Health System Factors Influencing Access and Utilization of Sexual and Reproductive Health Services in conflict settings: Yemen

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Yemen

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Master of Public Health

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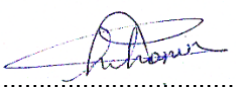
Signature: 

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List of Abbreviations

ANC	Antenatal Care
BEmONC	Basic Emergency Obstetric New-born Care
CDs	Communicable Diseases
CMWs	Community Midwives
DALYs	Disability-Adjusted Life Year
EMR	Eastern Mediterranean Region
EmONC	Emergency Obstetric Neonatal care
EPHS	Essential Package of Health Services
FP	Family Planning
GBV	Gender-Based Violence
GGHE	General Government Health Expenditure
GP	General Practitioner
GDP	Gross Domestic Product
GCC	Gulf Cooperation Council
HFs	Health Facilities
HIS	Health Information System
HeRAMS	Health Resource Availability Mapping System
HSS	Health System Strengthening
HHs	Households
HRHS	Human Resources for Health Strategy
HNO	Humanitarian Need Overview
IDPs	Internally Displaced People
INGOs	International Non-Governmental Organizations
MMR	Maternal Mortality Ratio
MNCH	Maternal, Neonatal and Child Health
MENA	Middle East and North Africa
MDGs	Millennium Development Goals
m	million
MoF	Ministry of Finance
MoPIC	Ministry of Planning and International Cooperation
MoPHP	Ministry of Public Health and Population
NHS	National Health Strategy
NRHS	National Reproductive Health Strategy
NCDs	Non-Communicable Diseases
NGOs	Non-Governmental Organizations
OOP	Out-Of-Pocket
PNC	Postnatal Care
PHC	Primary Health Care
RH	Reproductive Health
SRH	Sexual and Reproductive Health
STIs	Sexual transmitted Infection
SDGs	Sustainable Development Goals
THE	Total Health Expenditure
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
WB	World Bank
WHO	World Health Organization
YNHDS	Yemen National Health and Demographic Survey

Glossary

Accessibility: refers to physical, financial and information access where the services are available within the reachable area, affordable to the population who has the right to seek health information [1]

Humanitarian Crisis: "A significant disruption of the functioning of a community or society causing widespread human, material, economic or environmental losses, which exceed the ability of those affected to cope using its own resources, necessitating a request to the national or international level for external assistance. The crisis situation may be man-made (i.e, armed conflict) or natural (i.e. drought). Individuals living in humanitarian crises face significant barriers and challenges, which impede their access to health care more generally and sexual and reproductive health care in particular" [2,3]

Corruption: abuse/misuse of power and resources [4].

Fragile State: a country where its government cannot provide main functions to its community. Presence of fragility has been associated with "various combinations of the following dysfunctions: inability to provide basic services and meet vital needs, unstable and weak governance, persistent and extreme poverty, lack of territorial control, and high propensity to conflict and civil war" [5]

Health Systems Strengthening (HSS): defined "any array of initiatives and strategies that leads to better health through improvements in one or more of the health system's functions measured by increased access, coverage, quality, or efficiency. It also implies a measurable improvement in performance that is sustained beyond the period of donor assistance."[6]

Sexual and Reproductive Health (SRH): including prevention, diagnosis, and treatment to ensure good SRH which is "a state of complete physical, mental and social well-being in all matters relating to the reproductive system. It implies that people are able to have a satisfying and safe sex life, the capability to reproduce, and the freedom to decide if, when, and how often to do so" [7]. With relation to safe motherhood: Antenatal care (ANC), Postnatal Care (PNC), safe delivery, safe abortion, and post-abortion care, Sexual transmitTed Infection (STIs) and Family Planning (FP) services with SRH education [7].

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Summary

Background: Yemen is in an unstable situation since decades with different social characters which affect the sexual and reproductive health outcomes. That was deteriorated since the current conflict resulting in a fragile health system. The maternal mortality ratio in Yemen is considered one of the highest ratios globally with low utilization due to poor access.

Objective: To analyse the health system factors that affect access and utilization of the sexual and reproductive health services during a conflict setting in Yemen in order to come with recommendations for decision-makers to improve these services.

Methods: This study is based on a review of the literature and simple qualitative analysis of HeRAMS 2016 data using WHO/WB model for Health System Strengthening.

Findings: Mis-management of resources with poor quality of services caused lack of access to sexual reproductive health. In combination with financial barriers that decreased the governmental sharing and increased the services' fees resulting in services' underutilization. Attacks on health facilities decreased the availability of maternal health services due to a shortage of supplies and leaving of health providers.

Conclusion: The current conflict in Yemen has affected the functioning of the health system. The poor health sector performance has resulted in poor Sexual and reproductive health outcomes due to lack of access and low utilization.

Recommendation: There is an urgent need for health system strengthening, starting from the central level of the government to a low level of facilities.

Keywords: Health system strengthening, Utilization, Access, Sexual and reproductive health, Yemen

Word count: 11,404 words

Introduction

I am a medical doctor working with non-governmental organizations in different fields of health mainly in SRH programs, such fields are maternal, neonatal and child health, breast cancer, Aids and HIV, general humanitarian health services. Since the first position as a health educator for Reproductive Health (RH) issues, I heard a lot of comments from the population. They faced many challenges seeking health and protect themselves from getting complications during pregnancy. Even before the conflict, there was a complaint of a shortage of SRH services, mainly in rural areas where I lost my aunt (Asia) when she was trying to give birth, but there was no trained skilled birth attendant and the health facility was far from their catchment area.

Also, I noticed the shortage of health workers in different Health Facilities where I worked. There was some staff who ignored the standard operating procedures during case management, with variations in cost and fees of services.

SRH is an important issue all over the world as the key target of SDGs three is to reduce the Maternal Mortality Ratio (MMR), especially in low-income countries where there are poor outcomes as measured by low health indicators, i.e. MMR.

The improvement of SRH could not be done without a health system strengthening approach to address the poor performance of the health sector by focusing on one or all key functions of the health system.

From the evidence of some studies, it is shown that good governance with strong oversight and accountability through the presence of implemented policies, regulation, and accurate health information system will improve the health outcomes in general and SRH specifically. Also, health financing plays an important role in improving health-seeking behaviour and the quality of provided services. In addition, the quality of service provision through the health workforce, medical supplies, the functionality of HFs and distribution of these resources have influenced the access and utilization of SRH within the community.

Many actions taken to improve the health system in Yemen have had a good effect on improving the health outcomes mainly SRH outcomes. However, the health system is facing many challenges since decades and became fragile with the current conflict. This fragility needs to be addressed through improving the functioning of the health system with intersectoral coordination and collaboration of international and national organizations.

This study will highlight the current gaps in the Yemeni health system functioning in order to come with a possible recommendation for strengthening the health system.

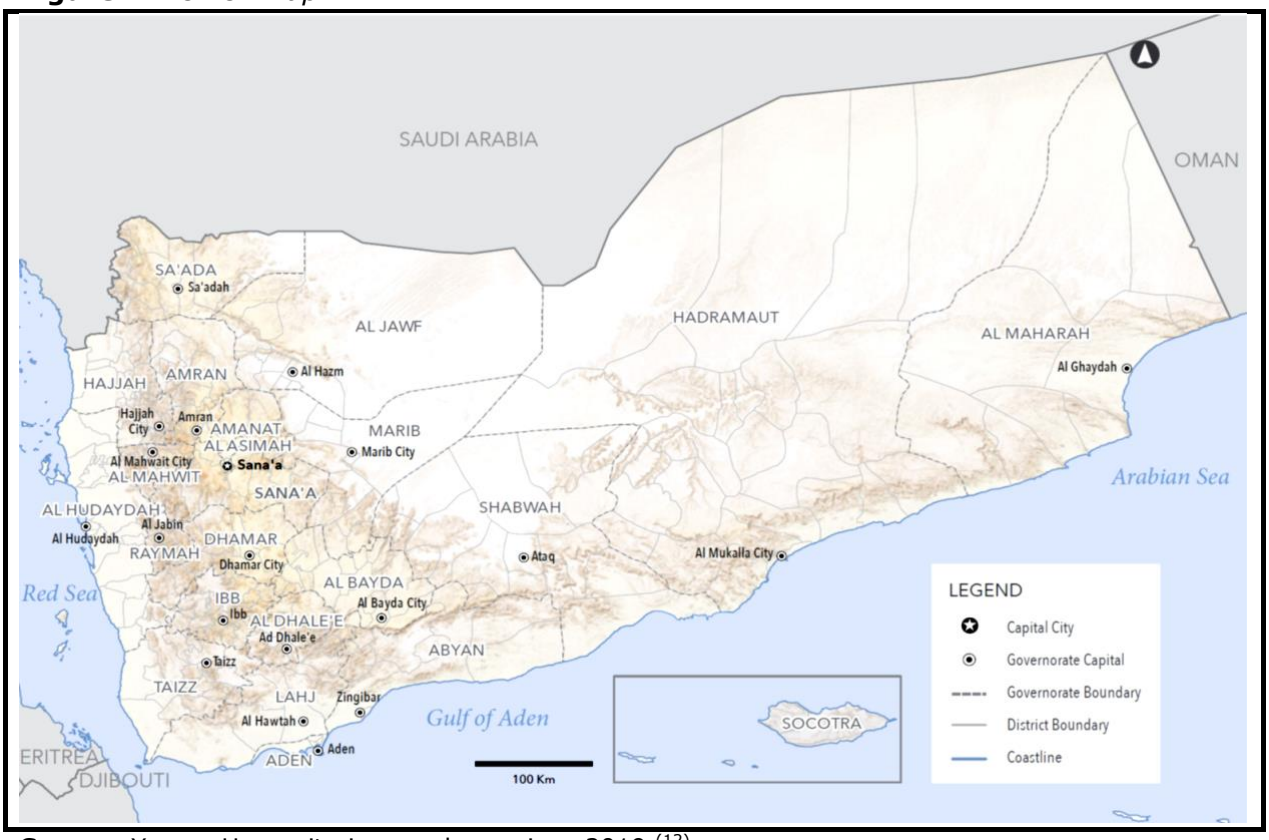
Chapter One: Background

2.1. Geography

Yemen is situated in the southern part of the Arabian Peninsula with 527,970 square kilometres in land size [8,9]. It is placed at the entrance of the Bab-El Mandeb passage which links the Red Sea to the Indian Ocean via the Gulf of Aden [10]. Its border is to the north with Saudi Arabia, to the east with Oman, the Red Sea to the west, the Arabian Sea and the Gulf of Aden to the south [10]. Yemen's topography is diverse with hills and mountains towards the middle and coastal lines in the south and west, and desert from far east towards the north of the country [10].

It has 22 governorates which are composed of 333 districts and 2,200 sub-districts [10]. The governorates include 36,986 villages, 91,489 sub-villages and more than 112 of islands in the Red and the Arabian Seas and its largest island is Socotra in the Arabian Sea [10]. These geographical characteristics reflect the population distribution on a wide range of gatherings which affects essential services for the population as health [11]. **Figure 1:** *Yemen Map* pf Yemen

Figure 1: *Yemen Map*



Source: Yemen Humanitarian need overview, 2019 [12].

2.2. Population

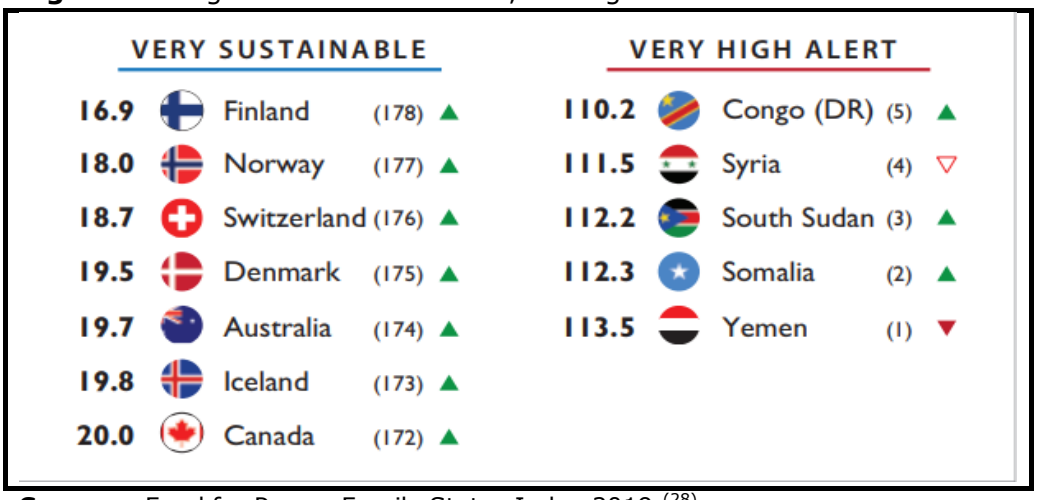
Yemen's total population estimation in 2019 is 30.4 million(m) with a growth rate of around 2.7% [9,13]. This growth rate is considered as one of the highest rates globally which will increase the demand for essential services as education, health care (promotional, preventive, curative, rehabilitation) and other essential services [14]. The total fertility rate in Yemen is 4.45 children per women with rural and urban differences, as it is 5.1 in rural areas and 3.2 in urban areas [15]. Around 63% of the population are living in rural areas

and 37% in urban areas [9]. Based on the estimated population projection, the sex ratio of the population (male per 100 female) is around 102, about 49% of the population is female and nearly 23% of the total population is within the reproductive age 15-49 years [13,16,17], **Annex 1**: Yemen Population Pyramid.
The life expectancy at birth is around 65 (63 years for males and 66 for females), this life expectancy remains low compared to other developing countries [14,18,19].

2.3. Political and Security Current Situation

The conflict started since the failure of a political transition which was supposed to make Yemen stable after the revolution of the Arab Spring, which forced president Saleh to hand over his power to his deputy, Hadi, in 2011 [20]. In 2014, Houthi groups took control of Sana'a (capital city) demanding lower fuel prices and a new government. After failed negotiations, the situation worsened dramatically, leading to a multi-sided war which allowed al-Qaeda and Daesh to grow stronger [21]. Then in 2015, the rebels of Al Houthi seized the presidential palace, leading president Hadi and his government to escape with limited power [22]. In March 2015, a coalition led by Saudi Arabia launched an operation of economic blockade and airstrikes in Yemen, which resulted in major consequences for the civilians and destroying civilian structures across the country [21,22]. This resulted in a crisis making Yemen "the world's worst humanitarian crisis" and announcing Yemen a "famine" country [23–25], with more than 24m people in need of humanitarian aid and protection from the effects of the economic collapse and destruction of essential basic services [26]. At the end of 2018, an agreement was signed by the different parties to the conflict to restore security, economic stability, and access to Al-Hodiedah port, but the situation remaining highly fragile [27]. This places Yemen among the most highly fragile countries and "the fourth fastest-deteriorating country", **Figure 2.**

Figure 2: Fragile States Index 2019, the highest and the lowest countries



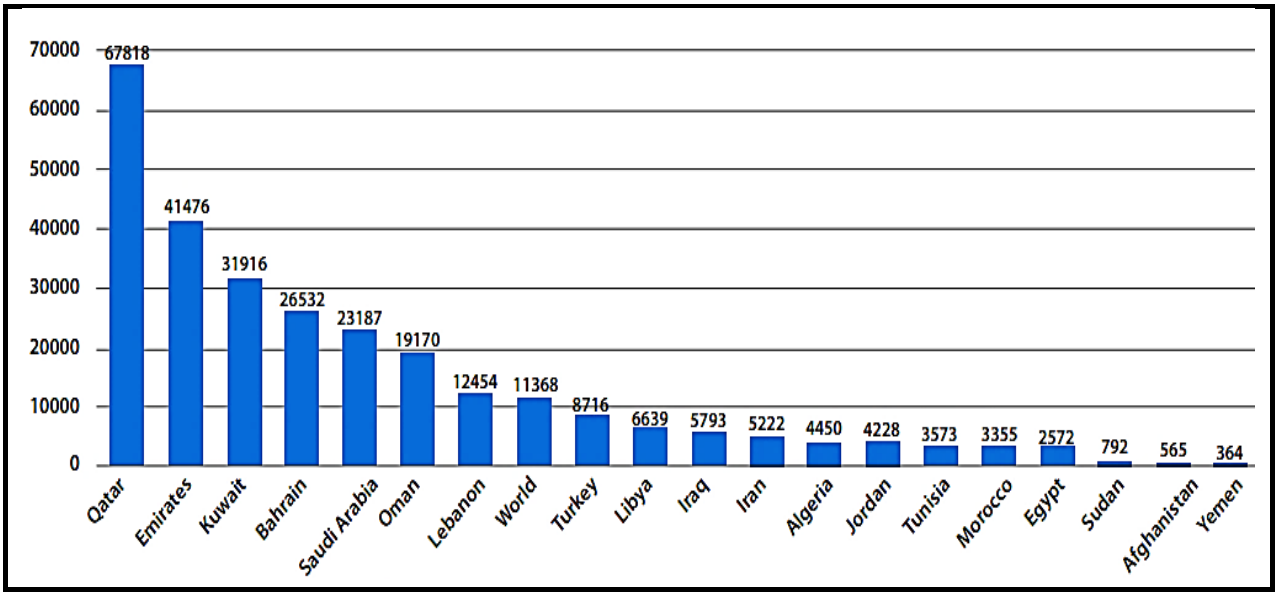
Sources: Fund for Peace, Fragile States Index 2019 [28]

2.4. Socioeconomic characteristics

Yemen faced a fragile economy since decades which worsened within years until 2018, which was known as "the year of economic catastrophe" [29]. The Yemeni Rial dropped dramatically recording an average increase of a more than 400% exchange rate to the US dollar, then it recorded quite an improvement while the inflation is still unstable and fragile [29].

Gross Domestic Product (GDP) per capita declined from $481 in 2017 to $364 in 2018, with about minus 2% growth rate. And around 49% an estimation of cumulative loss in real GDP between 2015-2018 that equals $49.9 billion: this puts Yemen at the bottom of the poor economic situation, compared to other countries[12,30,31], **Figure 3.**

Figure 3: GDP estimation per capita at current prices ($ per capita)



Sources: Yemen MoPIC. IMF database: http://www.imf.org/external/datamapper/NGDPDPC@WEO/MEQ/MENA/EGY/SDN/YEM/LBY/TUN/WEOWORLD, 2018 [28,31]

The Central Bank of Yemen function has been disrupted due to the ongoing conflict. After that, relocating the CBY from Sana'a to Aden in 2016 with a division of management of public finance increase the economic challenges [28,32]. This situation had led to inflation, unemployment, and unpaid remuneration for more than 0.5m civil employees who have not received salaries for nearly three years [27,32].
Yemen is considered one of the poorest countries in the Arab world with the Human Development Index (HDI) ranking it 178 out of 189 countries in 2018 [12,18,33]. The poverty rate in 2017 increased to reach 48% of the population who have less than $1.90 a day comparing to 30% in 2015, and 78.5% with less than $3.20 comparing to 56.6% in 2015. This increase in poverty rate causes a lack of access to the essential needs [34].

Before the conflicts, Yemen imported 90% of its main food and almost all of its fuel and medical supplies. Since 2015, access to the country was closed leading to restrictions on fuel, food, and medical supplies to come into the country, which created a shortage of commodities [27]. Sana'a airport remains closed and works only for domestic flights [27].

2.5. Sociocultural characteristics

Yemen is one of the Eastern Mediterranean Region (EMR) countries and its official language is Arabic. It's an Islamic country: Muslims represent 99.1% of the population; around 0.9% of the population are non-Muslims (Jewish, Baha'i, Hindu, and Christian), many of whom are refugees or temporary foreign residents [35]. Gender inequality has been observed in all sectors like health. Women access to health services need permission from her family, husband or/and sometimes from her husband's family and she has to be accompanied by a male relative [33]. As "Yemen is a very conservative country where social and traditional norms favour men" [33].

Social capital in Yemen is mainly formed by tribal association, especially in rural areas [36]. Other important ones including faith-based institutions, local community solidarity initiatives, civil society organizations, and support from the diaspora. During the current conflicts, the social capital has been eroded and the social dynamics within communities were affected, increasing social division and unequal access to social safety nets [36].

Different groups of the population are affected by the current conflict such as Internally Displaced People (IDPs), minorities, women, and children.

IDPs: Since 2015, around 4.3m people have been forced to displace. An average of 3.3m of them are still displaced and more than 0.5m people have been newly displaced in 2018. Nearly 74% of displaced households (HHs) are living in rented accommodation, and 22% are being hosted by families. Around 300,000 of the most vulnerable IDPs are living in 1,228 collective sites: 83% of these sites have no health services, 39% reported water deficits and 43% have no toilets [26]. Nearly half of IDPs are females and 27% of them under 18 years old. Displaced females tend to suffer mainly from lack of privacy, safety and restricted access to basic services [12].

Minorities: There is a high impact of ongoing conflicts on some groups like the Muhamasheena, mainly because the high percentage of them living in the most affected governorates by the conflict as Aden, Taiz, and Al-Hodeidah) [12]. An assessment done by Oxfam mentioned that this group and other marginalized ones were excluded from humanitarian aid services [36,37]. In 2018, an Integrated Model of Social and Economic Assistance and Empowerment assessment, done in Sana'a (the capital city and the governorate) regarding HHs of Muhamasheen, and reported that the urgent needs are food, health, shelter, and education [12]. Most members of the working-age group are illiterate and unskilled with an estimation daily per capita income of less than $1.90, and this suggests that all HHs are below the international poverty line [12]. Families are forced to choose negative coping strategies such as early marriage, roll out from school and low seeking health behaviours. Those coping strategies are a result of existing hardship and apply to many Yemeni families not only Muhamasheen [12].

Women and children: Since decades women suffer from inequity and marginalization, while the development status of women is essential for their health and their families [15]. The last Yemen National Health and Demographic Survey (YNHDS) 2013 mentioned that 55% of Yemeni women make health decisions either by themselves or with their husbands [11]. During the current conflict, women and girls face various forms of Gender-Based Violence (GBV): in 2018, the reported incidence has increased by 70% and Yemen was ranked 149 out of 149 in the 2018 Gender Gap Index [26,38]; there is an estimation of around 120,000 women at risk of different forms of violence [17]. There are important inequalities between men and women, accessing education, livelihood opportunities, and protection. As women are mainly affected due to limitations of mobility, decision-making power and lack of access and control over resources [39]. They also have poor access to information, whether it is regarding their rights and health as SRH due to insecurity and lack of access [39]. As mentioned before around half of the IDPs are women, and 21% of female-headed IDPs' HHs are headed by minors [12].
Young girls face different challenges, including a child and adolescent marriage, lack of formal education, and GBV [40,41]. Around three-quarter of females had been married before 18 years old as a coping mechanism to have an income or as a preventive way to protect girls from violence, and about 44% were married before 15 years old [40,41]. Increasing of child-marriages disrupted the girl's schooling, which will put Yemen in danger of having a generation without formal schooling [12,42].
Child recruitment in armed forces continued with at least 2,419 boys who had been recruited since March 2015; and risky forms of child labour are increasing with the increase in family, sexual and GBV issues [39,40].

[a] A marginalized group of people

2.5.1 Education: In 2015, the United Nations Development Programme (UNDP) estimated the literacy rate of youth (14-24 years old) among females around 77% and about 96% in males [15]. This is getting worse due to the ongoing conflict as 36% of school-age girls and 24% of boys did not attend school. In addition around 50% of teachers have not been paid their salaries since 2016, 66% of the education's infrastructure has been damaged and more than 2,500 schools are out of use as a result of airstrikes or shelling [26,40]. About 48% of women are illiterate according to the United Nations Population Fund (UNFPA) reports 2019 [17]. The female's education level affects SRH, new-borns, adolescents and the child health status of Yemeni community [15]. YNHDS reported the fertility rate with around 5% among uneducated women compared to 2% in women with a high standard of education [11].

2.6. Health Situation

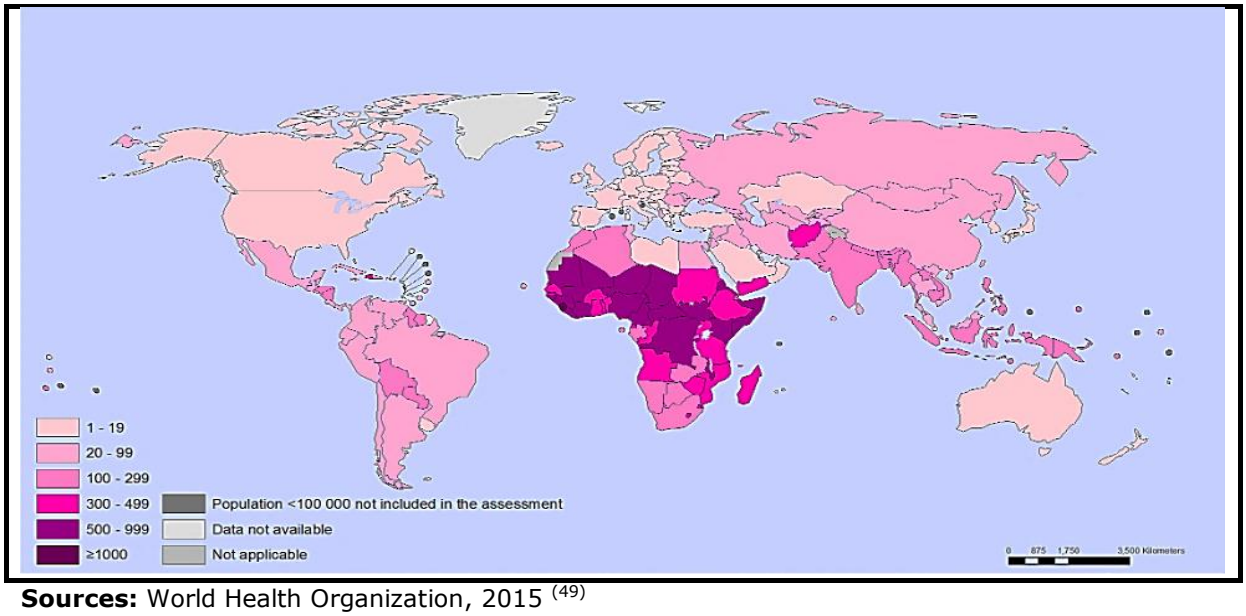
Health situation and Burden of Disease: Based on the global burden of disease and Yemen Health cluster data, the main causes of deaths in Yemen are Communicable Diseases (CDs), maternal, new-born and nutritional cases together responsible for about 50% of deaths, and Non-Communicable Diseases (NCDs) responsible of 39% of deaths [43–45]. Malnutrition was considered as the first contributing risk to Disability-Adjusted Life Year (DALYs) in 2017 [46].

Nearly 19.7m of the population are in need of health assistance; Food security affects around 20m people who lack access to the food supply to have a healthy life. Almost 10m suffer from extreme levels of hunger, includes 3.2m people who need treatment because of acute malnutrition (2m of children under-five and over one million pregnant and lactating women) and 46% under-fives are stunted [12,47], **Annex 2**: Prevalence of maternal underweight in Yemen.

More than 17m people of which 51% of females do not have access to safe water and sanitation which increases the risk of waterborne disease and worsen the nutritional status [12]. In 2018, there are 1,359,504 suspected cases of cholera since 2018, with 306/333 districts in 21/22 governorates affected [12]

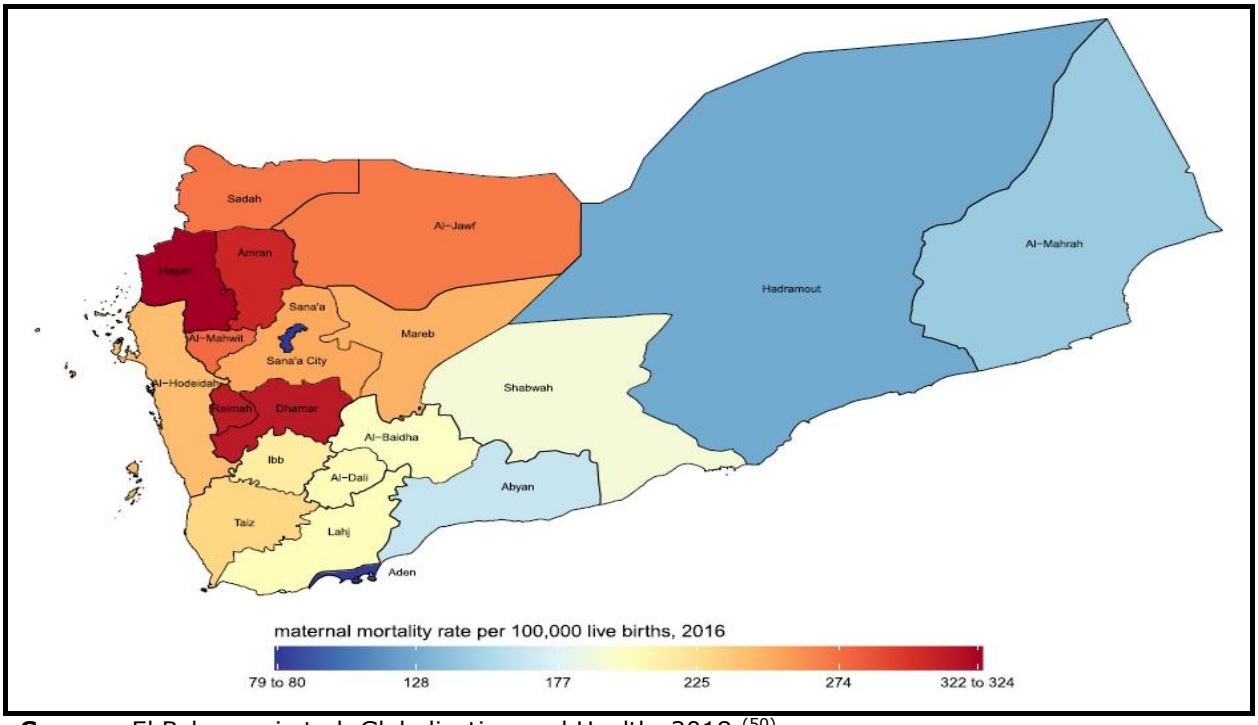
MMR in Yemen is one of the highest ratios in the Eastern Mediterranean Region (EMR) with 385 maternal deaths per 100,000 live births compared to 396 in Afghanistan and 732 in Somalia [47,48]. **Figure 4** shows worldwide MMR and **Figure 5** for MMR in Yemen.

Figure 4: Worldwide MMR



Sources: World Health Organization, 2015 [49]

Figure 5: MMR per government in Yemen



Source: El Bcheraoui et al. Globalization and Health, 2018 [50]

Health System: As cited in the National Health Strategy (NHS) 2015-2025" The public health sector provides health care services at different levels through the Ministry of Public Health and Population (MOPHP) which is the responsible body for all issues related to health in Yemen based on its mandate and the Public Health Law No. 4 of 2009" [51].

Before the conflict started and as World Bank (WB) 2014 data, the health system in Yemen had substantial differences in health status with a poor financial function and inequitable distribution of resources, while the conflict resulted in a very poor performing health system functions [52].

Since 2015, at the start of civil war, the public services provision collapsed, especially the health services: only around half of the total HFs were counted as fully functioning and only around 35%-37% of these provided maternal and new-born services [12,17,53]. Medical supplies are in a chronic shortage and many health workers have fled to safer places as there have been 120 attacks recorded on health care facilities [12,25,54,55]. Around 19.7m people are facing a lack of access to adequate health services as a result of the declined public sector. While the private sector exists, these services are still out of reach for millions of vulnerable people, due to the high cost of services [12]. Even before the conflicts started, almost all of the health services were of low quality with unskilled staff and limited poor infrastructure [56]. As a result of the ongoing conflict, Yemen has two governments and each government has its own ministries, such as two MoPHP; each one of these ministries is directing several governorates, the MoPHP in Sana'a (The Northern governorates) and the MoPHP in Aden (The Southern governorates) [57].

More details will be explained in chapter three: findings.

Chapter Two

2.1. Problem Statement

The actions to achieve the Millennium Development Goals (MDGs) were good but that goal was not achieved in Yemen by 2015 with high numbers of deaths among mothers, new-borns, and children [15]. Target one of Sustainable Development Goals (SDG) three "Ensure healthy lives and promote well-being for all at all ages" is to "Reduce the global MMR to less than 70 per 100,000 live births by 2030" [58,59]. Before the humanitarian crisis started, Yemen was known as one of the countries with a high MMR, and now the situation of women, especially pregnant women, has become worse due to the breakdown of the health system in addition to social challenges as culture, traditions and norms, gender inequality and literacy [50].

Yemenis faced many challenges before the conflicts that increased with the conflict, some of these challenges are: lack of water, sanitation, food, fuel and access to health services "Ensuring safe and unimpeded humanitarian access is not an act of mercy, it is an obligation under international law" [23]. All of these challenges limit the opportunity to reach the SDGs.

SRH is an essential need for each person health and wellbeing and will have a direct effect on the health and development of the community [2,3]. However, unmet need for SRH services is increased among most vulnerable groups, mainly adolescents and women with low socioeconomic status and who are living in areas with intensive conflict [2,3]. An estimated 32m females of reproductive age (15-49) who face challenges and barriers to access the health care services, including SRH services where they live in conflict-affected areas such as Yemen, Somalia, and Afghanistan. This unstable situation increases the risk of poor SRH services as a result of low access to health services and resources, non-functional HFs and high exposure to sexual violence [2,3]. The loss of a mother's life will dispossess families and communities of their potential, as each life of a mother and a child is invaluable to families, communities, societies, development and economic development [60]. The lack of needed and adequate SRH services affect the outcome of life-threatening complications of pregnancy and childbirth and may have an effect on the occurrence of complications, because of the delay in recognizing high-risk pregnancies [60].

A fragile health system results in lack of access and poor utilization of essential basic services which increase the risk of morbidity and mortality of women and new-borns. During conflict setting, the need for SRH services increases, as for ANC, safe delivery, PNC, Emergency Obstetric Neonatal Care (EmONC) and FP services. All of these services are essential to improve the surviving of families [15].

2.2. Justification of the study

Some programs have resulted in progress in the provision of SRH services during the conflict and the humanitarian crisis. However, there are important challenges persist regarding the access and utilization of SRH services. High MMR demands more activities to improve SRH outcomes [2,61].

Experience shows that without improving the core functions of the health system, little or no change will occur in the progress of health development [62]. So, the main challenge to improve the access and utilization of quality SRH services is to improve these functions, which are affected by conflict, war, and crisis. It is critical to strengthen the health system, involving all stakeholders to make a real and invaluable difference to Yemeni people's life [63].

In fact, a well-functioning health system puts 'health' of the whole population at the centre, by delivering services that the people need and where they need it [63]. The current formation of health services differs from one country to another. However, in all conflict setting countries, there is a need for a strong financing mechanism, a qualified well-paid health workforce, well-maintained functioning facilities, resources and logistics, and consistent data for management, decision-making, and planning [63]. SRH is a human right and is an important public health issue, especially during conflict settings. The most important way to ensure good health and wellbeing is by a country having a strong health system and making sure people use health services [60].

This study aimed to assess the core three functions of the health system, which have a high effect on the access and utilization of SRH services mainly during a humanitarian crisis.

2.3. Objectives of the study

General Objective: To analyse health system factors that affect access and utilization of SRH service delivery during the conflict setting in Yemen.

Specific Objectives

1) To explore the core three functions (governance, financing and service delivery) of the Yemeni health system which influences access and utilization of reproductive health services.
2) To review evidence-based interventions, related HSS, in other countries with similar context and to determine whether these interventions can be adapted to Yemen's situation or not.
3) To give recommendations to policymakers, public health professionals, international and local organizations, public and private health sectors, in order to adapt the current strategies and interventions to achieve better health outcomes and status for the population.

2.4. Methodology

- **Study Design:** It is a descriptive secondary data study.
- **Data Collection Methods**

  Literature Review: This study is based on a review of grey literature, peer-reviewed reports, published articles, international and national reports of the three core functions of the health system and the effect of conflict on these functions. In addition, to simple qualitative analysis of Health Resource Availability Mapping System (HeRAMS) 2016 data of 16 governorates in Yemen out of 22.

  The Search strategy of this thesis: An extensive search was done mainly in Google, Google Scholar, PubMed, Vrije University library database, ResearchGate, Lancet; other studies and reports and grey literature were used from international organizations like WHO, WB, UNFPA, United Nations International Children's Emergency Fund (UNICEF), UNDPA, United States Agency for International Development (USAID), and United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA). Furthermore, national policies, strategies, assessments, and surveys. The technique of snowballing was used where available and for valuable literature. The main keywords used to search for information were health system, governance, financing, service delivery, RH and Yemen. In addition to other keywords as in **Table 1.**

Studies done in other countries, with a similar context of Yemen, were reviewed and used in this thesis as well. English was the main language for searching while Arabic was used to access national data that are unavailable in English copy. For specific information of Yemen, data found before 2015 was included, while for global

information the most recent data were used where possible. Also, data found before 2015 and before 2011 was used to compare the findings before the Arab Spring revolution and the war.

Semi-Structured Interviews with Key-Informants: is used with personal communication asking for specific data related to the findings. The aim of it is to ensure the validity of the findings and to generate additional information. This was done through consultation from national experts via email, phone calls, and social media. **Annex 3:** Interview tool for key-informants

Table 1: Search keywords

Objective I			
		And	
Or	Keywords	Health System, governance, financing, service delivery, SRH	Yemen
	Other keywords	Oversight, accountability, regulation, standards, policies, strategies, planning, partnership, coordination, Health Information System (HIS), HeRAMS, service provision, qualified RH services, human resource, workforce, medical supply, health utilities, commodities, infrastructure, technologies, revenue, pooling, purchasing, crisis, humanitarian crisis, maternal health, utilization, access, health sectors, health expenditure, resource allocation,	Somali, Afghanistan, conflict countries
Objective II			
		And	
Or	Keywords	Health system strengthening (HSS)	Yemen
	Other keywords	Health system programs, intervention, SRH programs, utilization, accessibility, conflict sitting, crisis, war,	Somali, Afghanistan, conflict countries

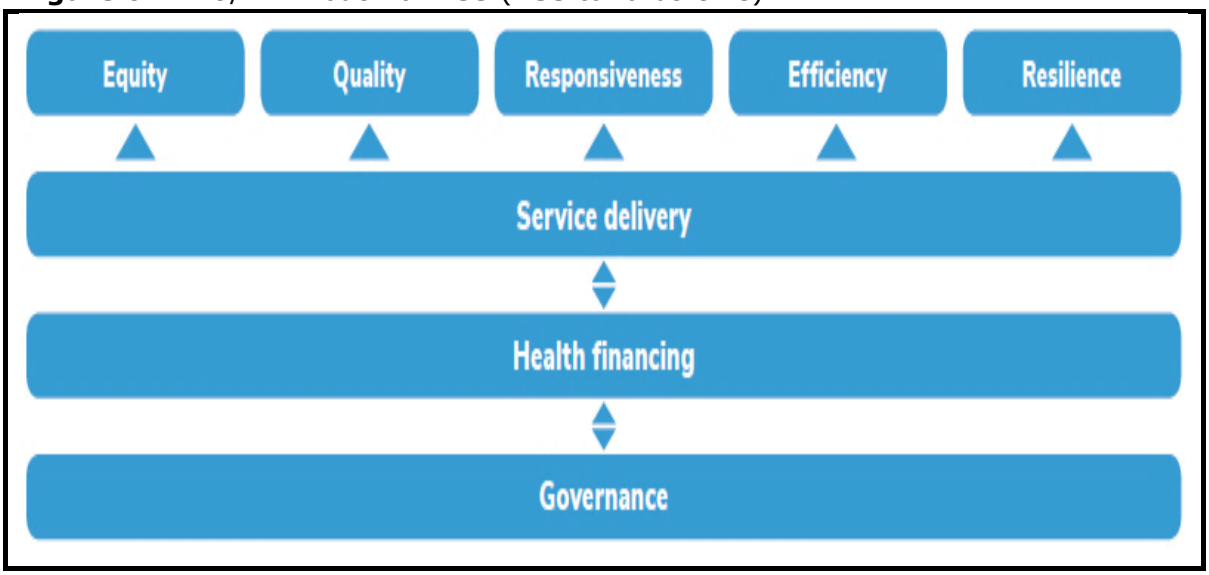
Source: Created by the author

- **Data Analysis:** This thesis was guided by using a model of HSS developed by WHO/WB [64], **Figure 6**.

  The rationale for choosing this model: At the beginning, the author chose Anderson and/or the WHO HSS models (2007 WHO HSS framework) then they were excluded due to the following causes: i) The Anderson model has social and environmental determinants next to the health system factors, and many thesis and papers already discussed social and environmental factors and explained the same analysis as education, socioeconomic factors, social characteristics. ii) The WHO/WB model for HSS focuses on the three core functions of the health system (governance, financing and service delivery) which interrelate. They are the entry points for policy to improve the performance of the health system (Equity, Quality, Responsiveness, Efficiency, Resilience) [64]. There is a need to analyse these core functions and its related sub-themes, by presenting the current challenges, which have deteriorated by the current conflict in Yemen. In addition, looking for possible successful interventions, which could be applicable to the Yemen setting in order to strengthen the current fragile health system to improve the performance.

A strong health system is the one which has good governance, suitable finance, and qualified services in addition to an aware population that seeks health services.

Figure 6: WHO/WB model for HSS (HSS towards UHC)



Source: Healthy systems for Universal Health Coverage – a joint vision for healthy lives, 2017 [64]

Based on the analysis of HSS core functions, the findings categorized as follow:

A) Governance: The main function of governance is to ensure **general oversight** *"Broad term used to describe a variety of actions related to management and supervision in accountability relationships"* [65], and **accountability** *"the process which ensures that health actors take responsibility of what they are obliged to do and are made answerable for their actions"* [1]. This role should be done through

- **Policies, planning and strategies** which addressed the health issues and the management of these policies with progress in implementing the planning to achieve the goals of current policies and strategies.
- **Regulations and Standards:** the government's regulatory framework aims to ensure that services are delivered with high quality and acceptable resource allocation. These standards should be examined by inspectors to ensure agreed standards and procedures have complied with public and private sectors.
- **Partnership and coordination:** for planning, following the policies and activities and as part of good leadership, there will be a need for coordination with all different stakeholders, including the central head of the government reaching ministries to the local level of authorized public and private sectors. In addition to the need for partnership and coordination with all international and national organizations to ensure their activities, strengthen the health system, targeting the need and following the regulation without any duplication.
- **HIS:** Information is required for planning, decision-making, and management. Also, the availability of quality, accurate and regular data provide a picture of the real situation and the effectiveness of the implemented activities. HIS used to monitor and to evaluate the programs progress, stakeholders, health workforce, standards, policies, and strategies progress

B) Health Financing: "arrangements determine the ability of health systems to respond to health needs, spread financial risks and operate efficiently and equitably" [64]. The three functions of health financing are revenue-raising, pooling, and purchasing.

C) **Service Delivery:** "is the primary interface between the health system and people" [64]. It includes service provision and quality of health care. Also, the sub-themes of it are; health service package, health workforce, stock management and distribution of supplies (vaccines, drugs, medical supply), management and allocation of technologies and infrastructure.

2.5. Limitations of the study

- The population-based data is not up to date as the last NDHS was done in 2013 and after that only an estimation of data.
- Most of the assessment data of the health system were done before 2014, and limited detailed data was found after 2015.
- Some national papers were published only in Arabic.
- Due to the escalation of the war in Yemen, there was limited information about access and utilization and most of the information was based on estimates.
- Limited literature found related to Yemen's health system.

Chapter Three: Findings

The purpose of this chapter is to present the health system factors which influence access and utilization of SRH service delivery based on literature.

There will be three sections focus on the core three functions of the Yemeni health system based on HSS 2017 model.

Section One: Governance

It is defined as the process to form a mission and vision of an organization to come with decisions to manage the resources for achieving the health goals [1,4,66]. In Yemen, MoPHP is the main responsible ministry of the health sector. Though, there are others who play a role in financing, planning, regulation, management and provision of health care services, which include the Ministry of Finance (MoF), Ministry of Planning and International Cooperation (MoPIC), Ministry of Civil Services, the independent hospitals, Health Manpower Institute, Military and Police Health Services, and the Drug Fund [67,68].

In 2000, the 'local authorities law' was adopted "towards political, fiscal and administrative decentralization to the local level" [51,67,69]. This law was planned to shift the decision making from the central level to local levels of the governorates and districts which were given the capabilities of "Formulating development strategies and programs, budgeting capital investment plans, supervising the implementation of the different strategies and programs, and monitoring the activities of the executive local authorities" [70]. But as the revolution started in 2011, the entire reform process was stopped [70].

One of the main functions of governance is to have general oversight and accountability to ensure the effectiveness of the health system functions.

General Oversight and Accountability

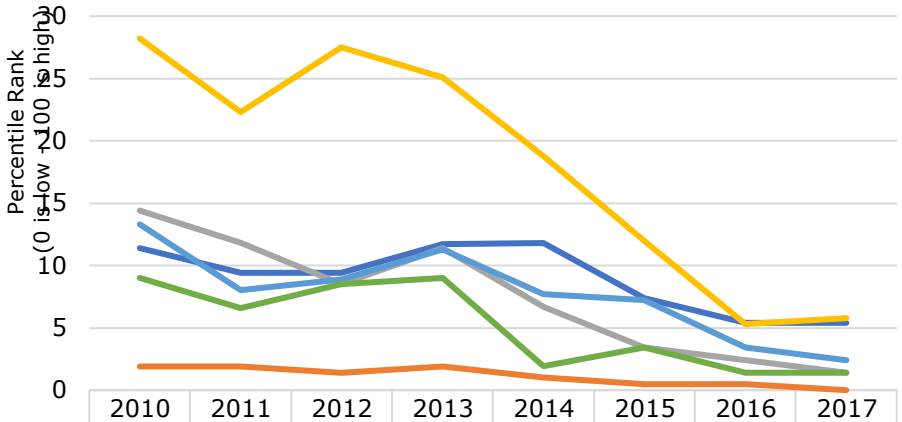
Yemen MoPHP is required to give an account to the population of how it has discharged its duties through policies, strategies and plans, regulations and standards, partnership and coordination through HIS [51,65].

An assessment on governance was done by the WB and USAID in 2006 and 2010 which showed that governance weakness and corruption were serious issues from the high level of government reaching the low level of the facility [67,71,72]. An example of corruption, that affected MoF: many employees on the payroll had double records or received salaries for jobs they did not perform or multiple salaries for the same job, which made it impossible for the government to pay the real workers' salaries and to cover the operational cost, affecting the basic health care services and its quality [26,73,74].

Since 2015, the National Central Organization for Control and Audits, which is the national auditing agency for public expenditure and the one who should investigate for corruption, was unable to do its tasks [73]. In addition, the Supreme National Authority for Combating Corruption was unable to provide oversight on corruption due to lack of capacity and information [73].

In 2017, Yemen had a percentile between 0%-6% of the good governance indicators and became one of the weak countries worldwide [28], **Figure 7.**

Figure 7: Percentile Rank of Yemen in Good Governance Indicators

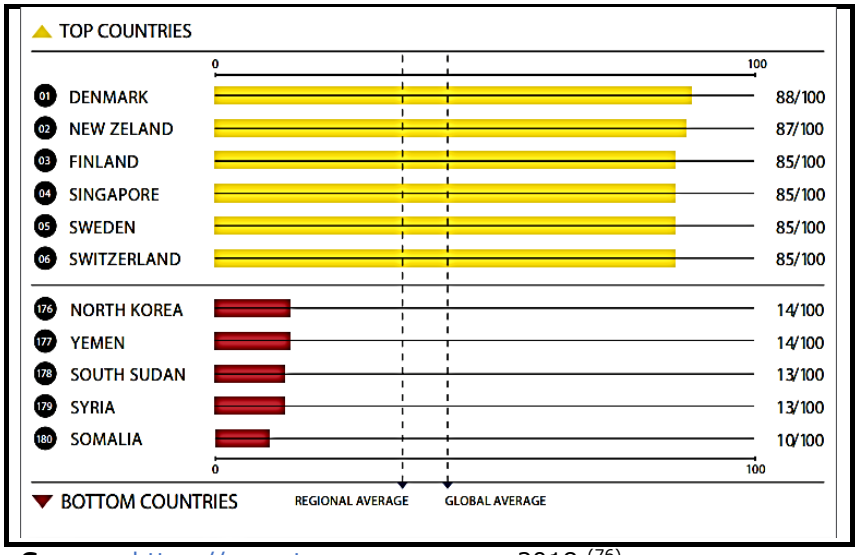


	2010	2011	2012	2013	2014	2015	2016	2017
Voice and Accoutability	11.4	9.4	9.4	11.7	11.8	7.4	5.4	5.4
Political Stability and Ansence of Violence/Terrorism	1.9	1.9	1.4	1.9	1	0.5	0.5	0
Government Effectiveness	14.4	11.8	8.5	11.4	6.7	3.4	2.4	1.4
Regulatory Quality	28.2	22.3	27.5	25.1	18.8	12	5.3	5.8
Rul of Law	13.3	8	8.9	11.3	7.7	7.2	3.4	2.4
Control of Cooruption	9	6.6	8.5	9	1.9	3.4	1.4	1.4

Source: Author's summary based on MoPIC. Yemen Socio-Economic Update, 2019 [28]

Figure 8 shows that Iraq, Afghanistan, Syria, Somalia, South Sudan, Libya and Yemen, all fragile states, are ranked at the bottom of the corruption perception index 2018. These countries were affected by an unstable situation in recent years [28,75]. Corruption has a high consequence in increasing inequalities in addressing SRH issues mainly for the commodities' cost and procurement.

Figure 8: Corruption Perceptions Index



Source: https://www.transparency.org, 2018 [76]

3.1.1. Policies, Strategies, and Planning

In 1978, Yemen approved the Primary Health Care (PHC) approach in the national constitution and with a policy of "all citizens should have equal access to free PHC services". That was part of its commitment to the health goals of the "NHS, regional and international obligations and protocols such as Alma Ata (1978), MDGs, Doha Declaration PHC (2008) and Yemen's commitments to the Gulf Cooperation Council (GCC)" [51].

Since 2004, the Essential Package of Health Services (EPHS) was developed focussing mainly on MNCH. However, a report done by USAID mentioned that there is no evidence of progress on EPHS implementation and it's "very limited and not well defined" [67,77].

The district health system was developed and accompanied by vertical programs that focused on the prevention and control of diseases with external financial support, including immunization programs, malaria programs, and nutrition programs [67]. That resulted in more effective and direct population coverage.

Yemen has developed a number of overall health policies, strategies, and initiatives to guide and follow the progress to the commitment. The main policies and strategies related to SRH are shown in **Table 2**.

Table 2: List of some Yemeni health policies and strategies

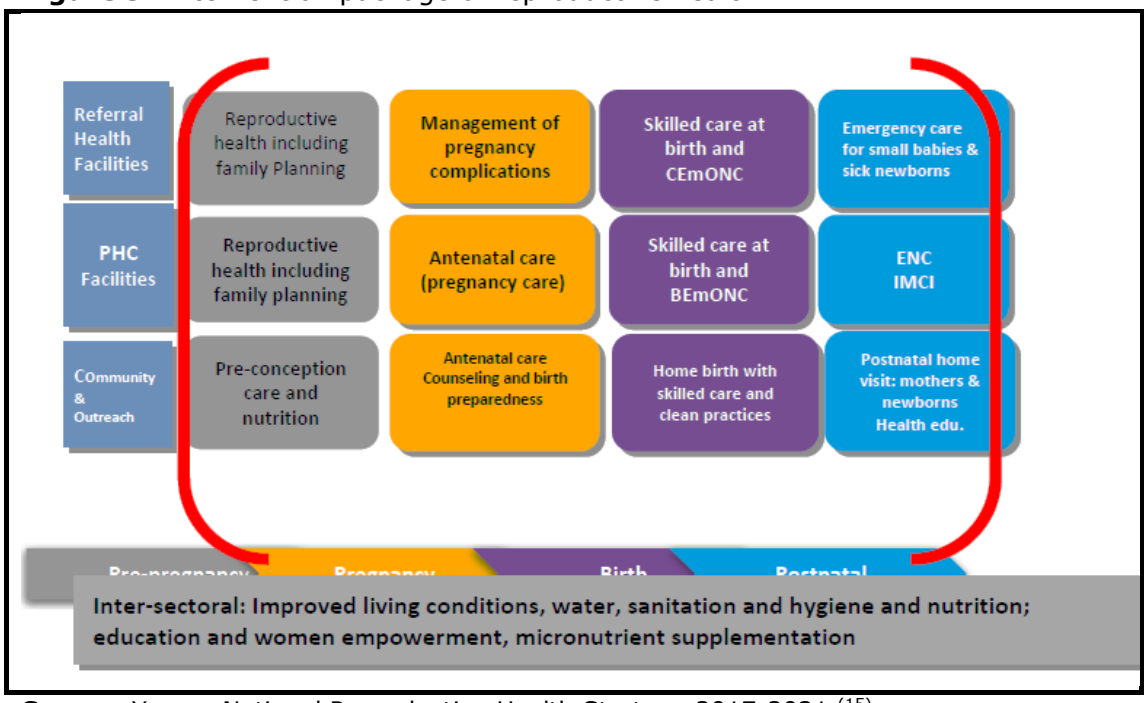
National Health Policy strategy and Plan 2010-2025 (NHS)	The National Reproductive Health Strategy (NRHS) 2017-2021
New-born Health Strategy 2017-2021	National Human Resources for Health Strategy, Yemen (HRHS) 2014-2020
National Strategic Plan for HIV and AIDS 2014–2018	Multi-Year Plan (cYMP) for Immunization 2011-2015
Costed national implementation plan for Reproductive Health 2011-2015	Maternal, New-born and Child Health acceleration plan 2014
RH commodity security	Free provision of FP) services

Source: Author's summary based on WHO and NRHS 2017-2021 [15,78]

Yemen National Health Policy strategy and Plan 2010-2025 (NHS) shows Yemen's vision, priorities, budget, planning, and plan to HSS towards "ensuring the provision of sustainable, quality and distinguished health services, satisfying both the beneficiaries and service providers and are sensitive towards equal distribution of resources and accessibility through a health system that supports taking the proper decisions based on evidence to upgrade the performance of the national health system at various levels." [51]. It was developed in 2010 but this strategy was not implemented due to the ongoing conflicts and war [79].

Yemen National Reproductive Health Strategy 2017-2027 (NRHS) with a vision of "Population living in Yemen, regardless of their location and/or their social and economic status will enjoy their reproductive rights through ensuring access to, and increasingly improved utilization of quality rights-based integrated RH services to contribute to achieving better health level for all the population of Yemen" [15]. Comparing to NHS, the NRHS presented three strategic lines in order to achieve its goals and with each line, there are interventions and actions to apply which are approved globally [15], **Figure 9**.

Figure 9: Intervention package of reproductive health



Source: Yemen National Reproductive Health Strategy 2017-2021 [15]

Some of the listed strategies and plans in **Table 1**, had progressed in implementation with positive health outcomes as shown by specific indicator values while some of these strategies are not in place due to weak implementation and inactive regulation [15]. However, Yemen has not developed other important policies and strategies such as the law of legal minimum age of marriage, the notification of a maternal death policy, and public-private partnership [15], in addition to the health financing strategy to support the implementation of the NHS [19].

3.1.2. Regulation and Standards

Regulations and laws are "key implementation mechanisms for translating major health policy objectives into action [80]. These regulations affect the quantity, quality, safety, and distribution of health services [80]. Yemen MoPHP developed national standards for HFs which included standards for staff, equipment, infrastructure, and essential drug list. Listed some key standards in **Table 3** as well as Health workforce laws in **Table 4**.

Table 3: Key standards for HFs in Yemen

HFs	Coverage Pop.	Staff
Health Unit	1,000-5,000	One of each (medical assistant, midwife, nurse, guard, and cleaner)
Health Centre	5,000-20,000	One of each (General Practitioner (GP), dentist, medical assistant, general health technician, Ray technician, pharmacist technician, lab technician, dental technician, guard, and cleaner), three of each (midwives and nurses) and two administrative staff

HFs	Coverage Pop.	No. of Beds	Staff
District Hospital	50,000-100,000	30-50	75 staff including: medical staff, medical assistant, administrative staff
General Hospital	250,000-500,000	100	240 staff including: medical staff, medical assistant, administrative staff

Source: Author's summary based on Yemen national guidelines of HFs, 2019 [81,82]

Table 4: legislation for Health workforce

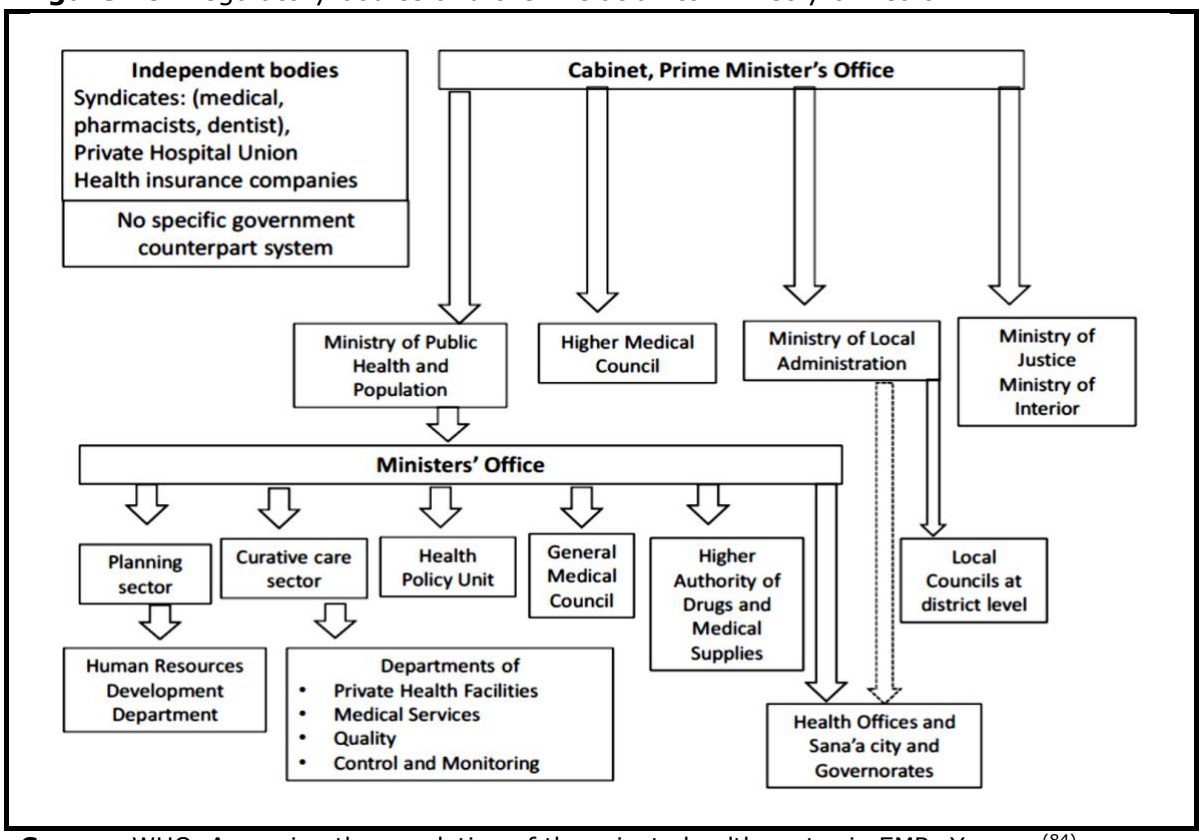
Law	For
1. Laws governing health profession practice, reformed in 1999	
• The medical council/law. • The medical professions practice law. • The private medical facilities law • The counterpart technical profession practice law.	Regulate medical and health practice Addressed requirements of registration, documentation and legal licensing of medical professional practice. Identify the fields and functions of different health staff, their rights, and duties.
2. Laws related to qualifications and training	
• Law NO 9 of the year 1975 regarding the establishment of health institutes. • Ministerial Resolution NO 286/11 of the year 1999 regarding the study system and educational scale of the higher and sub higher health institutes. • Law NO 18 of the year 1995 regarding Yemeni Universities. • The Republican decrees NO 55 of the year 1994 regarding the establishment of Yemeni Council for Medical Specialization. • Law NO 18 of the year 1999 for missions, gifts and study, and training leaves.	Addressed the educational level of the trainees applying for study in relevant institutes, and the level and type of certificates to be granted to the trainees. Identify the vocational and technical training curriculum of institutes, universities and community colleges.
3. Laws related to human resource administration	
• Law NO 19 of the year 1991 of civil services and it's executive by-laws	Determined the lower and upper scale of salaries for the public sector employees, The salaries range from 1,800- 12,200 YR. The bonus range is 100-300YR (1 $= 165YR)[a]. To reach group one the employee needs to have at least 24 years of work experience after a Doctoral Degree or Master Degree, and 30 years after bachelor Degree. The bye-law determines the incentives as either material by transferring of the employee from his current rank to the next higher one within the same class or moral by giving him appreciation certificate or priority of attending courses held locally and abroad.

Source: Author's summary based on WHO Yemen Health System profile, 2006 [83]

Figure 10, shows the main regulatory bodies for health in Yemen. The first main regulatory body is MoPHP, authorized by the Public Health Law for "development of health policies, strategic planning, resource allocation, financial management, monitoring and evaluation, and HIS. And the redefinition of the role of the Ministry in NHS 2010-2025, it retains its role in the provision of health services" [51,84].

[a] The exchange rate in 2006," $ dollar to YR Yemeni Rial"

Figure 10: Regulatory bodies and their relation to ministry of health



Source: WHO, Assessing the regulation of the private health sector in EMR: Yemen [84]

The Yemeni Medical Council is the responsible department of registration and licensing of medical practitioners, and with a law of practice especially for medical and pharmacist professions [85]. However, an assessment done by the EMR WHO reported that there is no descriptive note and insufficient implementation of legislation as some health staff who provided services without a license [84,85].

Also as mentioned within the Human resource for health strategy there is an "absence of a dedicated professional council for nurses, midwives, and allied health professions, the trade union of health professions is dealing with licensing aspects in a traditional manner with no clear standards" [85]. The hospitals in Yemen are understaffed and have to depend on, in part, unlicensed doctors and lack of control on informal providers resulted in an increased burden of disease due to misdiagnosis and mismanagement [84].

An assessment done in 2006, reported that private pharmaceutical companies schemed with the governmental health offices to secure the procurement bids for their own benefits. In addition to that, the assessment cited "Some of the private drug companies may be knowingly involved in the apparently growing fake pharmaceuticals market, which involves the import and distribution of faulty pharmaceuticals from developing countries such as India. The import of an estimated half of pharmaceuticals is thought to be tied up in smuggling, which allegedly has involved not only senior health officials but local shaykhs and military and security personnel who facilitated the illegal trade in return for bribes" [72]. That was due to poor inspection from the Higher Authority of Drugs and Medical Supplies, with poor implementation of procurement producers.

WHO assessed the regulation of the private health sector in Yemen 2014 reported that "Despite the weak regulatory system, the private health sector is thought to be better at conforming to health standards compared with the public sector. Problems in MoPHP oversight arise because of a lack of specifications in the law. It is worth noting that many of the non-policy-makers were not familiar with the available regulations and were not aware of an accessible system or database for the private health sector legislation and

regulatory documents. It appears that there are no regulations or control of the government on dual job-holding and the informal health sector" [84].
Dual employment is accepted in Yemen as a part to improve the income especially with low salaries and is accepted within the government [84]. Because of this, many health care providers direct patients to the private sector and make a profit [84]. This happens for many female patients who seek SRH services and are then directed to private clinics, hospitals, pharmacies, and labs to get the services they need.

Because of the absence of agreed tariffs for health services, the patients have to pay to have access to health. That tariff differs from one provider to another and since the conflict started, the fees increased sharply, regardless of the current regulations [52,67]. Also, there were efforts to set fixed tariffs for services with community participation but it failed [84].
A weak or lack of supervision with a weak organization decreases the health services' quality even with the presence of various laws and regulations that govern the health sector and the presence of informal influences [84].

3.1.3. Partnership and Coordination

One of the main issues of the health system is the absence of effective stakeholders' coordination and division between national and sub-national parties [51]. Prior to the current conflict, the NHS mentioned a strategy of the need for a commitment for intersectoral coordination and partnership with health development partner with enhancing sectoral coordination [51]. However, there was a poor intergovernmental coordination system, between MoPHP and different bodies, such as MoF, higher medical training institutes, Ministry of Civil Services, District Local Authorities, private sector and other related bodies to improve the health system [51,85]. An example of lack of intersectoral coordination is between the Ministry of the Higher Education and Scientific Research and the MoPHP that resulted in a mismatch between the production of health professionals and the real needs of the health sector [85].

Coordination between different levels and parties of the health sector is done in a complicated way. This was due to the involvement of different bodies in the leadership of the health tiers. However, the responsibilities and roles of each party have not been well laid out [51]. While, for the public-private partnership, there was an idea to implement the Turkish experience prior to the conflict, but both sectors (Public and Private) refused to have a partnership because of the presence of mistrust [84].

There is a Union for Private Hospitals within the private sector and the aim of it is to "protect the rights of investors and coordinate their work in terms of referral among the major hospitals and continuing medical education" but it needs more focus for self-regulation [84].

Since the conflict started in Yemen, there are two governments with two MoPHP (the Sana'a ministry controlled the coordination of the areas under its role and the Aden ministry controlled the other areas under its control). Those two Ministries control the implementation of health programs in partnership with humanitarian clusters[a] in Yemen. The humanitarian cluster organizes the humanitarian response of health issues and ensuring the implementation of the planned projects [45,86–88]. This cluster is considered as a coordination party which may have weakened the role of MoPHP. Also, with the presence of local leaders who enforce any partner to take permission from them to work in their

[a] There are ten clusters and three sub-clusters (Child protection, Sexual and gender-based violence, and Cholera response dashboard) to coordinate the humanitarian response in Yemen.

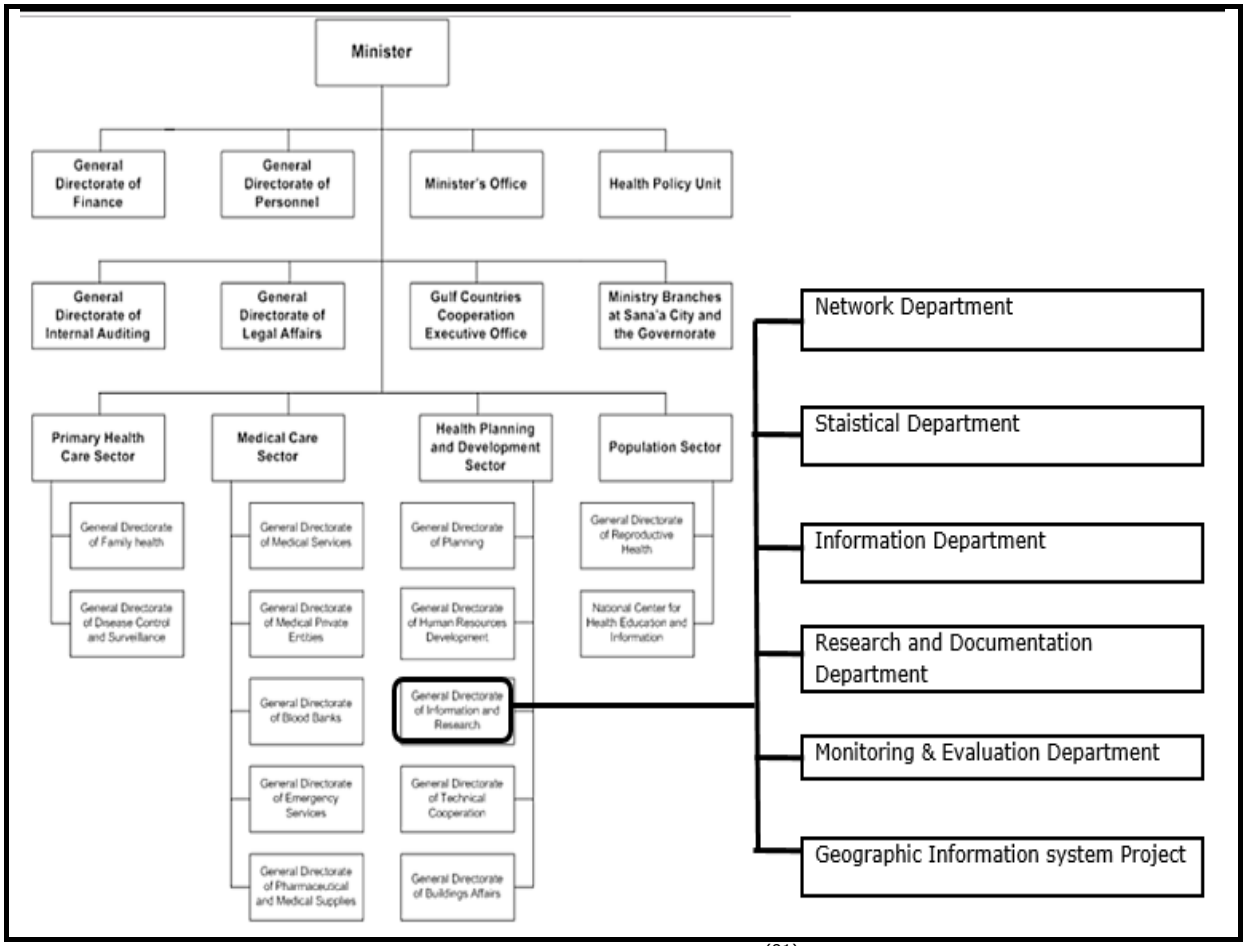
areas of control and even they use their power to decide who will work in providing services in that areas [a].
A study was done in a crisis and conflict-affected setting, showed increased in the networking of new stakeholders, donors and organizations lead to losing the institutions' coordination, leading to fragmentation of the health system [89].

Another example of poor coordination is the cholera outbreak in Yemen, as more than two waves were reported since the start of the current conflict and recorded a high level of emergency. That was due to poor coordination between different stakeholders in Yemen in combination with other influencing factors [90].

3.1.4. Health Information System (HIS)

HIS comes under the responsibility of the Health Planning and Development Department in MoPHP. The department is the main source and the responsible body of publishing health data, annual reports, surveys, researches and other data [91], **Figure 11.**

Figure 11: Health information and research in the organizational Chart of MoPHP



Source: Author's Summary based on Yemen MoPHP website [91]

A published article in 2014 mentioned that the poor health information infrastructure is a common feature in low- and middle-income countries, who lack the ability to monitor a timely performance. Yemen is part of these countries where the HIS is highly fragmented and inefficient resulting in data of low-quality [92].

[a] Author's communication

The collection of health data before the conflict was complex due to limits on health data collection, information differences, lack of operational fund, poor use of data, difficulties in coordination between information department and MoPHP; and an irregular flow of data from the first level of health service to the central level [51]. The vertical programs collected more detailed monitoring information, which exacerbated already weak capacity in management and dissemination of data [67]. Even with the presence of an authorized system from MoPHP for the basic information generated information was not used by the implementers as they have their own system [51].

Regarding the RH data and as mentioned in NRHS 2011-2015, there is no direct involvement of the information department in the monitoring and evaluation of RH activities as it did not receive the raw data [93]. Irregular and incomplete reporting makes the data update difficult even with the presence of the information system [93].

A study done in 2018 in 11 countries from the Middle East and North Africa (MENA) including Yemen, showed that there is a high need of complete, accurate and timely data because of its importance for planning, management and decisions making [84,88]. That was a problem started before the conflict; recurrent attacks and the transportation system barriers in Yemen makes the collection of data more difficult and could be impossible in some areas [94]. Another continuous problem is the poor use of population for civil registration to registering births and deaths [51].

Also, there is a limited exchange of data between public and private sectors and collected during review visits [84]. This is a critical issue as, without the exchange of data, MoPHP does not have adequate information to determine the priorities for planning[a].

The health system research is limited even with its importance for planning and management due to many challenges as reported in a study done of fragile and conflict settings included South Sudan, Afghanistan, Somalia, and Yemen. Those challenges are unavailability of needed support, coordination problems, poor capacity, access limitations and outdated results [95].

Section Two: Health Financing

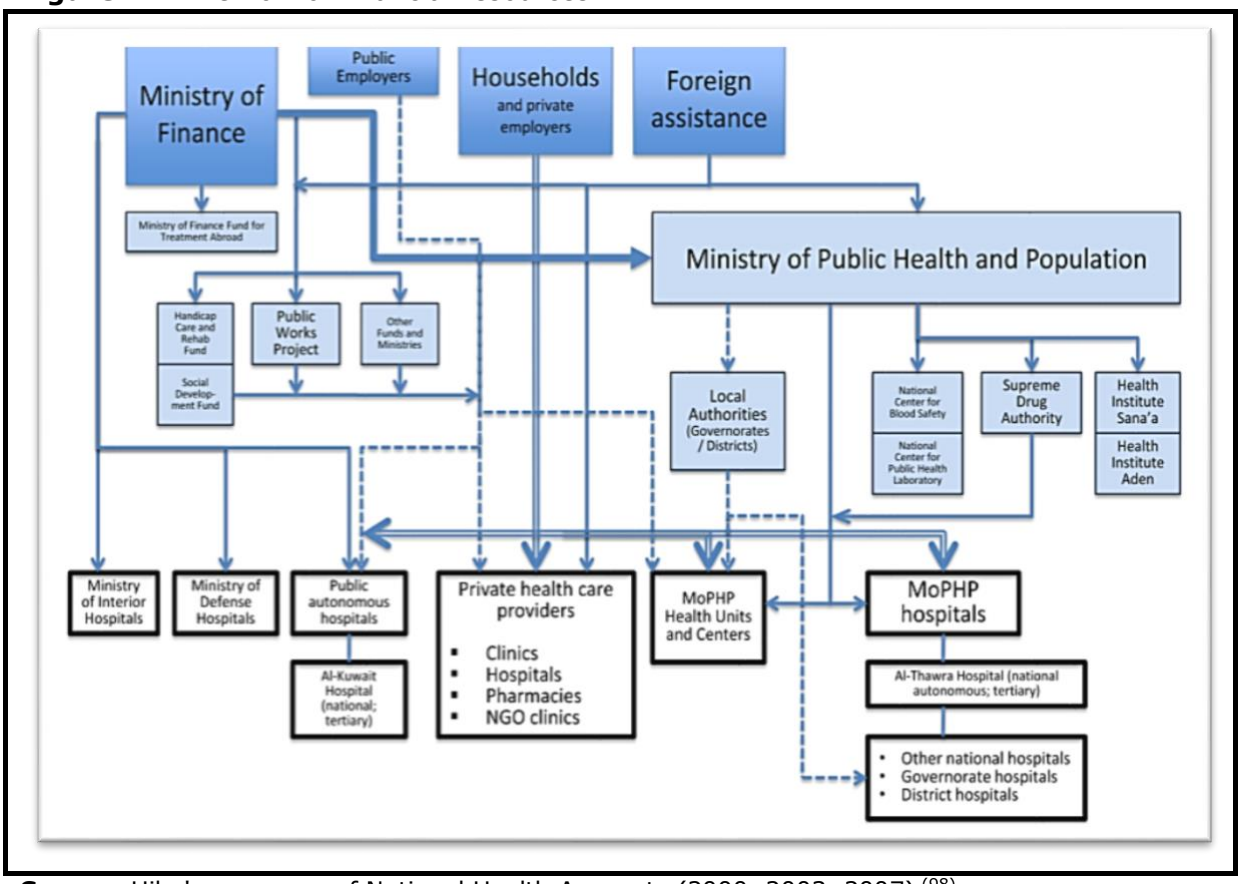
The WHO defined it as "function of a health system concerned with the mobilization, accumulation, and allocation of money to cover the health needs of the people, individually and collectively with the purpose to make funding available, as well as to set the right financial incentives to providers, to ensure that all individuals have access to effective public health and personal health care" [96,97].

Prior to 2011, the funding for the health sector in Yemen is known to have been inadequate and lower than funding for other governmental sectors, with unequal distribution within the health sector itself [51]. MoF is the responsible body of health finance and expenditure is Yemen [51]. **Figure 12**, shows that health financing comes directly from public resources, external aid, and HHs [98]. The allocation of budget within MoPHP based on WHO data before 2011 was as the following: "three-fourths of the ministry budget is spent on operations, roughly one-half is spent on wages and salaries, about one-third is spent on "goods and services" (including drugs and medical supplies), and about one-seventh is

[a] Author's communication

spent on "current transfers and support". On average over the five-year period, only about 4% of the recurrent budget (3% of the total budget) is spent on "maintenance" of facilities and equipment" [83]. While there is no available published data for health sector budget allocation per district/local authorities.

Figure 12: The flow of financial resources



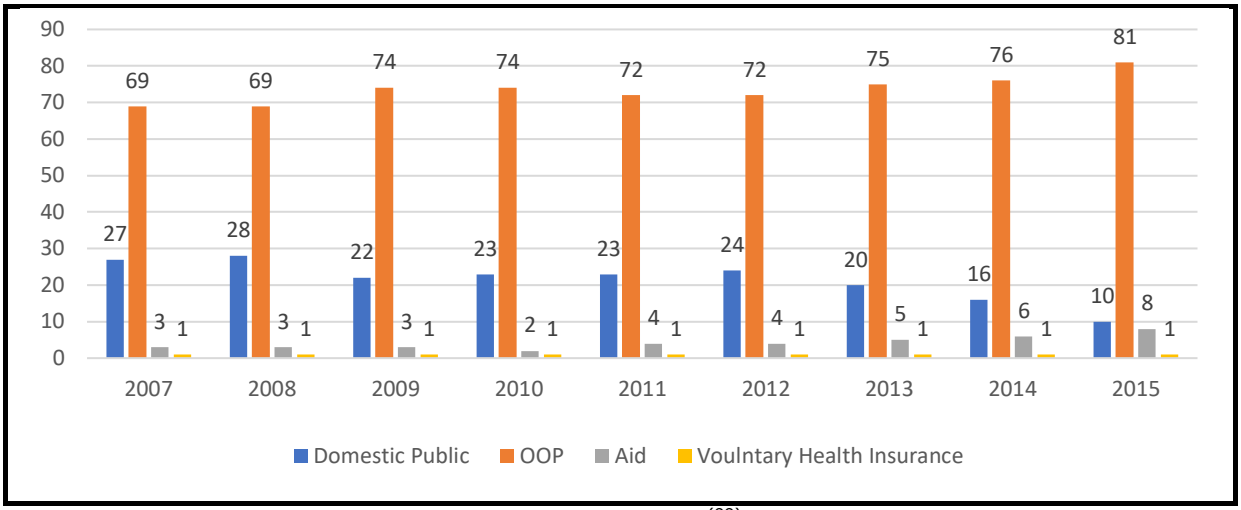
Source: Hiba's summary of National Health Accounts (2000, 2003, 2007) [98]

3.2.1. Revenue Raising

"The amount of revenue collected and the ways it is collected have important implications for financial protection and equity" [88].

According to the WHO National Health Account of Yemen database (**Figure 13**), the mean source of revenue is Out-Of-Pocket (OOP) which is increasing in years with a decline in public sharing [99]. The public sharing on health, coming from a direct transfer from MoF to MoPHP was equal around 4.1% of the total government expenditure [88,98]. Total Health Expenditure (THE) per capita in USD was $80 in 2014 and declined to $75.3 in 2015 which is considered as the lowest in the MENA region [88].

Figure 13: Percentage of THE between 2007-2015 by Revenue Source



Source: WHO, National Health Account Database, 2016 [99]

Due to the ongoing conflict, the public health expenditure decreased to reach around 3.5% in 2016 of the total budget of the government, as a result of the deterioration of the economy [67,88]. In the same time, the OPP increased for both public and private health care services and reached more than 75% as a result of a weak governance's management function and economic collapsed [52,67]. Most of the Yemeni population cannot afford health services [52,88]. Even for maternal health services, the patient should pay to receive services at all levels which are considered as one of the financial barriers with the costs of traveling mainly from rural to urban with long distance to HFs [100].

A study done in 2017 showed that the budget of the Yemeni health sector mainly relies on "insecure external sources" to provide basic health care services and on OOP expenditure [15,67,77]. Furthermore, the external advance and grant funding for pre-conflict health programs has decreased for security reasons and the humanitarian aid is becoming the main source to support health and nutrition activities [54,101]. As an example, of the coverage percentage according to the response plan to the health sector in Yemen, was around 111% in 2010 and about 49% in 2018 [101], **Table 5**. However, not all funded aid actually arrived in the country as there is no documentation of actual aid spent.

Table 5: Humanitarian Aid flow to health projects

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019[a]
Required (US$m)	5.8	10.8	33.6	30	22.5	65.9	182.3	215.2	593.6	627.2
Funded (US$m)	6.5	9.7	23	20.7	22.9	91	103.1	196.4	292.5	0
Coverage %	**111**	**90**	**69**	**69**	**102**	**138**	**57**	**91**	**49**	**0**

Source: Author's summary based on Financial Tracking Service of humanitarian flow, Yemen 2010-2019 [101]

[a] Up to July 2019

3.2.2. Pooling

It is defined as " accumulating revenue via prepayment financing mechanisms to ensure that unpredictable individual financial risks are accounted for and are distributed among all members of the pool". Three main mechanisms are generally used to pool revenue and health risks: i) state-funded health insurance schemes funded through taxation, ii) social health insurance funded by mandatory employee and employer contributions, and iii) voluntary private health insurance" [88]. The General Government Health Expenditure (GGHE) as the percentage of THE is under 30% since 2009; This indicator means a serious issue of collective coverage of health expenditure and Yemen is the only country below 30% in the MENA region [88].

Cost/fee per service is the main method of payment, as mentioned before even with the presence of limited insurance in Yemen. It is through private insurance companies and only for small-scale employment-based or often informal health financing schemes which developed during the 2000s. It offers good health care services with an average of $200 per employee annually. This scheme only covers less than 5% of the total population [67,88]. Though that scale of insurance covered only 2% of women, as 1% was covered with employee insurance and the other 1% with other types of insurance as through a relative of an insured employee [102]. So, the majority of women (98%) do not have any type of insurance [102].

3.2.3. Purchasing

It means "the transfer of pooled funds to health care providers. Several specific issues require consideration, including provider payment" [88].

Prior to 2011, MoPHP transferred budget to most of the hospitals. While the two central hospitals received health budget directly from MoF and covered around 60% of the total needed budget for these hospitals [98]. However, Health units and centres having an estimation of 17-20% of its total revenue from fees of services and without any type of purchasing strategy "or commissioning to provide incentives for quality or efficiency" from MoPHP [98].

By MoPHP data prior to 2011, there was a broad difference for services in general hospitals regarding " average daily admission rates, the average length of stay and bed occupancy rate". Especially for the obstetrics and gynecology department and internal medicine department which give an idea of the paying mechanism for health providers at both level macro and micro levels[a] [98].

Section Three: Service Delivery

A 2018 survey done by WB mentioned that "Health care services are characterized by a significant level of dissatisfaction among both patients and providers" [52,89]. This is mostly linked to poor quality of health services and lack of access [52]. There is around 77% of the population who live in rural areas are the most affected as they are not covered by HFs [103].

[a] Macro and micro level: facility and health care personnel

Service Provision and quality of care

In Yemen, the health care services are organized in three levels: first, second and with limited numbers of specialized centres in urban areas and considered as the fourth level [51,67], **Table 6.**

Based on the 2014 national report, from the total HFs in Yemen, there is 2,466 out of 4,207 HFs provided RH services.

Table 6: Level of Public Health Sector, Yemen

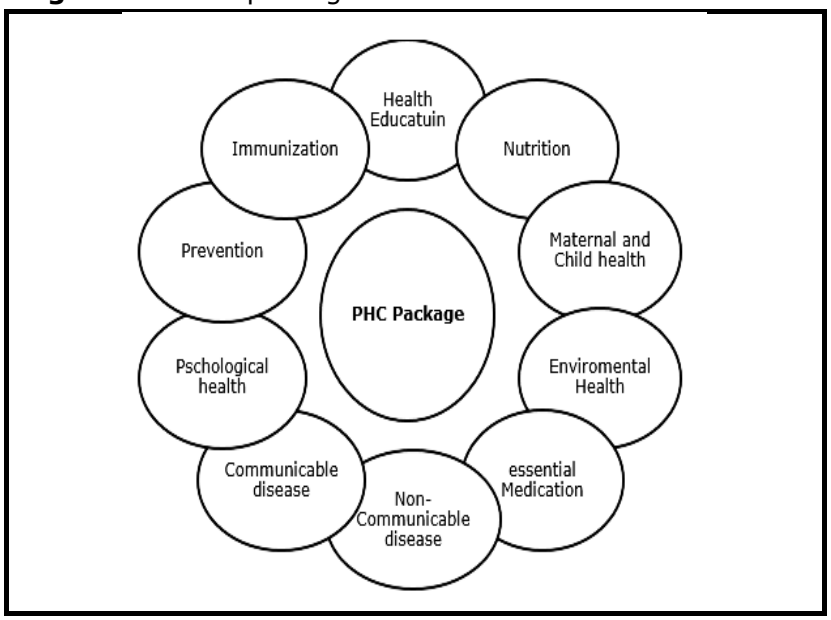
Level	Type of HFs	Service provided	No of HF. based on 2014 report
1st level	PHC units and health centres	The first entry point Preventive services including MNCH, FP, immunization, integrated management of childhood disease, health education and some curative services	Health Units:36 PHC units: 3,047 Health Centres: 881
2nd level	Governorate, Districts Hospitals	Curative health care for referred patients from the first level	Governmental general: 54 Districts Hospitals: 187
3rd level	Referral Hospitals	National and educational hospitals responsible for the complicated cases who couldn't be treated within the previous levels	Two
4th level	Specialized Hospitals	Advanced health care services by specialized centres under MoPHP responsibilities such as " Blood bank, cardiac centres, kidney centres, cancer centres, and rehabilitation centres"	
Total HF. without the specialized centres			**4,207**

Source: Author's Summary based on Yemen NHS 2010, NRHS 2017 & Annual Statistical Health Report 2014 [15,51,104]

▪ Health Services Package

As mentioned before there is a limited and undefined package of services within the national strategies, but it was listed in the national guidelines for HFs [81,105]. In these standards, they listed and defined the PHC services as in **Figure 14.**

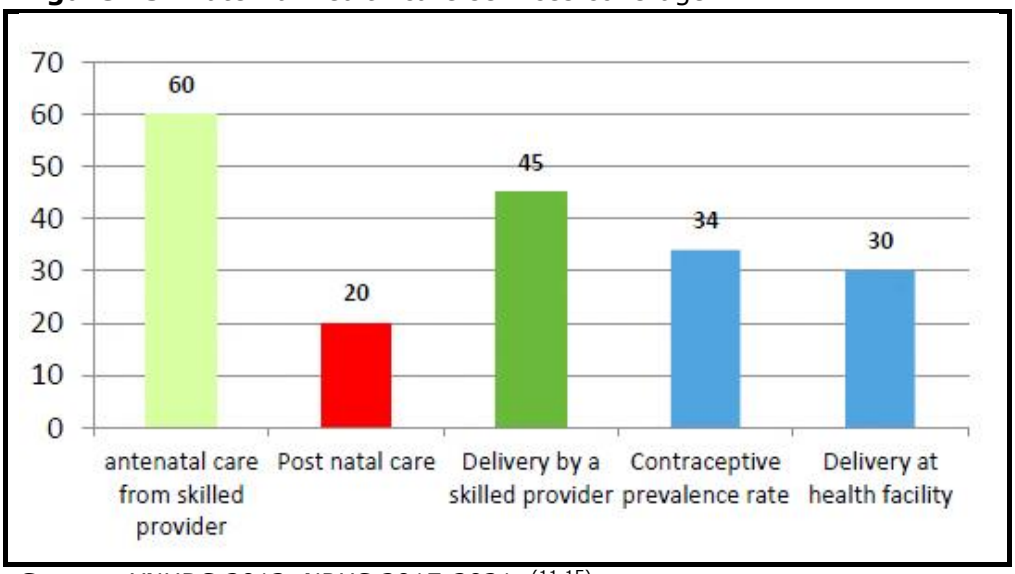
Figure 14: PHC package



Source: Author's summary based on Yemen health Units and centres Standards, 2005 & 2019 [81,105].

Prior to the conflict and based on YNHDS 2013, the coverage of maternal health services was like 60% ANC and 45% deliveries attended by skilled providers [15], **Figure 15**. There is a maldistributed of services and this is similar to other MENA countries. However, Yemen has the lowest coverage of less than 10% based on USAID reports 2018 [88].

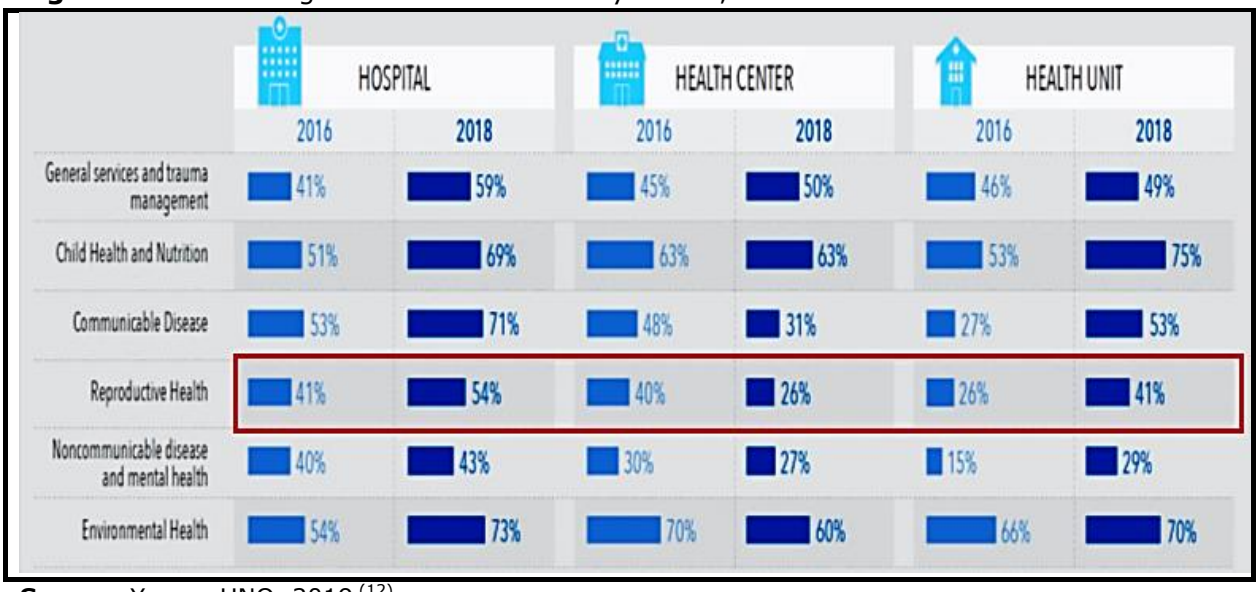
Figure 15: Maternal health care services coverage



Source: YNHDS 2013, NRHS 2017-2021 [11,15]

Figure 16, RH services are limited to less than 55% in each level of HFs with an improvement from 2016 data except in health centres which became worse [12,53]. This is an issue with other challenges related to the conflict which cause a shortage in health providers, infrastructure and medical supplies causing poor quality life-threatening services' provision for mothers and new-borns [15].

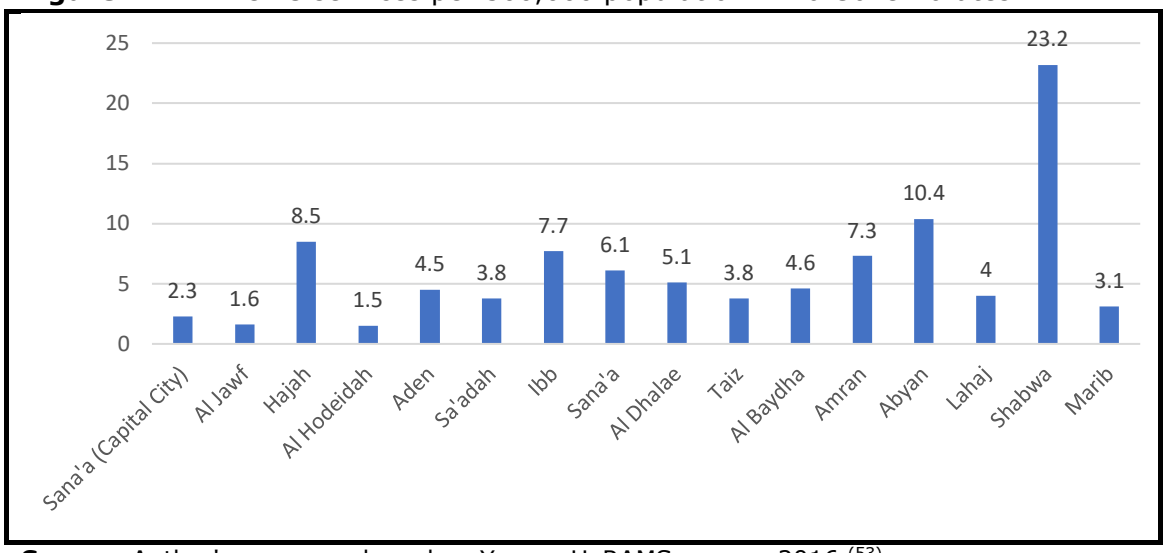
Figure 16: Percentage of Service availability in HFs, HeRAMS 2016 and 2018



Source: Yemen HNO, 2019 [12].

Figure 17, shows the Basic Emergency Obstetric New-born Care (BEmONC) where the standard value should be four or more BEmONC services per 500,000 population. However, there are six governorates below the standard value of BEmONC services (Sana'a the capital, Al Jawaf, Al-Hodeidah, Sa'adah, Taiz and Mariab. Those governorates are from the most affected governorates by the conflict.

Figure 17: BEmONC services per 500,000 population in 16 Governorates



Source: Author's summary based on Yemen HeRAMS survey, 2016 [53]

SRH situation: The median age at first marriage, according to YNHDS 2013, is 18 years old and the Adolescent birth rate (per 1000 women aged 15–19 years) is 67% in 2006-2017 compared to 87% in Afghanistan and Sudan [7,15,47]. While due to the conflict, child marriage increased by three folds between 2017-2018 (12). **Table 7** shows specific SRH data while **Table 8** shows the effect of conflict on health outcome as compression of 2014 and 2015 data. There is a different in of MMR of 2014 and 2015, with an increase in the ration in 2015 when the conflict started.

Table 7: Key SRH data

Data	
Deliveries occur within 24 months after the previous delivery[a]	30%
Female Genital Mutilation (FGM) in girls between 15-19 years old	16%
FGM by traditional excisors	90%
Prevalence of HIV	0.04%
Deliveries attended by skilled birth attendants (SBA)	44.7%
Deliveries by traditional birth attendants	21%
Births in HFS	3 out of 10
New-born deaths	One per 37
Teenage girls (15-19) gives births	One per 15
Pregnant women will suffer some form of maternal or obstetric complications	15% (144,000)
Contraceptive prevalence rate of women married or in the union who use any type of method	44%
Unmet need of FP	24%
Proportion of demand satisfied	64%

Source: Author's summary based on UNFPA, UNICEF, YNHDS, NRHS, et al. 2013-2019 (11,15,17,39,103,106,107)

[a] Considered as too close spacing and about two-third of births under-five are not registered

Table 8: Selected health indicators differences between 2014 and 2015, Yemen compared to WHO EMR

Domain	Indicator	Yemen		WHO EMR	
		2014 (unless otherwise stated)	2015	2014 (unless otherwise stated)	2015
Global indicators	Life expectancy at birth[a]	67.10	66.00	68.80	68.80
Child health	Infant mortality (per 1000 live births)[b]	35.10	33.80	41.60	40.50
	Under-5 mortality (per 100 000)[a]	929.91	1135.39	1136.67 (2010)	941.76
	Percentage of children under 12 months immunized against measles—MCV1 (MCV2),[c]	75 (53)	75 (49)	76 (N/A)	76 (N/A)
Maternal and reproductive health	Maternal mortality ratio (per 100 000 births)[a]	299.23	307.42	241.55	238.35
Communicable disease	Malaria incidence rate (per 100 000)[a]	619.52 (2010)	571.24	1076.08 (2010)	1018.69
	Lower respiratory tract infection mortality rate (per 100 000)[a]	30.08	29.80	35.36 (2010)	29.47
Non-communicable disease	Prevalence of cardiovascular disease[a]	3.93 (2010)	4.02	5.04 (2010)	5.18
	Prevalence of cerebrovascular disease[a]	0.37 (2010)	0.37	0.44 (2010)	0.45
	Prevalence of chronic respiratory disease[a]	8.23 (2010)	8.14	7.17 (2010)	7.48

Source: Qirbi, A Ismail. Health system functionality in a low-income country in the midst of conflict: the case of Yemen, 2017 [67]

▪ Health workforce

The MoPHP is the main employer of health providers in Yemen, but there is severe scarcity in skilled staff in Maternal, Neonatal and Child Health (MNCH) [52]. Even before the conflict, there were only two health care providers per 10,000 population, which is approximately similar to other low-income countries. In addition, the shortage of female health providers was known to be a barrier for access for women as 73% of the total health workforce are male [67,85]. The national report in 2014 reported that there were 16,148 male and 5,163 female staff in the health sector [104].

The health workforce crisis in Yemen is mainly due to maldistribution and it is a continuous problem throughout the years: around 20% of the health workforce is present in rural areas, while 80% is based in urban areas with a high shortage of hired female staff while many women preferred to seek health from female health providers [15,52,67]. This is a common issue in MENA which faces many challenges and one of them is training and retaining health staff is mainly in conflict sites and in rural areas [88].

Regarding the presence of midwives, there is Community Midwives (CMWs) network in Yemen which is coordinated by the MoPHP and stakeholders such as Marie Stopes International Yemen, Yamaan foundation and UNFP. These organizations provide different training topics to improve CMWs capacity and support them to increase utilization of services within their area of work[a].

A good training program, the EmONC diploma course, was implemented by Yamaan foundation and the Yemeni Board of Health Specialization. That program trained selected health providers from different districts on intensive training of EmONC management[b].

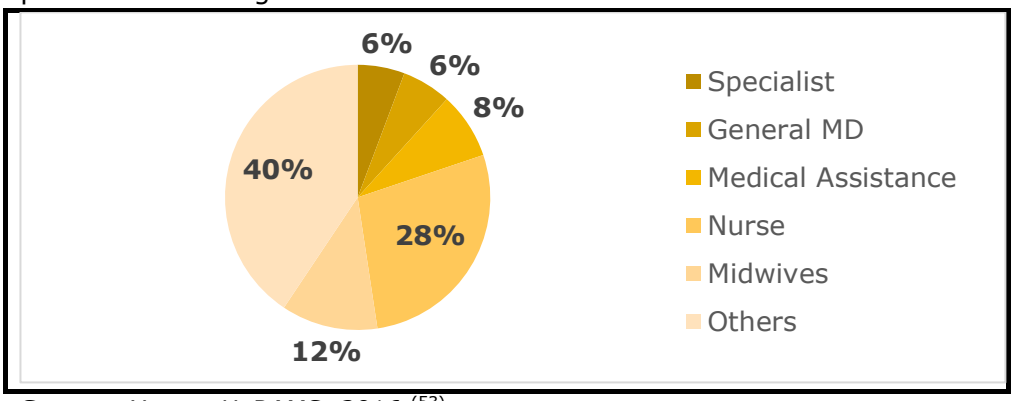
[a] Personal Communication
[b] Personal Communication

Although the current salary scales are above the poverty income levels, between USD 39 and USD 171 monthly, the salaries have not been paid continuously for several years, even with the presence of the labour law which mentioned before. That law is not implemented due to the conflict [73,108]. The 2018 World data highlighted that numerous Yemeni health workers have been providing services without salaries for almost two years [52,67].

Based on WHO data update in 2019, most of the health staff fled from their areas due to insecurity, difficulties in access and or unpaid salaries. While those who still are providing services within the HFs rely mainly on humanitarian actors' incentives which is similar to other MENA region countries affected by conflict [88,109]. Since 2015, there are more than 120% attacks have been reported since on health providers, assets and patients. These attacks limit access to health services [12].

WHO minimum average standard of health providers is 22 providers per 10,000 population. In HeRAMS 2016, there are 33,317 health care providers in the 16 governorates where the survey was done [53]. However, the national average is 17.03 per 10,000 population which is below the international standard for the health workforce [53], **Figure 1**

Figure 18: Percentage of Availability of Health workforce by professional background



Source: Yemen HeRAMS, 2016 [53].

Table 9 shows the distribution of health care providers (Specialist, GP, assistance, nurse, midwives and other). In Al-Hodeidah and Sa'adah where they have the lowest number of health staff due to the intensive conflicts there.

Table 9: Health workforce per governorate

No	Gov.	Population	Total No. of health staff	No. of health staff per 10,000 pop[a]	No. of districts without doctors
1.	Sana'a (Capital City)	3,155,736	8,281	20	0 out of 10
2.	Al Jawf	622,878	553	6	5 out of 12
3.	Hajah	2.060,867	2,837	10	5 out of 31
4.	Al-Hodeidah	3,079,241	3638	8	2 out of 26
5.	Aden	888,148	5,503	42.7	0 out of 8
6.	Sa'adah	1,027,237	932	6.3	12 out of 15
7.	Ibb	2,804,609	4,150	10.7	9 out of 20
8.	Sana'a	1,150,494	2,076	13.1	7 out of 16

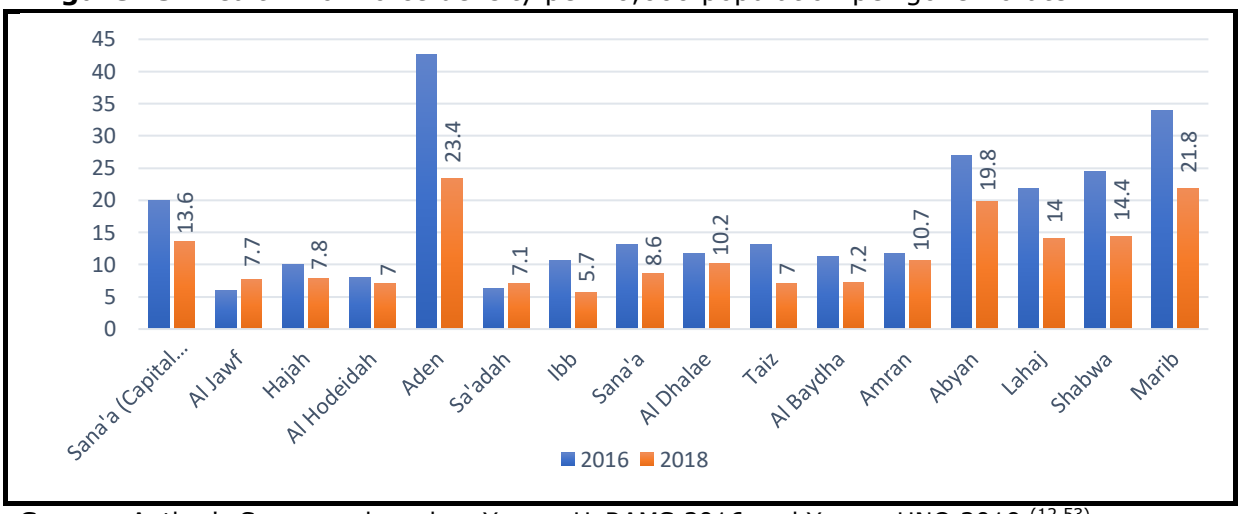
[a] WHO standard is equal or more than 22

9.	Al Dhalae	689,630	1,228	11.8	6 out of 9
10.	Taiz	3,155,736	5,720	13.1	5 out of 23
11.	Al Baydha	733,473	1,166	11.2	15 out of 20
12.	Amran	1,322,455	2,190	11.7	15 out of 20
13.	Abyan	573,656	2,371	27	3 out of 11
14.	Lahaj	973,720	3,311	21.9	5 out of 15
15.	Shabwa	609,935	2,152	24.5	10 out of 17
16.	Marib	329,231	1,524	34	10 out of 14
Total		**21,060,867**	**2,837**		

Source: Author's summary based on Yemen HeRAMS, 2016 [53]

Figure 19, the distribution of health workforce in governorates, according to 2018 data, which represent medical doctors, nurses and midwives, compared to 2016 data included Specialist, GP, Medical assistants, nurse, midwives and other. The causes of low benchmark numbers are due to the previously mentioned causes in addition to production issues as skill mix imbalance with the dominance of medical doctors and highly-trained specialists. Before the conflict, there were 21,606 students enrolled in medical institutes. part of that number presented as 32% medicine, 26% pharmacy, only 8% nurse, and 0.4% medical assistants [85]. Also, recruitment is known to be a long time problem as presented in the HRHS, there is an estimation of more than 20,000 graduates registered with the Civil Services who are waiting for jobs [85].

Figure 19: Health Workforce density per 10,000 population per governorate



Source: Author's Summary based on Yemen HeRAMS 2016 and Yemen HNO 2019 [12,53].

▪ Drugs, Vaccines and Medical Supplies

Yemen has five regional medical warehouses in Sana'a the capital, Aden, Al-Hodeidah, Mukala and Dhamar governorates and other lower-level stores. However, the numbers of these warehouses declined due to a shortage of funding to maintain and support these warehouses [51]. The request for new stock supplies was raised by the level of HFs to the district level then to the central level MoPHP. However, the supply chain of contraceptive is totally a donor funded and going through a procurement process. This process is not fully implemented due to miscommunication between partners and inconsistent information sharing that was further deteriorated by the current conflict. [110]. **Annex 4**: Overview of Procurement Process.

Even with the support from International Non-Governmental Organization (INGOs), the drugs and medical supplies are in short supply with an increase in demand while essential commodity stocks are limited at all health care levels, which decreases health care

utilization [103]. This is due to the closure of ports and the collapsed economya. The 2017 humanitarian bulletin of Yemen reported that "imports of medicine have dropped by two thirds since the start of the war" [45]. Before the conflict, there were numbers of pharmacological companies in Yemen which played a positive role in supporting the market with some essential drugs and medical supply.

Based on HeRAMS 2016 data, there was a high availability of outpatient services with availability of all essential drugs in Al Dalae's hospitals with 80% availability. Though, the lowest percentage was in hospitals of Aden, Al Jawf, Al-Hodeidah and Lahaj with 20% and less. For health centres, it was less than 10% in Abyan, Marib, Sana'a, and Amran. And for the health units, it showed that in 15 governorates the availability of services was less than 20% except in Al-Hodeidah where it was 48% [53], **Table 10.**

Table 10: Percentage of Available selected services per HFs and per governorate

No	Gov.	First Aid and Life support[b]			Outpatient services with availability of all essential drugs[c]		
		Health Unit	Health Centre	Hospital	Health Unit	Health Centre	Hospital
1.	Sana'a (Capital City)	n/a	31	n/a	n/a	36	n/a
2.	Al Jawf	0	33	33	0	17	17
3.	Hajah	36	47	90	14	28	56
4.	Al-Hodeidah	6	12	46	48	38	10
5.	Aden	n/a	41	60	n/a	41	20
6.	Sa'adah	28	38	67	11	33	67
7.	Ibb	25	40	85	3	17	54
8.	Sana'a	4	32	86	11	7	57
9.	Al Dhalae	15	37	100	11	27	80
10.	Taiz	27	44	60	18	53	74
11.	Al Baydha	25	37	57	2	11	67
12.	Amran	29	42	60	1	6	33
13.	Abyan	32	28	63	3	8	25
14.	Lahaj	17	40	46	7	38	20
15.	Shabwa	54	65	93	13	72	60
16.	Marib	27	27	78	8	9	56

Source: Author's summary based on Yemen HeRAMS 2016 [53]

One of the programs affected by the conflict is the prevention programs, such as the coverage of measles vaccine which declined from 80% to 40% all over Yemen due to inadequate vaccine supplies and low utilization [53,67,111]. Intensive campaigns were done at the end of 2015 which increased the coverage of the first dose of measles at nine months and rubella vaccines to only 75% under-five children [53,67].

A baseline assessment done before the conflict of 20 HFs in (Sana'a, Ibb, and Al-Hodiedah), which provided emergency maternal care, reported that there was a shortage or lack of essential drugs needed for this service. Five out of the 20 HFs had no drugs and none of the 20 HFs had the life-saving drug magnesium sulphate [112]. The RH supply chain assessment 2016 reported that the supply chain of RH is not working and it is inefficient

[a] Author's communication
[b] As a kit
[c] single commodities

as there is a limited MoPHP's budget for essential needs [15,113]. The effect of the conflict is worsening the situation, which leads to different challenges as weak supervision on warehousing, low capacity for management and lack of coordination in transporting the commodities [113].

▪ Technologies and Infrastructure

Before the conflict, there was an inequitable distribution of HFs as mentioned before and 80% of HFs are located in rural areas but are understaffed with only 20% of health staff [15]. The operation management of HFs is influenced by local leaders, mainly in the 1st level, causing coverage disparity as they misuse their power [84]. Due to this disparity, 59% of women in 2013 who found the distance to HFs is one of the important barriers to access SRH services [11,67]. While the private sector has been developed rapidly during the conflict, mainly in urban areas [52].

According to HeRAMS 2016, the direct attacks on HFs lack access to health services. As well as the serious damage to the infrastructure, impaired and lack supplies of fuel, electricity and other supplies, shortage of health workforce, financing problems and access barriers of the population. All of these issues are making the health system unable to provide health care services [52,67]. **Table 11** shows Population coverage per HFs. There are 3,515 HFs in 16 governorates and only 45% of them are fully functional[a], 38% are partially non-functional[b] and 17% are non-functional[c] [53], **Table 12**.

Table 11: Population coverage per HFs for 16 Governorates

For 16 out of 22 governorates	Average	National / International Benchmark
Population coverage with Health Unit	9,885	One unit for 5,000 at least
Population coverage with Health Centre	36,340	One centre for 20,000 at least
Population coverage with Hospital	150,190	One district hospital for 60-150,000 population
Beds per Population	6.2	10 or more for 10,000 population

Source: Author's summary based on Yemen HeRAMS 2016 [53].

Table 12: HFs Utilities per governorate

No	Gov.	Total HF	% of functional and Partially functional	% of Non-Functional
1.	Sana'a (Capital City)	86	83.7	16.3
2.	Al Jawf	94	44.7	55.3
3.	Hajah	326	86.8	13.2
4.	Al-Hodeidah	384	96.4	3.7
5.	Aden	45	82.2	17.7
6.	Sa'adah	163	63.8	36.2
7.	Ibb	365	84.7	15.4
8.	Sana'a	285	83.2	16.9
9.	Al Dhalae	155	85.2	14.8
10.	Taiz	425	85.2	14.8
11.	Al Baydha	177	76.3	13.6

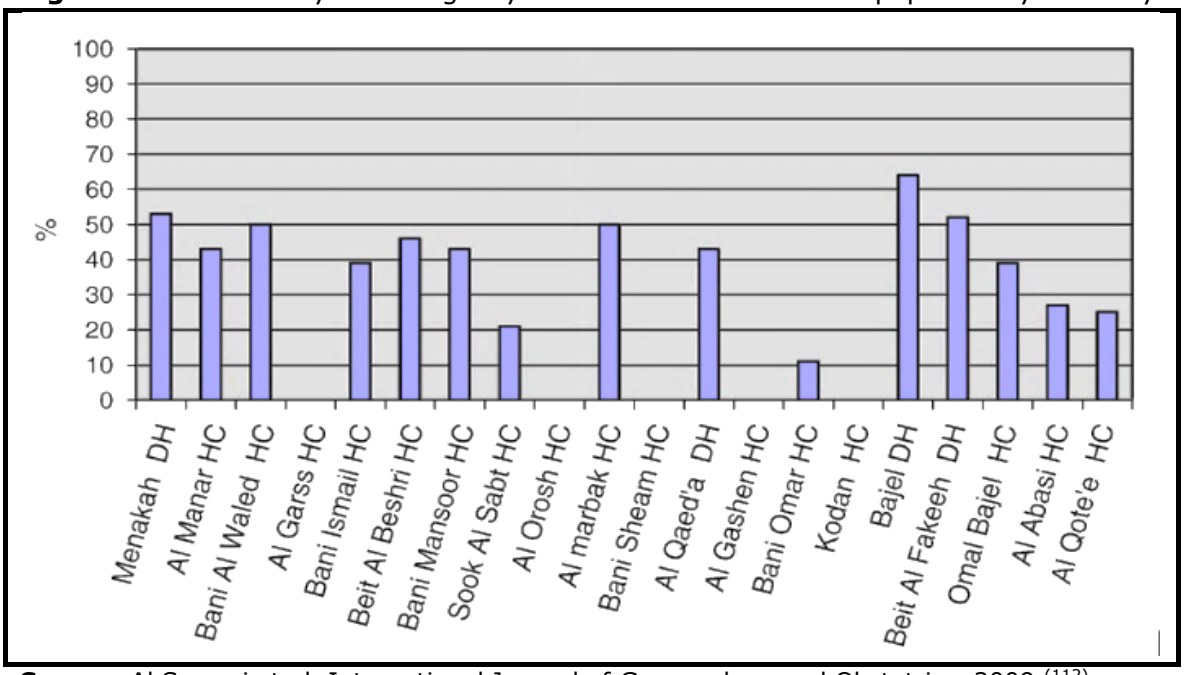
[a] The HF with all needed capacity to provide the services
[b] Incomplete provided services
[c] Partially and/or totally damaged by ongoing conflict or airstrikes

12.	Amran	304	83.9	16.1
13.	Abyan	168	79.8	20.2
14.	Lahaj	234	88.0	12.0
15.	Shabwa	184	83.7	16.3
16.	Marib	120	67.5	32.5

Source: Author's summary based on Yemen HeRAMS 2016 [53]

The problem of maldistribution of medical equipment items and other technologies already existed before the conflict, without regular proper maintenance due to the funding gap and low awareness of routine maintenance [51]. The baseline study (Al Serouri 2009) findings show there were a shortage and unavailability of equipment exists [112], as out of 20HFs, five were without labour room and the ambo bag for new-born resuscitation was not present in any of the 20 HFs. **Figure 20**

Figure 20: Availability of emergency obstetric care essential Equipment by a facility



Source: Al Serouri et al. International Journal of Gynaecology and Obstetrics, 2009 [112]

Chapter Four: Discussion

This chapter will discuss the findings of the health system functions in relation to access and utilization of SRH. In addition, possible interventions from a similar context will be discussed.

Governance

Utilization and access of SRH services in Yemen is affected by different factors and one of the most important factors is the health system functioning which facilitates or creates difficulties for the population to access SRH services.

The findings highlighted that weak governance is characterized by absent or weak oversight which deteriorated since the conflict started. That weakness resulted in increased corruption and ineffective management of the health sector in the presence of two MoPHP with lack of coordination.

The MoPHP in Yemen is the main responsible body of the health sector. However, the presence of two governments due to the current conflict is leading to fragmentation of the health system, where the lack of coordination between all bodies has occurred. That was a result of non-functional coordination structure. In addition, increased the role of Non-Governmental Organizations (NGOs) in service delivery has an effect of decreasing the role of MoPHP mainly the role of coordination: INGOs work based on their priorities, which is mainly emergency response at this time, with limited SRH services.

Similar to what happened in Somalia during the armed conflict where the national health system was non-functional and the service delivery of health had limited government oversight in all regions of Somalia [12,114,115]. In addition, the Somalia government was unable to provide basic functions, mainly the core services such as health and education to the Somalian population. The government depended mainly on the humanitarian aid to provide minimum basic services for the community which is typical like currently in Yemen [12,114].

Another example of the result of lack of commitment and financial capacity of the government in Somalia is when the health services are provided mainly by the private sector including NGOs because of staffing, medical supply, and infrastructure issues in the public sector. In the same time, regulatory frameworks remain, but conflict leads to a lack of enforcement to regulate and control the provision of health services resulting in worsening of health system functions [114,116]. This could be applicable to Yemen where the laws and regulation not effectively enforced. As mentioned before, the presence of unlicensed health providers, unregulated procurement process, lack of health providers' incentives (no salaries and poor training), misuse of power at all levels of the health sector. All of these decrease the quality of services which causing poor access and underutilized services.

Furthermore, there is a week HIS with inaccurate and poor data that affects the decision-making and limits monitoring and evaluation of services. There is a sharing of information between NGOs (local and international) and MoPHP but those NGOs using their own HIS and according to their standards of data sharing and level of coordination. Also, there is an absence of adequate data as the ones related to home deliveries and deaths, reproductive commodities stock, HFs visits, health staff, and their professionalism. Also, due to the current conflict, it is difficult to conduct population-based surveys as the last one was done in 2013 and poor attention to support health researches.

Health Financing

The limited health sector budget combined with an increase in the poverty rate in Yemen and increase the cost of health services, raise the barriers for seeking health care.

A study done in Somalia in 2017 reported that the main option to keep the health services provided is by the private sector and OOP as the access to health services do not depend on the need but on services' affordability [114]. But in Yemen, there is no public-private partnership as there is a limitation to increase the risk pooling.

Before the conflict, Yemen's government allocated a larger proportion of its budget to military services than social services and the response of external funds is focusing mainly on targeted programs according to their goals[a]. Similar to what happened in Syria, which resulted in a decrease of the public funding but "this information remains anecdotal and is not documented by any reliable sources due to the conflict" [88].

The collapsed economy will increase the dependency on external donors due to low governmental contribution to the health sector especially to SRH services. This decrease the sustainability of providing health projects, increase OOP with limited coverage of insurance scheme. In addition, the inability of MoPHP to ensure the provision of health services, i.e. MoPHP has challenges to pay health staff's salaries and implement the policy of free of charge PHC services.

As mentioned before inadequate access and low utilization due to financial challenges affect the SRH service delivery which deteriorated during the current crisis.

Service Delivery

Good actions were taken by MoPHP to develop the new NRHS 2017-2021 to improve the provision of SRH services. That strategy was part of the recommended strategies in NHS 2010-2025 which highlighted the ensuring of access and utilization to health care services as one of its main goals. However, as a result of conflict, the implementation plan of that strategy is not developed while other policies and strategies are still drafts, and the old ones did not replace by new policies.

The basic package of health services is not well defined in the NHS but the package of intervention for RH is highlighted in the NRHS 2017. However, the availability of RH services is limited to less than 50% in different levels of HFs as mentioned in **Figure 16**. With the poor quality of services which leads to loss of trust between the population and the health sector. This will decrease the utilization of services leading to increase the burden of disease as mentioned in **Table 5** where there was an increase in MMR before and during the conflict.

The SRH services provision is weak compared to other MENA countries. It was limited before the conflict and deteriorated during the current conflict.

The main challenges for rural HFs are a shortage of supplies, staff and equipment with lack of electricity and fuel to run these HFs which lack access to health services. As similar to what happened in South Sudan where the procurement and management of the supply chain were very difficult. The Ministry of Health had the responsibility to support HFs with medical supply, but the push system operation was unresponsive to the actual need [117].

In addition, low coverage of rural HFs due to maldistribution, poor referral system, shortage of RH commodities, poor maintenance of equipment, decreases the quality of services leading to low utilization as the MoPHP cannot meet its commitment to the community.

[a] Personal communication

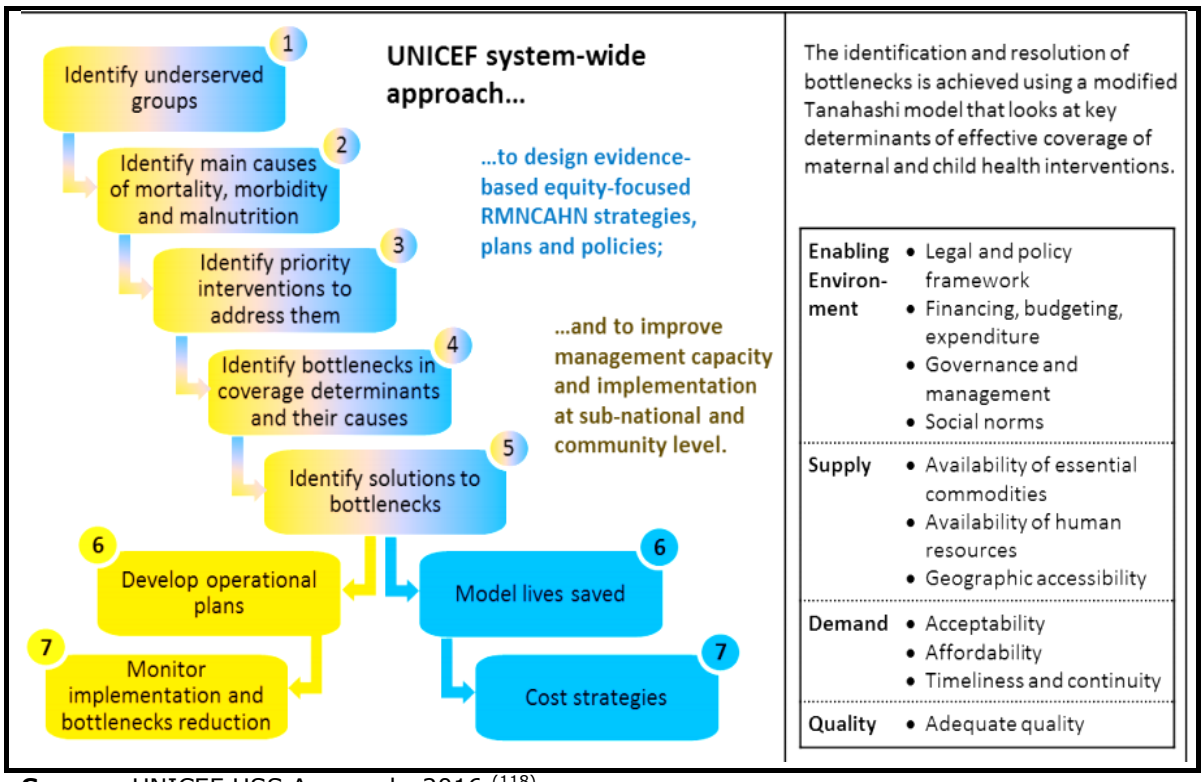
Possible Interventions

There were different evidence-based interventions and approaches implemented by International organizations to strengthen the health system in conflict settings which can be a guide to Yemen MoPHP to address the health system fragility.

One of these approaches is:

- **UNICEF approach to HSS for MNCH** includes activities at all levels (community, district and national) based on partners and stockholders' priorities and guided by "results-based approach that applies at all levels of the health system" [118]. Identification of these priorities and situation analysis are done using the seven-step approach as in **Figure 21**, which "can inform national plans, build efficiencies in the delivery of district health services, and strengthen the community platforms that deliver services, promote healthy behaviours and empower communities for local accountability" [118]. Also, using this approach to assess the impact of HSS actions on health outcomes

Figure 21: Seven-step approach to situation analysis and identification of priority actions in HSS[a]



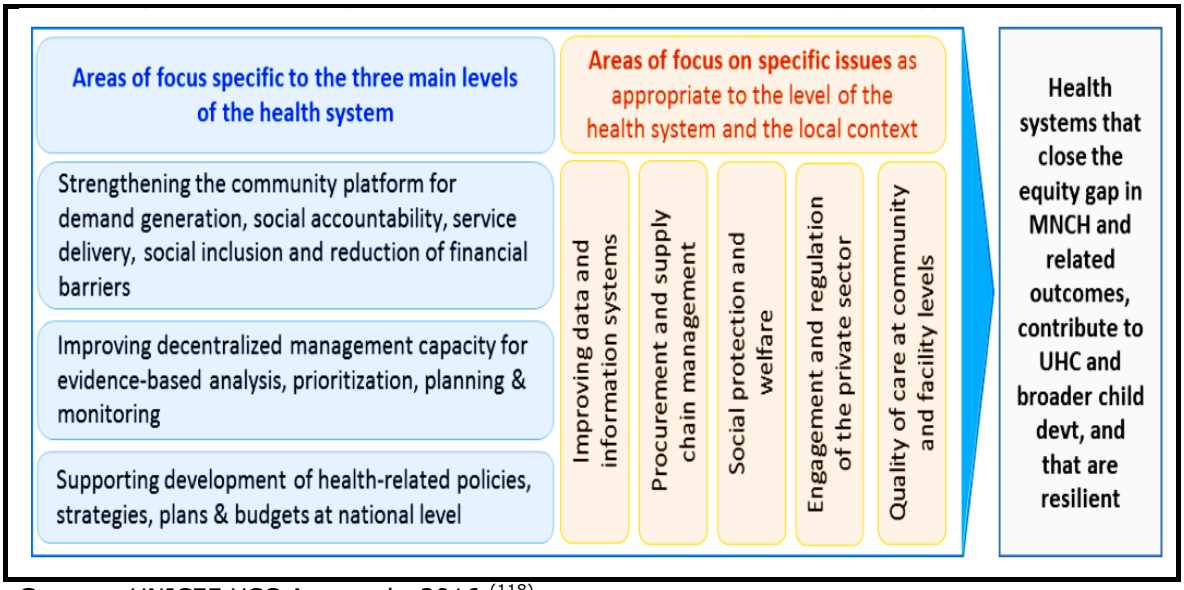
Source: UNICEF HSS Approach, 2016 [118].

UNICEF specified the areas of focus and actions to HSS efforts on connecting national and sub-national levels. In addition, improving the management capacity of the sub-national level and ensuring community participation based on national policies, strategies, and financing [118], **Figure 22**.

This approach implemented by UNICEF in different conflict settings as Afghanistan and Ethiopia.

[a] RMNCAHN: Reproductive, Maternal, Newborn, Child and Adolescent Health and Nutrition

Figure 22: Schematic representation of UNICEF's system-wide and issue-specific approach to HSS



Source: UNICEF HSS Approach, 2016 [118].

Some other evidence-based interventions which directed to specific health system factors are highlighted in **Annex 5.**

Chapter Five

2.7. Conclusion

The study found that lack of access and poor utilization of SRH services in Yemen is affected by the current fragile health system which was known to be fragmented already before the conflict, and worsened because of the current conflict. That collapse occurred by a deterioration of health system functioning especially characterised by low oversight and poor accountability, inadequate budget and low provision of services like SRH services.

These factors resulted in poor SRH outcomes in Yemen with poor health system performance and lack of government commitments to implement the current policies largely because of the important shortage of critical resources, i.e. health workers, drugs and medical supplies. etc. In addition, the social and economic collapse increased the poverty rate and decreased SRH services utilization putting Yemen with countries with the highest MMR globally.

HSS is challenging during an unstable situation. NGO input only covers service delivery; NGOs rarely contribute to HSS

2.8. Recommendations

There is a need to strengthen the health system to improve women health which will improve the health outcomes in Yemen. This could be done according to each health system function as follow:

A. Governance:

1- Improve government and health sector governance in oversight and accountability through enforced regulations, laws and standards of health staff, procurement process, quality of services. To reduce the occurrence of corruption at all levels.
2- Improve intergovernmental and intersectoral collaboration.
3- Define the role of partners and stakeholders in coordination avoiding parallel structures that take over the role of the MoPHP.
4- Ensure the current SRH policies and strategies are implemented.
5- Strengthen the coordination with the humanitarian actors and the community.
6- Strengthen the capacity of the HIS and enforce all actors in the health sector to use the system.
7- Improve the management of the monitoring and evaluation department in MoPHP which will present an annual report for health sector progress, timely review of the implementation policies and plans, and conduct population-based surveys.

B. Health Financing:

1- Establish Public-Private-Partnership (PPP) to strengthen health financing and increase service provision.
2- Encourage the private sector to invest in health by philanthropy

C. Service Delivery:

1- Ensure the provided services is with quality standards through timely supervision visit.
2- Define service tariff for the public and private health sector, and ensure they provide services based on it.
3- Ensure availability of pre-services and in-services training programs for health providers with equitable involvement of all providers in Yemen, before providing services and
4- Strengthen the current supply chain system and ensure its implementation to reduce the stock-out of SRH commodities.

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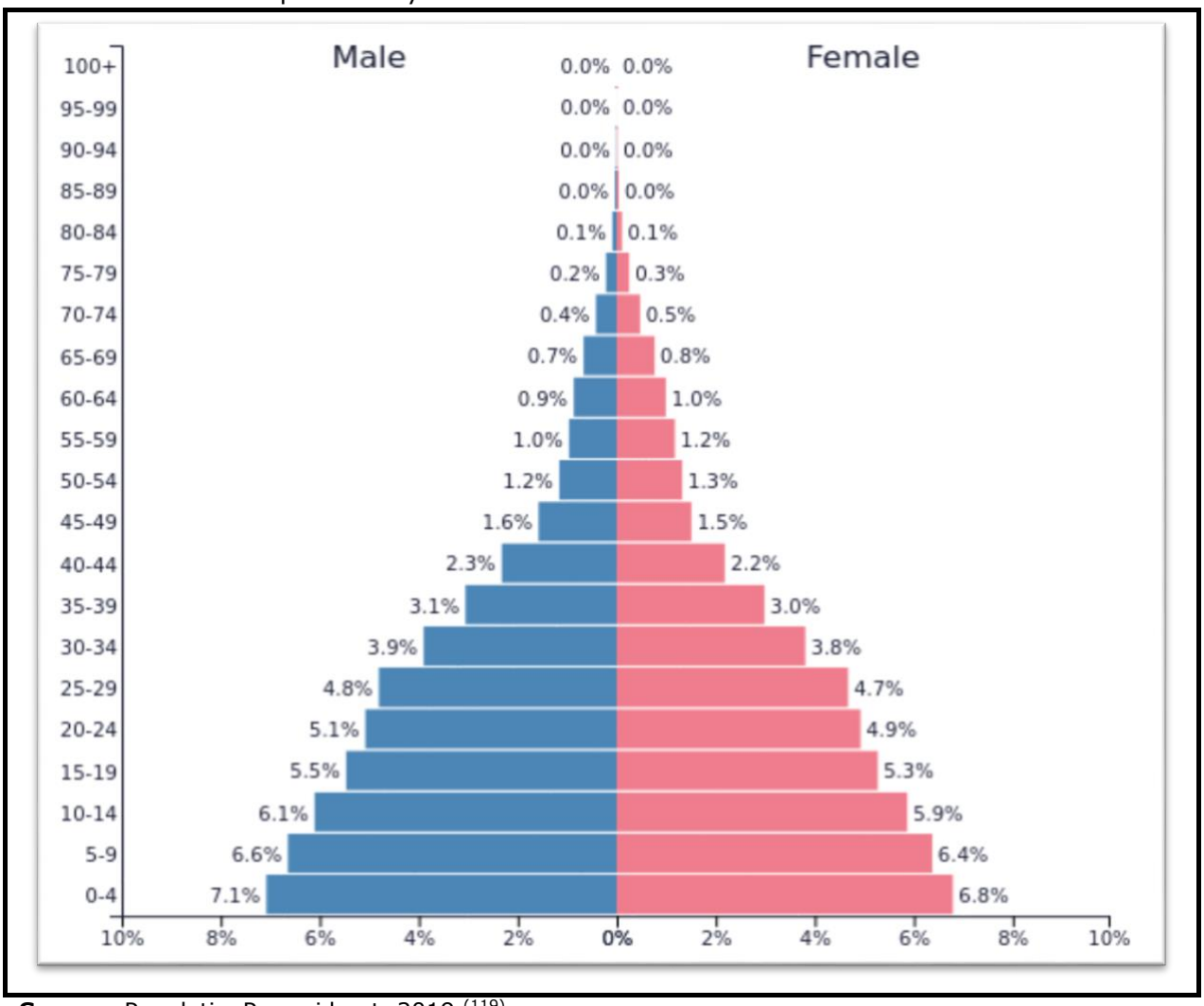
122. Grainger C, Gorter A, Okal J, Bellows B. Lessons from sexual and reproductive health voucher program design and function: a comprehensive review. International Journal for Equity in Health. 2014;13(1):33. Available from: https://doi.org/10.1186/1475-9276-13-33

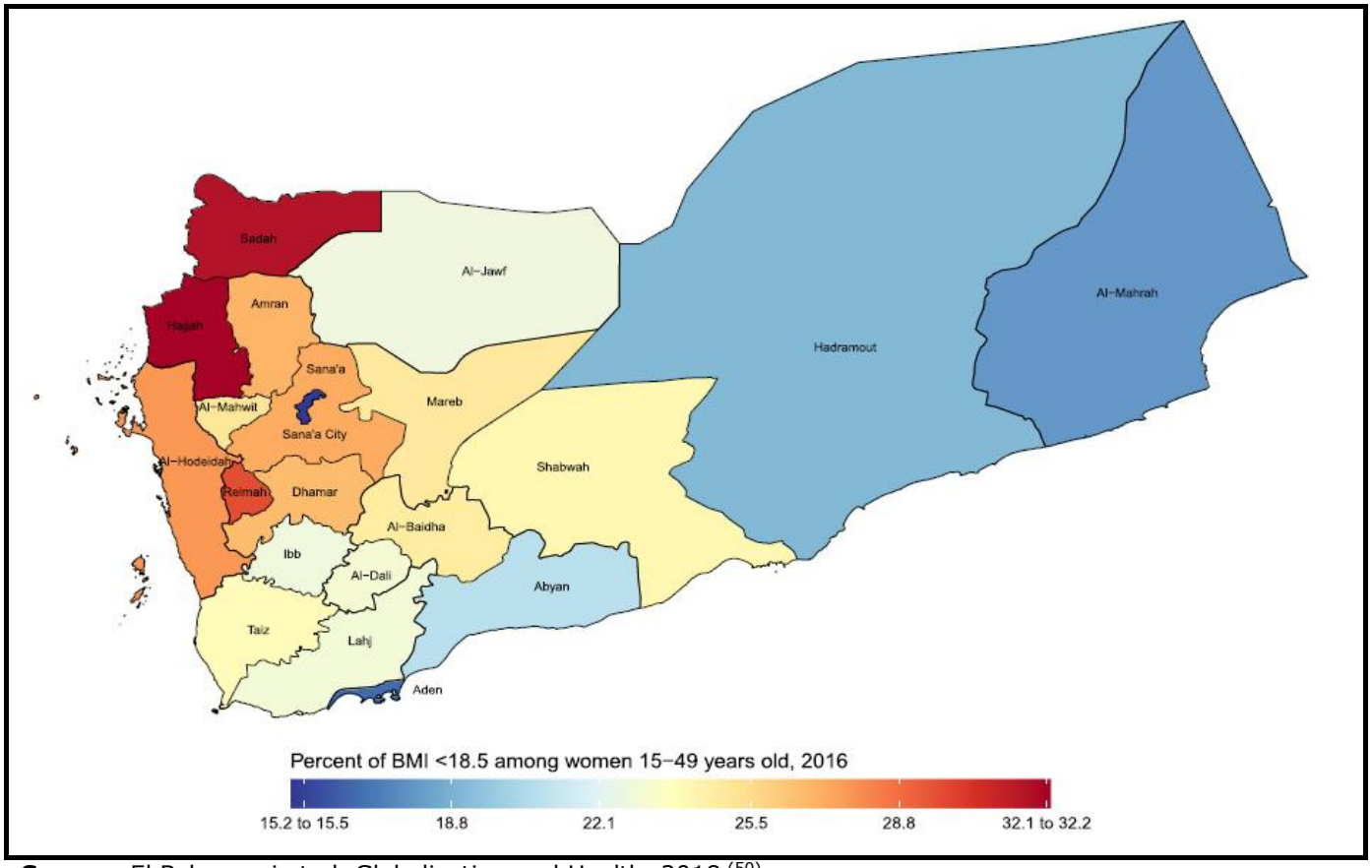
Annexes

Annex 1: Yemen Population Pyramid



Source: PopulationPyramid.net, 2019 [119]

Annex 2: Prevalence of maternal underweight – BMI < 18.5 kg/m2 in women 15-49 years old,



Source: El Bcheraoui et al. Globalization and Health, 2018 [50]

Annex 3: Interview tool for key-informants

Topic	Issues to discuss
Governance	▪ What is the role of MoPHP, and health sector responsibilities taken by which body? ▪ Th National Reproductive Health Strategy 2017-2021 is implemented or suspended? what the causes. ▪ Is there an active department in MoPHP who enforce the application of regulations and standards? ▪ What do you think about the health information system in Yemen? and how it is affected by the current conflict ▪ How is the coordination between different sectors and partners and who have the role of coordination?
Health Financing	▪ Is Yemen depend mainly on Aid? ▪ What is the role of OOP and private sector in health financing?
Service Delivery	▪ Is there a defined PHC package in Yemen? ▪ What is the effect of conflict on health service provision? ▪ Are the health staff provide qualified services, if not why? And what could be done to improve their capacity? ▪ Is the SRH accessible to all population, If not why? ▪ What is the process of procurement?

Source: Created by the author

Annex 4: Overview of Procurement Process

	1) Update Supply Plan	2) Prepare Request	3) Approve Request & Prepare Order	4) Execute Order	5) Clear & Receive Order
Key activities	Assess stock status Analyse quantities issues or consumption, stock on hand, orders in process. Estimate quantities and sates needed, and funds requires	Confirming funding source. Prepare request for procurement Submit request to UNFPA and inform funder	Approve request (Y)[a] Issue requisition and request HQ[b] approval (Y) Prepare documents according to funder agreement (PS) Issue purchase order to UNFPA HQ (y)	Place order with supplier (HQ) Inform MoPHP/PS of expected arrival date (Y) Track orders in process (Y) Inform MoPHP/PS of changes (Y)	Email UNFPA/Y and MoPHP/PS shipping document (HQ) Send MoPHP/PS original documents (Y) Clear shipment (PS)\Receive into inventory and perform QA (PS) Send delivery report to funder (Y)
Responsible	MoPHP/PS[c]	MoPHP/PS	UNFPA Yemen MoPHP/PS	UNFPA HQ UNFPA Yemen	UNFPA HQ UNFPA Yemen MoPHP
Outputs	Supply plan is updated based on annual forecast and stock survey Supply plan includes quantities, dates, and values needs	Request for commodity procurement is approved Funder is informed Adequate funds are available for procurement	Purchase requisition accurately reflects request and funded Documents required by funder are complete	Order and estimated arrival dates are confirmed with supplier MoPHP/PS is informed of estimated arrival date	Shipping & clearance documents are received Requested stocks are received into inventory Funder receives delivery report
Timeline	4-6 weeks	1-3 weeks	3-10 weeks	4-6 months	4-6 weeks

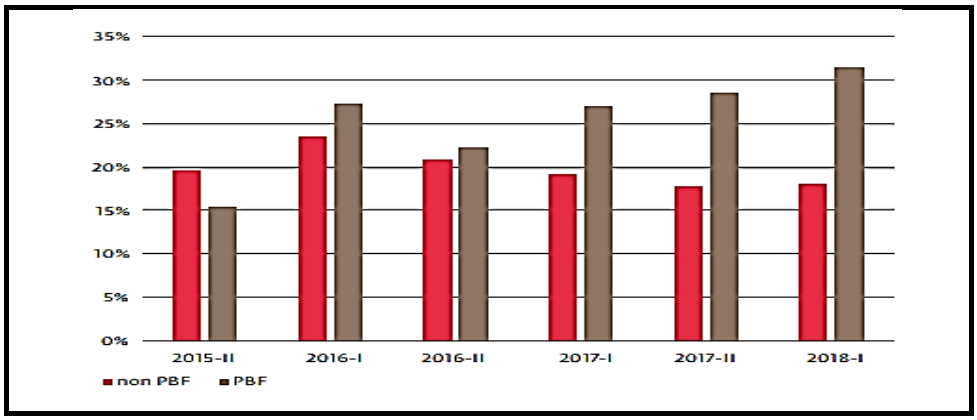
Source: USAID, Yemen: Mapping the Procurement Process for Family Planning and Reproductive Health Commodities, 2015 (110)

[a] UNFPA Yemen
[b] UNFPA Headquarter
[c] MoPHP Population Sector

Annex 5: Evidence-based interventions directed to specific health system factors

1) **Performance-Based Financing (PBF)** is "an adaptive HSS approach which enables actors to incentivize those services which are most needed in their particular context". The Cordaid organization implemented it in some countries as Ethiopia and another example implemented in Somaliland by the WHO. It is aimed to face some SRH challenges to increase access and utilization of services. It mainly incentive and motivate health workforce in conflict settings (120,121)**. Figure 23** shows the improvement of ANC four visits with PBF and non-PBF clinics between 2015-2018**.**
   In the presence of oversight and a high level of corruption, this approach will not be totally effective if there is no oversight body to control any corruption actions as misreporting.

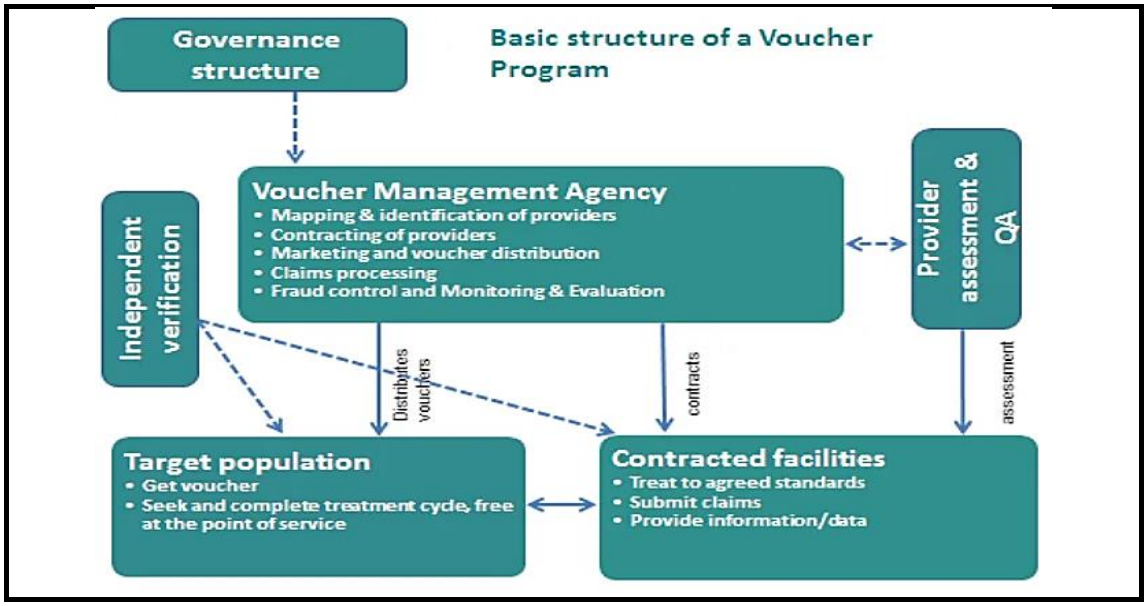
Figure 23: Percentage of women who have the Actual four visits of ANC four visits in PBF clinics vs non-PBF clinics, Ethiopia



Source: CORDAID, 2019 (120)

2) **Voucher Scheme** is mainly established for SRH services and is "commonly used to channel subsidies (from governments and/or donors) to stimulate demand for priority health services among specific underserved groups" (122), **Figure 24**

Figure 24: Key Characteristics of Voucher scheme

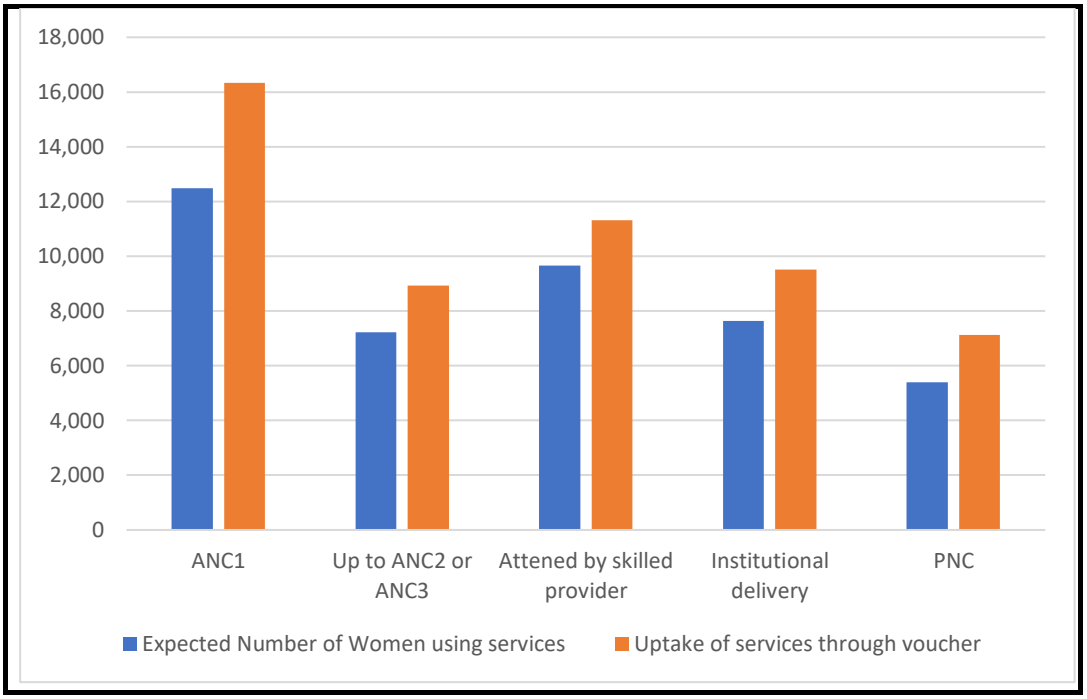


Source: Grainger C, Gorter A, Okal J, Bellows B. Lessons from sexual and reproductive health voucher program design and function: a comprehensive review, 2014 (122)

This scheme is implemented in different countries such as Yemen, where it is implemented as the safe motherhood voucher, before the conflict and is continued to be implemented during the conflict with a targeted population. That voucher has good outcomes in increasing the utilization of health services. In addition, improving the quality of provided services through contracting HFs which enforced by that contract to work within agreed standards, provide accurate data and submit claims. The payment to HFs used to cover the utilized services and improve the functionality of HFs[a].

Figure 25 shows the improvement in utilizing services with a voucher in Lahj governorate, Yemen. (100)

Figure 25: Expected uptake of safe motherhood services compared with uptake through vouchers, Lahj, 2014



Source: Grainger CG, Gorter AC, Al-Kobati E, Boddam-Whetham L. Providing safe motherhood services to underserved and neglected populations in Yemen: the case for vouchers , 2017 (100)

[a] Personal Communication