

Designing and Implementing Health System Strengthening Intervention Using Performance Score Card; the Effect on Health Service Delivery in Tanzania, a Study Protocol

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Abstract: *Introduction:* Sustainable development goals (SDGs) need to be achieved by Low and Middle Income countries in order to achieve the Universal Health Care (UHC). The strategies and interventions to achieve UHC need to be robust and effective for health system to work optimally. Simiyu Region (Health department) designed a health system strengthening (HSS) intervention which uses a continuous quality improvement (CQI) approach to address health system challenges. The designed HSS intervention had a major focus on improving health system performance using governance and leadership health system pillar as a lever. *Methods:* This is a prospective observational study implemented along with national essential health intervention packages. The governance priority areas included formulation of performance measurement/score card tool with 34 indicators and 87 operational standards comprised of structural, processes and outcome indicators. Governance domains are; supportive supervision, data quality assessment, monthly and quarterly data review meetings, star rating assessment, health facility governance committee meetings, medicine and drug audit and so forth. Performance measurement was done in all six councils quarterly to ensure intervention institutionalization and improved indicators performance. *Data collection:* *Quantitative data:* Data collection tools for the intervention will be developed according to the objectives, research questions and outcomes and outputs from this intervention. Routine data collection tools of Ministry of Health will be used to collect data outcome data of service delivery. Observational data of governance performance are collected using the generated performance measurement tool. *Qualitative data:* Will be collected using in-depth interviews and focus group discussions with regional and council management teams, health care staff, HMTs and council leaders. The interview will explore program acceptability, drivers and barriers towards its implementation of this intervention. *Data analysis:* *Quantitative data* will be analyzed using appropriate statistical software and data are presented in tables, charts and frequencies. Statistical significance test for association of independent and dependent variables will be performed accordingly. Qualitative data will be analysed by using Ground theory where the contents analysis will be performed after the data being transcribed verbatim. *Discussion:* Leadership and governance is critical cross-cutting pillar for HSS. Routine performance measurement using validated tool is important to monitor the strengths and weaknesses of governance structures and health system performance with end results of health system responsiveness and

resilient. *Conclusion:* HSS interventions with CQI involving leadership and governance are indispensable in restricted resource countries for achieving large ends with restricted resources.

Keywords: Health System Strengthening, Performance Management Contract, Score Card, Leadership, Governance, Outcome, Continuous Quality Improvement

1. Introduction

Sustainable development goals (SDGs) and Universal Health Coverage (UHC) need to be achieved by resource constrained countries. Both need to be addressed by robust and resilient health system interventions [1-3]. National and subnational levels of health sector in LMICs shall institutionalize continuous quality improvement (CQI) interventions which would ultimately strengthen health system with end results of delivering the intended results [4]. Tanzania is among the resource constrained country and the health system is still facing the challenge of being inadequately responsive and resilient to demand side.

This call for effective programs with health system strengthening elements that would provide evidences for decision makers to scale, promote innovations and sustain programs for the best values from the resources [3, 5]. On the other side; because of limited budget allocation to health sector from the lower income countries (LICs), interventions related to health system strengthening are given less attention. This systemic oversight have resulted in inequitable and inequalities among population groups of rural vis a vis urban, high income and low income profile population with difference in accessing health services [6]. Objective goals in most of LMICs are tied up by pre-defined targets and indicators and an oversight of including health system strengthening ingredients in health programs are usual findings [7, 8]. Empirical evidences from researchers have highlighted evidences of delivering health interventions under weak health system and less effort towards investing on interventions that are likely to strengthen health system [2]. Reasons for this varies from country to country but common ones include verticalization of programs particularly HIV/AIDS, Malaria, Tuberculosis, Immunization and Vaccination programs, maternal and child health interventions. Other reasons are organizational and institutional bottlenecks such as; inadequate institutional capacity to manage health system, inadequate budget allocation to execute interventions that are likely to improve health system performance and inconsistency monitoring and evaluation of programs –both medium term and end program evaluations. However, the knowledge towards health system strengthening has been in a hot subject of understanding among the stakeholders not only from Low Income Countries but even in developed countries [9, 10]. The common understanding and consensus for health system strengthening have been in un-ending discussion among scholars. Sophie et al., in her article described the key elements of scope of intervention to be able to effect positively across building blocks (address more than one health problem), an intervention to be able to cut across levels of health systems;

lastly such an intervention need to be sustained for a long period of time; but of most important being able to impact positively on health outcomes, equity, financial risk protection and being responsive to both demands and supplies [10, 11]. This concept continue to emphasis that, when we develop or design a program health system strengthening that targets single health system and does not cover all systems, an oversight to its effect is critical for it to be called health system strengthening program [11]. Most of vertical programs that are donor funded come with names of ‘health system strengthening (HSS)’ intervention; but in reality they are not since most of them are not qualifying the explained attributes of HSS.

HSS intervention involves working through all six (6) health system building blocks namely Human Resource, Leadership and Governance, Health Information systems, Commodities and technology, Health Service delivery and Health Financing [12, 13]. However, there are other ongoing discussion about adopting community health system to accommodate issues of community involvement and engagement from the designing, planning and implementation of health interventions for resilient and sustainable health interventions [14, 15]. Of most important, when designing HSS intervention we shall consider contextual issues of community governance system and local needs as well [10, 14]. In Tanzania; HSS intervention is designed in Simiyu region and it is explained in details hereforth.

1.1. Designing of Health System Strengthening (HSS) Intervention in Simiyu Region

Simiyu region is located in North–East of Tanzania and administratively it is divided into six (6) councils and total population is estimated to be 2.2 million. Number of health care facilities is 236; ranging from 206 dispensaries (lowest level of health care pyramid), 21 health centers, 8 district hospitals and 1 regional referral hospital. The region through regional health management team (RHMT) under health department unit designed a HSS intervention using leadership and governance building block as a critical pillar of health system to effect performance of other building blocks of World Health Organization building blocks. The intervention formulated governance domains (with indicators and standards) in each health system building block to enhance stewardship, monitoring and evaluation for better results. Performance management contract approach using score card tool was introduced to enhance accountability and responsibility for health and non-health leaders within the government health system of Simiyu Region. Health system performance evaluation using the designed score card is done quarterly at the level of council health management team and

facility level and results are shared with regional and district officials for appraisal. Plans for future improvement in areas with weaknesses are developed by each district based on their performance. Therefore, this pragmatic approach is systematically documented for the future evaluation of the intervention and informed policy decisions. It will also contribute to the body of knowledge towards drivers and barriers of HSS interventions particularly in restricted resource settings.

1.2. Description of HSS Based on Health System Building Blocks

1.2.1. Leadership and Governance

This is the critical and cross-cutting health system building block with spillover effect to other health system building blocks as well as health system performance. Government policies, reforms and their implementation are guided by this pillar. Good governance have been mentioned in number of literatures as a core component of this pillar and guide health sector reform processes for improving quality and access to health care services and achieve large ends with minimal resources. It is therefore important to develop and provide guidelines and standards that are sound evidence to enable routine monitoring, self-orientation, self-assessment and supervision [13, 16]. Some activities that are implemented under this pillar includes but not limited to community engagement and participation, ensuring the functionality of health sector governance structures such as health sector/facility advisory committees, processes and political harmonization. Others include health system performance management, leadership capacity development, coaching and mentoring, teamwork building and lessons learning and sharing among stakeholders for improving quality of health service delivery, management competency and staff motivation [3, 10, 13, 17]. Leadership and governance also promote intersectoral collaboration and efficient use of resources by effective use of research and development to inform political and policy decisions.

Leaders in health system have the roles of providing or contributing to development of strategic policy framework, combined with effective oversight, coalition building, regulations, attention to system designs and accountability [2, 18]. On the other hand, the pillar consists of clinical aspect of governance which involves caring for patients, managing clinical practices and administration to ensure we get desired outcomes [4]. In this aspect, leaders at regional, districts and health facility levels are required to ensure the implementation of all aspects that enhance governance and accountability towards provision of care. The actions and activities include;

1. Monthly and quarterly meetings discussing health system performances at health facilities (monthly), districts (monthly and quarterly) and regional levels (quarterly).
2. Ensure the live tenure and quarterly meetings of council health service boards (CHSB) and health facility governing committees (HFGCs) with detailed agenda that accommodate all health system. This is believed to

increase community participation, transparency, accountability and decision making of health related issues at local community.

3. Conducting bi-annual star rating performances of health facilities; the national standard prescribed that; health facilities shall have stars of 3 to 5. Health facilities with minimum number of star ratings will have good performances of health system and quality of care as compared to those with stars 2 and below.
4. Conducting quarterly general supportive supervision (SS) of health system performances. The SS reports will include detailed report that might inform management to do decisions on the issues observed and plan for future improvement. The supervision also includes measuring and evaluation of health system performances using the score card tool.
5. Through patient-centered approach, health management teams at both health facility and councils will conduct community score card and client satisfaction surveys to gather the community views on the aspects of health care delivery systems.
6. Matters related to annual budget planning and reporting systems at all levels.

1.2.2. Health Workforce

Human resource for health is the key component of health system building blocks and virtually any interventions that addressing human resource for health are directly related to the strengthening of health systems [19, 20]. If the health workforce is capacitated to effectively implement the activities and interventions that are related to HSS, eventually the health system performance and services outputs and outcomes will be improved. Interventions related to institutional capacity development and human capacity building is important for sustaining the gains of health sector. Such interventions and activities may include but not limited to implement the described incentives and statutory benefits (financial, educational, regulatory or governance) and retention packages to human resources particularly those working in underserved areas [10]. Others include task shifting and involvement of nonformal cadres of health workers (community health workers) to help the crisis of shortage of health staff especially for tasks that are not highly specialized [15, 19]. Human resource for health management outcomes such as staff attrition, personnel productivity, national targets achievement, institutional capacity development and so forth have to be systematically monitored formatively to inform the health systems challenges and bridge them [17]. Governance of human resources for health (HRH) is more critical as it enhance resilience of health systems. Regular supportive supervision accompanied with health performance management mechanisms such as health system assessment; certification and accreditation systems can improve quality of health care services and increase job satisfaction among stretched health care workers [19, 21]. Institutional performance management in the domain of human resource for health will usually look on activities such

as institutional training need assessment for short, medium and long term trainings; management of human resource for health information system, human resource for health performance management systems including issues of staff productivity et cetera; all these intervention and activities when done regularly, systematically improve quality and quantity of health service delivery [17, 22]. It is also important to conduct regular staff satisfaction survey to look on staff working atmosphere and environment that help the management to evaluate drivers and barriers of staff productivity [7, 8]. Such surveys would also unfold the challenges and opportunities that can be improved among the health workforce by planning interventions that are context specific [23].

Good working environment and atmosphere for health staff is important ingredient for them to deliver the desired results. It is therefore important to understand the different skills and capacity needed among health workforce and assess the situation to enable the institution to capacitate their health workforce for improving productivity [21, 24]. Therefore, CQI on HSS intervention on human resource for health involving the actions and activities such as;

1. Regular updating of Human Resource for Health Management Information System (HRHIS). The updated HRHIS will inform management different status of HRH and take actions accordingly. The actions might include need for training, staff productivity, staffing workload, staff attrition rate, retirement and plan for succession and so forth.
2. Human Resource for Health capacity building and development plan; this is usually updated quarterly according to health facility assessment and performance of health systems. During supportive supervisions and assessments, different human resources for gaps are identified and need to be planned to fill the gaps [25]. Plans might include on the job training, mid and long term trainings et cetera.
3. Availability of incentive and appraisal system pertaining to health system performance. This is critical to inform budgetary processes and fund allocations. However, disciplinary measures for staff that is negligent and cause health hazards to patients and other health system are also liable to be accountable for their actions and effected consequences [13, 26].

1.2.3. Health Financing

Monitoring and evaluation of budgetary, funding and expenditure mechanisms are important to achieve desired outputs and outcomes. Most of LMICs have restricted health system budgetary allocations and hence realizations of the health system performance are inadequate. The tradeoff of funding options and choosing cost-effectiveness interventions to these countries have been in vain due to lack of financial freedom [27]. Several initiatives regarding health financing building block particularly on resource mobilization, purchasing of health services inputs, tracking spending and others need to be systematically governed and evaluated.

Health outputs and outcomes related to strengthening health financing building block are directly related to the improvement of health systems outcomes including increasing life expectancy, reduction of maternal and neonatal mortality and morbidity, enhancing health equity, improve availability of health commodities and supplies as well staff motivation and retention [10].

The health system inputs have to be financed adequately and timely for them to be responsive to the other health system pillar and population needs. It has been realized that adequate and optimal financing remained to be a challenge in restricted resource settings including Tanzania. However, health system strengthening mechanisms related to health financing and resource mobilization need to be deployed to maximize the health gains under restricted resources. At the implementation levels like regions, councils and health facilities, we receive funds through user fees charges from clients and national general budget (that include domestic funds from taxes and international aids from donor countries). Consolidated plans which include objectives, targets and activities to be executed against the allocated funds are submitted at central level during each financial year. Thus, for the region, councils and health facilities to maximize the gains, the following actions and activities are carried out, monitored and evaluated in HSS intervention;

1. Improve and increase oversight to council and facility own funds collections through installation and use of Government of Tanzania Health Management Information System (GoTHOMIS). The system increases financial transparency and patient records tracking but also reduces paper works [28].
2. Creation of council tasks force with prescribed terms of reference (TORs) for governing all the actions and tasks related to financial management.
3. Enforce use of government facility financial and accounting systems (FFARS) and ensure all the information including financial reports are presented accordingly and used for daily decision making.
4. Ensure availability of quarterly financial and technical reports from Plan Rep and FFARS. This task is enhanced by accountant assistants who will help carrying over financial and accounting system and prepare required reports, both financial and technical.
5. Strengthen and improve health services available and expand new ones for them to be attractive to users and consumed with returns of financial resources.

1.2.4. Health Management Information System (HMIS)

All health information that are necessary for decision making are routinely collected through this pillar notably routine health service delivery data, incidence reports et cetera. The culture of timeliness, completeness and accurate data entry, data analysis and data use for decision making must be emphasized in all health system. This building block involves gathering, storing, analyzing, disseminating and use of data for decision making. The following activities of HMIS building block were closely monitored and periodically

evaluated to improve data use for decision making;

1. Conducting Data Quality Assessment (DQA) at health facilities in quarterly basis. Quality data provide an insight on the performance of health system and enhance effective decisions for improvement or making choices.
2. Conducting monthly data review meeting at council and health facility levels. Health facilities will discuss the data generated in the specified period if are in conformity with quality of data, targets have been attained, actions to bridge the gaps have been generated et cetera.
3. CHMTs will discuss the data that have been entered into District Health Management Information System (DHIS).
4. Data visualization is also important for both internal and external clients to see the performance of that facility in the specific period.
5. Enhance the local data use for informed decision making regarding health services provision.

1.2.5. Health Commodities and Technology

The output of health system building blocks cannot be accomplished without availability of health commodities, equipment and supplies. Any interruption with health system supply chain is liable to weaken the health system particularly the whole chain of service delivery. In Tanzania we have number of interventions that are implemented along the health commodities and technology building block; such like supply chain systems re-designs, health commodities bottom-up quantification approaches –the approach used for annual estimate of health commodities et cetera. Others include continuous quality improvement (CQI) approaches for supply chain such as IMPACT and drug and medicine audit. The effectiveness and efficiency to supply chain, access to care and improved health outcomes at large need to be evaluated while implementing these activities. However, activities and interventions for health commodity and technology will mostly involve the efforts to ensure availability of medicines, equipment and supplies. With this regard, health system strengthening activities for this pillar involve; financing activities such as efforts to increasing budget for supply chain, developing guideline and standard operating procedures for health commodities audit and tracking, developing guidelines for rational use and prescription and so forth. Other activities includes development of hospital formulary and adherence to national standard treatment guidelines, development of electronic system to timely tracking the information regarding the supply chain data for decision making among prescribers.

The tasks and activities that are implemented in HSS intervention are prescribed below;

1. Opening of pharmacy or drug outlets shops at high volume facilities to start with at district hospitals and health centers that are providing Comprehensive emergency maternal obstetric and neonatal care services (CeMONC). The government issued the circular to the local government with such an instruction; and the main

objective being, firstly; reducing the frequent medicines and supplies stock out at those facilities. The second objectives is to strengthen the revenue collections at health facility level and lastly to ensure the population are served with the best quality of medicine and other medical supplies from the hands of government facilities [28] instead of getting medicines from private drugs outlet at the moment of stock out at government health facilities.

2. To undertake quarterly medicine and drug audit at health facilities according to the instruction from the central government. This had to be a regular practice of drugs and supplies audit because all health commodities have to be accounted for whether they have used accordingly or otherwise. The process include rigor scrutiny of health commodity documents including ledger books, store ledgers, dispensing registers, bincards, records from monthly stock taking; to mention but a few. It also includes financial accountability for funds that have been spent in purchasing such commodities in the said period [22, 29].
3. To strengthen the practices of IMPACT approach. IMPACT is the acronym of ‘Information Mobilized for Performance Analysis and Continuous Transformation’ and it is being used as one of the scientific approach of quality improvement mechanisms of strengthening the supply chain of the health commodities. The approach has to be practiced by the health facilities each month when discussing health commodities at facility level [29]. IMPACT has terms of references (TORs) that guide health facility staff to carry out discussion and scrutiny of health supply chain systematically. The best practices if available have to be documented and sustained; on the other side when challenges are encountered, the facility have to plan for actions to be taken in plan –do- study-act cycle (PDSA) and this have to be repeated every month at facility level and quarterly at CHMTs [22, 29, 30].
4. Strengthen the availability and use of safe anesthesia by using Universal Anesthetic Machine (UAM) and DDAs at all health centers providing CeMONC as well as district hospitals. The objective of this enforcement through health system management score card was to adhere to the guideline for conducting safe surgery and ensure the use of these machines and drugs after observation that they were not used along with provision of CeMONC services [31]. In most cases of practices, surgeries at primary health care have been conducted by using partial anesthesia drugs including ketamine as drug for general anesthesia; this has impacted many unhealthy consequences to patients including pain during procedures and sudden shock. Never the less, post-surgical pain management have been mostly using non steroids anti- inflammatory drugs such as diclofenac injectable and occasionally tramadol (opioids) which do not give comfort to patients after surgery. The use of DDAs which are recommended to be used post –surgery are hardly not available and used.

Government of Tanzania procured UAM to almost all CeMONC facilities and hospitals but hardly these machines are not used because of lack of skills to use these machines. Where skills are available; there are lacking supplies and drugs for making these machines functioning. All these challenges compounded to unsafe surgery and maternal and perinatal mortalities are happened systematically secondly to system maldeficiency irrespective of health technology advancement [29, 31].

5. Enforce quarterly check and conducting planned preventive maintenance of medical equipment (PPM). In most of the situation, health facilities are equipped with number of medical equipment and machines that need routine check and preventive maintenance. In most of cases, medical equipment is not listed for being followed up regularly to ensure they are functioning accordingly.

1.2.6. Health Services Delivery

Health Service Delivery (HSD) building block will include activities and interventions of improving organization systems. Demand creation activities are currently embedded in this building block in order for the system to effectively delivery health care services and being responsive to the community needs. In Tanzania, HSD is accomplished through public health facilities which consist of 72%, Faith Based Organizations' health facilities consist of 18% and private health facilities which consist of 10%.

In order to achieve the Universal Health Coverage (UHI) and accomplish the sustainable development goals by 2030, HSD strengthening at primary health care services is of paramount important. Interventions such integrated community case management of childhood illness (IMCI), reaching every child for immunization and vaccination, providing respectful maternal care and resuscitation for newborns are believed to be effective to those subgroup who are vulnerable to mortality in poor resource settings. HSD interventions that integrating community initiatives with community health workers are will strengthen health system and create demand and improve access to care [15]. Service integration interventions usually involve multiple building blocks and it can be evidenced at meso level and micro level [28]. The integration of such interventions when informed designed have vividly resulted to positive outcomes for example on maternal and newborn interventions have resulted to positive decline of maternal and newborn and infant mortality and morbidities [32, 33]. Another evidence of integration is experienced on the HIV intervention where HIV is mixed with other interventions such as voluntary medical male circumcision, prevention of mother to child transmission (PMTCT), tuberculosis services, non-communicable diseases et cetera. The results of inputs and all mechanisms of quality improvement, innovations and technology are finally impacted to this component as the health system output.

Tasks and actions that are planned to be done in this section are linked and interchangeably repeated to other components of health system but they might also appear here because of

the importance of this component. They are underlined below.

1. Client satisfaction survey and community score card are emphasized in this component as health services providers would like to know the perception of the clients and the community about the health care services they receive from the facilities. The beneficiaries must be given opportunity and platforms to air out their opinions, suggestions, complements and complaints about health services they receive.
2. Review of the services output and outcomes data. This activity is central to health service delivery component. The data are giving direct feedback to the providers about the coverage of their services, quality of services given, quantity of commodities if are matching with number of clients to be served, mortalities and morbidity data. It is therefore important to always strengthen this are of data quality in order to have informed decision making and improve service delivery.
3. Clinical audit is one of the components that are being looked up into the holistic chain of service delivery. Quality improvement literatures have been documented that; over 79 percent of mortalities in the world are due to clinical malpractices and the proportion is even higher (above 90%) in developing countries [7]. It is therefore important to always review health services data to see if they conform to the quality of care and standard treatment guidelines. Quality improvement mechanisms such as Maternal and Perinatal Deaths Surveillance and Review (MPDSR) are quarterly done at all levels to improve quality of reproductive and child health by reducing morbidity and mortality to the targeted group. Other quality improvement mechanisms include the use of infection prevention and control and safety (IPC-S), 5S –KAIZEN, star rating approach, to mention but a few.
4. Quarterly review of Nutrition Compact agreement score card. The score card entails following up of nutritional indicators at the region, district, wards and at community level in order to strengthen nutrition health services.
5. Social welfare services are also monitored by reviewing the data from the database and outside the databases such as minutes of coordination meetings.

1.3. Description and Contextualization of HSS Intervention in Simiyu Region

Simiyu Regional Health Management Team (RHMT) under health services, social welfare and nutrition department is currently implementing HSS intervention which was started on January 2021. The intervention is multi-perspective, collaborative and multi-disciplinary. It is looking for engaging all stakeholders for better outcomes. Its implementation comes as a result of systemic challenges and weaknesses of health system implementation that have negatively impaired to health service delivery outcomes. Health system needs to be responsive and resilient to health needs to achieve pre-defined benefits and health gains as an ultimate goal of health system

service delivery. Therefore, RHMT designed an operational tool known as '*health system strengthening score card (HSS-SC)*'; which focuses on the management, practices and evaluation of health system performance based on their context. The research is going to study on various drivers and barriers for successful functioning of health system at regional, council, facility and at community level. District/Council Health Management Teams (D/CHMTs) are health managers at the district level who have been vested with responsibilities of managing health system performance in their areas of jurisdictions. It is hypothesized that, the low rate of achieving better health outcomes is due to systemic deficiencies in routine practices of health system activities [2, 16]. It is of beneficial to monitor and evaluate routinely the effectiveness of each system towards achieving desired health outcomes [34].

The operationalization of HSS-SC intends to evaluate the capacities of institutions to deliver health services and management of health systems interventions. The tool applied the Pareto principle where by few selected aspects /activities from each health system form some standards, indicators and activities to be accomplished by CHMTs and health facilities. The standards, indicators and activities for HSS-SC were coupled with supportive supervision mechanisms coupled with mentorship, coaching and on the job training [29, 30]. The approach is a CQI mechanism that report results obtained by optimization of the resource allocation [35]. The design has advantages like; firstly, it provides a robust and local fit evaluation of health service delivery through the interconnectedness of all health system and community aspects; secondly it does not involve individual patient recruitment, rather it observe health facilities performance via health system. Health facilities and CHMTs are units of study and lastly; for ethical purpose it ensure all health facilities receive the proven beneficial intervention along with the implementation of the program. The design also gives real time opportunity for learning and improves the implementation challenges among the facilities during the quarterly data sharing meetings. This approach therefore provides equal chance of improving quality of care and outcomes.

1.4. Roles of Key Stakeholders

RHMT under Health, Social welfare and Nutrition Section at Regional Commissioners Office, is mandated for oversight and supervising the CHMTs for carrying out routine health activities intended to facilitate routine delivery of health services to the population. The CHMTs' supervisory roles to the lower level health facilities are crucial to ensure that health workforce is responsible and accountable for daily operation of service delivery to the clients. The CHMTs also has to ensure if health facilities management teams are adequately equipped with knowledge, skills, equipment and related medicines and supplies for delivering quality health services using the dispensed guidelines and standard operating procedures delivered from central level. Not only service delivery but also to oversee how other health system are

effectively managed to deliver services to community and finally achieve the final goals as stipulated in the national and subnational health sector strategic documents. The CHMTs will also inquiry the community through the community score card and client satisfaction survey to gather the community opinions about service delivery at their local health facility. The oversight and supervisions to be offered from each level need to be objectively as it has been defined in supervision guidelines [26]. However these guidelines have been too prescriptive without detailing and give insight on how health system strengthening can be leveraged from integrated supportive supervision activities conducted by health management teams from different levels [4, 30]. Effective health system management will enable health management teams and health facilities to achieve large ends with limited resources that are usually given especially in developing countries including Tanzania.

1.5. Problem Statement and Study Justification

Inadequate health management capacities amongst health management teams (HMTs) are systemic challenges as appointment of health managers do not necessarily include basic knowledge for health system management. The inadequate literacy of health managers to manage health system systematically affect their capacity for tracking, monitoring, evaluating health system output and outcomes and make an informed decisions at their working places. With this little literacy of health system strengthening and operation, national and global health targets have not been able to be achieved. This results to the vicious cycle of health burden in restricted resource countries like Tanzania. It is therefore important to implement health HSS-SC at regional, districts and facility levels to show how implementation can bring changes in terms outcomes. This study is therefore important for gathering the evidences from the grounds to inform the policy decision on the better methods of managing the health system for the aim of achieving intended results at a specified time horizon. The implementation results from health, social welfare and nutrition intervention package will show effectiveness of the approach in terms of drivers and barriers for future plan, generalizability and sustainability.

1.6. Objective

The aim of this program is to describe and implement the HSS-SC. The program will also determine its effectiveness on health services provision particularly on maternal and perinatal outcomes after the roll out in all health facilities in Simiyu Region, Tanzania.

Specific Objectives of the program

1. To document the changes in performance of health system strengthening score card national indicators in two years of implementation.
2. To document the changes in perinatal and maternal outcomes over the period of implementation.
3. To explore the perception, experiences and practices on leadership and accountability model of HSS-SC at

regional and district leaders among the key stakeholders.

4. Identify enablers and barriers as reported by key stakeholders for sustainability of HSS-SC.
5. To establish the association among the health system performance and 'three stars and above' health facilities and the others with 'two stars and below'.
6. To explore the impact of strengthening referral system communication by the use of SMS APP on reduction of maternal and perinatal deaths in Tanzania health facilities.
7. To determine the effect of implementation of IMPACT approach on the availability of medicine in Tanzania health facilities.
8. To explore the effect of enhancement of use of Universal Anesthetic Machines (UAM) and Dyfed Drug and Alcohols (DDAs) on emergency cesarean sections.

2. Methods

2.1. Study Designs

This is a prospective observational study. It is a CQI of HSS intervention; implemented in all councils of Simiyu Region along with the national health system interventions. All six [6] district councils in the region are included purposively in this intervention to improve leadership and governance of health system. The governance priority areas include but not limited to; supportive supervision, data quality assessment, monthly data review meetings, star rating assessment, health facility governance committee meetings, medicine and drug audit, et cetera. All the six councils in the region received the intervention at the same time since January 2021. However the actual implementation started on April 2021. Thirty four (34) indicators with 87 operational standards comprised of structural, processes and outcomes were adopted across all six building blocks of health system. Prospective observational data will be collected before and after introduction of the intervention for comparison. Outcomes of interest or indicators from the health facilities are continuously observed and monitored to measure the stewardship from the council health management teams (CHMTs). The before implementation data were collected in the first round of assessment as baseline health system data and operational procedures, while repeated observations and evaluation were done after every three months in a repeated plan-do-study-act (PDSA) cycle coupled with dissemination platform at regional level.

2.2. Study Sites and Study Population

The intervention is implemented at all 225 health facilities of both public and private health facilities at six councils in Simiyu Region. The health facilities include seven (7) hospitals, twenty-one (21) health centers and 197 dispensaries at which implementation of the intervention at ground level took place. District leaders such as district commissioners, district executive directors, council health management teams,

ward executive officers, village executive officers and community representative through health facility governing committee representative are all involved in implementation and stewardship of the HSS-SC.

2.3. Description of HSS-SC Intervention

RHMT conducted a rigorous review and scrutinization of health sector documents that include the national targets of the pillars of health system building blocks. The most important documents for review arise from Health Sector Strategic Plan V (HSSP V) of 2021 to 2026 [28], sustainable development goals (SDGs) and lessons from MDGs were not learnt adequately in order to fasten the achievement of post-MDGs [1, 36]. The baseline information was extracted from the national District Health Information System (DHIS). The scrutiny showed most of targets and indicators are below the national targets, including high number of maternal and perinatal mortalities and morbidities. Other findings were frequent lack of equipment, supplies and medicines from health facilities equipment, inefficient financial system, ineffective accountability and governance of health system amongst the health managers at regional, districts and facility levels and to mention but a few. The policy guidelines and standard operating procedures (SOPs) from the central government were all scrutinized in order to understand the tasks and activities to be achieved for health system pillars to work effectively. Finally the discussions and conclusion of this scrutiny highlighted issues of governance and management of health system to be the pivotal for failures and non-performance of health system within the region. Brainstorming resulted to development of series of actions that were believed to be the health system strengthening interventions/ approach. These actions are summarized below;

- i. RHMT to undertake the situational analysis and reviewing data from DHSIS2 and the actual realizations from the community perspective.
- ii. Brainstorming key activities, indicators and standards from health system pillars that are systematically influence the positive changes of the health system.
- iii. Developing the health system strengthening score card that is contextualized and being used to assess the council's health system performance.
- iv. Selection of few indicators and activities with spillover effect to the health system performance.
- v. Develop an assessment protocol.
- vi. Orientation of assessment tool to key players (CHMTs and Health facilities in charges).
- vii. Signing of contracts among the health system key actors for accountability. This involved, Regional Commissioner, Regional administrative secretary, District Commissioners (DC), District Executive Directors (DED), CHMTs, Ward Executive Officers (WEO) and Village Executive Officers (VEOs) and Health Facility in charges.
- viii. Starting implementation with the focus on performing district quarterly evaluation.
- ix. Results dissemination and action plans

development using plan-do-check-act cycle.

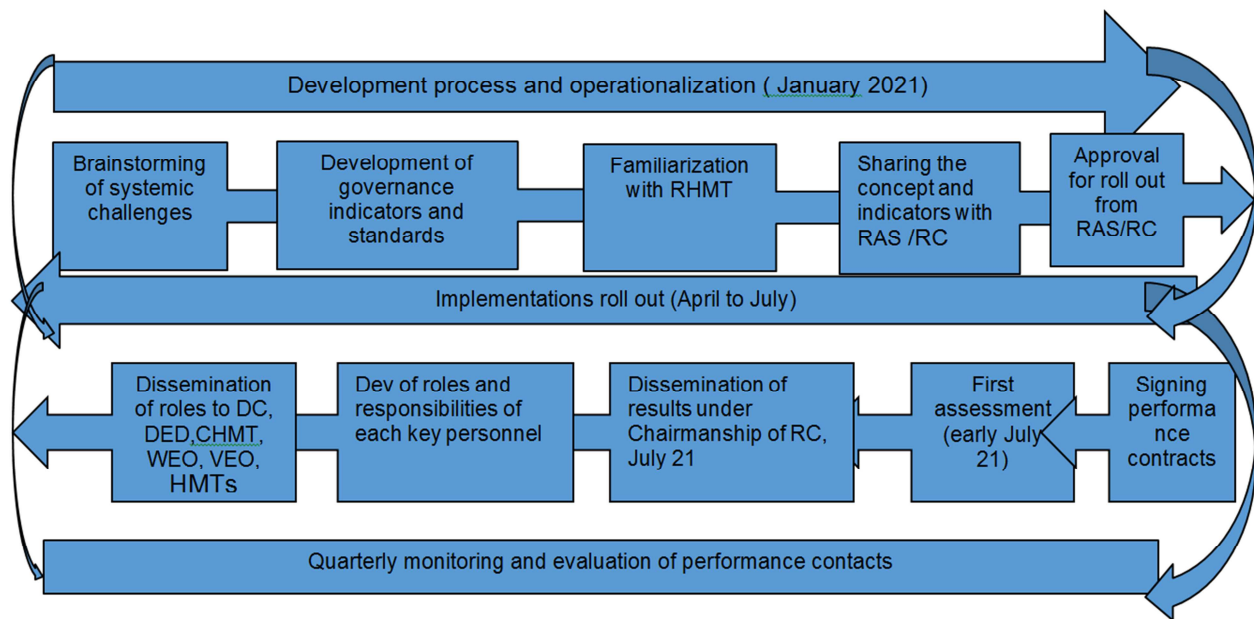


Figure 1. Critical path for designing and development of Health System Strengthening (HSS) intervention in Simiyu Region.

2.3.1. Primary Outcomes

1. Perinatal mortality (stillborn baby with no signs of life at delivery and at more than 28 weeks of gestation and neonatal deaths from 0 to 7 days).
2. Maternal mortality defined as death of pregnant women of more or equal to 28 weeks of gestation occurring due to obstetric courses.

2.3.2. Secondary Outcomes

1. Proportion of deliveries resulting in emergency caesarean sections or instrumental deliveries and managed successful
2. Proportion of neonatal morbidities (i. e., resuscitation, low Apgar score, and admission to neonatal units within 24 h after birth)
3. Proportion of health facilities with three stars (3) and above at districts
4. Proportion of emergency deliveries by caesarean sections attended by using UAM and prescribed DDAs as mode of analgesia with 24 hours after delivery
5. Healthcare workers' attitudes, perceptions and acceptability towards the HSS-SC
6. Key stakeholders' experiences and perceptions about enablers and barriers towards implementation of HSS-SC
7. Proportions of availability of health commodities (tracer medicines) for RMNCAH services
8. Proportion of pharmacy shops that have been opened and functional in Simiyu region.
9. Nutritional status for both pregnant women and children who are under-five is improved

2.4. Implementation Strategy of HSS-SC

The implementation of health system management score card is done by RHMT at Regional Administrative and Local Government Authority Office in Simiyu Region. The RHMT developed the tool that comprised of indicators, standards and activities that were ought to improve health system performance in region. The center for operationalization is the Regional commissioners' (RC) office through RHMT. The round table discussion between the regional commissioners' office and district commissioners' office together with technical health teams from the region and councils was done to reach the consensus for operationalization. Among the key stakeholders include Ward and Village Executive Officers (VEOs) with CHMTs were mandated to oversee the implementation at the lower level health facilities and review the quarterly results at the district level before the regional sharing meeting which is done under the chairmanship of the Regional Commissioner. Therefore, the stewardship include all the leaders (both health and non-health) from the regional level up to the village levels where management, accountability and governance system were backed up by signing the performance/ compact contracts which described the roles for every stakeholders at all levels. The standards are quarterly evaluated at the council level through CHMTs after verification of some of the standards from selected health facilities to observe whether they have been implemented accordingly to agreed standards and action plans. Hence; the study population involved includes council health management teams (CHMTs), health facility management teams (HMTs) and health facility staff.

The summary of tasks, actions and indicators that are included in the health system strengthening management score card (HSSMSC) in Simiyu Region are summarized below.

Table 1. Representing Health System building blocks, domains of health system building blocks and dimensions to be monitored.

SN	Health system building block	Domains of health system building blocks	dimensions /items being monitored
1	Leadership and Governance	Councils Health Service Board meetings	Tenure of the committee Agenda for discussion Timeliness Featuring of the community issues in agenda and discussion Matter arising of the previous meeting and resolutions Timeliness of meetings
		Health Facilities Monthly meeting submitted to CHMTs and attended accordingly	Format of Agenda Matters arising from previous meeting and resolutions CHMTs attended all the issues raised timely Health Facilities are visited at least quarterly Standardized tool is used for supportive supervision Findings and action plans are shared to the facilities The status of Star at all councils are known Action plans are shared CHMT have action plan to improve and maintain Stars First and Second Round scores of CCHP Quarterly Technical and Financial reports
		CHMTs supportive supervisions to the lower level facilities	
		Star Rating Initiative	
		Planning and reporting	
2	Human Resource for Health (HRH)	Human Resource for Health Information System (HRHIS)	Regular updating of council HRHIS
		Appraisal system and incentive policy	Availability of Council incentive policy for health Availability and function of appraisal system
		Capacity building and training need assessment	Availability of capacity development plan Availability and functionality of training need assessment report (revolving)
3	Health Financing	Management of own source collections /revenues	Installation of GOTHOMIS to Health Facilities Availability of resource mobilization task force Monthly meetings Availability and implemented plans Number of Households enrolled to iCHF Information filled in the IMIS Proportions of claims pushed into IMIS and successfully passed. Quarterly financial and technical reports Hospital pharmacy shops opened per council Availability of tracer medicine Medicine Auditing
		Improved Community Health Funds (iCHF)	Medical and Therapeutic committee meetings Implementation of 'IMPACT' approach Use of DDAs to the CeMONC facilities Use of Universal aesthetic machines at CeMONC health facilities Planned Preventive Maintenance Building constructions and renovations Quarterly DQA reports Action plan for improvement Timeliness
4	Health Commodities and Technology		Completeness Data visualizations Data review meetings Community score card intervention Clients satisfaction survey Complaint, complement and suggestion system Mortalities Health services data Elderly concerns
5	Health Management Information system	Data Quality Assurance (DQA)	Issues of vulnerable groups Women and child protection issues Updating of NICMS database Implementation of IPC-S approach Environment sanitation and hygiene Vaccination and immunization intervention Malaria, HIV /AIDS and TB Maternal and Newborn care Nutrition for women, adolescents and children under five years of age Review Nutritional Score card quarterly
		Health Indicators from DHIS2	
6	Health Service Delivery and Community Systems	Community Systems	
		Social Welfare Services	
		Health Promotion and IPC	
		Nutrition services	

2.5. Data Collection and Management

Quantitative data; Data collection tools for the intervention will be developed according to the objectives, outcomes and outputs from HSS-SC. Routine data management tool have been developed and is used for quarterly data collection activity along with the implementation of HSS-SC intervention. Research assistants (most of them are RHMT) have been trained to collect data, and each quarter before data collection task; they receive refresh training from the principle researcher. Quality data, data completeness and accuracy are ensured during the data collection by using two to three data collectors who must reach consensus with the CHMT and facility information. Primary data are synthesized from routine services and correction of errors and data check is done by facility staff before entering to the DHIS. CHMTs will also do data quality check in DHIS to see any error that might be unchecked at the level of facilities. Implementation data are collected prospectively from all six [6] councils and the data will be collected for the period of two years. Cross-sectional data will be collected according to the need and objectives of the specific research question and objective. Several dataset will be collected according to indicators set, items and tasks/activity agreed to be accomplished as part and parcel of the research. Example of dataset includes; RMNCAH output indicators, maternal and perinatal outcomes indicators, nutritional indicators and other process/ tasks indicators described in the research protocol.

Qualitative data

The adoption of HSSMSC will also be evaluated by collecting qualitative data through in-depth interviews and focus group discussion (FGDs) with key implementers such as CHMTs, RHMT, health care staff and HMTs. The interview and discussion will explore program acceptability, drivers and barriers towards its implementation. Data will be collected by digital recorders.

2.6. Data Analysis

The plan for data analysis will be finalized in line with study objectives, research questions and study outcomes and outputs.

Researcher assistants will assess completeness and quality of the data before further data processing. Digital recorders used to collect qualitative data will be heard repeatedly before analytic steps such as transcription. After data collection and quality check and cleaning process, they will be transferred to software such as excel software, STATA software for processing and analysed. Summary tables, graphs and charts will be processed and analysed. Statistical analysis such as Paired-t sample Test and regression analysis will be done to see any association and correlation of observed variables. The Poisson regression models will be used to estimate the differences in rates of morbidity and mortality. Qualitative thematic content data analysis methods will be used to analyze qualitative data.

3. Discussion and Conclusion

Designing and implementing a contextualized health system strengthening intervention coupled with regular supportive supervision for monitoring and evaluation of the approach is critical for retaining best practices and improving management and governance of health system. The findings that would be gathered from this study, not only would provide evidences on effectiveness of the intervention but also would inform policy and decision makers on the best approach of acceleration towards achieving Universal Health Coverage and SDGs in 2030 [1]. Experiences of practices and knowledge gathered from HSS-SC are therefore indispensable particularly in restricted resource settings like Tanzania with high burden of disease mortality and morbidity. However, the methodology limitations would further be improved in future studies of other settings.

4. Study Strengths and Limitations

4.1. Strengths

1. This is the prospective observational study design where the data collection and data quality is ensured.
2. There is a large sample size of health facilities that are involved in this research and hence we expect a high statistical power of association between dependent and independent variables.
3. Because of its multi-centric study, it guarantees generalizability in other regions in Tanzania and other countries with the same social-economic context.
4. The study would use quality and reliable data from the district health information system (DHIS) for monitoring and evaluation of the intervention.

4.2. Limitations

1. The challenge of contamination of intervention results from other incoming programs like reproductive and child health. It might be difficult to differentiate the role of the incoming program and the intervention. However this will be explained by in co-operating all the pre-defined outcomes of interest of the incoming programs and those of intervention because the major aspects of the intervention are systematic quarterly supportive supervision, monitoring and evaluation of the programs including leadership and governance aspects of the intervention.
2. The intervention has no region of comparison of outcomes which could explain the differences and contribution of intervention to other regions.

Abbreviations

CHMT: Council Health Management Team

RHMT: Regional Health Management Team

HMT: Health Management Team
 PDSA: Plan Do Study and Act
 SDGs: Sustainable Development Goals
 MDGs: Millennium Development Goals
 CQI: Continuous Quality Improvement
 IPC-S: Infection Prevention Control and Safety
 DHIS: District Health Information System
 HSSMSC: Health System Strengthening Management Score Card
 WHO: World Health Organization
 HMIS: Health Management Information System
 IMPACT: Information mobilized for Performance, Analysis and Continuous Transformation
 HSS: Health System Strengthening
 DQA: Data Quality Assessment
 CeMONC: Comprehensive Emergency Maternal Obstetrics and Newborn Care
 UAM: Universal Anesthetic Machine
 DDAs: Dyfed Drugs and Alcohol services
 TORs: Terms of References
 FFARS: Facility Financial Accounting and Reporting System
 GoTHOMIS: Government of Tanzania Hospital Management Information System
 HRH: Human Resource for Health
 HRHIS: Human Resource for Health Information System
 CHSB: Council Health Service Board
 HFGCs: Health Facility Governing Committees
 RMNCAH: Reproductive Maternal and Neonatal Care and Adolescent Health
 DED: District Executive Director
 DC: District Commissioner
 VEO: Village Executive Officer
 WEO: Ward Executive Officer
 HIV: Human Immunodeficiency Virus
 AIDS: Acquired Immuno-deficiency Syndromes

Authors' Contributions

BRM conceptualized and designed the study. BRM produced the first draft of this protocol. BRM facilitated the drafting of the ethics section, tools, and application to the National Institute for Medical Research. BRM facilitated draft, development, and finalization of illustrative figures. BRM developed the analysis plan interpretation of baseline data. BRM facilitated the conceptualization and development of the implementation plan of the project. All co-authors provided technical inputs into the protocol and study design and reviewed, contributed to drafts of the protocol and data collection, data quality and data analysis. All authors have read and approved the final version of the manuscript and have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated (to be reviewed).

Data Availability and Materials

This is a study protocol and data analysis will be presented at some stages. After data collection is completed, a pre-identified dataset may be made available upon reasonable request of the corresponding author once the study is complete.

Ethical Approval and Consent to Participate

All research activities will conform to the Declaration of Helsinki. Waiver of consent will be applied from the Ministry of Health and National Institute for Medical Research. Data collected during implementation will be used for evaluation of the CQI program of HSS-SC and will be treated with confidentiality. For the qualitative studies, only women and healthcare workers above 18 years will be recruited. Written informed consent will be obtained from both recruited women and healthcare workers who will be interviewed. All research assistants and investigators who will be involved in the evaluation of HSS-SC intervention will be trained on good clinical practice, research ethics, research integrity and confidentiality.

Consent for Publication

This is the study protocol and there is no identifying data is being presented in this manuscript therefore consent to publish is not applicable. However, in the course of using the data for publication waiver consent will be sought from the Ministry of Health and National Institute for Medical Research.

Conflict of Interests

The authors declare that they have no competing interests.

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