Supply-side barriers and health system concerns in five high maternal mortality settings in Africa

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Abstract

Background: Chad, Central African Republic (CAR), Sierra Leone, Liberia and Nigeria are among the seven African countries with the highest rates of maternal mortality globally due in the main limited facility deliveries and basic emergency obstetric care.

Data Source and Methods: The study sought to contextualize supply-side barriers that encroach on maternal mortality by examining some health system concerns confronting selected African countries. The study makes use of data from the World Bank and adopts a descriptive-analytic approach. Current Health Expenditure of less than 10% in four countries and Domestic General Government Health Expenditure of less than 2% in all five countries evinced underfunding of health.

Results: In all five countries, the proportion of skilled health workers fell well short of the WHO requirements for density of doctors and nurses.

Conclusion: The onus on individuals to pay for health care was formidable in Nigeria. CAR had the lowest proportion of births attended by skilled health personnel. CAR and Sierra Leone relied heavily on External resources for funding health.

Keywords: Maternal mortality, maternal health, obstetric care, Africa, health system

Introduction

Maternal health care plays a pivotal role in bringing down maternal morbidity and mortality levels (WHO 2016b). UNICEF (2019b) contends that MMR figures have stabilized in most countries due to women obtaining medical care during pregnancy and childbirth, the timely identification of possible difficulties that may arise during labour, access to antenatal care and curbing the number of home births. Gage, Ilombu & Akinyemi (2016) noted that most maternal deaths are avoidable and can be prevented with emergency interventions including access to basic surgery for caesarean sections, blood supplies for hemorrhage and drugs for eclampsia and infection. However, these maternal health offerings are less than ideal in developing countries.

Singh (2016:1) notes that in developing countries, many impediments deter the uptake of maternal health care services. The existence of both supply and demand side barriers may restrict access to suitable health care and delivery in a health facility. The three delays model purports that mortality can be blamed on three sets of circumstances, namely, a delay in choosing to obtain care; secondly a delay in coming to a health care facility, and thirdly a delay in dispensing or receiving care (Hurst, Semrau, Patna, Gawande et al. 2015:2). The model is operative for both demand and supply side barriers. Some notable demand-side barriers include insufficient income, social and cultural customs, remoteness to health centers, unavailability of transport to ferry the sick to a health care center, poor treatment at the hands of nursing staff, reliance on traditional healers, poor state of roads, unhappiness at being examined by a male nurse, avoidance of early disclosure of pregnancy status, poor knowledge about the whereabouts of health care centers and perceptions about health care delivery (World Bank 2019c; Kyei-Nimakoh, Carolan-Olah & McCann 2019; Hurst et al. 2015).

Some of the supply-side barriers impinging on healthcare access and utilization include the cost of treatment, lack of transparency regarding costs, the uphazard state of health care centers, non-payment of support staff such as community agents, shortage of proper equipment and medicines; lack of properly trained staff, staff shortages and weak or non-existent referral practices (World Bank 2019a; Kyei-Nimakoh et al. 2019). The uneven distribution of health care facilities favours urban women at the expense of their rural counterparts (Tracey, Bolkan & Sagbakken 2018:1). In rural settings, factors such as transport costs and distance deter women from accessing health care facilities and hamper facility delivery (Bonawitz, McGlasson, Kaiser, Ngoma et al. 2019).

Edoka (2016) points out that transport costs may be more significant in impeding access than user fees themselves. A 2009 study of Sub-Saharan African countries using data between 1997 and 2006 found firstly an inverse and significant correlation between MMR and per capita government expenditure on health. Secondly, the study showed a significant direct correlation between MMR and out-of-pocket expenditure on health, that is, the greater the extent of Out-Of-Pocket Expenditure on health in a country, the higher was the MMR (Alvarez, Hernandez & Gil 2009). A study by Illias, Balram, Ankit & Nasim (2019) conducted in West Bengal found that the delay in receiving suitable healthcare was responsible for 18.9% of maternal deaths.

It has been widely acknowledged that some features of the health system affect access to and delivery of maternal health care (Graham 2002; Parkhurst, Penn-Kekana, Blaauw, Balabanova et al. 2005; Alvarez et al. 2009; Jaeger, Bechir, Horouna, Moto et al. 2018.; Azestop & Ochieng 2015; Akokuwebe & Okafor, 2015; Gunawardena, Bishwajit & Yaya 2018; Hirai, Morris, Luoto, Ouda et al. 2020; Illias et al. 2019). We can infer that how a country fares with regard to maternal mortality and maternal health is contingent on the state of its health system. In fact, certain weaknesses in the health system may fuel high levels of maternal mortality. A key supply-side barrier undermining the delivery of appropriate health care is the state of the health system. This in turn affects the range of maternal health care offerings, as well as the quality and availability thereof. The objective of the study is to examine health system concerns existent in five high maternal mortality settings in African countries. Specifically, we focus on two health system concerns, namely, health expenditure and human resource levels.

Seven countries in Africa have the highest maternal mortality ratios (MMR) which exceed both the world figure (216) and that for least developed countries (434). These countries are Liberia (725); Sierra Leone (1360); Chad (856); CAR (882); Nigeria (814); South Sudan (780) and Somalia (782) (United Nations Development Programme 2018). We focus only on five countries, namely, Liberia, Sierra Leone, Chad, CAR and Nigeria and exclude South Sudan and Somalia due to the unavailability of data.

Literature review

The global maternal health agenda

The inclusion of maternal health, as a separate Goal in the Millennium Development Goals (MDGs) shone the spotlight on an important public health issue. The Sustainable Development Goals (SDGs) continues on the path of the MDGs. Goal 3 seeks broadly to guarantee healthy lives and bring about well-being (UN WOMEN and United Nations, 2019). Reproductive health matters are catered for in the SDGs in terms of Targets 3.1, 3.2 and 3.7. Target 3.1 spells out that by 2030, the MMR should be less than 70 per 100 000 live births. Target 3.1 subsists of 2 indicators, namely, 3.1.1 (dealing with the MMR) and 3.1.2 (dealing with the share of births attended by skilled health workers) (WHO 2019b).

Even in the African continent, the severity of the issue prompted the African Union (AU) to voice concern over the sidelining of maternal deaths. The body duly put forth the Campaign on Accelerated Reduction of Maternal Mortality in Africa (CARMMA) to impel member states to bring down the number of maternal deaths in their respective countries (Department of Health 2012). Moreover, Agenda 2063, a blueprint for socio-economic development on the African continent, recognizes the importance of reproductive health in the overall well-being of women (African Union 2017).

A contextualization of maternal mortality

According to the World Health Organization (WHO 1997:n.p.) a maternal death "is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes." A measure of maternal deaths is given by the MMR which is defined as the proportion of deaths per 100 000 live births (WHO et al. 2015). UNICEF (2019b) points out that in the past two decades the number of maternal deaths fell from 532,000 in 1990 to 303,000 in 2015 (a 43% decrease). In 2015, the global MMR stood at 216. In 2017 the global MMR was estimated to be 211, falling by 38% between 2000 and 2017 (WHO 2020). Trailing behind HIV/AIDS, maternal mortality in 2016 was listed the second leading cause of death among women of reproductive age and the leading cause among those aged 15 to 29 years (WHO 2019b).

According to Piane (2019:83) "every four years almost one million African mothers die from preventable health conditions whilst women in wealthy nations give birth with very little risk." Roughly, as much as 95% of all maternal deaths take place in low-income and lower-middle-income countries and two-thirds or 65% of them happen in the WHO African Region (WHO 2019b). Sub-Saharan Africa accounts for over 50% of the global maternal mortality tally. However, since 2000, Sub-Saharan Africa saw a 40% decrease in MMR (WHO 2020).

The WHO (2019b) acknowledges that the extremely high number of maternal deaths in certain countries is indicative of the inequalities in access to healthcare and underlie both income and residential disparities. Poor women in rural areas are most often denied sufficient health care and have to contend with serious shortages of skilled health personnel. Globally in 2015, 89% of births in the richest 20% of the households had a skilled health attendant compared to 43% in the poorest 20% of households. In 2017, one in four women died in low-income countries due to pregnancy and childbirth complications (WHO 2019b). The reality is such that millions of births take place without the help of a midwife, a doctor or a trained nurse. Each maternal death in low-income countries undermines the well-being of existing family members as well as the community at large and may usher in inter-generational poverty (WHO 2019b).

Factors impinging on maternal mortality

The WHO (2019b) stresses that all women should be afforded uniform access to the full spectrum of care, namely, antenatal care, delivery care and post-natal care at the appropriate time. An essential requirement in lowering both maternal and neonatal deaths and morbidity is to make sure that skilled birth attendants (nurses, doctors or midwives) attend delivery. Whilst the proportion of skilled birth attendance has grown substantially in recent years, it has not been uniform across all countries. Skilled birth attendance rates are however, especially limited in poor countries that are saddled with steep levels of maternal deaths. Worse still is the fact that millions of births take place annually without skilled birth attendants (UNICEF 2019b).

Another crucial input to prevent maternal deaths is access to facilities equipped to deal with emergency obstetric cases (UNICEF 2019). Evidence shows that delivery at a facility that has the capacity to undertake either basic emergency obstetric and neonatal care (BEmONC) or comprehensive emergency obstetric and neonatal care (EmONC) brings about improved results in respect of both maternal and infant health ((Bonawitz et al. 2019). UNICEF (2019b) notes that a caesarean section or C-Section is a key component of comprehensive emergency obstetric care, which can subdue maternal and newborn mortality and morbidity. In 2015 there were approximately 29.7 million C-Section deliveries worldwide, representing a jump from 12 to 21% (around 16 million) since 2000. In Latin America and the Caribbean, C-Sections stood at 44% of all deliveries in 2015 and was tenfold that of West and Central Africa (close to 4%). The small number of C-Sections in West and Central Africa is reflective of the inadequate access to potentially life-saving medical intervention (UNICEF 2019b).

Evidence indicates that large parts of Sub-Saharan Africa are lagging in their efforts to make available basic emergency obstetric care (BEmOE) (Gage et al. 2016). Sadly, in Africa, besides many health facilities being poorly equipped, they do not have skilled medical staff to undertake such interventions. In addition, there are shortages of crucial drugs and medical equipment coupled with the absence of well-functioning referral and transportation services. Worst still a requirement such as blood for performing caesarean sections are often unavailable (Ministry of Health and Sanitation 2017).

Supply-side factors in high maternal mortality settings in Africa

Supply-side factors are features of the health system that end-users have no influence over (Singh 2016:2). This point is very pertinent and underscores governments' role in healthcare provision. We briefly look at the supply-side constraints in five African countries.

(1) Sierra Leone

Sierra Leone's maternal mortality outlook is daunting. Almost 81.8% women die at a health facility; almost 14.1% die at a community level facility while 4.2% of deaths occur in transit (Ministry of Health and Sanitation 2017:23). Two events, namely, the eleven years of civil war and the outbreak of the Ebola epidemic in 2014-2015 severely compromised Sierra Leone's already fragile health system (Figueroa, Linhart, Beckley & Pardosi 2018). These events dislocated the health system and triggered wholesale destruction of health infrastructure together with a steep exodus of skilled health workers. The introduction of the 'Free Health Care Initiative' (FHCI) in 2010 had limited impact in pushing up access to health care services and reducing the costs of seeking medical intervention. An evaluation of the functioning of FHCI found there was limited use of public health care facilities and that pregnant women were still responsible for the cost of medicines and medical supplies due to a shortage of drugs in most public health care facilities (Edoka 2016).

Only 2% of births took place in an EmOC facility, way short of the required 15% of expected births (Jones & Ameh 2015). Sharkey, Yansaneh, Bangura, Kabano et al. (2017) found that over one-third of all births took place at home. In their study, they found factors such as long distances to facilities and limited availability and means of transport were significant

factors that were largely accountable for women not delivering in a health care facility. During the Ebola epidemic, the heavy exodus of health personnel saw maternal mortality rates climbing to those existent in 2000. The whole episode was accompanied by the closure of key health centres, a 25% decline in facility deliveries due to mistrust of health workers and increased use of traditional birth attendants (Figueroa et al. 2018).

The Sierra Leone National Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCAH) Strategy 2017 – 2021 (Ministry of Health and Sanitation 2017:13) singled out supply-side barriers that pertain to the "health system related bottlenecks" as being primarily to blame for the maternal mortality tally. The country was inundated with human resources shortages pertaining 'critical cadres' of skilled staff to undertake critical medical intervention. The health worker density stood at two skilled health care workers per 10,000 which is below the WHO recommended minimum of 23:10,000. There was also low staff morale; uneven distribution of health personnel regionally; inadequate medical supplies; a shortage of ambulances; poor referral systems; and poor supply chain management (Ministry of Health and Sanitation 2017:15).

An assessment of the state of health care facilities in 2016 uncovered that the majority of health care facilities had deficiencies in some or all of the sixteen trace commodities for RMNCAH. Lack of safe blood in CEmONC sites posed a challenge to Delay 3 in terms of conducting life-saving interventions such as C-Section. Blood stock outs were due to poor infrastructure and amenities, deficient laboratory processes and a shortage of donors. There was also poor infrastructure including water, power sources and needed equipment for delivering RMNCAH services especially 24/7 EmONC services. Sierra Leone's shortfall in infrastructure meant that there were only 1.2 suitably functioning EmOC facilities per 500,000 population which was below the recommended number of at least five EmOC facilities per 500,000 population. Most labour wards, theatres and post-natal words had no piped water connections and source of power. There were shortages of vital equipment such as blood pressure machines, delivery beds and neonatal equipment. Sierra Leone also has high out-of-pocket expenditure for health, which hinders access to health care (Ministry of Health and Sanitation 2017: 31-32).

(2) Central African Republic (CAR)

The CAR bore the brunt of decades of war and instability which negatively impacted on the country's health system and which triggered the second highest MMR (Relief Web International 2017). Advancement in the health domain over the past few year have not yielded much positive outcomes as health care continues to be inaccessible and expensive for most people. The health system lacks proper co-ordination by the state which has largely removed itself from the public provision of health care. Health infrastructure is in a dire state. Health provision in the CAR is weighed down by an acute lack of transport, which is compounded by other factors such as health centers being far removed, and requiring long travelling times, as well as the state of roads, which may be either impassable or unsafe to use. Residing far away from the nearby health care facilities means that many women opt for home deliveries (Relief Web International 2017).

All health costs are borne privately even if health services are dispensed by state health facilities. Women that do decide to go to a clinic for delivery, encounter many deficiencies. Firstly, there are only a limited number of health care centers that well-equipped to deal with medical complications such as hemorrhaging or have the needed expertise to undertake surgical interventions, especially C-Sections (UNICEF 2016). The availability of health personnel exhibits clear failings. In terms of skilled health personal, the country has fewer than three physicians and nine nurses per 100,000 people. The country has less than two licensed midwives per 100,000 people (UNFPA 2014).

(3) Chad

Civil war as well as and more recently insurgency by Boko Haram have not only been a drain on the government coffers but led to many regional hospitals being destroyed (Financial Times 2016; Hasan, Djekonbe & Dombou 2019). In 2015 only 22% of births took place in a health facility while in rural areas, the figure fell to 14%. Only a fractional number of C-Sections were performed, namely 3.8% in urban areas and 0.8% in the rural areas (Danawi, Deen & Hasbini 2016). The country's high MMR is due to widespread under-resourcing of health facilities, shortages of skilled health care workers, emergency and obstetric care being largely inaccessible, scarcity of medicines and vaccines, a poorly run referral system, insufficient supplies of bed nets, inadequate hygiene training to manage infection and workers not being paid (Azestop & Qchieng 2015:8).

In spite of the Chadian government's endeavors in 2008 to provide free health care in respect of emergency surgical procedures, obstetric and medical care, it made little headway (Azestop & Qchieng 2015:3). The 13 health centers located in the different regions are under-equipped and understaffed with one nurse attending to a thousand

people and surgery undertaken without adequately trained medical staff (Azestop & Qchieng 2015:3; Danawi et al. (2016). The number of health workers was limited as the country only had 3 trained health workers (namely, doctors, nurses or midwives) per 10 000 population which was below the WHO stipulated minimum threshold required to guarantee essential maternal and child health care of 23 health workers per 10 000 population. In terms of service delivery, the availability of EmONC services (percentage of minimum acceptable level) in 2011 was 2% (Danawi et al. 2016).

People have to travel a distance on average of 14.4 kilometers to receive or access health care. The condition of the country's roads also pose a problem with many of them being impassable. Such circumstances push people to use traditional healers. Income barriers existed in the form of out-of-pocket payments, which, were deeply entrenched, even for free public services. The out-of-pocket payments continued to be the foremost source of healthcare funding and made-up about 50% of total health outlay (Azestop & Qchieng 2015:3).

Rural areas were largely beset by a shortage of health care workers (Jaeger et al. 2018:1). Pregnant women in rural areas and newborn babies received very little healthcare and were forced to travel long distances, often by foot to reach a health care facility or to be attended to by a doctor (Doctors of the World 2017). These circumstances have meant that a large number of women died without getting any medical care.

(4) Nigeria

Close to one hundred and forty-five Nigerian women die in childbirth every day (Piane 2019:83-94). Nigeria is home to nearly 20% of all global maternal deaths (WHO 2019a). Between 2005 and 2015, the count of maternal deaths was 600 000 and no less than 900 000 maternal near-miss cases took place. The utilization of maternal health care services is meagre in Nigeria with only 36% of births taking place in a health facility and 38% of births being aided by a skilled health worker (Gage et al. 2016). The underlying health system and maternal health care system are constrained in their efforts to bring down the tally of maternal deaths (WHO 2019a). In Nigeria there is inadequate access to health care facilities coupled with poor utilization of healthcare facilities. The proportion of Nigerian women who get crucial post-natal care such monitoring of and attending to complications for two days after delivery is less than 20%. Deficiencies in the health system is palpable in the shortage of health care facilities, insufficient numbers of qualified staff, lack of needed equipment and poor staff attitudes (Akokuwebe & Okafor 2015). Health care delivery in Nigeria is diverse with approximately one-third of all private health care facilities and three-quarters of the hospitals in the hands of the private sector. Nigeria has 34,000 primary health care centers. However, many women do not use the primary health care centers as they experience staff shortages and are under-equipped. Studies focusing on the supply-side factors that impinge on the use of maternal health care services in Nigeria have found that there are disparities existent in both the condition of health care facilities as well as in their functioning. Evidence indicates that the health care system possess shortcomings pertaining to the health workforce and medical equipment. Furthermore, it has been shown that privately owned health care facilities are more equipped to administer basic and comprehensive emergency obstetric care than public health care facilities (Gage et al. 2016:2).

(5) Liberia

Almost 14 years of civil unrest and instability left the country with a highly dysfunctional health care system that could not cater to the health priorities of women and girls. The weak health care system was further battered by the recent Ebola Viral Disease outbreak. The Liberian health care system has the triple tribulations relating to scarcity of skilled health personnel, weak infrastructure and amenities and poor healthcare delivery (Government of Liberia 2016). Liberia's high MMR emanates from inadequate access to healthcare, poor quality of healthcare, shortfalls in the minimal levels of emergency obstetric care, a steep proportion of home deliveries performed by unskilled people and a scarcity of midwives (UNFPA, Affaires Mondiales, Global Affairs & UNICEF 2016). The proportion of births attended by skilled health personnel was 61%. C-Section rate as a percentage of live births among women aged 15-19 was 4% in 2007 and 2013. Many health care facilities did not have the capacity to provide basic and lifesaving interventions to deal with delivery-induced complications. Other problems include the fact that only 45 of all health care facilities possessed a functional blood bank (Government of Liberia 2016).

The procurement of essential medication was hampered by poor supply chain management processes, shortage of financing, poor management, theft and a flawed storage of essential drugs. In terms of human resources, there were inadequate skilled health care personnel such as midwives and physicians. The country had a small number of skilled birth attendants, namely 1.15 per 1 000 population,

which fell short of the estimated minimum threshold of 2.3 doctors, nurses or midwives per 1,000 people such that 80% of births have a skilled birth attendant present. Community health worker per 1 000 people was 0.04 in 2004. Nurses and or midwives per 1,000 people was 0.3 in 2004 and 0.27 in 2010. The poor quality of health care delivery was evident in the limited training of health personnel, for example, only 31.3% of the 73.5% of health personnel had been trained on the procedure of bimanual uterine compression (UNFPA et al. 2016; Government of Liberia 2016).

Poor perceptions about the quality of health care dispensed at health facilities also undermined the level of facility deliveries. There was limited demand for reproductive, maternal and neonatal healthcare services including antenatal care and skilled care during delivery, which were compounded by suboptimal service delivery and unsafe social and cultural practices. In many regions of Liberia, community-based care is virtually non-existent (UNFPA et al. 2016).

Another drawback in obtaining health care is the uneven regional distribution of health care facilities. Approximately 29% of the population in Liberia, mainly those situated in rural areas have to walk more than 60 minutes or 5km to reach the nearest health care facility. In places such as Gbarpolu, as much as 68% of the people endured this difficulty (Government of Liberia, 2016). Indirect financial costs of care, physical access as well as extensive distance to facilities also limited access to health care. Other problems that arise are poor communication channels due to weak mobile network systems and poor infrastructure investment, preventing women from obtaining care close by or even seeking assistance by phone. Poor road infrastructure also posed challenges (UNFPA et al. 2016). The steep out-of-pocket expenditure on health (51%) of total health expenditure in 2011-12 was yet another factor that restricted access to health care services (Government of Liberia, 2016).

Methodology

The study adopts a descriptive-analytic approach and seeks to contextualize supply-side barriers that encroach on maternal mortality by examining some health system concerns confronting selected African countries. We focus on two aspects of the health system, namely, health expenditure and human resources. The study does not seek to quantify the different variables. It makes use of published data from the World Bank Group.

Discussion

Health systems and maternal healthcare

According to Graham (2002), the provision of maternal health care rests on the state of the health system in totality. A sound health care system underpins the maternal welfare of women of childbearing age (Akokuwebe & Okafor 2015). Most experts in the field of maternal health contend that the health system plays a vital role in tackling maternal health. If a country's health system is well resourced, and functions optimally, then the different dimensions of health care including maternal health should stand to benefit and thereby engender good quality health care. A health systems approach is pertinent when dealing with the provision of maternal health care delivery. A health systems approach entails analyzing how broader health system concerns influence the execution, functioning and delivery of health care services. The basis of the health systems approach imply that certain shortcomings in a country's health system can be observed in terms of health care personnel, organization, management, delivery of health services, financial matters and other factors (Parkhurst et al.2005). According to Yaya, Uthman, Bishwajit, Ekholuenetale (2019:1) maternal mortality in Africa must be contextualized in terms of the state of its health system, which has failed its women in terms of tending to their healthcare needs.

Certain features of the healthcare system may determine whether women are able to seek health care during pregnancy and childbirth (Raman et al. 2017). Exorbitant health care costs before, during and after childbirth may be liable for pushing pregnant women to undergo risks to themselves and their babies. The gulf in respect of facility-based delivery is widest between the poorest and the richest women in West and Central Africa due in the main to access to health care (UNICEF 2019a).

Health system concerns

Supply-side factors affecting maternal health and facility delivery in most countries is symptomatic of wider health systems issues or constraints. Gunawardena et al. (2018) who reviewed studies in West Africa that focused on impediments confronting health care facilities pertaining to delivery found that human resource constraints was frequently cited in all studies. This shortcoming typified the need for nurses and midwives. Furthermore, this factor related to Delay 3, namely, the delay in obtaining good care once at a facility.

Skilled health workers such as doctors, nurses and midwives are deemed core frontline cadres (UNICEF 2019b). They make up the fabric of the health care system and epitomize its smooth operation. The shortage of medical doctors in many developing countries pushes the onus on nurses to dispense the

entire range of curative and preventative care more so in rural areas. This kind of shortage led to doctors' responsibilities being transferred to less qualified personnel (Jaeger et al 2018:2). Anomalies in health care provision are stark in that 73 countries that account for 96% of the global burden of maternal mortality, have less than 42% of the world's midwives, nurses and doctors. Indicators such as the number of skilled health personnel per 10 000 population are proxy measures of maternal health service delivery (UNFPA 2014).

For the period 2013-2018, statistics show that roughly 40% of all countries had less than 10 medical doctors per 10 000 people. Yet, this situation occurred in 90% of low-income countries and only 5% of high-income countries. In 2017, the average or mean global density of doctors stood at 15 per 10 000 people. In terms of nursing and midwifery health personnel, nearly 93% of low-income countries had less than 40 of such workers per 10 000 people, compared to a low figure of only 19% of high-income countries. Almost 64% of countries had less than 5 dentists per 10 000 people and 60% of countries had less than 5 pharmacists per 10 000 people (WHO 2019b).

During the years 2010 to 2017, the proportion of health personnel rose in many countries but the increment was lowest in developing countries, which bore the major share of maternal and neonatal deaths. For example, between 2010 to 2017, Mozambique recorded an increment of 4 to 5 health workers per 10,000 people and Ethiopia saw a jump from 3 to 9 health workers per 10, 000 people. Over the same period, Norway witnessed a rise of 213 to 228 health workers per 10, 000 people (UNICEF 2019b). Since 2017 Africa had a total health workforce, which was estimated to be 1.9 million (doctors, nurses and midwives). In effect, there was still a 3.7 million deficit of the total 5.6 million required if each country were to fulfil the WHO minimum standards (WHO 2019b).

Human resource levels in five African countries

Proper functioning of the health system rests on a well-trained cohort of health workers. "A qualified health workforce that is available, equitably distributed and accessible by the population is essential for a well-functioning health system" (WHO 2019b:49). Normally as the level of income in a country rises, the amount of health workers to cater to the population should also escalate. Table 1 shows that the compromised state of health in five African countries is clear-cut as they fared poorly in some dimensions that clearly fell short of the WHO recommendations. During the period 2009-2018, the severe shortcomings concerning skilled birth attendance was prevalent in Chad (40), CAR (20) and Nigeria (43) which were below the African region figure of 59 births attended by skilled health personnel. The WHO standards stipulate a minimum of 44.5 doctors, nurses and midwives per 10 000 people. During the period 2009-2018, the density of doctors was less than one in Chad, CAR and Liberia. In terms of skilled health care workers, the WHO advocates an amount of 23 per 10 000 people (Government of Liberia 2016). In the five-country subset, this amount ranged between 1.0 and 14.5 during the period 2009-2018. Shortages of skilled health personnel in these five countries lagged behind both global and African regional tallies. The number of hospital beds per 1 000 people was severely constrained for Chad, Nigeria and Sierra Leone but levels for all five countries were under both the global and Sub-Saharan levels.

Table 1: Human resources, hospital bed count and skilled birth attendance

INDICATOR	CHAD	CAR	LIBERIA	NIGERIA	SIERRA LEONE	GLOBAL	AFRICAN REGION	SUB-SAHARAN AFRICA
Proportion of births attended by skilled health personnel (%)(2009-2018)	40	20	61	43	69	81	59	
Density of medical doctors (per 10 000 population)(2009-2018)	0.5	0.6	0.4	3.8	1.3	15.1	2.8	1.9
Density of nursing & midwifery personnel (per 10 000 population)(2009-2018)	3.6	2.0	1.0	14.5	10.0	34.8	11.0	
Density of pharmacists (per 10 000 population)(2009-2018)	0.1	<0.1	0.1	0.9	0.3			
Hospital beds (per 1 000 people)	4	10	8	5	4	27		15

Source: World Bank data

Healthcare expenditure in five African countries

Financing of health systems in most African countries is reliant on multiple sources such as government funds, worker contributions, donor funds, household contributions and non-governmental organization contributions. The 2001 Abuja Declaration encouraged African countries to allocate 'at least 15%' of their national budget to health. This was a momentous call, which prioritized health and anchored health systems funding in a countries wider development strategy. The Abuja Declaration was also endorsed in the Maputo Declaration in 2003. In reality, most African countries face a daunting challenge mobilizing domestic funds for healthcare and generating public revenue. This is partly due to the informality of their economies that curb tax collection (WHO 2013).

A reasoned argument is that countries ought to spend a large chunk of their GDP on health given the broad benefits that healthcare transmits to the population at large. Table 2 shows a number of dimensions of health expenditure. In 2017 in terms of Current Health Expenditure, Nigeria followed by Chad had the lowest proportion of Current Health Expenditure as a percentage of GDP, that is, 3.8% and 4.5% respectively. Current health expenditure per capita in 2017 in all five countries straggled behind contribution amounts in Sub-Saharan Africa (US$ 198.00) and low-income-countries (US$ 93.20).

Historically Domestic General Government Health Expenditure as a percentage of GDP in most countries makes up less than 2% of GDP, which is lower than the often-used target of 5-6% of GDP (WHO 2013). Globally in 2016, the mean level of government expenditure accorded to health was 10.6%, varying from less than 2% in some countries to above 20% in other countries. For example in 2016, low-income countries had the smallest share (namely, 6%) whilst the amount stood at over 14% in high-income countries (WHO 2019b). Table 2 shows that in 2017 not much has changed in respect of Domestic General Government Health Expenditure as a percentage of GDP of under 1% was recorded in the case of three countries, namely, Chad and CAR (both at 0.7) and Nigeria (0.5). This implies there was not ample expenditure outlays on health by governments.

Some other denominations of government health funding are presented in Table 2. In 2017, Domestic General Government Health Expenditure per capita was close to US$10 in only Liberia and Nigeria but well short of the figure low-income countries (US$ 23.18). In 2017, Domestic General Government Health Expenditure as a percentage of Current Health Expenditure amounted to less than one-fifth in all five countries and trailed behind the level for even low-income countries (US$ 24.12). Domestic General Government Health Expenditure as a percentage of General Government Expenditure for the period 2009-2018, hovered around 5.0% and 5.9% for Chad, CAR and Nigeria and was below the figure for the African Region (7.3%).

In countries where healthcare receives meagre government funding, Out-Of-Pocket payments are sizeable. Besides Out-Of-Pocket expenditures pushing up the cost of healthcare, they are a hurdle to healthcare access. They also impinge heavily on the financial well-being of households and may push poor households into deeper poverty and financial hardship (WHO 2013). Regarding payments by individuals for health services in the guise of out-of-pocket expenses, the following interesting observations can be made. Out-of-Pocket Expenditure as a percentage of Current Health Expenditure exceeded 30% in all five countries. In 2017, it was highest in Nigeria (77.2%), four-fold that of the global figure. Out-Of-Pocket Expenditure per capita was lowest in CAR (US$7.05) and highest in Nigeria (US$59.67) in line with the extremely high Out-Of-Pocket payments existent in Nigeria. Out-Of-Pocket expenditure as a percentage of GDP was lowest in CAR (1.8%) imply that it made an insubstantial contribution to GDP. Another category of individual spending in health was private spending. Domestic Private Health Expenditure as a percentage of Current Health Expenditure was above 40% in all countries and the highest in Nigeria (76%). This indicates the financial burden placed on individuals to meet healthcare costs.

Table 2 also shows that for most African countries, external funds made up less than one-fifth of total health expenditure. The 2011 WHO Regional Meeting endorsed the view that external sources of funds should play a facilitator role and that financing of health should largely emanate from domestic sources. External funding or (aid) comprised less than 1% of global health expenditure (WHO. 2013). Whilst external funding makes up a tiny and falling share of health expenditure in middle-income countries, it tends to be rising in low-income countries (WHO 2019b). In respect of the level of Total Net Official Development Assistance to medical research and basic health sectors per capita in the period 2009-2018, the level in three countries, that is, CAR (US$10.49), Liberia (US$ 13.79) and Sierra Leone (US$8.72) topped that of the African Region (US$4.83). This is indicative of the reliance on external funding to prop up health systems in some countries.

Table 2: Health care funding and sources

Indicator	Chad	Car	Liberia	Nigeria	Sierra Leone	Global	African Region	Sub-Saharan Africa	Low-Income Countries	Middle-Income Countries
Current Health Exp as a % of GDP (2017)	4.5	5.8	8.2	3.8	13.4	9.9	5.9	5.13	5.48	5.27
Current Health Expenditure per capita (US$)(2017)	30	24	57	74	66	1.356.60	103.00	198.00	93.20	588.15
Domestic General Government Health Exp as a % of GDP (%)(2017)	0.7	0.7	1.4	0.5	1.8	5.9		1.80	1.23	2.78
Domestic General Government Health Exp per capita (US$) 2017	5.80	2.41	9.83	10.33	9.64	940.61		69.19	23.18	292.23
Domestic Private Health Exp as a % of Current Health Exp	60.92	44.19	55	76.66	47.66					
Domestic General Government Health Exp as a % of Current Health Exp (%)(2017)	15.8	12.8	17.2	14.2	13.7	74.26		35.07	24.12	50.90
Domestic General Government Health Exp as a % of General Government Exp (%)(2009-2018)	5.9	5.1	3.9	5.0	7.9	10.6	7.3			
Out-Of-Pocket Exp as a % Current Health Exp (2017)	58.0	31.2	45.5	77.2	50.4	18.56		36.73	41.03	38.89
Out-Of-Pocket Exp per capita (current US$)(2017)	19.3	7.05	36.62	59.67	35.67	310.45		72.55	38.13	237.75
Out-of-pocket Exp as a % of GDP	2.6	1.8	3.7	2.9	6.8					
External aid as a % of Current Health Exp	21	55	28.8	7.9	18.7					
Aid (External)(per capita)(US$)	6	13	16	6	12					

Total Net Official Development Assistance to medical research & basic health sectors per capita (US$)(2009-2018)	2.44	10.49	13.79	3.51	8.72	1.39	4.83			

Table 3 depicts the different avenues for funding health care in the five countries in 2017. External resources formed a sizeable portion in three countries, that is, Chad (29%) whilst for both Sierra Leone and CAR contributions stood at 41%. This reaffirms the stance on using donor funds to augment domestic funding shortages. Domestic General Government Health Expenditure was the main source of finance in Chad (58%) whilst in Nigeria Out-Of-Pocket Expenditure (77%) was the foremost source.

Table 3: Funding composition

COMPONENT (%)(2017)	CHAD	CAR	LIBERIA	NIGERIA	SIERRA LEONE
External resources (EXT)	21	41	29	8	41
Domestic General Government Health Exp (GGHED)	58	15	17	14	11
Out-Of-Pocket Exp (OOPS)	16	43	46	77	42
Other	5	1	9	1	6

Source: World Bank data 2019b.

Policy

Aid to maternal health has been slashed by about 11% in the past years from $4.4 billion in 2013 to $3.9 billion in 2019 causing a shortfall in funding of about $700 million for the period 2020 (UNFPA et al. 2016). These occurrence places greater responsibility on governments to fund health care. Policy directives on funding by the WHO endorse a system based on prepayment methods and pooling schemes to fund healthcare services whilst negating Out-Of-Pocket expenditure (WHO 2013).

At an immediate level, there are certain basic things that countries can implement to improve their health systems. This includes propping up the health system, boosting core components of skilled health workers, upgrading health care facilities to optimally cater for deliveries, as well as ensuring ample blood supplies for undertaking transfusions, C-section and other complications that may arise during delivery. It should also cater for those interventions that require sizeable investments in the health system (UNICEF, 2019b).

The WHO in their quantification of funding needs to meet the health SDGS in low-and-lower-middle-income countries noted that about one-third of the added finance would go towards the cost of health workers' employment, aside from the needed education and training. It also noted that there would be global shortfall of almost 18 million health workers by 2030 mainly in low-income and lower-middle-income countries (WHO 2019b). Thus, when governments plan to initiate reform in their health systems, they must factor in human resources as the key ingredient in propping up health systems (UNICEF 2019b). Thus, sizeable investments in human resources will be a priority in efforts to comply with the SGDs.

Conclusion

The underfunding of healthcare and shortages of skilled health workers was apparent in all five countries. A snapshot of some health variables per country shows all five countries fell short of the WHO requirements for density of doctors and nurses. Liberia had the lowest density of doctors (0.4) and nurses (1.0), the lowest level of Domestic General Health Expenditure as a percentage of General Government Expenditure (3.9%) and the highest amount of Total Net Official Development Assistance (13.79%). The onus on individuals to pay for health services was formidable in Nigeria as can be seen in Out-Of-Pocket Expenditure (77.7%) and Private Domestic Expenditure. (77.6%). CAR had the lowest proportion of births attended by skilled health personnel (20%), the lowest level of both Current Health Expenditure per capita (US$24) and Domestic General Health Expenditure as a Percentage of Current Health Expenditure (12.8%). Liberia and CAR strongly relied on donor funding showing governments' inactivity in a key area. Both Chad and Sierra Leone had the lowest number of hospital beds (0.04 per 1000 people). In general, shortfalls in the health system surface as supply-side constraints in the guise of insufficient and under-resourced health facilities as well as shortages of skilled health workers that undermine the provision of good quality maternal health care.

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