FACTORS THAT INFLUENCE HEALTHCARE SERVICE QUALITY IN SUDAN

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By:

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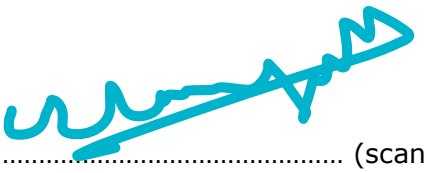
Sudan

Declaration:

Where other people's work has been used (either from a printed source, internet or any other source) this has been carefully acknowledged and referenced in accordance with departmental requirements. The thesis Factors That Influence Healthcare Service Quality in Sudan is my own work.



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LIST OF TABLES AND FIGURES:

ABBREVIATIONS

ACT: Artemesinin-based-combination therapy
EML: Essential medicines list
ER: Emergency room
FMoH: Federal ministry of health
GDP: Gross domestic product
GF: Global fund
GNI: Gross national income
HDI: Human development index
HIV: Human immunodeficiency virus
HR: Human resources
HWs: Health workers
IDPs: Internally displaced persons
LMICs: Lower-middle-income countries
MM: Maternal mortality
MDR-TB: Multi drug resistant tuberculosis
NCDs: Non communicable diseases
NGOs: Non-governmental organizations
NHIF: National health insurance fund
NHP: National health policy
NHQPS: National healthcare quality policy and strategy
NHSCC: National health sector coordination council
NMSF: National medical supplies fund
PHCs: Primary healthcare centers
SDGs: Sustainable development Goals
SMoH: State ministry of health
T.B: Tuberculosis
UHC: Universal health coverage
UNDP: United nations development program
USD: United States dollar
WHO: World health organization

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ABSTRACT

INTRODUCTION: Poor quality of healthcare services is a major challenge for the health system in Sudan. Inconsistencies in knowledge and perceptions regarding quality of care exist among both health professionals and the public. Sudan faces many health problems including a double burden of communicable and non-communicable diseases. Furthermore, indicators for maternal mortality, neonatal mortality and child mortality are very high despite ongoing efforts by the health system to increase coverage by healthcare services. Quality is important to achieve universal health coverage.

OBJECTIVE: To determine factors that influence healthcare service quality in Sudan and to provide recommendations to help in improving the quality of healthcare services.

METHODOLOGY: A literature review guided by the health systems dynamics framework by J van Olmen et al.

FINDINGS: Inequitable distribution of resources and services, Poor people in rural areas receive suboptimal care, low health literacy among the population, Poor compliance of patients with medications, Poor health infrastructure, weak governance, lack of adherence to clinical guidelines, lack of adherence to patient safety and infection control measures, medication errors, self-medication and irrational use of antibiotics, disregard for people-centeredness, Poor health financing system, weak policy implementation, and lack of regulation and supervision.

RECOMMENDATIONS: To increase government commitment towards quality of healthcare services, to strengthen the role of governance within the health system, to acknowledge the rights of patients, to increase accountability at all health system levels and to conduct research in various areas with the aim of improving quality of healthcare services.

KEYWORDS: Sudan, factors influencing, quality, healthcare

Word count: 12377

INTRODUCTION:

Quality of care is defined as: "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge". (1) Quality is an important component of service delivery. (2) To say a service is of high quality, it must be effective, safe, efficient, people-centered, equitable, timely and integrated. All these dimensions should be present at all levels of the healthcare system, for both preventative and curative services, and should be provided to everyone. (1) (2)

In line with the endorsement of the sustainable development goals (SDGs) and to achieve universal health coverage (UHC), the government of Sudan must make a strong commitment to ensuring quality at all healthcare levels.

I am a medical doctor from Khartoum, Sudan. I studied at and graduated from the University of Medical Sciences and Technology in Khartoum in 2011. Throughout my medical school training I was aware of the poor state of hospitals in Sudan, especially the public ones. People in general are aware of the bad quality of care within public hospitals; the poor physical facilities that lack in hygiene standards, waiting for a very long time to receive care, harsh treatment (in some cases), problems with diagnosis and difficulties in obtaining therapy.

When I started working as a medical doctor, I was further familiarized with the situation. Poor management, high workload, lack of equipment and supplies, lack of clear guidelines, concerns about workplace safety and security were all factors I have experienced. Sometimes items as simple as gloves were not available when needing to examine a bleeding patient in the Emergency Room (ER). Being at the interface between the healthcare system and the general public, doctors and other health workers (HWs) are often blamed for all the shortcomings that the patients and general population experience with the system.

I started working for the federal ministry of health in an area that supplies secondary and tertiary healthcare government facilities with infrastructure, equipment, specialist doctors, and trained supporting staff. Despite efforts to increase service coverage, and even though a separate directorate for quality exists within the ministry, quality of healthcare services remains a challenge for the health system in Sudan. More emphasis needs to be put on it.

By determining factors that influence quality of healthcare services within the Sudanese context, I am hoping to be able to identify gaps, problem areas and research needs, and in addition provide recommendations that can inform change.

1 BACKGROUND INFORMATION:

This chapter provides background information about Sudan. It is meant to give the reader an idea about the context in which the healthcare services are being provided.

1.1 Geography and Environment:

Sudan is a sub-Saharan country in northeast Africa. It is the third largest country in Africa with a total area of 1,861,484 km. (3) It is bordered by Egypt, Libya, Chad, Central African Republic, South Sudan, Ethiopia, Eritrea, and the Red sea in the north-east. The landscape is generally flat, with mountains in the west and the south-central parts, and hills in the east by the Red sea. The climate is a hot dry desert climate especially in the north where there is little rain fall. The amount and frequency of rainfall increases towards the south. The White Nile and the Blue Nile meet in Khartoum, the country's capital, to form the Nile river which flows north to Egypt. (4)
Environmental issues in Sudan include desertification, soil erosion, water pollution and water scarcity. (3)

1.2 Demographic Data:

Sudan has a total population of 41.8 million, distributed over 18 states. (5)The population continues to rise with an annual growth rate of 2.4%.The total fertility rate is 4.5 births per woman. (5)
The country has a young population; with 50.6% below the age of 18 years, while children under 5 represent 15.2% of the total population. (6)
It is estimated that 3.2 million of the population are internally displaced persons (IDPs), and there are over 2 million refugees from other countries including Syria and Yemen. (7) (8) Sudan is undergoing urbanization with an annual change of 3.17%. It is estimated that 34.6% of the population live in urban areas, while the remaining occupy rural areas and a small percentage are pastoral nomads. (3) Khartoum is the most populated state with a population of 5.53 million. (3)

1.3 Sociocultural Situation:

Sudan is an ethnically and culturally diverse country. The population is a mixture of Arab descendants and non-Arab groups such as the Nubians, Fur, and others. There are more than 500 tribes in Sudan and many languages are spoken, however Arabic is the official language. (9) Most of the population are Muslim with the remaining being Christians and those who follow other beliefs. (9) In terms of gender, the country faces some issues with inequality between males and females which can be reflected as disparities in education, employment, and health access, in addition to female child marriage and female genital mutilation. (10)

1.4 Socioeconomic Situation:

Total life expectancy at birth in Sudan is 65 years. The total population literacy rate is 75.9%; among males it is 83.3% and among females 68.6%. Expected years of schooling and mean years of schooling are 7.4 and 3.7 years respectively. (3)(5) Total unemployment is 13%, while total youth unemployment is 26.7%. (5) Approximately half the population lives below the poverty line; earning less than one US dollar (USD) per day. (6) Poverty rates are even higher in rural areas compared to urban areas. (6)
According to the united nation's development program (UNDP), Sudan ranks very low on the human development index (HDI), at number 167 from 189 countries. (11)

1.5 Economy:

In 2017 Sudan's gross domestic product (GDP) was 123 billion USD, as of 2019 the current GDP is 40 billion USD and gross national income (GNI) per capita is 1,560 USD. (5) A decade ago, and despite of US sanctions that were already imposed at that time, Sudan was considered one of the fastest growing economies in the world. As a result of years of civil war, secession of South Sudan (which contained 80% of Sudan's oil fields) took place in 2011 and this had major economic consequences. (12) Before the secession, the oil sector was a major contributor to GDP growth, and since then the country has struggled economically. Corruption, political instability, and ongoing conflicts in the western states of Darfur, South Kordofan state and Blue Nile state have further contributed to economic decline. (3) Despite the lifting of US sanctions in 2017, the Sudanese pound continued to drop in value and inflation rose to 43% in 2018. (13) Towards the end of 2018 the economic situation worsened to the extent where access to food, essential medicines and healthcare became very difficult. (14)

1.6 Government and Political Situation:

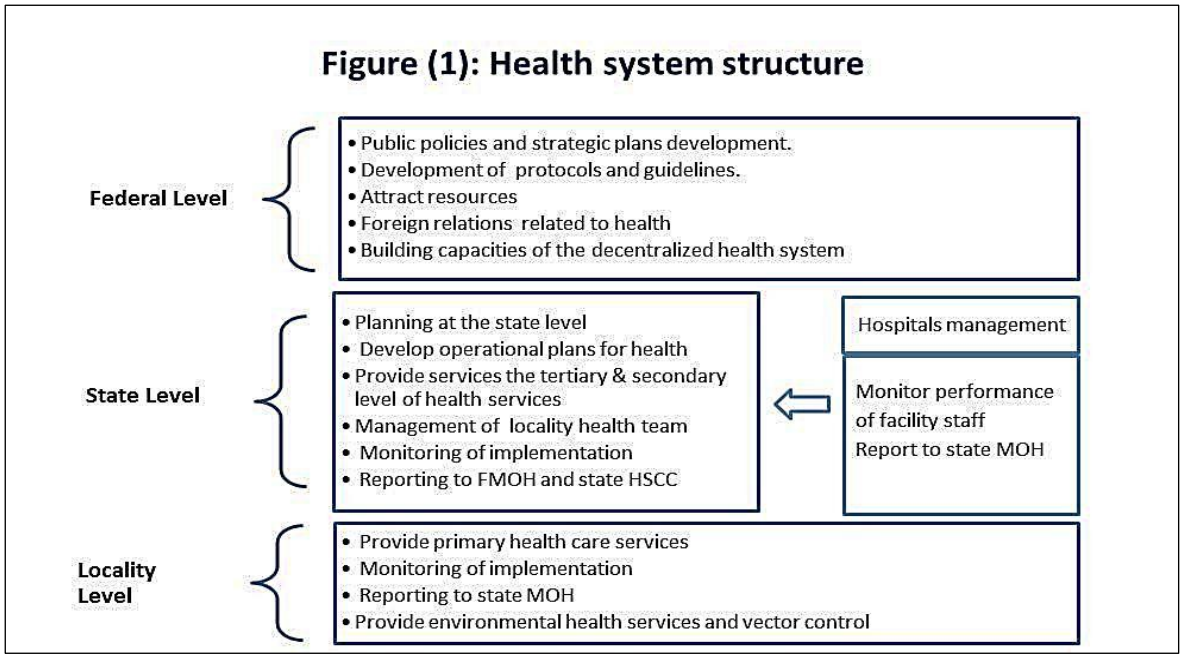
Sudan has a decentralized federal government. There are 18 states and 184 localities. The local government act (2003) and interim national constitution (2005) facilitated the devolution of authorities particularly in the areas of health, education and development to the states, and localities. (15) The country has a long history of political instability; since its independence from Britain in 1956, it has been ravished by civil war and ongoing conflict. This has resulted in the death and displacement of many in addition to difficulty to access healthcare in conflict areas. (16) The health sector has always been less of a priority and most of the government's expenditure went to the military. According to transparency international, Sudan is ranked among countries with the highest degree of corruption within the public sector, it ranks at 172. (17)

1.7 The Health System

1.7.1 Governance

The health system is tiered into 3 levels: Federal ministry of health (FMoH), state ministries of health (SMoH), and Localities. Governance functions within the health system are mainly the responsibility of the FMoH, while a national health sector coordination council (NHSCC), is responsible for overseeing policy-related processes and is the main body to which policy implementors are accountable. (6)

Despite devolution, authority is rarely exercised by the states and localities, and the federal government retains control of the budget, deciding how it's allocated between the states. (15) Lack of coordination between the 3 levels, in addition to poor management and planning has led to fragmentation and inefficiencies in implementation of health policies. Moreover, challenges with accountability and issues with transparency especially in financing, have resulted in the undermining of healthcare service quality. (6) (15)



Source: Sudan National Healthcare Quality Policy and Strategy, FMoH 2017 (18)

1.7.2 Health Finance:

Current health expenditure per capita in Sudan is 152 USD. While higher than that of Egypt (130.9 USD) and the average for sub-Saharan Africa (78 USD), it's below that of Jordan (223.5 USD) and the average for eastern Mediterranean region (556.8 USD). (19) (20) 5.6% of the country's GDP is spent on health, and the domestic general government health expenditure is 10.7% of general government expenditure (below the 15% target the government committed to as part of the Abuja declaration). (5) (6) People in Sudan are not protected from catastrophic health expenditure. (15) Considering that half the population live below the poverty line, out of pocket expenditure represents 74% of the total health expenditure. (21) Health insurance covers 37% of the population, and contributes 7% to total health expenditure. (15) Generally the health financing system is weak, resource pools are fragmented, and resource allocation is not priority driven.(15)

1.7.3 Human resources (HR):

There are 5.6 doctors per 10,000 population and 47.6 nurses per 10,000 population; these ratios vary between and within different states. (22) Unequal distribution and shortages in human resources is an ongoing issue in Sudan. 70 % of health workers (HWs) work in urban regions, almost a third of whom work in Khartoum. (15) Moreover, migration is very common among HWs in search of better lifestyles and career opportunities abroad. It is estimated that 60% of Sudanese physicians have migrated. (6)

1.7.4 Medicines and Technology:

Both the federal and state levels have regulatory bodies for the pharmaceutical sector. Additionally, the national medical supplies fund (NMSF) oversees supply chain management and procurement of medical devices, while the national medicine and poisons board (NMPB) is concerned with regulating prices and the private sector. (6)

Despite the presence of a "well-developed" registration system, medicine prices are not tightly regulated, quality assurance is not fully implemented, and drug prescriptions are not well monitored. Moreover, there are issues with management and maintenance of medical devices. (6) More than 50% of health facilities have reported to have less than the minimally required equipment. (22)

1.7.5 Health Information System:

The health information system relies on reports from facilities and surveys. (6) An integrated digital reporting system was introduced in 2016 with the aim of increasing reporting rates and improving data quality. Efforts to engage stakeholders including the private sector are being made to limit data fragmentation. (6) There has also been a focus on health research through the updating of the national health research policy and formulation of a strategy. (6)

1.7.6 Service delivery:

Healthcare services within the public sector are mainly provided by the states and localities. Other providers include the police, armed forces, national security, national health insurance fund (NHIF) and universities. The private sector is a major contributor to service delivery. However, it's engagement with the public health system is limited; regulation of and receiving information from the private sector are challenges the health system faces. (6) Also important for service delivery is the role of non-governmental organizations (NGOs), especially in providing humanitarian aid in areas of conflict within the country. (23)

Despite the presence of numerous providers, lack of coordination has led to some states having high concentration of services while others have gaps in services. (23) According to the FMoH, geographical coverage by basic health facilities has reached 95% however this percentage varies greatly between different states and urban and rural areas. (22) An estimated 14% of the population are not covered by health facilities i.e. no available facilities within a 5 kilometer radius. (22)

2 PROBLEM STATEMENT, JUSTIFICATION, OBJECTIVES AND METHODS:

This chapter displays an analysis of the problem and why it is important to address. It also presents the objectives of the thesis and methods that were employed to reach the objectives.

2.1 Problem Statement and Justification:

Addressing quality of healthcare services in Sudan is of vital importance. Inconsistencies in knowledge and perceptions regarding quality exist among both health professionals and the public. (1) Healthcare acquired infections, diagnostic and therapeutic errors - among other issues related to patient safety represent major threats for the health system. (6) Furthermore, Universal Health Coverage (UHC) is considered a priority for the health system as was outlined in the national health policy 2017-2030 (NHP). (6) Achieving coverage with essential healthcare services and providing financial protection without ensuring quality, will not improve health outcomes. (6) (1)

Over the past two decades the average life expectancy in Sudan has increased from 57 years to 65 years. However, it lags behind the average life expectancy within the eastern Mediterranean region (69 years), and when compared to countries like Egypt (70.5 years) and Jordan (74.3 years). (24) Sudan faces many health problems, including a high burden of communicable diseases, and a rapidly rising burden of non-communicable diseases (NCDs). (6)

Communicable diseases represent 52.8% of the total disease burden in Sudan. (25) These include Malaria, Respiratory tract infections, Tuberculosis (T.B), HIV, and neglected tropical diseases. The primary healthcare level is where most interventions for these diseases should take place. (26) However, despite efforts by the health system to expand primary healthcare services and increase access to them, poor quality of care and medical errors continue to be a problem. (6) (25)
Within the past three years, mortality has increased due to malaria which is a major cause of premature death in Sudan. (27) Improving health outcomes for malaria requires a combination of patients seeking care, appropriate diagnosis, and effective treatment. Studies have shown that gaps in quality management of malaria exist and even health seeking is influenced by the quality of healthcare being provided. (28) (29) (30)
The burden of NCDs is 33.9% of total disease burden in Sudan. The most prevalent of these NCDs are cardiovascular diseases which include ischemic heart disease, the number one cause of death in Sudan. (31) Other prevalent NCDs include diabetes, chronic respiratory diseases and cancer. (25) It is believed that the health and economic outcomes related to NCDs in lower-middle-income countries (LMICs) reflect poor preventative and treatment efforts, and by 2030 NCDs are projected to cost LMICs 21 trillion dollars. (32) NCDs service packages are available in Sudan but are unfortunately not integrated into all primary healthcare centers (PHCs). Awareness about risk factors, screening, and diagnostic services are required to reduce disease progression and prevent the occurrence of complications. (25) (32) (33) `A study done in the River Nile State showed that among 500 participants, 49% had undiagnosed hypertension. The high prevalence was attributed to lack of awareness about the disease and poor health seeking. (34)

Maternal and child mortality in Sudan are quite high despite ongoing efforts at reduction by the health system. (6) Maternal mortality ratio (MMR) is 311 per 100,000 live births

and under 5 child mortality (U5 mortality) is 63.2 per 1000 live births. These figures represent some of the highest within the eastern Mediterranean region, where MMR is 166 per 100,000 and U5 mortality is 52.5 per 1000 live births. (35) Many factors related to quality of care can be implicated; such as failure to adhere to guidelines, inadequately trained staff, and lack of functioning diagnostic, treatment and referral facilities. (36) Furthermore, there is a link between maternal mortality and neonatal mortality, which is also high at 30 per 1000 live births. (37) Birth asphyxia is the most common cause for neonatal mortality. (38) Some studies have suggested that the high neonatal mortality rate can be attributed to the fact that most of these births take place at home under the care of unskilled attendants providing poor quality care. And that even if the cases were to be referred to the hospital following complications, they will still garner poor outcomes. However even in hospitals, midwives are usually the first point of contact with neonates when they are born, and in some cases, they are not adequately trained in neonatal care if at all. (38) (39)

Quality of care is a core component of the right to health and is an important dimension of service delivery. (40) (2) Inability of the health system to provide and evenly distribute resources required for quality healthcare delivery, such as human resources, financing, infrastructure, equipment and supplies and not having a robust information system in addition to weak governance compromises the right of people to access these services. This results in unmet health needs and further contribute to poor health outcomes.
Quality of care is very complex and multi-dimensional, as it involves multiple actors, systems and healthcare levels. Healthcare services provided by certain providers at a certain time to certain users in a certain manner in order to achieve certain outcomes and to minimize others, and it all has to be done in the right combination and the right way and is a continuous effort. (1) (2) (41)
Despite the complexity and intangibility of certain aspects of it, quality should still be measured and its determinants identified since it profoundly impacts health system goals. (41) (42)

Poor quality can prevent people from seeking care and cause them to lose trust in the health system. Incidentally, perception of good quality of care can stimulate health seeking behavior and therefore influence utilization of healthcare services. (42) (43)Poor quality healthcare is not only a barrier to universal health coverage, but it also contributes to increased morbidity and mortality. (1) (43) Long-term disability can result from morbidity, which can lead to negative economic effects such as decreased productivity, in addition to high costs incurred by individuals, their families and the health system. (1) Hence, improving quality lowers inefficiencies, results in higher productivity, and saves money that could be invested elsewhere. (1) (41)

Research on quality of care is available in Sudan. Most studies are facility-based, usually from supply side perspective, such as studies determining adherence to procedures or guidelines in addition to a few studies that measure patient satisfaction. Research results are not always incorporated into practice and decision making. (1) To the best of the author’s knowledge, there are no studies on the factors influencing the quality of healthcare services in Sudan. Hopefully this thesis will collect all the available data and provide some knowledge on the issue and identify gaps that can be addressed by future research

2.2 Objectives:

2.2.1 General Objective:

To determine factors that influence healthcare service quality in Sudan and to provide recommendations to help in improving the quality of healthcare services.

2.2.2 Specific Objectives:

1- To identify context and population factors that influence healthcare service quality.
2- To identify resources and leadership & governance factors that influence healthcare service quality.
3- To analyze service delivery factors that influence healthcare service quality.
4- To identify and suggest effective interventions to help in improving healthcare service quality.
5- To provide recommendations to help in improving the quality of healthcare services.

2.3 Methods:

This study is based on a literature review. An extensive online search was conducted to retrieve relevant literature on quality of healthcare services in Sudan. Google search engine was used to retrieve a report from the WHO website. Google scholar, PubMed database, and Vrije university library were used to search for peer reviewed journal articles. Grey literature sources (National health policy 2017-2030 draft, and the National healthcare quality policy and strategy 2017-2020 draft) were obtained by directly contacting focal persons at the Federal ministry of health through email.

2.3.1 Search Strategy:

For articles used in the analysis, an advanced search was employed using the following combination:
((Quality AND Healthcare) AND Sudan) on Google scholar, PubMed and Vrije university (VU) library. Then further search was done using the following keywords in different combinations:
(Quality, Healthcare, Sudan, Safety, Efficiency, Effectiveness, Equity, Timeliness, people-Centered, Integrated, Service delivery, Policy, Guidelines, Standards, Structure, Processes, Outcomes, Satisfaction, Adverse events, Medical errors, Infection control).
The search yielded many results which were then filtered by scanning the titles and reading the abstracts, and duplicates were removed. Reference lists within articles were scanned for further results. Articles selected were studies conducted in Sudan and were in English language. Initially, selection was confined to studies that were from 2009 to 2019, however, an exception was made due to extreme relevancy of the study. Studies on oral and dental health were excluded. A total of 40 research papers were thoroughly read and were used in the analysis.

2.3.2 Analytical framework

The framework that was used as a reference to guide the analysis is the health systems dynamics framework by J van Olmen et al (**Figure 2**). (44) It contains the six building blocks found in the WHO health system framework. (45) Namely: leadership and governance, health workforce, health information, health finance, medical products, vaccines and technologies, and service delivery, in addition to other elements.

Within the health system dynamics framework, the building blocks of the health system are organized into 1) leadership and governance 2) Resources; which include human resources, finances, knowledge and information, infrastructure and supplies (pharmaceuticals, technologies and goods), and 3) Service delivery. Interestingly, infrastructure is mentioned in the health system dynamics framework but not in the WHO framework. Furthermore, the health system dynamics framework considers the context within which the health system is found, and it also includes the interaction of the population with the health system within the local context. It is set in such a way where service delivery is found at the center; it demonstrates how service delivery is interrelated to the other building blocks and how it's an "immediate output" of the other building blocks. (2) The framework also demonstrates the central role of leadership and governance in steering the other components, i.e. resource management and influencing service delivery, which both influence the population. Not only that but leadership and governance can have influence on contextual factors through policies and other actions thereupon influencing the population.

As it has been mentioned previously, for a service to be considered of high quality it must fulfill seven dimensions of quality of care. (1) (2)

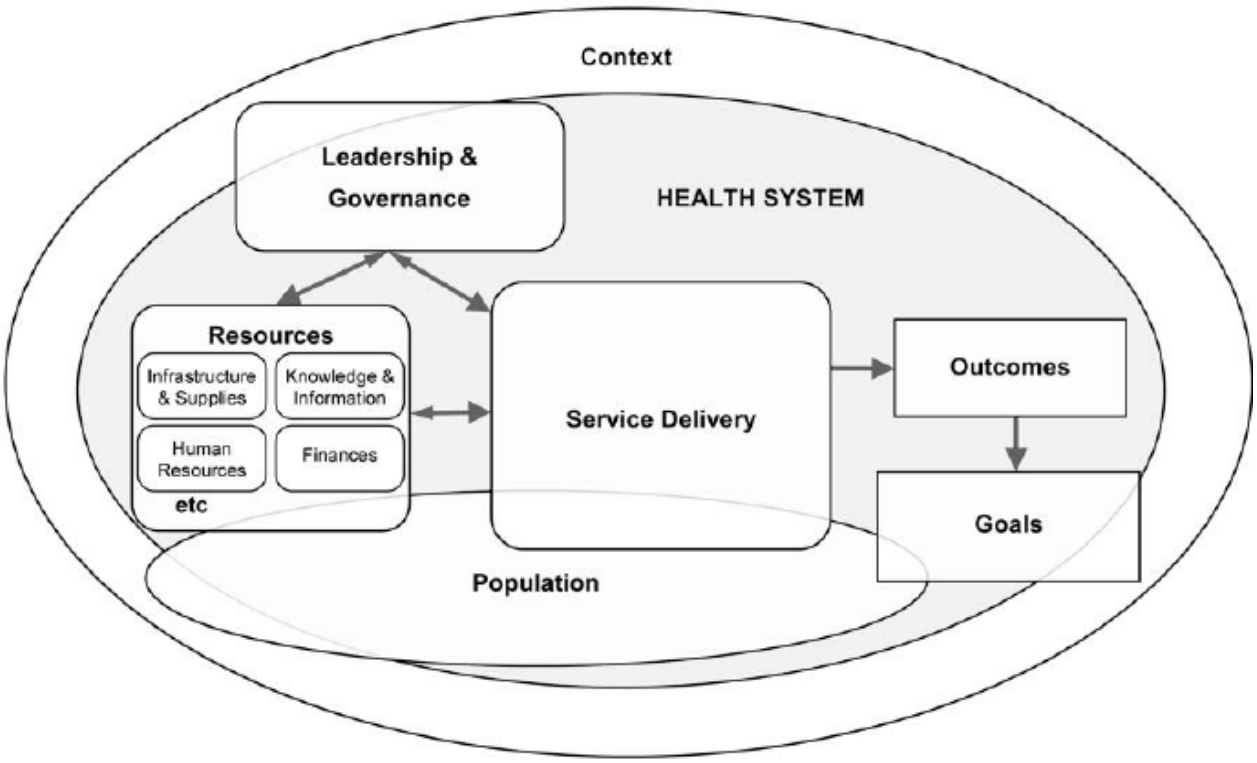
Effectiveness, safety, efficiency, people-centeredness, equity, timeliness and integration will be put under service delivery component of the framework. The study is based on the hypothesis that under favorable contextual conditions, and when all the elements of the health system are in place and service is delivered in such a way that it fulfills quality dimensions, the outcome will be good quality care. Which will then contribute to the health system goal of improved health outcomes. (44)

The health system dynamics framework therefore is a suitable option for determining the factors that influence healthcare service quality, because it provides a wide perspective of all the elements that are involved in quality and how they interact with each other. It can also aid in determining those areas which are weak or contain deficits and therefore allow for recommendations on how to address them.

2.3.3 Limitations of the Study:

The study being completely based on a literature review is on its own a limitation. Only English language studies were included which could have resulted in some findings in Arabic (or other languages) not being identified. Furthermore, the source of all research papers was the online search, which means there is a possibility that some non-internet sources were missed. Also, a few articles were inaccessible beyond the abstract even through VU library account, so they weren't included. Finally, the time period allocated for the study was also a limitation.

Figure (2): Health systems dynamics framework



Source: health systems dynamics framework, van Olmen et al, 2012 (44)

3 RESULTS:

This chapter displays the findings from the literature that was mentioned in the methodology section. It shows the different factors influencing quality of healthcare services. The health systems dynamics framework is used to display these factors, as they are grouped within its components.

3.1 Context:

Contextual factors are those outside the health system, and play a very important role in shaping the health system. (44) They also influence the health status of the population and the quality of healthcare services delivered.

3.1.1 Geography and Environment:

Sudan's vast geography combined with deficits in infrastructure pose a great challenge for service delivery. (46) (47) In Darfur it was reported that humanitarian aid faced many difficulties in reaching communities that needed healthcare because they were separated by vast distances. (46) Furthermore, environmental factors such as water pollution, water scarcity, environmental pollution and floods cause diseases such as malaria and diarrhea, and at the same time can challenge the provision of quality healthcare services. In Gedaref state for instance, these factors challenged prevention efforts for visceral leishmaniasis and also were barriers for health seeking, as was revealed by a qualitative study conducted there. (47) In the conflict regions of Darfur, IDPs living under poor sanitary conditions made them prone to diarrhea which contributed to increased mortality rates during a period of HRH shortages. (48) Furthermore, floods during the rainy season prevented access to health facilities and caused logistical issues that challenged quality of services. (46)

3.1.2 Political Situation:

A country's political situation and its stability is very critical on the health system; political decisions can greatly influence quality of healthcare. (44) Devolution of healthcare services to the states and localities without ensuring adequate managerial capacities, coupled with inequitable funding, has contributed to gaps in service delivery and quality of care in different regions. This has been reflected in a maternal death review conducted in 2013 which showed wide variations in maternal deaths in different states and reported that those who were least likely to receive adequate care were poor women living in rural areas. (49) Moreover, conflict in Sudan has resulted in the displacement and marginalization of many people for nearly decades; during this period many decisions were taken which directly affected the healthcare system. (48) (46) In Darfur it has been implied that expulsion of humanitarian aid workers by the government may have had an effect on increased mortality rates in the area. (48) Another study from West Darfur revealed that government enforced security restrictions and limitation of working hours prevented clinicians, health education volunteers, and supervisory workers from maintaining quality in a maternal and child health program. (46) Furthermore, issues such as the robbing of equipment and abduction of health workers by armed militia have also affected healthcare quality. (46)

3.1.3 Economy:

The country's poor economy has greatly impacted the ability of the health system to provide quality healthcare services. (50) This was the reason behind the introduction of user fees for public healthcare services in 1991, however it hasn't done much to

improve the situation. Decline in the quality of public healthcare services as a result of poor economy has been a reason for the flourishing of the private sector. (50) Services in the private sector are perceived to be of higher quality despite the need to pay higher fees as was expressed by a household survey conducted in Khartoum. (50)

3.2 Population:

Quality healthcare is a right for all. (40) Although contextual factors influence the population, the population itself can have influence on their own health. (44) Most population factors are related to health seeking, access and perceptions of quality.

3.2.1 Geographical access:

Geographical access can influence quality of healthcare services by affecting the population's
health seeking. Studies in Sudan found that distance to health facilities affects continuity of treatment and delays diagnosis and management of diseases. (47) (51) This finding was confirmed by a case-control study conducted in Khartoum to determine why T.B patients defaulted their treatment. (51) Out of 2727 patients receiving care, 14% interrupted treatment due to long distance from T.B centers since they were living in rural areas. (51) In Gedaref, barriers for geographic access resulted in the delay of diagnosis and management of visceral leishmaniasis as patients needed to travel to the city. (43) A third study in Khartoum exploring why pharmacists (particularly community ones) dispensed antibiotics to self-medicating patients, cited geographical inaccessibility of facilities as a reason.

3.2.2 Knowledge and Information:

Lack of information about a certain disease or condition can have negative consequences on patients by influencing their attitude and behavior, and consequently the quality of healthcare being provided to them. A descriptive-cross sectional study to evaluate the knowledge, attitude and behavior of asthmatic patients about their condition showed a significantly poor knowledge of the etiology of the disease. (52) Some of the study subjects refused to accept their condition as asthma and only regarded it as allergies. (52) Almost half the subjects (46%) were not using their prescribed preventive steroids, and 12% refused to use the treatment inhalers out of fear of dependence. (52) Stigma related to the disease could be associated with this. It should also be noted that study subjects were all educated to at least high school level and higher.

3.2.3 Awareness:

In some cases, patients may not be aware of their illness and therefore may not understand its consequences. A study done in Khartoum among hypertensive patients found 34% of the study subjects did not visit their doctor regularly, 18% were not taking their prescription medication, and only 20% monitored their blood pressure regularly. Most of them were found to be unaware of the consequences and risk factors of the disease when interviewed. (53) most of the patients in this study where educated, only 16% where illiterate and 62% had at least high school education.

3.2.4 People's Perceptions:

Perceived health can influence quality of healthcare. A case-control study conducted across different states in Sudan to assess risk factors leading to multi-drug resistant tuberculosis (MDR-TB) reported that 37.7% of 430 cases of MDR-TB and 2.1% of 860 controls (patients with susceptible T.B) have interrupted their first line treatment mainly due to feeling better. (54) In Khartoum, a survey determining the patterns of

self-medication discovered that 50% of respondents resorted to taking antibiotics when they thought their symptoms were familiar to them, so seeing a doctor was unnecessary. (55) It should also be noted that most the participants were at either university level or have graduated university. (55)
Perceptions of healthcare services can also influence healthcare quality. A study conducted in Khartoum on unsafe abortion and abortion care revealed that sometimes traditional providers are trusted more by women to keep confidentiality regarding abortion, over going to healthcare facilities. (56) Sometimes these providers were not adequately trained, which resulted in complications requiring hospitalization. (56) Another study in Khartoum exploring measles vaccine hesitancy, revealed that some parents perceived the vaccines to be of low benefit while others just did not trust the health providers. (57)

3.2.5 Financial status:

Failure to buy medication or not being able to afford a consultation due to financial reasons, can have serious consequences on the patient's health. A case-control study on the economic and social impact of diabetes that took place in Khartoum, revealed that out of 375 patients, 59% weren't on regular medical follow up and 48% couldn't buy insulin, all due to financial reasons. (58) A cross sectional survey performed on cardiac patients in Khartoum detected poor adherence to medication in 51% of the study subjects; costly drug prices was a reason behind non-adherence. (59) On the other hand, low income was found to be associated with self-medication. (55) (60)

3.2.6 Sociocultural Factors:

Sociocultural factors such as beliefs associated with certain religious and ethnic groups are also population factors that can influence quality of healthcare services. (57) In the study about asthma patients is Khartoum, it was revealed that 44% of them have sought non-medical methods such as traditional medicines, religious recitals, and even harmful practices like cigarette smoking. (52) In a cross-sectional study assessing the characteristics of patients using traditional healing services for mental illness, many of the respondents (70.1%) reported they had healthcare facilities near where they lived. Despite that, approximately half of the study subjects have never received psychiatric care before. (61) And among the other half who have received formal psychiatric care, many thought it wasn't effective and only a few mentioned costliness and distance as barriers. (61) However, it was found the majority (77%) were brought against their will for traditional care by family members.

3.3 Leadership and Governance:

Leadership and governance play a central role in the stewardship of all the other functions of the health system. This involves the use of policies to guide all actors at all levels of the health system. (44)

3.3.1 Coordination, ensuring adequate resources, and advocacy:

Coordination between different actors including stakeholders and ensuring adequate resources are important governance functions that can influence healthcare quality. (44) A qualitative study in Blue Nile state investigating the provision of sexually transmitted infections (STIs) services revealed that quality was undermined due to various governance related issues. (62) It was reported that while these services where drafted in annual plans, they were not prioritized, and relied on donor funds that were insufficient. (62) Also, little commitment was shown by authority figures, and there were issues with coordination among the different managing bodies including the ministry of health. (62) The coordination issues were attributed to the

verticality of the program. (62) Lack of commitment from authority figures could be due to little or no advocacy regarding STIs.

3.3.2 Regulation:

Another role of governance lies in the regulation of the health sector. But sometimes despite the presence of regulatory authorities, implementation seems to be an issue. This has been highlighted in a study conducted in Khartoum state where it was found that lack of monitoring by regulatory bodies, was one of the reasons pharmacists irrationally dispensed antibiotics. (60) Regulation should also span beyond the public sector, i.e. the private sector should also be regulated. According to the ministry of health this (regulation of the private sector) has been weak despite the existence of a policy for the private sector. (6)

3.3.3 National Quality Policy and Strategy (NHQPS) 2017-2020:

The Sudan national healthcare quality policy and strategy was formulated in 2017. It was formulated correspondingly with the national health policy 2017-2030. According to (NHQPS), Sudan defines quality as "Providing the best possible patient centered care using available resources and evidence based practice". (18) Formulation of the policy was inclusive with the involvement of multiple stakeholders besides the FMoH and SMoHs; these included the private sector, communities, patients, national and international quality experts, regulatory bodies, and funders such as the WHO and Global Fund (GF). The policy came about as a result of the fact that quality was never much of a priority for the health sector as was increasing access to healthcare. (18) Therefore, commitment towards instating quality in healthcare was deficient and resources allocated to it were few. Furthermore, the decentralized health system was also cited as being a hindrance to provision of quality healthcare services, and efforts to improve it have been inconsistent and ineffective over the years. The policy addresses four major priority areas: "Governance and accountability for quality of care, Compliance with national quality standards , Promotion of people-centered approach and Reduction of avoidable harm to patients " (18)

3.4 Resources:

3.4.1 Human resources:

Human resources are considered among the scarcest resources in many health systems. (44) An effective workforce should have adequate number of workers that are competent and perform according to standards. (44)

3.4.1.1 Competence (Knowledge and skills):

Lack of adequate knowledge and skills by health providers can severely affect quality of healthcare services and can have detrimental effects on patient's safety and health outcomes. In Gezira, a state which has a high burden of malaria, significant knowledge gaps were found among frontline healthcare providers regarding malaria treatment. (63) Overall knowledge about artemisinin-based combination therapy (ACT) was only 22% and knowledge of dosing was very deficient. (63) Moreover, less than half the providers were able to correctly define a case of malaria, not to mention that a large number were discovered not relying on lab diagnosis for confirmation. (63)

Another Knowledge attitude and practice study conducted in a major teaching hospital in Khartoum among operating-theater staff uncovered profound knowledge deficits regarding infection control measures. (64) This manifested in very poor observed practice; from ineffective handwashing, to improper sterilization and waste

disposal measures. (64). Even though the incidence of hospital-acquired infections was not measured in this study, one can assume that these findings could contribute to it. It was also revealed none of the nurses had a university degree. (64)
A third study conducted in Khartoum also revealed limited knowledge among doctors regarding key issues of women with epilepsy. (65) This is particularly significant since due to shortages in neurologists in Sudan, some women with epilepsy are treated by doctors who are not specialized in the field. Therefore knowledge of issues such as pregnancy, counselling, and care for these patients are important. (65)

3.4.1.2 Motivation and Satisfaction:

A study was conducted in Agok , a region between Sudan and South Sudan to measure the quality of care of a humanitarian aid project using the Donabedian criteria. (66) It revealed poor process quality compared to structural quality, which was attributed to shortages in skilled human resources who lacked motivation. (66) Motivation and satisfaction are very important in delivering quality healthcare, both can affect performance and influence patient satisfaction. Many factors influence health provider's satisfaction. A cross sectional hospital-based study conducted in River Nile state to assess job satisfaction among junior doctors found that 50.9% of them were not satisfied with their job. (67)Low salaries, heavy workload, long work hours, poor facilities, lack of training, and workplace security were among the factors involved. (67) High workload and low salary were also the reason for decreased motivation among the humanitarian staff working in Agok, even though some of the national staff described that helping their own people was a motivator. (66)

3.4.1.3 Quantity:

The quantity of health workers is also an important human resource factor that influences quality of care. Shortages in staff number can result in increased workload which can affect performance and patient's health outcomes. It has been suggested that staff shortages in health centers in Gezira state resulted in suboptimal care for asthma patients. (68) In the conflict-stricken state of Darfur during a period of rise in non-violent deaths (mostly due to diarrhea) it was found that the increase in number of cases at that time occurred when there was an 18% reduction in humanitarian aid workers. (48)

3.4.2 Infrastructure and Supplies:

Having well developed, well maintained, accessible and well-equipped facilities are very important for quality healthcare service delivery. (44) A well-regulated drug supply system is also equally crucial. (44) Sudan experiences disparities in the distribution of infrastructure. Water and electricity access for example can range from 100% in some facilities in Khartoum to only 20% in South Kordofan state. (69) Inequities in distribution of equipment and supplies also exist across different facilities. (69)

3.4.2.1 Infrastructure:

Lack of appropriate facilities for infection control including sinks and waste disposal systems in addition to an ineffectively cleaned hospital environment, has been observed in operating theatres in Khartoum. (64) This has been shown to have implications on patient safety. In Darfur, structural quality was found to be reduced as a result of poor storage infrastructure for drugs and equipment and inadequate cleaning of facilities. (66) Inappropriate storage infrastructure was also found to influence quality of care for children with asthma, since it interfered with access to patient information cards. (68)

3.4.2.2 Supplies:

Certain medical supplies are critical for the provision of quality healthcare and the lack of their availability can directly influence patient outcomes. Shortages in blood supply for example, sometimes as a result of non-functioning blood banks, was found to be a leading contributing factor in maternal deaths as a result of hemorrhage. (49) Similarly, irregular availability of medication can also profoundly influence quality of healthcare and certain disease outcomes. This was one of the factors that led to lack of adherence to medication in the study conducted on cardiac patients. (59) In Gedaref, irregular availability of leishmaniasis medicine was a concern for the patients as it hindered the treatment of the disease. (47) Moreover, patients were found to resort to buying the drug from a "black market". (47) This can potentially have serious consequences on disease outcome especially since the quality of these drugs are not known.

3.4.3 Finances:

Effective financial management is an absolute necessity for the health system to achieve its goals. (44) A strong health financing system secures access to healthcare services while ensuring financial protection for the population. (2)

3.4.3.1 Costs of services:

In 2008, the government introduced a policy that would remove user fees for pregnant women undergoing cesarean sections and children under-5 in northern Sudan. (69) However, due to pre-existing inequities in resource allocation, and many issues related to the policy (mainly its financing and sustainability), it wasn't effective. (69) Quality of care improved in facilities that already had adequate resources and to which the policy provided added funding. However, in facilities that were already experiencing shortages in resources and were understaffed the increased workload that came with increased access as a result of the policy resulted in decline in the levels of quality. (69)

3.4.3.2 Funding

Delays and shortages in funding can influence the quality of healthcare services. In Blue Nile state for example, it was reported that reliance on external funds delayed service provision and hence affected service quality. (62) A retrospective mortality survey in Darfur reported that cutbacks in funding resulted in decreased humanitarian aid and accounted for an increase in mortality rates (48) In Agok, perceived low salary rates in comparison to perceived high workload among staff were factors contributing to impaired quality of care. (66)

3.4.3.3 Insurance:

When it comes to pooling of resources and risk sharing, the health insurance system in Sudan suffers some weaknesses, in addition to sustainability issues. (70) Furthermore, involving the informal sector is a challenge. Approximately 40% of people from the informal sector do not renew their insurance membership. (70) A qualitative exploratory study performed on health insurers discovered that while the participants acknowledged the fact that coverage with insurance services is weak, they perceived that the services they provided were of good quality. (71). A survey study to determine the reasons people dropped out of national health insurance revealed that satisfaction with quality of services made people less likely to drop out.(70)

3.4.4 Knowledge and Information:

Health information is very important because it informs decisions. (44) Information from health facilities can be used in estimating disease burden and for other epidemiological reasons. Recording patient information is crucial for quality of care and contributes to the safety of the patients and for follow-up. (72)

A descriptive audit study carried out in North Kordofan found that medical personnel focused more on the delivery of medical care than documenting patient information. (72) Important information regarding patients' history, physical examination, management plans and even discharge data were found to be incomplete. (72) Another study evaluating the completeness of asthma cards in Gezira found most of the cards to have incomplete data and unreadable variables. (68) It was also found that 47% of the cards had no contact information which is very concerning since thereafter 63% of patients were lost to follow up. (68) A third study in Khartoum revealed incomplete health records of children with severe acute malnutrition, data that was critical for the management of such serious cases including vital signs was left out of some records. (73) Health information can also help in disease control; failure to register patient contact information in the case of an infectious disease such as T.B as presented in the study about risk factors associated with MDR T.B has major health consequences for the patients as well as their contacts. (54)

3.5 Service Delivery

Health services stem from the organization of resources guided by leadership and governance through policies and provided to individuals or populations with the aim of accomplishing health system goals. (44) These include: preventative and curative services, at all healthcare levels. (44)

High quality healthcare services require the following dimensions be available:

3.5.1 Effectiveness:

Effective healthcare means that patients are managed according to scientific knowledge and guidelines that are evidence-based. (1) According to the NHQPS there are currently 26 national clinical guidelines for use at the primary healthcare level and another 15 for the most common diseases encountered at the secondary and tertiary levels. (18) Although clinical guidelines were proved to reduce medical errors and improve health outcomes, their use remains to be a challenge. (66) (49) (74)

3.5.1.1 Lack of availability of guidelines:

Lack of availability of national guidelines can influence quality of healthcare. A prospective hospital-based study in Khartoum revealed only 2.7% compliance on the use and administration of antibiotics for surgical prophylaxis when it was compared to international guidelines. (74) Prophylaxis was not recommended in a quarter of the patients who received it, and among those for whom it was recommended, high spectrum antibiotics and unnecessary combinations were used contrary to recommendations. Also, a very large number of patients were found to be given subtherapeutic doses. (74) All this happened despite the presence of a therapeutic committee in the hospital. (74)

Lack of availability of guidelines was a reason magnesium sulfate was not used in the treatment of women at the hospital and contributed to maternal deaths from hypertensive disorders in 2013. (49)

In a survey study carried out in Khartoum to assess doctors' knowledge about the availability of national guidelines for cardiology, over half them (51%) stated that

they were not sure if these guidelines existed. (75) Another 35% believed there weren't any national guidelines for cardiology, and only 14% mentioned that the national cardiology guidelines present were for hypertension management only. (75) Within the same study, most doctors agreed that while international guidelines could be used for cardiology practice in Sudan, they needed to customized to fit the context of the country. (75) Furthermore, some doctors believed that personal experience with management is indispensable and that they would choose that over guidelines in some cases. (75)

In Blue Nile, failure of management to provide treatment guidelines in facilities, was reported as a barrier to effective care in Blue Nile state. (62)

3.5.1.2 Lack of compliance despite availability of guidelines:

This can be due to deficient monitoring and supervision. In a cross-sectional study exploring antimalarial prescribing practices in Gezira state, it was found that despite the availability of guidelines, less than 41% of patients were diagnosed correctly, and only 26% were correctly managed. (29) Lack of adherence to nationally adopted WHO treatment guidelines for the management of severe acute malnutrition in Khartoum resulted in ineffective care towards patients. (73) Classification of malnutrition, testing, and treatment were not in line with the guidelines. (73)

3.5.2 Safety:

Patient safety involves all the measures that minimize harm to the patient. (1) Following guidelines and carefully reviewing patient information prevents the occurrence of medical errors that lead to serious health consequences in patients. (1) In Gezira, artemether injections were incorrectly prescribed in 9.5% of patients who were diagnosed with uncomplicated malaria. (29) Also, within that same study most prescriptions were written incorrectly; with incorrect or unspecified dosing, amounts, and lack of scheduling. (29) Inadequate labeling was detected in 44.3% of dispensed pediatric drugs in Khartoum. (76) An exploratory survey in Gezira state conducted to determine the reasons behind medication prescribing errors revealed that 28% of prescriptions had the route of administration written incorrectly and instructions were missing in 43.8%. (77) Moreover, it was observed that multiple prescriptions carried the risk of serious drug interactions therefore exposing the patient to serious harm. (77) All but one prescription out of 2000 was written correctly, which was very concerning because the same study revealed that some pharmacists did not bother to correct prescriptions. (77)

3.5.3 **Efficiency**:

Efficient healthcare means that when a patient is treated, no resources are wasted. That includes unnecessary use of medicine, diagnostic tests, and procedures. (1) Also, generic drug names should be used in prescriptions instead of brand names to avoid higher costs. (1) Irrational drug use is an example of inefficiency.

A study was conducted in four major pediatric hospitals in Khartoum to assess drug use practices in comparison to the WHO core drug use indicators. (76) While the average number of drugs prescribed conformed to the guidelines, it was discovered only 49.3% of the drugs were prescribed by their generic name when it should be almost 100%. (76) 43% of the drugs prescribed where not from the essential medicines list (EML) indicated in the national drug policy. (76) Furthermore, antibiotics were being significantly overused at 81.3% which exceeded the <30% rate recommended by the WHO. (76) Another study in Gezira which also used WHO guidelines to assess prescription patterns among general practitioners (GPs) working

at the national health insurance centers, detected high antibiotic percentages in prescriptions (54.7%) while generics prescriptions were only 46.3%. (78) A third study on antimalarial prescriptions also conducted in Gezira showed unnecessary antibiotics in 25% of the prescriptions. (29) Irrational antibiotic use increases the risk of antibiotic resistance therefore affecting the safety of the patient.

3.5.4 People centeredness:

People centered care is healthcare that is coordinated and tailored to fit patients' desires and needs. (1) It also keeps them informed and engaged on their condition, and ensures that they are treated with respect and dignity. (1) The way patients are treated can reflect on their compliance with services being provided and their outcomes.

Communication is key for people centered care. In Khartoum, 51% of cardiac patients were not adhering to their treatment; some of them stopped taking their medication without referring to their doctors after experiencing side effects. (59) Those who were on five or more drugs were also non-compliant with treatment, and in cases where the drugs were not available in stores, they just stopped taking them. (59) It was revealed that many were not aware about the consequences of non-adherence to medication. (59) A lack of provider-patient communication is evident and can have serious consequences on the outcomes of these patients. Another study, among diabetic pregnant women attending follow up, found that 82.4% of them were not aware about hypoglycemia and also a quarter did not know about the effects of diabetes on both the mother and fetus. (79)

A study in Khartoum state comparing patient satisfaction with diabetes services in government PHCs and specialized diabetes centers revealed an overall higher satisfaction rate in the specialized centers (57.8%) than the government PHCs (24.5%). (80) Specialized centers recorded higher in areas that included consultation, information and counselling and referral services. (80) It was revealed that lack of counselling by pharmacists is a contributor to antibiotic misuse among people. (60) Lack of care and sometimes commercial reasons are behind that. (55) (60) This can end up having detrimental effects on the health of these patients and public health implications.

Some studies have shown that bad attitude and harsh treatment by some providers is a factor that influences quality of healthcare by making patients dissatisfied and therefore affecting compliance with treatment. (57) (81) On the other hand, training of health providers on communication skills in a quasi-interventional study conducted in Omdurman maternity hospital led to improved communication, and better attitude and behavior. (82) This resulted in higher patient satisfaction due to patients feeling more informed about labor and delivery and feeling more respected. (82)

With regards to patients' rights and respect, a cross-sectional study in Khartoum performed on nurses revealed that despite more than half of them have shown acceptable knowledge, fewer than half knew of the existence of the Sudanese charter for patient's rights. (83) This made the authors suspect that knowledge may have been biased by social acceptability standards and suggest a need to study actual practices. (83)

3.5.5 Equity:

Equitable healthcare means the same level of care is provided to all individuals and populations regardless of gender, social background, or geographical location with

the goal of improving health status. (1) Many disparities exist in the distribution of healthcare services in Sudan. The poorest of the population are the ones who tend to receive the least level of care. (47) (49) An example of this is the unequitable distribution of resources and the difficulties the people in Gedaref state face with visceral leishmaniasis, especially the village inhabitants who have to travel long distances to reach private clinics in the cities to receive proper care. (47)

3.5.6 Timeliness:

Timely healthcare means that there are no delays in service provision and the patient receives care within acceptable time limits. (1) Services should be planned in a way where patients don't have to wait a long time to receive care. (1)
In Khartoum, some of the women who were admitted for abortion/post abortion care waited for as long as 12 hours to receive treatment, while some only waited an hour. (56) Long waiting times to receive a consultation resulted in patient dissatisfaction with hypertension services in public PHCs. (81) Long waiting times was also found to be one of the reasons behind antibiotic misuse and self-medication. (60) (55) In Gezira, a poor health information system made it difficult for asthma patients to receive timely care since it took a very long time to find their cards. (68) In Gedaref a delay in diagnosis of visceral leishmaniasis due to unreliable diagnostic tools in village health centers, and then continuous drug stock-outs prevented the provision of timely care for patients. (47) Timeliness is also critical for urgent situations and may also depend on factors such as the availability of a functional triage and referral system. However, no studies were found regarding quality of care in emergency situations.

3.5.7 Integration

Integrated healthcare means that the patient receives coordinated care across different providers and facilities depending on their condition. (1) This is especially important for patients who have multiple morbidities or a systemic illness.
Among diabetic pregnant women in Sudan, it was found that the majority don't have regular follow ups with an endocrinologist, also a large proportion never received ophthalmic and renal assessments. (79)
On the other hand, a clinical trial studying the impact of pharmacist's intervention on diabetes care for patients with type 2 diabetes showed significant improvement in the intervention group's post prandial blood glucose (PPBG) and glycated hemoglobin (HBA1C), indicating better control among them compared to the control group. (84)

4 INTERVENTIONS:

This chapter lists interventions to improve quality of healthcare services in Sudan. It displays some selected WHO evidence-based interventions (2018) that can be applied in Sudan, and an outline of the interventions from the national healthcare quality policy and strategy 2017-2020. (1) (18)The purpose is to compare the two sets of interventions and address intervention gaps within the policy based on this study findings. A table with the full list of WHO interventions is found in the appendix.

4.1 WHO quality interventions:

1- Interventions to improve health system environment:
   a. Accreditation and external evaluation.
   b. Application of clinical governance, through clinical auditing; risk management; involvement of patients; education and development of health providers; clinical research; having clinical governance committees; and utilization of the information system.
   c. Performance based financing and contracting of health providers.
   d. Training and supervision of health workers.
   e. Regulation of and assurance of safe and effective medicines, vaccines and equipment that conform to standards.

2- Interventions to Reduce harm:
   a. Inspection of healthcare facilities for basic safety standards.
   b. Establishment of safety protocols and safety checklists to reduce the risk of harm and mortality in patients.
   c. Reporting of adverse events that occur as a result of healthcare services and tying them with a learning system.

3- Interventions that improve clinical care:
   a. Adopt clinical standards and protocols and implementation of clinical audit and feedback to ensure adherence.
   b. Implementation of morbidity and mortality reviews to foster transparency and encourage learning by healthcare providers with no fear of blame.

4- Interventions that engage and empower patients, families and the community:
   a. Formal involvement of communities to contribute to their own health and to healthcare system performance.
   b. Implementation of health literacy among patients.
   c. Fostering shared decision making between patients and providers.
   d. Peer support and expert patient groups that allow sharing of knowledge and experiences among patients with the same medical conditions.
   e. Establishment of mechanisms for patient experience of care through feedback.

4.2 NHQPS 2017-2020 interventions:

1- Strengthen Governance and increase accountability for quality of care:
   a. Formulation of an accountability policy, strategy and framework, with the engagement of all health system levels and healthcare facilities, in addition to establishment of accreditation bodies. All while building the capacities of healthcare professionals and managers on quality improvement according to established standards.
   b. Reinforcement of accountability through a robust monitoring and reporting system, and the strengthening of reporting, feedback and evidence-based learning

c. Fortification of professional regulation systems to tackle poor performance, establishment of risk management systems, and introduction of performance-based financing mechanisms.

2- Compliance with national quality standards at all levels of delivery:
   a. Formulation and revision of clinical protocols and guidelines and production of accreditation standards for all healthcare levels. And development of policies for routine clinical auditing, peer review and feedback.
   b. Routine measurement of quality improvement methods nationwide, learning from existing quality improvement projects at the national level, and sharing experiences internationally.
   c. Introduction of a clinical governance system to be implemented nationwide and building capacities on clinical governance.
3- Promotion of People Centered Approach:
   a. Formulation of policies for the formal Involvement of patients and communities in planning and monitoring of a people centered approach for clinical decision making.
   b. Promotion of people centeredness among healthcare providers.
   c. Establishment of a system for receiving feedback from patients and their families about healthcare services (experience of care).
4- Reduction of avoidable harm to patients:
   a. Identification of the root causes of the three major avoidable causes of harm in patients and addressing them accordingly.
   b. Assurance of infection control procedures at all levels of healthcare by adaptation and implementation of WHO guidelines and establishment of a surveillance system for hospital acquired infections.
   c. Monitoring compliance with patient safety protocols in healthcare facilities, and creating a reporting system for incidents regarding patient safety
   d. Raising awareness among all stakeholders on safety and encouraging a learning and "no blame" culture and creating peer support.
   e. Introduction of patient safety into undergraduate and graduate curricula for healthcare providers.

There is an overlap between most of the interventions, however, additional interventions that can be applied within the context of Sudan that are found on the WHO package and not on the NHQPS are: Training and supervision of health workers, regulation of medicines, health literacy, peer support and expert patient groups, and morbidity and mortality reviews.

5 DISCUSSION:

This chapter synthesizes the results and suggests some key interventions that can be applied based on the study findings in addition to identifying some research gaps.

The findings have affirmed the multi-dimensionality of quality of care. Many actors are involved in quality of healthcare, and factors that influence it are numerous and interrelated. Contextual factors have a huge impact on the population health status. They also influence what resources are available for healthcare, where and how infrastructure and resources are distributed, and who has access to care. Governance also plays a role in distribution of healthcare services and can be influenced by context and population factors; for these are the factors that should be considered when policies are formulated. The population are the recipients of the product of inputs put into the healthcare system. The population is affected by the general context within which they exist, available resources, and by the existing policies formulated by governing bodies or lack thereof. Nevertheless, certain personal factors pertaining to the population can influence the quality of care that they receive and hence their health status. It can therefore be said that quality healthcare results from harmonization of population factors, health system factors (leadership and governance, resources, and service delivery) and external contextual factors.

Contextual factors include geography and the environment, political factors, and economic factors. It is not surprising that in a country like Sudan, where the context is always undergoing change, quality of care is a challenge for the health system. Environmental factors such as heavy rains and floods are not only responsible for the rise in some communicable diseases, but also hinder the delivery of healthcare services. This is especially significant in rural areas where there are no facilities, or health infrastructure is already poor due to unequitable distribution of resources. Moreover, delays in seeking care as a result of these factors can have a great impact on patients' health outcomes; as a patient may interrupt their treatment, or their condition can become significantly worse requiring a higher level of care.
It has been observed that out of contextual factors, political factors seem to have the biggest influence on healthcare service quality. Beginning from the government's weak commitment and low expenditure on health and lack of prioritization of quality healthcare services. Constant political conflicts destroy the already dilapidated healthcare infrastructures, exhaust resources and affect people's stability. Not to mention that conflicts highly influence economic development, further weakening the health system. Moreover, denial of humanitarian services to people that are in dire need of them when public healthcare services are not available, violates their right to healthcare. Instability of contextual factors carries negative consequences on the health system and requires constant preparedness to adapt to them.

Population factors include geographical access (which is also linked to context), knowledge and information, awareness, people's perceptions, financial status and sociocultural factors. These factors generally influence the quality of healthcare services by affecting compliance or adherence to certain treatments. Regarding access to healthcare services it has been found that those most disadvantaged, are people who live in rural areas; particularly the poor. This is directly linked to inequities in distribution of services which raises the issue whether the health system is supportive of the poor. As a result, these people can have their diagnoses delayed, not receive timely care, self-

medicate, or in some cases, be forced to discontinue treatment. This carries grave consequences. An example of this is in infectious diseases such as TB, where lack of compliance can contribute to increased severity, development of resistance, spread of infection, and even death.

Lack of knowledge and awareness among the population about certain diseases especially chronic ones, seems to be an issue. This was found to result in patient nonadherence to treatment. What's interesting is that although a low level of education may sometimes be a factor, it was revealed that knowledge and awareness about certain diseases even among educated people is low. This sheds light on the role health providers should have on informing patients about their conditions. A lack of health knowledge and awareness can also influence how people perceive health and healthcare services; which also in some cases may not always be related to a person's level of education. Perceptions can be influenced by attitude, expectations and sociocultural factors. Sociocultural factors such as ethnic and religious beliefs can lead to behavior that can influence quality of healthcare services being provided to patients, such as lack of cooperation with care due to stigma, or social pressure. What's significant about this is that sociocultural factors involve communities and may have a greater impact; therefore, interventions will need to target entire communities.

Poor financial status is also strongly associated with lack of adherence to treatment and follow up; this is further aggravated by the unstable economy and uncontrolled prices. Poor financial status was also found to contribute to self-medication. This can have serious consequences on patients, such as the development of antibiotic resistance which can challenge effective treatment efforts.

Providing health education to patients, families and communities enhances their knowledge, encourages compliance, and improves health seeking. (1) Health literacy should be continuous and should involve influential figures within the community to be effective. (1) Peer support and expert patient groups can also be created, for them to learn from each other and to overcome stigma related to certain diseases. (1) Furthermore, community empowerment through formal inclusion, to make contributions in health, can positively influence the health system and healthcare service quality. (1) (18)

The findings have revealed shortages in all resources. This hinders service delivery and hence results in poor healthcare service quality. Human resource factors include competence (knowledge and skills), motivation and satisfaction, and quantity. Some of these factors are interrelated. Shortages in numbers of health providers for instance, can lead to them experiencing increased workload. High workload, in turn, along with other factors (low salaries, long work hours, poor facilities, lack of training, and workplace security) decrease motivation and satisfaction, and ultimately quality of care. Decreased motivation and satisfaction can simultaneously result in turnover and hence shortages in staff numbers. Provider competence is central to quality healthcare service delivery. lack of proper knowledge and skills among health providers leads to ineffective care and compromises patient safety. Training and supervision of staff can help increase knowledge and skills. However, supervision requires effective leadership and management skills, in addition to necessary support from authority figures. (1) Performance based financing; paying health providers based on their performance, can be implemented to increase motivation and satisfaction and improve healthcare service quality. (1) (18) But this will require improving the health financing system in Sudan

first, in order for it to be sustainable. (1) To address human resources issues, it is crucial to revisit human resource policies and effectively address the gaps in management. Infrastructure and supplies depending on their availability and quality, can influence both human resources and patient satisfaction by either being facilitators for or barriers to delivery of quality healthcare. Poor infrastructure impedes timely service provision, has implications on patient safety and contributes to dissatisfaction in both patients and health providers. The lack of availability of supplies can have a direct impact on patient outcomes, especially in the case of emergencies. Irregular availability of medicines was found to be associated with non-adherence and discontinuation of therapy. Moreover, unavailability of some medicines prompts their purchase from unauthorized sources. It is therefore vital to activate the existing pharmaceutical regulatory bodies. Furthermore, using predefined standards is necessary to assure the safety and effectiveness of medicines, vaccines and equipment. (1) Applying quality interventions may not be possible if infrastructure is not in place. This is not only limited to buildings, but elements such as a reliable water supply systems, electricity and proper roads should be in place. It is therefore imperative to engage the government and stakeholders in the building, rehabilitation and provision of these services.
A well-established information system is requisite for quality of healthcare services. Evidence of incomplete and poor-quality data within health facilities shows that information generated from these sources can be completely unreliable. And therefore, can hamper quality improvement efforts. Moreover, none of the studies demonstrated the reporting of data from the facilities to higher levels.

Evidence-based clinical guidelines represent the core for effective care. However, lack of use of guidelines is a major issue in Sudan. Ample evidence has shown lack of adherence to guidelines; as a result of either unavailability, or just a lack of compliance despite their availability. Ineffective management especially for very serious diseases such as malaria, can have detrimental consequences on patients' lives. Plentiful evidence involving medication errors and inefficient drug use indicates a serious problem within the country. Prescribing errors where the most frequently encountered medication errors. Irrational use of antibiotics which carries serious public health risks is also a major problem. Furthermore, there is a clear issue regrading communication between doctors and pharmacists about prescriptions, which needs to be addressed. It was also found that there is no monitoring and supervision despite the presence of the responsible entities within facilities; necessitating the need to explore reasons behind it. Surprisingly, studies involving diagnostic errors and errors with procedures linked to outcomes were not found by this study's literature search. Clinical guidelines and protocols need to be available for different clinical conditions and they should be up to date. (1) (18) It is also important to ensure their availability in healthcare facilities and within the reach of providers. Implementation of audits is then important to ensure adherence to guidelines and protocols by tracking use, it's also then important that providers receive feedback on this to aid improvement. (1) (18)
It was very much expected that safety and infection control measures within healthcare facilities do not comply to standards. Even with the presence of hospital-based quality committees; again, an area that needs to be addressed. Studies about hospital acquired infections would have been interesting to see, however, non were obtained. Adoption of interventions such as inspection of healthcare facilities for minimum safety standards; use of safety guidelines and checklists to reduce harm on patients; and reporting of adverse events, are necessary for the improvement of quality. (1) (18) These

interventions don't only lower morbidity and mortality, but reporting increases transparency and accountability. (1)
The findings made it obvious that patient-centeredness in Sudan is not well-regarded in healthcare service delivery. Lack of communication with patients and involving them in their management is deficient. Many instances from the findings where there is a lack of compliance or adherence to treatment could've been addressed by proper communication and asking patients on their opinions and concerns regarding management. Moreover, Sudan is a multicultural and multiethnic country; clear understanding needs to be established between patients and health providers about needs and preferences in order to achieve satisfactory outcomes. Promotion of people-centered care is a necessity. Fostering shared decision making between patients and health providers and allowing patients to give feedback on experience of care help to improve quality of healthcare services. (1) (18) Also, studies involving quality of care from a demand side should be investigated.
It is most likely that patients, especially those who are poor, and illiterate do not know about their rights when it comes to healthcare. The lack of equity in distribution of healthcare services, established from the literature and findings confirm that socioeconomic status (poverty and rural residency) is associated with poor quality of care. These people were also prone to not receiving timely care as a result of contextual, personal and health system obstacles. Timeliness is also most important in emergency care; however, no studies were found in that area.
There is not much focus on integrated healthcare services in Sudan. However, engagement of pharmacists in the management of diabetes patients was found to improve outcomes. Integration of services, and the presence of coordinated care can have positive effectives on patients' outcomes. From the findings, this could especially apply to mental health management, diabetes care, hypertension and maternal care. There's a need for further studies on quality of care and integrated healthcare services in Sudan.

Weaknesses in some governance functions are apparent and negatively influence quality of healthcare services. Failure in acquisition of adequate resources and poor resource management results in shortages and delays in service delivery, which is inconvenient for both patients and healthcare providers.
Many issues related to health financing were indicated by the findings. Formulation of effective mechanisms for health financing and then linking them to improving quality of healthcare services is very fundamental. More research on financing could be useful to find ways to improve healthcare service quality.
Sudan has a well-established healthcare system structure, in addition to the presence of various legal and regulatory entities. However, it's clear that enforcement and implementation of policies and regulations are a challenge. An example of this is the lack of regulation of the private sector which has been mentioned in various reports, however, research studies about healthcare service quality in the private sector are very limited.

It is of great advantage that a comprehensive national quality healthcare policy and strategy have been formulated. Although the policy addresses governance and accountability, in addition to putting emphasis on information and measurement indicators, it will require a great amount of collaboration and involvement of all stakeholders to achieve its goals.

Success of quality improvement interventions requires the availability of adequate resources, commitment, and continuous monitoring and supervision.

6 CONCLUSION AND RECOOMMENDATIONS:

Quality of care is indispensable for the realization of universal health coverage, which in turn contributes to the sustainable developmental goals that Sudan has committed to. In order to improve health outcomes, it is important to determine the factors that influence healthcare service quality. By knowing and understanding these factors, outcomes such as increased morbidities, disabilities, and deaths can be averted. Furthermore, economic and developmental outcomes can be improved. There are major gaps in quality of healthcare services in Sudan. Several factors that influence healthcare service quality were identified. These fall into contextual factors; population factors; leadership and governance factors; resource factors; and service delivery factors. They are all interrelated and together influence health outcomes and consequently contribute to population health status.
Political decisions including commitment to health and healthcare service quality and inequities in distribution of resources and poverty have the highest influence on quality of care. Governance functions and financing of the health system are also very important.
It has been revealed from the study that the most common health issue related to quality of care is medication errors, the most prominent among these are prescribing errors. self-medication, irrational use of antibiotics, and lack of patients' compliance with medications are also major issues. Other problems related to quality of healthcare services include, problems with adherence to clinical guidelines and protocols, suboptimal safety and control measures and disregard for people-centered care.
Evidence-based quality interventions to address problems in quality of care were identified and some key interventions were suggested for some of the major findings. These include: Health literacy, Peer support and expert patient groups, community empowerment through formal inclusion, to make contributions in health, Training and supervision of staff, Performance based financing, Regulation of medicines and assurance of safe and effective medicines, vaccines and equipment that conform to standards, Implementation of audits to ensure adherence to clinical guidelines and protocols, use of safety guidelines and checklists to reduce harm on patients; and reporting of adverse events, and Fostering shared decision making between patients and health providers.
The study was also able to identify some research gaps that need to be explored. Based on the literature, findings, and discussion, some recommendations have been formulated:

1- Government level:
    a. Inclusion of the government within the accountability framework whereby it becomes accountable for the health system. And increasing commitment towards quality of healthcare services through the allocation of more funds to finance it.
    b. To strive for conflict resolution and protection of healthcare facilities and infrastructure from threats.
    c. To address economic issues, poverty and inequities in distribution of health services and resources.
    d. To build, rehabilitate and provide infrastructure that facilitates provision of quality healthcare services (buildings, roads, water, electricity. etc)
2- Health system level:
    a. To work on strengthening the healthcare financing system and formulate effective and sustainable mechanisms whereby people can easily access healthcare services that are of good quality.
    b. To strengthen the role of governance by establishing, implementing and monitoring the accountability framework; ensuring adequate resources for the

healthcare system; advocacy for quality of healthcare services; engagement and coordination of all partners and stakeholders to improve quality of healthcare services; enforcing regulations and implementation of policies that contribute to healthcare quality (eg. drug policies)

c. To promote quality of care and build capacities on all levels of the health system on how to improve quality of healthcare services.
d. To Strengthen the information and reporting system at all levels, ensuring the use of the information to measure and improve quality of services; monitoring and supervision of all quality related activities.

3- Healthcare Facilities level:
    a. Recognition of and ensuring patients' rights
    b. To support and monitor and supervise all quality improvement interventions within healthcare facilities.
4- Research:
    a. Conduct research on financing and how it could be used to improve healthcare quality.
    b. Studies on quality of care from the demand side.
    c. Studies on quality of care and integrated healthcare services in Sudan.
    d. Studies about quality of care during medical emergencies.
    e. Studies exploring the reasons why there is no monitoring and supervision of services despite presence of responsible bodies.
    f. Studies about diagnostic errors and procedure errors linked to outcomes.
    g. Studies about hospital acquired infections
    h. Studies about quality of healthcare services in the private sector
    i. Studies comparing quality of healthcare in Sudan to other countries

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Annex:

Table 5.1 **Illustrative quality interventions**

Category	Interventions
System environment	• **Registration and licensing** of doctors and other health professionals, as well as health organizations, is often considered a key determinant and foundation of a well performing health system. • **External evaluation and accreditation** is the public recognition, by an external body (public sector, non-profit or for-profit), of an organization's level of performance across a core set of prespecified standards. • **Clinical governance** is a concept used to improve management, accountability and the provision of quality health care. It incorporates clinical audit; clinical risk management; patient or service user involvement; professional education and development; clinical effectiveness research and development; use of information systems; and institutional clinical governance committees. • **Public reporting and comparative benchmarking** is a strategy often used to increase transparency and accountability on issues of quality and cost in the health care system by providing consumers, payers, health care organizations and providers with comparative information on performance. • **Performance-based financing and contracting** is a broad term for the payment of health providers based on some set of performance measures and is increasingly used as a quality lever. The amount contingent on performance is often a subcomponent of the full payment, which may be based on a range of financing modalities. • **Training and supervision of the workforce** are among the most common interventions to improve the quality of health care in low- and middle-income countries. • **Medicines regulation** to ensure quality-assured, safe and effective medicines, vaccines and medical devices is fundamental to a functioning health system. Regulation, including post-marketing surveillance, is needed to eliminate substandard and falsified medicines based on international norms and standards.
Reducing harm	• **Inspection of institutions for minimum safety standards** can be used as a mechanism to ensure there is a baseline capacity and resources to maintain a safe clinical environment. • **Safety protocols**, such as those for hand hygiene, address many avoidable risks that threaten the well-being of patients and cause suffering and harm. • **Safety checklists**, such as the WHO Surgical Safety Checklist and Trauma Care Checklist, can have a positive impact on reducing both clinical complications and mortality. • **Adverse event reporting** documents an unwanted medical occurrence in a patient resulting from specific health services or during patient medical encounters in a medical care setting and should be linked to a learning system.

Source: Delivering quality health services, WHO 2018 (1)

Category	Interventions
Improvement in clinical care	• **Clinical decision support tools** provide knowledge and patient-specific information (automated or paper based) at appropriate times to enhance front-line health care delivery. • **Clinical standards, pathways and protocols** are tools used to guide evidence-based health care that have been implemented internationally for decades. Clinical pathways are increasingly used to improve care for diverse high-volume conditions. • **Clinical audit and feedback** is a strategy to improve patient care through tracking adherence to explicit standards and guidelines coupled with provision of actionable feedback on clinical practice. • **Morbidity and mortality reviews** provide a collaborative learning mechanism and transparent review process for clinicians to examine their practice and identify areas of improvement, such as patient outcomes and adverse events, without fear of blame. • **Collaborative and team-based improvement cycles** are a formalized method for hospitals or clinics to work together on improvement around a focused topic area over a fixed period of time with shared learning mechanisms.
Patient, family and community engagement and empowerment	• **Formalized community engagement and empowerment** refers to the active and intentional contribution of community members to the health of a community's population and the performance of the health delivery system, and can function as an additional accountability mechanism. • **Health literacy** is the capacity to obtain and understand basic health information required to make appropriate health decisions on the part of patients, families and wider communities consistently, and is intimately linked with quality of care. • **Shared decision-making** is often employed to more appropriately tailor care to patient needs and preferences, with the goal of improving patient adherence and minimizing unnecessary future care. • **Peer support and expert patient groups** link people living with similar clinical conditions in order to share knowledge and experiences. It creates the emotional, social and practical support for improving clinical care. • **Patient experience of care** has received significant attention as the basis of designing improvements in clinical care. Patient-reported measures are important unto themselves; patients who have better experience are more engaged with their care, which may contribute to better outcomes. • **Patient self-management tools** are technologies and techniques used by patients and families to manage health issues outside formal medical institutions and are increasingly viewed as a means to improve clinical care.

Source: Delivering quality health services, WHO 2018 (1)