning for the future"*

*"You map them to know exactly who is where, what is there, and how they are supporting and in what services." –P3, 12 years' experience*

It was repeatedly noted by the participants that the conflict has dramatically changed the HRH map in the country. Some specialists relocated to relatively safer states in the country and started providing operational services that weren't historically offered in these contexts. It is also worth noting that massive numbers of junior doctors and fresh medical graduates immigrated to gulf countries or European ones. Therefore, the mapping of HRH within the country and abroad is

considered a priority exercise to be conducted simultaneously with early identification of gaps and needs to appropriately match HRH with the level of expertise required.

*"... one thing that comes across all these issues are human resources. Human resources map has differed a lot from what we had previously ... now with the war to some extent we have witnessed some kind of distribution to different states, localities, and rural areas." –P9*

*"First, you need to do your homework on what exactly you want from them, then each gap is addressed in a different way." –P3*

Participants recommended that in addition to providing appropriate financial compensations, a conducive and safe environment for providers to work and live is important as well.

*"Retain them with, of course, good incentives but also a good working environment... Yes, good incentive is one thing, but good environments mean good living conditions for them, the working environment should be made humane for them to be able to survive." –P11*

Some participants considered the forced redistribution of HRH as a result of the current conflict as a potential benefit to the health system. Post-conflict, participants felt that one priority might be to incentivize the currently distributed HRH to continue providing services in the underserved areas they are currently working in. Participants felt that appropriate incentives could include supervision, sufficient salary, and overall development within the system.

*"It is a good thing, although it is bad that it happened because of war, but it is a good thing that you have this vast distribution of different expertise along different states making accessibility to service for those who were underserved way better. But we need to make use of that by retaining them."*

*"it is not just about financial incentives, no financial incentives are important, very important ... they must have some sort of supervision, training, and not just training but for specific self-actualization, this person feeling they are part of the aspiration to be able to build their capacity, to learn, to grow." –P11*

In addition, providing adequate technical support and heavily investing in local capacity were viewed as strategies that could encourage the retention of HRH in current local and state levels.

*".. we have to think about is how to retain them and address their needs beginning with their distribution on healthcare facilities for their internship... and supervision, training"–P9*

*"it's not just about repatriating people it's about building the local capacities that exist and at the same time to be able to integrate" –P11*

However, other participants advised that there is a difference between forcibly displaced and redistributed health workers, and that this difference is important when considering long-term resettlement. One participant noted that it is too early to clearly determine displaced healthcare provider preferences for staying in their new locations or returning to their original states.

*“This is my problem; I don’t think a redistribution happened I believe it is forced displacement there is a difference. It is not just it is not voluntary; it is not systematic in any way that you can easily formalize.” –P11*

## Discussion

The study’s results show that transitional period’s political context significantly influenced all of the health system building blocks. Healthcare financing was characterized by inefficient use of resources which was linked to the fragility, underdevelopment, and limited capacity of the national systems. Additionally, the system failed to adequately retain essential workforce and massive brain drain was underway. The recommendations for leadership and governance focused on strengthening coordination and ensuring peace and political stability. In healthcare financing, the need to adopt sustainable financing modalities was highlighted, and for HRH proper incentivization was emphasized as the key solution to retain and equitably redistribute HRH.

The examination of the leadership and governance health system building block directly linked the leadership component with the political atmosphere of the country. The current conflict has weakened the already fragile health system’s governance structures and created a vacuum in authority and dysfunctional decision-making modalities.

Effective coordination mechanisms has long been an ongoing discussion in Sudan, considering its context of protracted crises necessitating diverse actors in the health sector and across states<sup>16</sup>. Considering the negative impact of the war on different aspects of the health system, coordination and aid effectiveness should be approached by revising previous successful models and adjusting them based on the dynamic context. Furthermore, valuable lessons can be learned from countries that emerged from conflicts. For example, in Mozambique, even though the contextual circumstances played in favor of the Ministry of Health to plan the reconstruction before the stop of the hostilities, significant hurdles faced the system reform process. It faced challenges in directing the reconstruction efforts and mainstreaming the government’s priorities over the donors’ influence on the NGOs that flooded the country post the conflict<sup>17</sup>. And while Mozambique was at that time further along the health system rehabilitation process, the ministry of health achieved several milestones in governance such as mobilizing resources for technical assistance to build the national capacity and promoting mutual

accountability by establishing coordination mechanisms to align the work of the different partners with the national priorities, and then proceeded to sponsor a code of conduct to govern stakeholders in the health sector. Unfortunately, implementation gaps, such as resistance of development partners to commit to aid harmonization principles, and weakness of the health system's leadership to make decisions on recommendations persisted<sup>18</sup>.

In the Rwandan context, the government took a leadership role in the development of the health sector, after the 1994 ethnic genocide. It aligned the 2005 national health sector strategic plan with the Economic Development and Poverty Reduction Strategy of the Rwandan government<sup>19</sup>. It then proceeded to make significant reforms to improve the overall quality of healthcare. In the area of donor coordination and ownership, it focused on aid effectiveness and sustainability by collating all donors' funds for development into one framework. It promoted transparency by establishing a high-level forum as a monitoring mechanism and annually engaged development partners in an inclusive dialogue of future plans, achievements and failures<sup>20</sup>.

The Sudanese civil society has historically been involved in leading political change and contributing to establishing peace and the provision of basic services<sup>21</sup>. An effective engagement of civil society actors in the health system as a whole has the potential to address deeply rooted structural issues in the health sector in Sudan, such as holding public officials and institutions accountable to their role and mandate. Accountability is considered an intrinsic aspect of the governance role in the health system, particularly in the context of an open political atmosphere and with an increase in funds allocated in case peace is established and Sudan is re-integrated into the international community. There will be an increase in the demand to produce results and manage performance with transparency.

The discussion on how to approach the reconstruction of the health system led to an exploration of its current structure in regards to centralization vs. decentralization, another issue that was repeatedly discussed in the health sector and few attempts were made to achieve progress<sup>22,23</sup>. The current health system in Sudan is decentralized into three levels of management, the Federal Ministry of Health being responsible for setting the national priorities, strategic plans, monitoring and evaluation, and overall supervision. The state ministry of health is in turn responsible for regulating the state's national plans, policies and strategies, in line with federal guidelines. Lastly, the Local Health Authority (LHA) is tasked with the implementation of the national/state policies and plans, and provision of healthcare services<sup>22</sup>. This decentralization wasn't accompanied with proper implementation and resources allocation to the lower levels. As LHA are tasked with implementation, supervision, and surveillance, all of which it had limited resources, capacity, and power to execute<sup>15</sup>. The current decentralization on policy papers but centralization in practice should be approached through contextualization based on the healthcare function. Examples are given such as EPI functions, management of primary healthcare services, in contrast to resources mobilization, especially HRH because of the

historically extractive nature of centralizing resources in Khartoum, on the federal level of the ministry of health.

Regarding financing building block of the health system, the study generated recommendations to explore innovative and sustainable financial models. However, for this to be achieved significant support and flexibility in funding modalities by the international community is encouraged considering the current economic crisis in Sudan and predicting that even in a ceasefire and a peace context, national resources will be initially directed towards security. Therefore, in addition to gradually increasing the public funding to the healthcare system, actionable support must be provided from the side of the international community. Sudan can further learn and adapt from the Rwandan financing model which is a community-based health insurance scheme to improve accessibility to and affordability of healthcare services. It enhanced the quality of health services by gradually scaling up performance-based pay for health workers, further cementing principles of good governance and accountability<sup>20</sup>.

Because Sudan's healthcare system is heavily dependent on aid and international donors' funds and inefficiency is a recurrent theme, the current model of social health insurance might undergo reform with clear demarcation of roles and responsibilities. Balance could be struck in mobilizing and allocating funds based on specific strategic priorities to ensure sustainability in implementation and funds management. Along with ensuring effective coordination with the different stakeholders to agree on which particular functions and authorities are to be relegated to the state and local levels in contrast to those to remain under centralized control.

Historically, the health system in Sudan was financed through a mix of public, private, and international donors funding schemes. The government disperses public funds through Ministries of Health on both the federal and state level, the NHIF, and few other public insurance schemes. The private sector expenditure is estimated at 73.14%, with out of pocket expenditure at 70%, resulting in the increase of the percentage of households impoverished due to out of pocket expenditure on health<sup>24</sup>.

Finally, regarding healthcare workforce, the study's results align with the expansive literature previously published on Sudan's imbalanced system that struggles with a shortage in personnel<sup>24</sup>. It falls behind on WHO recommendations of at least 4.5 health workers per 1,000 population; as it has been estimated that there is one skilled health worker per 1,000 population, 0.2 physicians and 0.3 nurses per 1,000 population, respectively<sup>25</sup>. This shortage is driven by poor governance of the healthcare workforce, inadequate retention, poor remuneration, lack of professional and career development opportunities, resulting in the high turnover, brain drain and immigration of health professionals to the regional and international labor market<sup>15</sup>. Similarly, in Mozambique, the huge salary differentials between Ministry of Health and donors/INGOs created a significant brain drain of the health workers<sup>17</sup>.

Considering potential solutions to retain HRH is further complicated by the current conflict that resulted in the diverse workforce of the health system to face multiple logistical challenges, such as inaccessibility to health facilities and acute shortage in the availability of medical supply, and fear of targeted attacks. The latter aligns with a study conducted by the International Committee of the Red Cross in sixteen countries, healthcare workers are under direct threat of violent events such as killing, wounding and kidnappings, and in danger of being targeted during conflicts<sup>26</sup>.

This study had several limitations, including the limited generalizability of its results, considering it explores a specific context during a specific political time period. However, the general overarching recommendations might be applied to similar contexts emerging from armed conflicts in regards to approaching the rehabilitation of the health system. Another limitation is the skewed sample towards certain attitudes with underrepresentation from the broader public of healthcare workers as the majority of participants were either current or previous leaders in Sudan's health system. There is also a potential of recall bias as a result of the war, in addition to recommendations being contextualized in the current state of destruction. It is worth noting that the participants shared their perception and what I believe their true feelings of both time periods, with the war context and damage heavily influencing their responses. Additionally, the volatile and dynamic nature of the war in the country makes it hard to generate concrete and actionable recommendations, particularly in regards to HRH and health financing.

In conclusion, the current collapse of Sudan's health system on so many fronts necessitates starting to explore salvaging what remains functioning and strategically plan to reconstruct and rehabilitate the most pressing priorities. This is not only important to save current lives being lost to lack of access to essential health services, but also to ensure future policy directions are rooted in learning from past experiences and guided by recommendation in specific building blocks of the health system. This analysis provides information to help set the tone for a sustainable peace and shifting the rehabilitation of the health system beyond the short-sighted continuation of the humanitarian healthcare services delivery modality adopted during the conflict, and towards the development of a functional and resilient health system.

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## Appendix

Figure 2: example of codes

<b>Code Name</b>	<b>Category</b>	<b>Code Description</b>	<b>Inclusion/Exclusion Criteria</b>
Leadership	Challenges	This code describes the challenges faced by the ministry's leadership	When the participants specifically explore leadership challenges
Limited staff	Challenges	This code is used to describe limitations in the number of HRH	when scarcity of HRH as personnel is referenced
International community support	Opportunities	This code is utilized to highlight the international community's engagement and support to Sudan	When the role of the international community is mentioned by the participants
Accountability and transparency	Influencing factors	This code is used to describe the influence of the lack of accountability and/or transparency on the health sector	When accountability/ transparency/ good governance are referenced by the participants
Addressing implementation	Recommendations	This code describes how implementation can be approached and enhanced.	When participants address implementation barriers and give suggestions for overcoming them.
Retention challenges	HRH	This code describes challenges faced in retaining HCW.	When participants explore factors impacting the retention of HCW in the public system.

Figure 3: Sudan's Health System Management structure

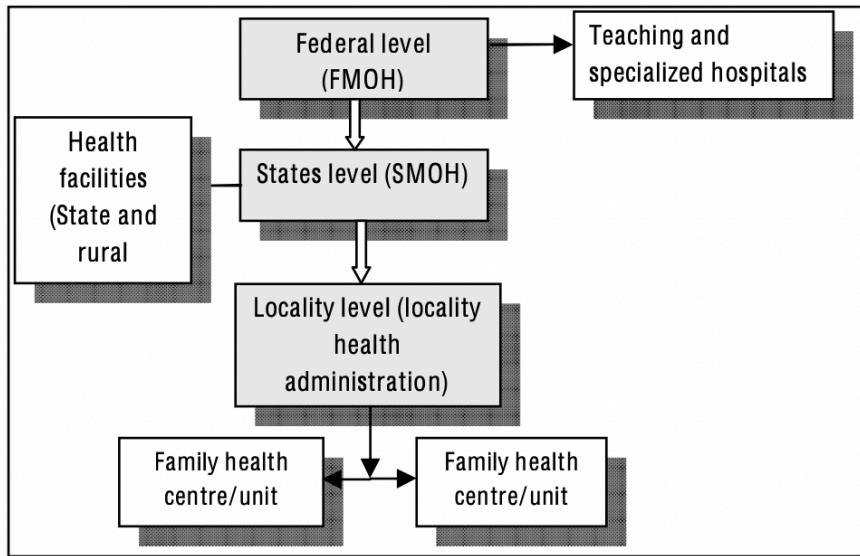


Figure 4: A table showing post-conflict recommendations for the health system based on the building blocks.

Building Block	Recommendations
Leadership & governance	Peace, political stability, and coordination
Healthcare financing	Allocation of public funding to the HS and efficiency
Healthcare workforce	Local capacity-building and proper incentivization

Figure 5: Examples of questions from the interview guide

Building block	Questions
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Leadership and governance	<p><b>During the transitional period</b></p> <ol style="list-style-type: none"><li>1. What were the opportunities and challenges that faced the development of a national health policy and strategic plan<ol style="list-style-type: none"><li>a. In what ways do you think the political context of the transitional period influenced (facilitated/hindered) the governance of the health sector.</li><li>b. Aside to that, what factors do you think influenced the ownership of the ministry in pushing for aid effectiveness and governing donor coordination</li></ol></li><li>2. <b>Recommendations</b><ol style="list-style-type: none"><li>a. How do you think the HDPNx can be utilized in the context of Sudan to guide the system's rehabilitation</li><li>b. What are your recommendations for strengthening the ministry's governance in the post-conflict period?</li><li>c. How do you think the centralization vs decentralization of the health system should look like post the war</li></ol></li><li>3. Corruption tracking:<ol style="list-style-type: none"><li>a. <b>Recommendations:</b> what conditions and actions you believe are necessary to ensure the implementation of an anti-corruption tracking platform in the post-conflict context in the health sector</li></ol></li><li>4. CSOs<ol style="list-style-type: none"><li>a. What are your thoughts on the engagement and the role of civil society during the transitional period. What are your <b>recommendations</b> for post-conflict engagement.</li></ol></li></ol>
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