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MINISTRY OF HEALTH - ETHIOPIA

SPECIAL BULLETIN

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THE 24TH ANNUAL REVIEW MEETING OF THE HEALTH SECTOR

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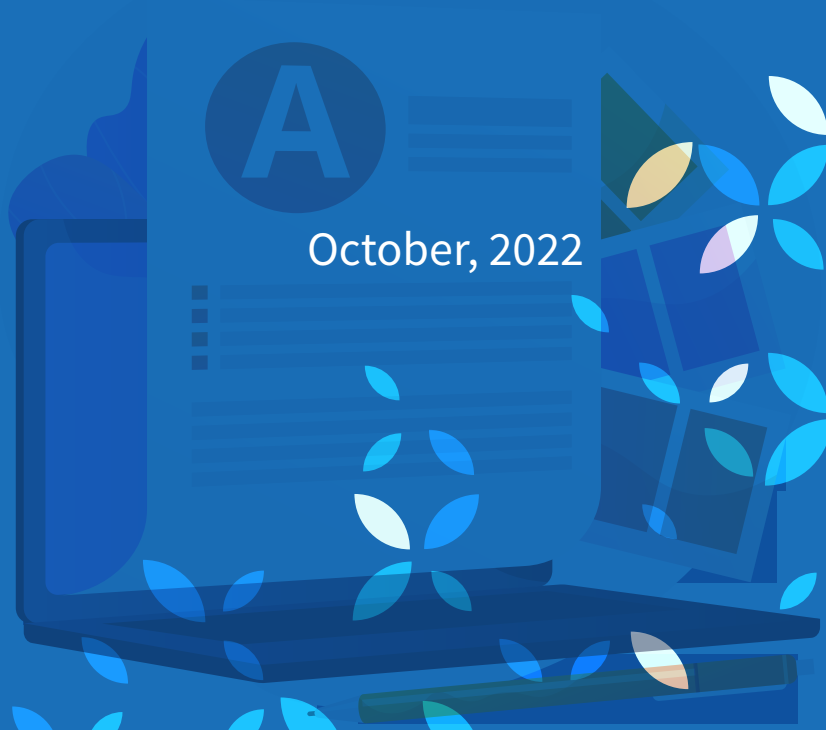
Equitable and Quality Health Service for All!



October, 2022

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Equitable and Quality Health Service for All!

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FOREWORD

NAOD WENDRAD

Director of Policy, Plan, Monitoring, and Evaluation Directorate

On behalf of the editorial board, I am delighted to present to you this issue of the special bulletin while extending my warmest welcome to this distinguished event of the Ethiopian health sector, the 24th Annual Review Meeting (ARM). This publication features poignant program experiences, promising initiatives, and strong scientific evidence from original research articles conducted during the recent fiscal years, particularly in the first two years of the second Health Sector Transformation Plan (HSTP II).

To inform the health system performance and thereby improve health outcomes, the health sector has prioritized the information revolution (IR) as one of the transformation agendas of the health sector both in the first and second HSTPs. To advance the IR agenda, the Policy, Plan, Monitoring, and Evaluation Directorate (PPMED) of the Ministry of Health (MOH) has been implementing Health Information System (HIS) Strategic plan as one of the sub-strategies of HSTP-II. The HIS strategic plan has eight strategic directions among which strengthening vital statistics, surveillance, and research is one. In line with the plan, the PPMED has been striving to enhance evidence generation and use to inform the designing of health programs and improve health system performance.

To this end, the PPMED has been producing and disseminating scientific evidence with a special bulletin annually for the last 10 years to enhance the generation, availability, and accessibility of health data from different sources other than routine health data. As such, with this annual publication, PPMED aims to enhance the capacities of the health system to generate and synthesize scientific evidence; and dissemination of evidence among participants of the ARM and to researchers, policymakers, programmers, implementers, and stakeholders of the health sector in general.

This 11th issue of the Special Bulletin for this 24th ARM envisages availing scientific evidence under three categories of articles; research articles, new initiatives, and best practices. The new initiatives section is essential to shedding light on the new policy and strategic issues of the health sector while the best practices bring experiences from the field for possible replication and scale-up of practices at large. The evidence organized in the three categories of this edition of the bulletin, I hope, would inform our efforts to enhance the performance of the health system to realize equitable and quality health services for all segments of the population.

I sincerely would like to extend my appreciation and gratitude to all MOH directorates, regional health bureaus, agencies, researchers, programmers, and other health care cadres for their efforts and contributions in publishing the articles. I am also grateful to the editorial board members, PPMED staff, contributors, and reviewers for their extraordinary efforts to realize the publication of this special bulletin.

Have a good read!

Naod Wendrad

Director of Policy, Plan, Monitoring, and Evaluation Directorate

EDITORIAL

"Equitable and Quality Health Care for ALL".

Universal health coverage (UHC) has been a global agenda, and its contributions to a better quality of life, global peace, and security have been recognized for quite a long time. The achievement of UHC by realizing access to quality essential healthcare services and access to safe, effective, quality, and essential medicines and vaccines for all without experiencing financial hardships is one of the targets of the Sustainable Development Goal (SDG) three—ensure healthy lives and promote healthy lives for all at all ages—by 2030. It entails making the full spectrum of essential, quality health services, from health promotion through prevention, treatment, rehabilitation, and palliative care, available across the life course without putting people in financial hardship owing to out-of-pocket expenses.

Ethiopia has made significant progress over the previous two decades in terms of increasing access to health services through the expansion of primary healthcare services and the deployment of a large number of health workers. The health extension program (HEP)—Ethiopia's Community Health Worker Program—was inaugurated in 2004, and today 41,119 Health Extension Workers (HEWs) provide basic preventative and curative primary services to over 100 million Ethiopians in 17,457 health posts. Furthermore, there has been a significant increase in the number of health centers and hospitals. Currently, the country has 31 specialized, 85 general, and 227 primary hospitals, as well as 3,587 health centers that provide primary, secondary, and tertiary-level health care. The government has also developed an essential health service package, which defines the minimal set of services that must be supplied at each level of the health system. Furthermore, the government has been encouraging the private health sector to play a larger role in extending healthcare access.

Several interventions have been implemented to enhance financial risk protection in accessing essential health services. The major interventions include the provision of high-impact interventions free of charge through an exemption program; subsidization of more than 80% of the cost of care in public health facilities; implementation of community-based health insurance (CBHI) schemes; and full fee waivers of both health services and CBHI premiums to the very poor. The healthcare financing strategy was also revised within the framework of UHC. Besides, the health sector has established a unit dedicated to advancing equity, devised equity strategies and guidelines, provides special support to geographic areas which have health systems and outcomes comparatively disadvantaged, and closely monitors health outcomes through equity lenses. Nonetheless, the disparity in access and use of health services has persisted across domains of geography, age, gender, and disability.

Despite the impressive gains, the progress toward achieving UHC has faced colossal national and global challenges. The interlinked and cascading global political crisis, the COVID-19 pandemic, and the economic recession the world is currently experiencing has resulted in the disruption of health services, shrinking of jobs and incomes, and refugee crises, which have wiped out the recent gains towards UHC globally and in Ethiopia. The response to the COVID-19 pandemic has diverted efforts and resources away from providing essential health services, as well as disrupting services in the early stages of the pandemic in low-resource areas where the health system has been proven to be fragile. Furthermore, COVID-19 has influenced the economy and resulted in a shrinking of development funding,

compromising the health system's ability to access critical supplies and provide basic health services. The GOE has responded by coordinating sectoral efforts and using innovative and digital technologies to track the progression of the outbreak and adopt necessary evidence-based interventions.

Aside from COVID-19, recent armed conflicts in the country have resulted in the destruction and ransacking of tens of hospitals, hundreds of health centers, and thousands of health posts, leading to the collapse of the health system in parts of Amhara, Afar, Benishangul Gumuz, Oromia, and Tigray regions. The conflicts have also resulted in the internal displacement of people, adding to the problems that the health sector is currently grappling with. The health system used a twining strategy to restore the functionality of the destroyed health facilities by linking them with facilities outside the conflict zone, which showed that restoration is a time-consuming and resource-intensive endeavor. It has also become clear that there is a need to handle the conflict's multifaceted ramifications, including mental health disorders such as post-traumatic stress disorder.

According to a recent national health accounts study, health expenditure is heavily reliant on external sources and out-of-pocket expenses, and health funding in Ethiopia is limited, fluctuating, and out of sync with program developments and trends. The key priority areas for improving health finance and accelerating progress toward financial risk protection will include pooling mechanisms such as strengthening existing insurance systems, program prioritization, innovative and performance-based financing, and boosting the participation of the private sector. Priority should be given to the aged, people with chronic diseases, the elderly, the less privileged, and those who are socially isolated in risk-pooling systems.

Ethiopia has devised a five-year strategic health sector transformation plan (2020-2025) to improve public health by safeguarding people from health emergencies, enhancing the responsiveness of the health system, and accelerating progress toward UHC.

To speed-up progress toward UHC, the GOE has developed a roadmap to reinvigorate the HEP, which envisions redesigning the program to fit the public's contemporary and evolving healthcare needs. Furthermore, achieving UHC has been the strategic objective of the first and second HSTPs, while quality and equity of health services were one of the transformation agendas during both HSTP periods.

To ensure that shocks do not make the health system deviate from its trajectory, the health system must be resilient enough to overcome emergencies while maintaining routine healthcare functions. To that end, the health system must adopt cutting-edge innovations, collaborative learning, and solutions; continually tailor its strategies and priorities to ensure its agility in responding to the public's arising needs; prevailing contexts and arising needs. The generation of scientific knowledge to guide the adoption of adaptive management systems is crucial to ensuring that the health system is nimble enough to respond to any emerging health problems, including emergencies.

Section One: Research Articles

Leaving No One Behind: Financial Hardship to Access Health Care in Debretabor Town, Ethiopia

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Abstract

Introduction*:* Financial hardship due to health care expenditure is a global and national priority area. All people should be protected from financial hardship to ensure inclusive better health outcomes. However, the financial hardship of healthcare has not been well studied in Ethiopia in general and in Debre Tabor town in particular. Therefore, this study aimed to assess the incidence of financial hardship in healthcare and associated factors among households in Debre Tabor town.

Methods*:* Community-based cross-sectional study was conducted, from May 24/2022 to June 17/2022, on 423(selected through simple random sampling) households. Financial hardship was measured through catastrophic (using a 10% threshold level) and impoverishing (using a $1.90 poverty line) health expenditures. Patient perspective bottom-up and prevalence-based costing approaches were used. Indirect cost was estimated through the human capital approach. Bivariable and multivariable logistic regressions were used.

Results*:* The response rate was 95%. The mean household annual healthcare expenditure was Ethiopian birr 12050.64. About 37.1% (95% CI: 32, 42%) of the households spend catastrophic health expenditure with a 10% threshold level and 10.4% of households were impoverished with a $ 1.90-a-day poverty line. Age of household head (AOR: 2.5, CI: 1.071, 5.821), not enrolled in community-based health insurance (AOR: 2.188, CI: 1.037, 4.619), chronic illness (AOR: 7.20, CI: 3.64, 314.262), traditional healthcare seeking (AOR (95%CI): 2.632(1.372. 5.046)) and socially unsupported (AOR: 2.773, CI: 1.246, 6.170) were significant factors for catastrophic health expenditure.

Conclusion: The study showed that a significant number of households were not yet protected from the financial hardship of healthcare. The financial hardship of health care is stronger among the less privileged populations: non-insured, chronically ill, the elder, and socially unsupported. Therefore, financial risk protection strategies should be strengthened and intensified by the concerned bodies.

Keywords*:* Financial hardship, Healthcare, Ethiopia, Debre Tabor, leave no one behind, 2022

Introduction

The financial hardship of healthcare is defined as the difficulty of obtaining affordable healthcare. Universal Health Coverage (UHC), one target of Sustainable Development Goals (SDGs) and agenda 2063 (of Africa), ensures that all people receive quality essential health services without being exposed to financial hardship. UHC, particularly, financial hardship, is also one priority area or transformational agenda in the Ethiopian health sector as indicated in the second Health Sector Transformational Plan (HSTP II). It will be achieved when there are no financial barriers, such as Catastrophic Health Expenditure (CHE) and Impoverishing Health Expenditure (IHE), to access essential health services.

Financial hardship is measured through CHE and IHE. CHE is considered when healthcare spending exceeds a certain threshold (varied from 10%

to 40%) of household expenditure or income. Whereas, IHE is considered when households' health expenditure pushes households below a given poverty line or further impoverishes the poor to extreme poverty.

This financial burden (CHE&IHE) contributes to socioeconomic disparities in access to essential healthcare services. In the majority of low-income countries, the lack of protection from catastrophic healthcare costs has led to reliance on Out of Pocket (OOP) health payments. The burden of OOP is directly proportional to the severity of the underlying health conditions. This leads poor people to delay (or forgone) essential healthcare services. This implies that the poor have been left behind to access the health care they need.

Ethiopian healthcare financing reform has been implemented since 1998. For example, various financial risk protection strategies/measures like fee waiver systems, exempted services, and community-based health insurance, among other reform activities, have been implemented. However, OOP health expenditure continues to be a financial burden on households as it is stated in the latest national health account, OOP health spending amounted to 31% of the total health expenditure, which is higher than the global recommended target of 20%.

Evidence, on the incidence of financial hardship in healthcare and its associated factors at the household level, is critical to ensure effective, equitable, and affordable access to quality health services that will achieve the pledge of "leave no one behind" as stated in SDG 3.8.2 and HSTP II. However, it has not been well studied in Ethiopia in general and in Debre Tabor town in particular. Therefore, this study aimed to assess the incidence of financial hardship in healthcare and its associated factors among households in Debre Tabor town, south Gondar Zone, Ethiopia.

Objective

The objective of this study was to assess the incidence of financial hardships in healthcare and associated factors in Debre Tabor town, south Gondar Zone, Ethiopia, 2022.

Methods

The community-based cross-sectional study was conducted, from May 24/2022 to June 17/2022, on 423 households (selected through a simple random sampling method) in Debre Tabor town which is one of the conflict-affected areas in the Amhara region. Financial hardship was measured through catastrophic (using a 10% threshold level of the household total expenditure) and impoverishing (using a $ 1.90-a-day extreme poverty line) health expenditures. The incidence and intensity of CHE were measured using headcount and overshoot, respectively. Patient perspective bottom-up and prevalence-based costing approaches were used. Indirect cost was estimated through the human capital approach. Total household expenditure was estimated annually from May 2021 to May 24/2022. Data were collected using a structured questionnaire, adapted after consulting literature. Data were entered into EpiData version 3.1 and exported to SPSS version 25 for analysis. Bivariable and multivariable logistic regressions were used. Adjusted odds ratio (AOR) with a 95% confidence interval and a P-value of <0.05 were used to state the strength and the significance of the associated factor of CHE, respectively.

Results and discussion

The response rate was 95%. The mean household annual healthcare expenditure was Ethiopian birr 12050.64. About 37.1% (95%CI: 32, 42%) of the households encountered CHE with a 10% threshold of their total household expenditure and 10.4% of households were impoverished with $1.90 a day extreme poverty line because of their health expenditure. This implies that protecting households from impoverishing health expenditures can reduce the level of extreme poverty by 10.4%. Age greater than 60 years of household head (AOR: 4.21, CI: 1.23, 14.45), not enrolled in community-based health insurance (AOR: 2.19, CI: 1.04, 4.62), having a chronic illness (AOR: 7.20, CI: 3.64, 14.26), seeking healthcare from traditional healers (AOR: 2.63, CI: 1.37. 5.05) and being socially unsupported (AOR: 2.77, CI:

1.25, 6.17) were statistically significant factors for catastrophic health expenditure. This implies that a significant number (probably this is due to the escalation of healthcare costs as a result of the COVID-19 pandemic and the recent conflict) of households have not been yet protected from the financial risk of healthcare.

Strengthening social support among households, and intensifying enrollment in community-based health insurance are important financial risk protection strategies. The finding also implies that households led by the elder aged head and head employed in private sectors, and households having chronically ill members should have been given high emphasis to protect them from the financial risk of healthcare.

Table 1: Multivariable regression of catastrophic health expenditure and associated factors among households in Debre Tabor town, 2022

Variables	Category	No	Yes	COR(95%CI)	AOR(95%CI)
Age of Household head	<=30	75	17	1	1
	31-45	107	54	2.226(1.198, 4.238)	2.50(1.07, 5.82)*
	46-60	49	41	3.691(1.888, 7.216)	1.884(0.725, 4.90)
	>60	22	37	7.42(3.321, 15.636)	4.21(1.23, 14.45)*
Employer of HH head	Self-employed	135	60	1	1
	Gov't employed	108	80	1.667(1.096, 2.536)	0.81(0.31, 2.10)
	Private sectors	10	9	2.025(0.783, 5.239)	6.34(1.77, 22.80)*
Insurance status	Insured	66	25	1	1
	None insured	187	124	1.751(1.048, 2.925)	2.19(1.04, 4.62)*
Chronic health conditions	Yes	36	94	10.302(6.344, 16.73)	7.20(3.64, 14.26)*
	No	217	55	1	1
Traditional healthcare seek	Yes	42	46	2.244(1.388, 3.626)	2.63(1.37, 5.05)*
	No	211	103	1	1
Social Support	Yes	27	52	1	1
	No	226	97	4.487(2.662, 7.565)	2.77(1.25, 6.17)*

Conclusion and recommendations

The incidence of catastrophic health and impoverishing health expenditures were high in Debre Tabor town. Moreover, catastrophic health expenditure is stronger among the less privileged populations: the non-insured, the chronically ill, the elder, and the socially unsupported. Therefore, financial risk protection strategies, such as intensification of enrolling in health insurance and social support, should be strengthened by

Heath System Restoration in Post-Conflict Period, Ministry of Health Ethiopia October 2021 – June 2022

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Abstract

Introduction: Humanitarian challenges significantly impact the health and well-being of the affected population. Access to life-saving healthcare, which includes health promotion, prevention, treatment, rehabilitation, and palliative care, would be critical in all stages of the emergency. To mitigate the challenges, the MOH has explored several modalities; the health facility twining model was identified as the most pragmatic and efficient. The facility twinning approach is part of the national comprehensive Emergency Response Plan. Conflict-affected health facilities are rapidly supported through institution-to-institution partnerships and peer relationships by systematically mobilizing more prominent hospitals with capability and resources from non-conflict-affected areas.

Objective: Document the lessons of restoration of the health service provision capacity of conflict-affected facilities and building back better health systems in the conflict-affected regions.

Methodology: Affected facilities are supported through institution-to-institution partnerships and peer relationships by systematically mobilizing more prominent hospitals from non-conflict areas. The supporting facilities are selected based on their human resource availability, service complexity, level of expertise, equipment availability, experience, and institutional capacity.

Results: In Amhara, of all the 40 damaged Hospitals 10 have been restored and are fully functional, whereas 25 are partially functional. Of the total of 453 damaged Health centers, 134 are restored and fully functional while 273 are partially functional. In Afar one of the two damaged Hospitals was restored and of the 41 damaged health centers half were restored and resumed to provide routine health services.

Conclusion: Post-conflict health system restoration through twinning has helped successfully resume essential health service provision in the affected facilities. However, full recovery requires resource-intensive and meticulous strategic planning.

Keywords: Twining, Restoration, Conflict

Background

As of November 10, 2021, per the assessment carried out in accessible areas, more than 4.7 million people have been displaced across the country, of which 2.3 million people in Amhara, Afar, Oromia, and Benishangul Gumuz regions are in dire need of emergency aid. Furthermore, a total of 42 hospitals, 565 health centers, and 1327 health posts were affected by the conflict. In addition to the impact on health facilities, four blood banks in four different zones, and 124 ambulances from 37 districts were vandalized and looted. (1) The above figure has not included areas with a security concern.

Restoring the facilities and resumption of health services was not time-giving for the suffering community. The Ministry of Health has designed an approach to reach out and convert such an ample number of facilities with the available resource in a coordinated manner. It is called the twinning approach, which utilizes institution-to-institution partnerships and peer relationships to rapidly build the capacity of the conflict-affected facilities. It primarily focuses on hospital service restoration, while selected health centers were allocated to specific regions for support and solidarity. The twinning arrangement addressed the health system gaps in the conflict-affected

facilities through peer support mechanisms. The supporting facilities in the twinning arrangement were selected based on a set of criteria, mainly their human resource availability (both in composition and quantity), area of specialty, level of expertise, availability of equipment/ commodity, level of experience, and institutional capacity. Accordingly, Regional Health Bureaus, university or federal hospitals, and private health institutions that fulfill the criteria above are paired with facilities from the conflict-affected areas. The facilities are expected to provide all-rounded support geared to restoring the health system in the conflict-affected hospitals, including restoring the governance system, re-instituting the human resources, and keeping them motivated through a mentorship system. The MOH, RHBs, and partners worked closely with each paired hospital to achieve the desired goals.

Methods

The twinning model has followed step by step approach. The first phase is the Introductory Phase where the MOH and respective RHB made the first arrangement to link the two facilities by formally announcing the establishment of the twinning arrangement in writing. It is followed by the Rapid Assessment phase where the assessment tool developed by MOH, the parties jointly conduct a rapid assessment of the supported facility to understand the extent of damage as gaps and bottlenecks that hinder service delivery. The next is the Developing Action Plan phase where an Action plan was developed to ensure the restoration of vital health services in the supported facilities. The other is the Implementation Phase where the supporting hospital has mobilized the entire organization's resources and the highest leadership level to preside over the process. Ideally, a dedicated team under the foresight of the supporting hospital's leadership was explicitly designated for supporting the twinning function. Regular discussions and frequent communications at all levels were also essential components of the implementation. The last is the Graduation and Transition Phase, although such a twinning arrangement lasts beyond the initially intended timeline and the twinning institutions can enter a lasting relationship, the initial engagement should consider agreed-upon parameters for the graduation of the supported hospital, and a clear transition plan needs to be embedded from the outset.

Results

As per the effect of the intervention, of all the 40 damaged Hospitals in the Amhara region, 10 have been restored and are fully functional, whereas 25 are partially functional. Of the total of 453 damaged Health centers, 134 are restored and fully functional while 273 are partially functional. In Afar one of the two damaged Hospitals was restored and of the 41 damaged health centers half were restored and resumed to provide routine health services.

MOH report in June 2022 revealed hospitals' clinical service initiation succeeded 91% related to their pre-conflict state. Hospitals Nonclinical service initiation reached 84% compared to their pre-conflict state. The Addis Ababa hospitals, universities (the twinned university hospitals and Federal hospitals shown in table 4), and federal hospitals (the twinned university hospitals and Federal hospitals shown in table 5) contributed 126,389,888.00Birr worth of support. The support included pharmaceuticals, medical equipment, and health information system equipment. Twining was not the sole effort to restore the facilities there was as well a concerted input from stakeholders. The Ministry of Health supported 175,712,167.18 Birr worth of supplies and equipment to damaged facilities in Afar and Amhara. Other regions of the country provided support worth 22.7million Birr. The Diaspora community donated 6,321 USD worth of medical supplies and equipment. The support from partners was 1,226,174,024.00 Birr. In terms of human resource support, all the conflict-displaced professionals have returned to their original facilities (2, 3).

Conclusion and recommendation:

Post-conflict health system restoration in Ethiopia through twining was a kind of new approach to the health system in Afar and Amhara, which enabled the full restoration of 11 (26.2%) hospitals and Nearly 25 (60.5%) Hospitals that were partially

functional. Looking at Health centers 134 (27.1% were fully functional and 60% were made partially functional. The remaining facilities have still an ongoing security concern. As a recommendation, it is believed the regional Health bureaus have to restore the damaged health posts as they are not relatively cost-intensive and less feasible for twinning. The damage incurred in the infrastructure and some services are immense that cannot be addressed in such a short period, and a strategic plan should be prepared for a full recovery. The team has learned from this program is that we can build a more resilient health system if the twinning approach instituted during the average time among the health facilities to bring about holistic support areas.

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Annex

Table 1, the status of Hospitals in the affected regions as a result of the conflict and their functionality after Twinning for restoration

Region	Affected Hospitals	Twinned Hospitals	Fully functional	Partially Functional	Non Functional	Total Functional	Remark
Afar	2	1	0	1	1	1	
Oromia	6	6	6	0	0	6	
Amhara	40	25	10	25	5	35	5 have a security concern
Total	48	32	10	32	6	42	

Table 2, the status of Health centers in the affected regions as a result of the conflict and their functionality after twinning for restoration.

Region	Affected HC	Twinned HC	Fully functional	Partially Functional	Non-functional	Total Functional HC	Remark
Amhara	452	242	144	271	0	415	37 have a security concern
Afar	41	17		2o	21	20	
Benishangul Gumuz	15	0	Data N/A	Data N/A	Data N/A	Data N/A	All have a security concern
Oromia	54	0	__	33	21	33	
Total	565	259	144	323	43	467	

Table 3, the support provided for the affected facilities in the Afar and Amhara region by the Ministry of Health (Medical equipment and supplies).

S/N	Type of support	Total estimated cost
1	Distributed 64 items of medical equipment via EPSS for 36 hospitals restoration (Afar and Amhara)	139,597,279.77
2	Distributed medical equipment through Amhara and Afar RHB	21,746,274.08
3	Medical equipment maintenance campaign	3,035,280
4	Distributed HC Kits	11,333,333.333
Total		175,712,167.183

Table 4, Damaged Hospitals twinning with University Hospitals for Service restoration In Afar and Amhara regions

No.	University Hospitals	Hospitals in conflict-affected areas
1	Tikur Anbessa specialized Hospital	Woldia CSH
2	Hiwot Fana Specialized Hospital	Akista Hospital
3	Hawassa University Hospital	Mersa Primary hospitals
4	Dilla University Hospital	Tefera Hailu/ Sequota
5	Worabe University hospital	Ataye
6	Jigjiga University Hospital	Aderkay Primary hospital
7	Nigest Eleni Hospital	Zequala hospital
8	Mizan Tepi University	Tenta primary hospital
9	Wolaita Sodo University hospital	Wodila Primary hospital
10	Arba Minch University Hospital	Lalibela General hospital
11	Wolkite University Hospital	Amdework primary Hospital
12	Jimma University Medical Center	Delanta
13	Ambo University hospital	Kobo primary hospital
14	Meda Wolabu University Hospital	Shewa Robit primary hospital
15	Metu Karl University Hospital	Kercha Hospital (Oromia)
16	Selale University Hospital	Gidami Hospital
17	Wollega University Hospital	Abidongoro Hospital
18	Bulehora University Hospital	Melkasoda
19	Assela University Hospital	Guduru Hospital
20	Dembi Dolo University Hospital	Begi Hospital

Table 5, Damaged Hospitals twinning with Federal and Addis Ababa Hospitals for Service restoration In Afar and Amhara regions

No	Federal and Addis Ababa Hospitals	Facilities in conflict-affected areas
1	St. Paul's Hospital and MMC	Dessie CSH
2	St. Peter Specialized Hospital	Kelewan PH & Boru Meda hospital
3	ALERT hospital	Kombolcha hospital
4	AaBET Hospital	Bati primary hospital
5	EKA kotebe Hospital	Haik Primary hospital
6	Yekatit 12 Medical College	Wore Illu PH
7	Zewuditu Memorial Hospital	Degolo/ Jama PH
8	Menilik II CSH	Mehal Meda hospital
9	Tirunesh Beijing hospital	Kemise General Hospital
10	Ras Desta Damtew Hospital	Debre Sina PH
11	Ghandi Memorial hospital	Molale primary Hospital
12	Amanuel Specialized Hospital	To facilitate mental health and psychosocial support in the facility restoration

Overview of Healthcare Financing in Ethiopia: Evidence from the Recent National Health Account Study

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Abstract

Background: National Health Account (NHA) is a tool designed to inform the health policy process by providing policymakers with valuable information on the distribution of health funds within the system. The recently released NHA of Ethiopia Provides a comprehensive picture of health spending in the country.

Objective: The objective of this article is to synthesize the main findings by making comparisons across time, paying special attention to, the sources of financing, the management of health resources, households, and donors in financing health expenditures, and expenditures for diseases conditions, and health care functions.

Methods: The NHA exercise was carried out using the System of Health Accounts (SHA) 2011 guidelines and the Health Account Production Tool (HAPT).

Results: The result shows that total health expenditure (THE) and per capita health spending in Ethiopia have reached USD 3.62 billion (6.3% of GDP) and USD 36.4 in 2019/20. The government, donors, and households contribute 32%, 34%, and 31% while the contribution of insurance and the private sector is very small.

Conclusions and recommendations: The health financing system of Ethiopia still depends on external sources and that government spending on health, although it grew slightly, is still low. This implies that the country's health system is currently highly unsustainable and underfunded. It is recommended to strengthen resource mobilization efforts and the pooling mechanism, giving priority to primary healthcare and preventive health services.

Keywords: National health account, health expenditure, the system of health account.

Introduction

The second health sector transformation plan (HSTP II) of Ethiopia aims at improving the health of our population through the realization of progress towards Universal Health Coverage (UHC), creating Woreda transformation, and protecting people from emergencies (1; 2). It builds on the success of the previous health sector strategies. It is known that the level of financing, and how the finances are mobilized, allocated, and spent, all affect service delivery and health outcomes. Thus, a review of health financing and expenditure is crucial to progress toward improving health outcomes and achieving the country's universal health coverage (UHC) goals (that is, access to essential health services and financial risk protection).

The National Health Accounts (NHA) are used to help policymakers understand who pays for health care, who manages health resources, and how resources are spent on interventions or diseases (3). Ethiopia's 8th National Health Account (NHA) provides a breakdown of spending by standard disease classifications, financing sources, financing schemes, level and type of provider, and health function. This study bases the analysis using data from the 2012 or 2019/20 fiscal year. The objective of this article is to synthesize the main findings by making comparisons across time, paying special attention to, the sources of financing, the management of health resources, households and donors in financing health expenditures, and expenditures for diseases conditions, and health care functions.

Methods

The NHA exercise was carried out using the System of Health Accounts (SHA) 2011 guidelines and the Health Account Production Tool (HAPT). The SHA 2011 is an analytical framework that is an international standardized tool used to track all health spending of a country over a defined period irrespective of the entity or institution that financed and managed the spending (3). The framework classifies health expenditure according to the tri-axial accounting structure for health care consumption, service delivery, and health financing. Such a tri-axial presentation of health financial information provides policymakers and other stakeholders with a more robust understanding of the health care financing scheme and the flow of health resources.

Health expenditure data were collected from the Ministry of Finance (MoF), universities, bilateral and multilateral donors, a sample of non-governmental organizations (local and international NGOs), employers, insurance companies, and line ministries. In addition, data from the 2019/20 general household survey and other sources were used (4; 5; 6; 7; 8).

Major Findings

Total health expenditure has reached ETB 72 billion (USD 3.62 billion) in the 2019/20 fiscal year (9) – showing an increase of 16.8% from 2016/17. This accounts for approximately 6.3% of the GDP. As shown in Table 1, the share of recurring health care spending constitutes 92.4% of the in 2019/20, while the share of capital spending and share of training and research spending are 6.2% and 1.5% respectively.

Table 1: Health spending in 2019/20

Source of Financing	Recurrent (ETB)	Capital (ETB)	Training & Research (ETB)	Total (ETB)	Total (USD)	Share by source
Donors	40.52	2.69	-	43.21	1.23	33.9%
Government	34.02	5.15	1.86	41.04	1.17	32.2%
Federal Levels	8.56	2.91	1.86	13.33	0.38	10.5%
Regional & woreda level	25.46	2.24	-	27.71	0.79	21.7%
Households: Direct OOP	38.92	-	-	38.92	1.11	30.5%
CBHI (Voluntary prepayment)	1.13	-	-	1.13	0.03	0.9%
Private employers and others	3.13	0.04	-	3.16	0.09	2.5%
Total	**117.7**	**7.9**	**1.9**	**127.47**	**3.63**	**100%**
Share (as a % of THE)	**92.4%**	**6.2%**	**1.5%**	**100%**	**100%**	

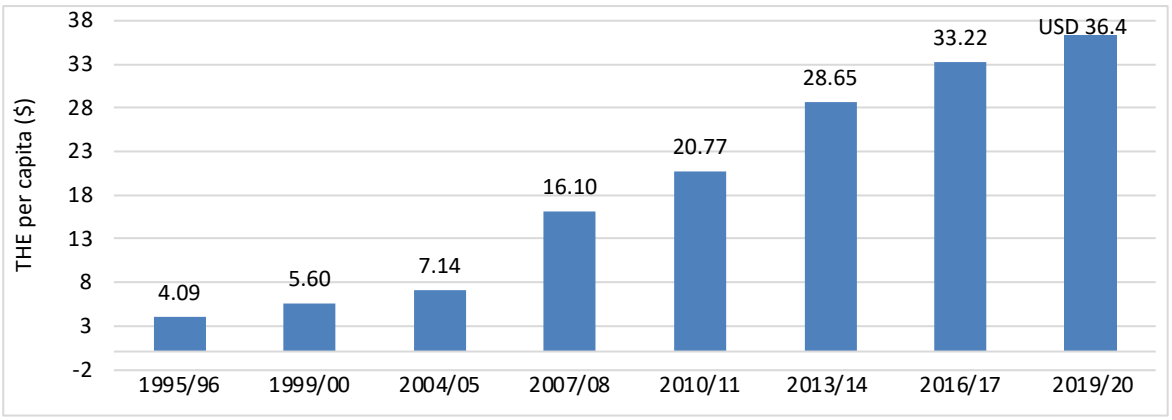

Figure 1: Trends of per capita health expenditure in Ethiopia

Looking at the per capita health spending, it has been growing steadily over the past two decades, from USD 4.50 in 1995/96 to USD 33.2 in 2016/17, to USD 36.30 in 2019/20. The amount is still low compared with the USD 43 average for low-income African countries, and it is far less than the $86 per capita spending the WHO recommended for the delivery of essential health services by 2015.

Financing Sources

The government's share of THE increased slightly between 2016/17 and 2019/20, from 32 % to 32.2%. In contrast, the contribution of donors has slightly decreased from 35% to 34% of THE, even though the amount increased from USD 1.09 billion to USD 1.23 billion USD. Similar to previous health accounts, the share of private employers and other sources remained insignificant, as it accounted for only around 2.5 percent of THE. Community-based health insurance (CBHI) was initiated in Ethiopia as a key mechanism to provide financial protection and mobilize resources. Although the CBHI scaled up to 770 woredas at the end of 2019/20, the share of THE contributed to out-of-pocket expenditure remained at about 30% and the role of CBHI as a financing source for health remains limited to about 1% of total health expenditure (or 2% of total expenditure managed by the government).

Management of health resources

The government continues to play a key role in managing funds for health. The share of THE managed by the government decreased slightly from 52% to 47% between 2016/17 and 2019/2. The share managed by donors and NGOs increased slightly from 15% to 20% while the resources managed by insurance companies and private employers remained limited.

Health Providers

In 2019/20, spending at the Primary health care unit (primary hospitals, health centers, and health posts) accounted for 44% of total health expenditure. Tertiary and secondary hospitals expenditure was 10.5% of the total health expenditure. Spending on health care system administration and financing has continued to increase – from 4% of THE in 2013/14 to 18% in 2016/17 to 20% in 2019/2020.

Healthcare function, diseases, and health conditions

Spending on curative services remains at about half of total spending (~56%). Spending on preventive services decreased from 30% in 2016/17 to 19%. Communicable diseases account for about 56% of THE, while non-communicable diseases (NCD) account for 25% of households and the government bears the main financial burden. About 190 million was spent on COVID-19 during 2020 (5% for 2019/20). The government financed about 50% of this, while donors financed 40%.

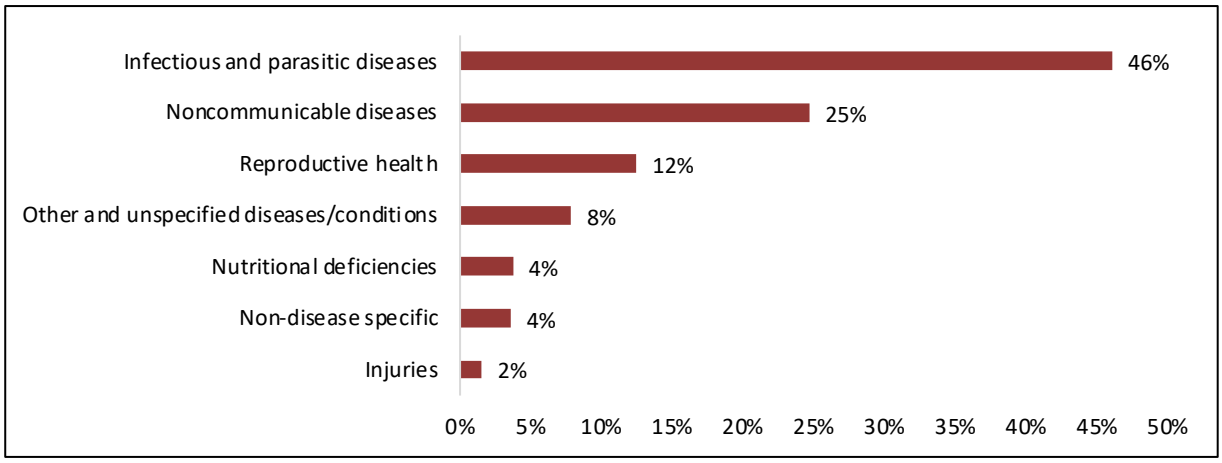

Figure 2: Health expenditures by diseases and health conditions

Key health financing indicators

Key health financing indicators are shown in the table below. Government spending increased by 18 percent in real terms, from USD 1 billion in 2016/17 to USD 1.17 billion in 2019/20. As a result, the government's share of total health spending increased slightly, from 32% to 32.3% in the same period. In general, health has been prioritized through a pro-poor policy, with average pro-poor spending of around 65 percent of total general government expenditure going to the five pro-poor sectors of agriculture, education, health, infrastructure, and water from 2010/11 to 2019/20 EFY. Nonetheless, public funding for the health sector accounted for approximately 8.5% of total general government spending. While this expenditure is higher than the average of 6.2% for other low-income countries (10), it is significantly lower than the 15 percent target set by the Abuja declaration.

As expected, considering the relatively low government expenditure, OOP payments continue to play a significant role in Ethiopia - higher than the global average of 21% and the 15%-20% threshold suggested by the WHO to minimize financial catastrophe and impoverishment due to accessing healthcare services (11). However, it is less than the low-income country average (43%). Increasing OOP payments over the years 1995/96 to 2019/20 contributed to total health expenditure and total per capita health expenditure growing faster than GDP and GDP per capita.

On the other hand, the CBHI contribution has increased from 0.35% percent in 2016/17 to 0.9% in 2019/20. Although the contribution of voluntary prepayment or CBHI is very low, has a positive impact on health service utilization, and financial risk protection and brings solidarity among the society (12).

Table 2: Key health financing indicators in Ethiopia

Indicators		2007/08	2010/11	2013/14	2016/17	2019/20
1a	Total expenditure on health (In billion USD)	1.2	1.6	2.5	3.1	3.63
1b	Total expenditure on health (In billion ETB)	11.1	26.5	49.57	72.05	127.47
2	Total expenditure on health as % of GDP	4.50%	5.20%	4.70%	4.20%	6.30%
3	Health spending by the government as a % of GDP	0.90%	0.80%	1.40%	1.40%	2.00%
4	General government health spending as % of TGE	4.80%	3.50%	7.60%	8.10%	8.50%
5	OOP expenditure on health as a percent of GDP	1.70%	1.80%	1.60%	1.30%	1.93%
6a	Total health expenditure per capita (USD)	16.1	20.8	28.7	33.2	36.4
6b	Total health expenditure per capita (PPP $)	47.7	75.6	81.3	106.7	105.3
6c	Government health spending per capita (USD)	3.4	3.3	8.6	10.6	11.7
6d	Government health spending per capita (PPP $)	10	12.1	24.4	34.2	34

Conclusion

The recent NHA of Ethiopia shows that the health financing system is still dependent on external sources and that government spending on health, although it grew slightly, is still low. This implies that the country's health system is currently highly unsustainable and underfunded. Sources of financing continue to be fragmented and not effectively pooled. There was an inefficient allocation of health resources across programs, as the following program areas (infectious and parasitic diseases and reproductive health) were responsible for two-thirds of health spending. The study also showed misalignment in the allocation of resources based on national priorities (the HSTP II). The study also showed little misalignment in the allocation of resources based on national priorities, and low capital investment to support and sustain healthcare delivery systems.

Policy Implications and recommendation

The Ministry of Health needs to strengthen resource mobilization efforts and the pooling mechanism, giving priority to primary healthcare and preventive health services. Some of the key recommendations made in this study are: increasing government spending on health over time; efforts to expand financial protection mechanisms, efforts are needed for NCD and preventive care; more investment in primary health care (PHC) for universal health coverage (UHC); An emergency health financing mechanism should be in place, and the government should introduce new and alternative financing options.

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Finding the Missed Tuberculosis Cases in Addis Ababa

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Abstract

Background: Globally as well as nationally, one-third of the estimated tuberculosis (TB) cases are missed annually i.e., only two-thirds of the estimated TB cases were diagnosed and reported [1]. Sputum-Smear Microscopy (smear), which has very good specificity (reported above 95%), but very poor sensitivity especially in Sub-Saharan African settings, is still the most commonly used TB diagnostic method in low- and middle-income countries. In the Ethiopian setting, the sensitivity of microscopy is between 30 and 40%, meaning 70 to 60% of TB patients are misdiagnosed as negative.

Objective: Targeting and reaching the diagnostically missed TB cases at health facilities to maximize case detection and TB treatment coverage.

Method: Sputum samples (both smear-negative and positive) were collected from TB diagnostic health centers in Addis Ababa that use smear as a diagnostic tool. Samples collected from new presumptive patients who consent to participate were included in the study. Samples were transported to the project facility in a motorbike that has a triple packaging system. Once arrived at the project facility, samples were heat-inactivated, cooled down, and sniffed by trained rats. Those samples that were smear-negative at the health facility but positive by the rats were subjected to a concentrated smear confirmation procedure using fluorescence microscopy. Samples that were confirmed as TB positive by concentrated smear were reported back to the health facility for eventual call-up of the patient and TB treatment initiation.

Result: Since March 2018 and until July 2022, there were 86,054 samples collected from 44,007 presumptive TB cases which were screened by the trained rats. The health center's laboratory found 2,000 smear-positive cases whereas there were additional 1,486 TB cases picked up by the rats and confirmed by concentrated smear.

Conclusion: It was possible to demonstrate that using trained TB detection rats can increase pulmonary TB case detection in Addis Ababa. Scaling-up rats-based secondary screening contributes to finding missed TB cases and has the potential towards TB elimination efforts.

Keywords: missed TB cases, TB detection rats, giant African pouched rats, pulmonary TB

Background: Ethiopia is one of tuberculosis (TB) high-burden countries [1] and Addis Ababa, like most capitals of high-burden countries, is one of the hotspots of TB in the country [2]. One of the main challenges for TB control in resource-limited countries in general and in Ethiopia, in particular, is the lack of rapid and reliable diagnostic tools. Though Xpert MTB/RIF is recommended as the initial TB diagnostic test, sputum-smear microscopy (smear), a technology that has been used for over 120 years, is still a common method used in the TB clinics of low- and middle-income countries. The smear has very good specificity, reported above 95%. The sensitivity of the method, however, which has been extensively researched and published, varies between 20 to 80%. Particularly in HIV coinfected patients and children, the identification of TB is unreliable and challenging. In the Ethiopian setting, the sensitivity of smear is between 30 and 40%, meaning 70 to 60% of the patients are misdiagnosed as negative [3]. APOPO, a Belgian non-profit organization, has been investigating the use of trained giant African pouched rats for the detection of TB in sputum samples in Tanzania and Mozambique. The same research has been implemented in Addis Ababa, in collaboration with AHRI and Addis Ababa City Administration Health Bureau, since 2018. Therefore, this AHRI-APOPO project envisages targeting and reaching the missed TB cases and maximizing case detection and TB treatment coverage that effects halting the spread of this disease.

Objective: the objective of the AHRI-APOPO project is to demonstrate that using trained TB detection rats can increase pulmonary TB case detection in Addis Ababa by finding cases missed by the conventional method (sputum smear microscopy).

Methods: Samples collected from new presumptive patients who consented to participate were included in the study. Sputum samples that were provided by presumptive pulmonary TB cases at 58 health centers in Addis Ababa, irrespective of smear microscopy results, were collected after smear examination at the respective health centers' laboratory. The smear-positive samples were used as reward samples to keep the rats motivated. Patient numbers from the laboratory logbook, gender, age, and the clinic's smear results were the information collected along with samples. Samples were transported to the project facility in a motorbike that has a triple packaging system. Once arrived at the project facility, samples were heat-inactivated, cooled down, and sniffed by trained giant African pouched rats. Those samples that were smear-negative at the health facility but positive by the trained rats are subjected to a concentrated smear microscopy confirmation procedure. The confirmed patient results were duly reported to the respective health facilities for eventual tracking of the patients and treatment initiation. Scheme 1 depicts the entire procedure pictorially.

Results: From the beginning of the project up to the end of July 2022, there were 86,054 samples collected from 44,007 presumptive TB patients. There were also 2,000 patients diagnosed by the health centers microscopy whereas the project found additional 1,486 patients which were missed by the health centers microscopy (Table 1). These results were duly reported to the respective health centers for treatment initiation. The increase in case detection (total number of additional cases found by the project divided by the total number of smear positives by the health centers' microscopy) was 74% for the entire project period. These figures are higher than the increase in case detection reported by similar projects in Tanzania and Mozambique which usually ranges between 35-45%. The main reason could be the significantly lower positivity rate (4-5%) of the clinics' microscopy as compared to the international standard that suggests about 10% of smear results should be positive which is also the case in Tanzania and Mozambique. Furthermore, we used Xpert MTB/RIF Ultra as confirmatory method for older (> 65 years) and younger (< 15 years) patients which adds up to the confirmed cases.

Patients tested at local clinics

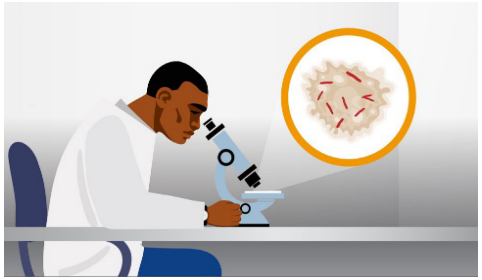
Sputum sample collection

Sample referral network

Heat inactivation of samples

Samples sniffed by trained rats

Rats find TB-positive samples missed by the clinics



Rat positive samples confirmed by concentrated smear FM

Result sent to the clinic for treatment initiation

Scheme 1. Pictorial presentation of the rat evaluation procedure

Table 1. Sample and patient flow as well as additional TB cases found in each project year.

Measures	2018	2019	2020	2021	2022	Total
Samples evaluated	18,849	26,099	15,188	15,750	10,186	86,054
Patients screened	9,667	13,312	7,721	8,097	5,210	44,007
Smear positive cases at health centers	249	541	481	456	273	2,000
Additional TB cases detected by trained rats and confirmed by concentrated smear FM	215	395	218	430	228	1,486
% Increase in case detection	86	73	45	94	84	74

Challenges: The smear positivity rate is way below that of other high-burden countries (e. g. Tanzania and Mozambique) affecting the rats' performance who are trained for high positivity settings. The cost-effectiveness of the rats' technology is more pronounced when used for a huge number of samples decreasing the cost per patient and cost per additional case found. Covid-19 decreased the patient flow in 2020 and 2021 (by 42% and 39% respectively) increasing the cost per patient screened. The immediate impact of Covid-19 on the patient flow observed in Addis Ababa in quarters 2 and 3 as compared to the pre-Covid quarter (Q1) of 2020 was reported previously [4].

Conclusions: It was demonstrated that using trained TB detection rats can increase pulmonary TB case detection in Addis Ababa. Scaling-up rats-based secondary screening contributes to finding missed TB cases and has the potential towards TB elimination efforts. The impact of Covid, which has affected patient visits to health facilities, is still persistent in 2022 (data not shown) and stakeholders may exert a concerted effort to contain the spread of both TB and COVID. Further operational research is highly recommended to find out the cause of the low smear microscopy positivity rate at the health centers.

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Adverse Clinical Outcomes and Associated Factors among COVID-19 Infected Pregnant and Postpartum Women at Eka Kotebe General Hospital, Addis Ababa, Ethiopia.

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ABSTRACT

Background: Pregnant and postpartum women are at increased risk of severe illness due to coronavirus disease 2019 (COVID-19). However, evidence is limited on clinical outcomes of COVID-19-infected pregnant and postpartum women in Ethiopia. Therefore, this study assessed adverse clinical outcomes and associated factors among COVID-19-infected pregnant and postpartum women.

Methods: Institutional-based cross-sectional study was conducted among 484 pregnant and postpartum women from March 13/2020 to March 13/2022. A structured and pretested data extraction checklist was used. The extracted data were coded and entered into Epi-data and exported to the Statistical Package of Social Sciences (SPSS) for analysis. Descriptive results were displayed by texts, tables, and figures. The association between outcome and exposure variables was analyzed by bivariable analysis. Multivariable logistic regression was fitted to identify independent predictors of outcome variables. The strength of association and level of significance was determined by AOR and at P-value < 0.05.

Results: 484 study subjects were studied. The overall magnitude of adverse clinical outcomes of COVID-19-infected pregnant and postpartum women was 20.7% (95% CI: 17.1, 24.5) (specifically, oxygen therapy 20.7%, ICU admission 7%, and maternal death 2.3%). Chronic hypertension (AOR=3.13, 95% CI: 1.15, 8.51), diabetes mellitus (AOR=2.97, 95% CI: 1.19, 7.36), preeclampsia (AOR=3.94, 95% CI: 1.61, 9.68) and advanced maternal age (AOR=2.39, 95% CI: 1.36, 4.18) were factors associated with adverse clinical outcomes of COVID-19 infected pregnant and postpartum women.

Conclusions: The overall magnitude of adverse clinical outcomes is high. This indicates that COVID-19 has a significant impact on maternal health. Advanced age, chronic hypertension, diabetes mellitus, and preeclampsia were factors associated with adverse clinical outcomes. Strengthening preventive measures and screening vulnerable groups is recommended.

Keywords: Adverse clinical outcomes, pregnant, postpartum, women, COVID-19, Ethiopia.

Background: Coronavirus disease 2019 (COVID-19) is an infectious disease caused by a virus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (1). They are a group of viruses belonging to the family of Coronaviridae, which, affect both human beings and animals (2, 3). In late 2019, a novel coronavirus, SARS-CoV-2 was identified as the cause of an outbreak of acute respiratory illness in Wuhan, China (1, 2, 4). This COVID-19 infection is highly contagious and has spread to every corner of the world to become a global pandemic disease as declared by the World Health Organization (WHO), on March 11/2020 (5).

Pregnant women are a high-risk population for COVID-19 infection due to physiological and mechanical changes throughout pregnancy (6). Coronavirus disease 2019 infection during pregnancy increased poor clinical outcomes such as Intensive Care Unit (ICU) admission, invasive ventilation, and oxygen therapy (7, 8). Globally, maternal clinical outcomes have worsened during the outbreaks of COVID-19 infection with an increase in maternal death and ICU admission of pregnant and postpartum women (9). This COVID-19 infection is unique among human coronaviruses since it has high transmissibility

and uncontrollable fatal deaths among high-risk groups. Getting a COVID-19 infection during pregnancy and the postpartum period may put an additional risk of occurring adverse clinical outcomes.

Therefore, this study assessed adverse clinical outcomes and associated factors among COVID-19-infected pregnant and postpartum women. Investigating adverse clinical outcomes and its associated factors among COVID-19-infected pregnant and postpartum women showed the effect of COVID-19 on maternal health.

Objectives

To assess adverse clinical outcomes and associated factors among coronavirus disease-infected pregnant and postpartum women at Eka Kotebe General Hospital, Addis Ababa, Ethiopia, 2022.

Materials and methods

Study setting, period, and design: This study was conducted at Eka Kotebe General Hospital from March 13/2020 to March 13/2022, and the data were extracted from April 21/2022 to May 14/2022. An institutional-based Cross-sectional study was employed. All admitted pregnant and postpartum women with COVID-19 infection at Eka Kotebe General Hospital from March 13/2020 to March 13/2022 were included in the study.

Data collection: This study used secondary data in which, data were extracted from patients' charts by using a structured data extraction checklist. The checklist addressed socio-demographic factors in the first part, chronic comorbidity factors in the second part, pregnancy-related factors in the third part, clinical-related factors in the fourth part, and laboratory-related factors in the last part. The data were extracted by 3 BSc nurses and 1 BSc nurse as supervisor after receiving one-day training. The checklist was prepared in English language and it was used to extract data from the patient's charts. To ensure data quality, each data extracted by data collectors were supervised by the supervisor and checked by the principal investigator every day.

Data analysis: The data were extracted using a structured data extraction checklist. The extracted data were checked for their completeness, entered into Epi-data, and exported to SPSS for analysis. Adverse clinical outcomes: considered COVID-19-infected pregnant and postpartum women who had one of the following (need for oxygen therapy, ICU admission, and maternal death) (11). Texts, graphs, and tables were used to present the descriptive part of the findings. To determine the association between the outcome and exposure variables, a bivariable analysis was computed and a multivariable logistic regression was fitted to identify independent predictors of outcome variables. The strength of association and level of significance was determined by AOR and at P-value < 0.05.

Ethics: The ethical letter was obtained from Debre Markos University Ethical Review Committee, College of Health Science (Ref.No/HSC/R/C / Ser/co/124/11/14) and it was submitted to Eka Kotebe General Hospital to get permission. Ethical approval was obtained from the research and ethics committee of Eka Kotebe General Hospital (Ref.No/EK/150/5/106). Confidentiality of the information was assured by not recording patients' names on the data extraction checklist and preserving the privacy of the information.

Results and Discussion

In this study, 484 COVID-19-infected pregnant and postpartum women were included with a data completeness rate of 94%. The mean age ± (SD) was 29.54 (± 4.89) years. Of the study participants, 3.7% had a history of chronic hypertension and 4.5% had a history of diabetes mellitus. More than half 52.9% of women were multipara. The majority 85.5% of women were admitted during pregnancy. Of which 4.5% of women had preeclampsia.

The maximum and minimum length of hospital stay of study participants were 35 and 2 days respectively, and the median time hospital stay was 8 days with an interquartile range of (5-13 days). 15.1% of patients had shortness of breath at admission.

The overall magnitude of adverse clinical outcomes was 20.7% (95% CI: 17.1, 24.5). This implies that COVID-19 infection has a significant impact on maternal health. This result is in agreement with studies conducted in Italy (18%) (12), Brazil (23.8%) (13), and Iran (20.2%) (14). However, the finding of the present study is lower than studies conducted in Nigeria (26.3%) (10) and Chile (25.5%) (15). This could be due to the difference in study period that the various changes its genus over time.

Specifically, The magnitude of oxygen therapy was 20.7 %(95% CI: 17.1, 24.5). This finding is similar to studies conducted in Turkey (21.4%) (16) and Saudi Arabia (20.5%) (7). The magnitude of ICU admission was 7 % (95% CI: 4.9, 9.7). This finding is similar to the studies conducted in Nigeria (5.3%) (10), Italy (5.5%, 8%) (12, 17), and Chile (5.6%) (15). However, the figure is lower than studies conducted in the United States of America (16.2%) (18), South Africa (15.9%) (19), the United Kingdom (17.3%) (20), and Iran (10.7%) (21). This might be due to that the PCR test was performed with the indication (suspected, clinical symptom, and contact history) and it might be due to that studies compute the magnitude of ICU admission only from severe cases.

Maternal death due to COVID-19 was 2.3 % (95% CI: 1.1, 4.0). This result is consistent with studies conducted in Iran (3.1%) (14) and Mexico (3.1%) (22). However, this figure is lower than studies conducted in Nigeria (5.3%) (10), South Africa (6.3%, 5.8%) (19, 23), Italy (5%) (17), and Brazil (8.2%) (13). This difference might be due to that studies compute the magnitude of death only in severe cases. Furthermore, this finding is higher than studies conducted in United Kingdom (1%) (24), United States (0.1%, 0.7%) (18) (25), and Chile (0.2%) (15) . This might be owed to the fact that the studies in the United Kingdom and the United States were based on national population information.

In multivariable analysis, chronic hypertension, diabetes mellitus, preeclampsia, and age ≥ 35 were variables associated with adverse clinical outcomes. Accordingly, chronic hypertension was significantly associated. This revealed that the odds of adverse clinical outcomes among pregnant and postpartum women who had chronic hypertension were 3.13 times higher when compared with women who had no chronic hypertension (AOR=3.13, 95% CI: 1.15, 8.51). This result is consistent with studies conducted in South Africa (23), France (26), and India (27). This could be the fact that high BP damages tissues and releases cellular debris which weakens the immune system and makes it susceptible to viral replication (28).

Diabetes mellitus was significantly associated with adverse clinical outcomes. The likelihood of adverse clinical outcomes among pregnant and postpartum women who had diabetes mellitus was 2.97 times higher when compared with women who had no diabetes mellitus (AOR=2.97, 95% CI: 1.19, 7.36). This is supported by the studies conducted in South Africa (23), Brazil (13), and India (27). This could be due to the increased blood sugar in diabetes mellitus patients promoting the production of destructive molecules in the body which interfere with the body's natural defense mechanism and reduces the immune response (29).

Preeclampsia was significantly associated. In addition, women who had preeclampsia were 3.94 times more likely to have clinical adverse outcomes when compared with women who had no preeclampsia (AOR=3.94, 95% CI: 1.61, 9.68). It was found that women who had preeclampsia were more likely to have adverse clinical outcomes. The result is consistent with the studies in Nigeria (10) and France (26). This could be due to the fact that preeclampsia worsens pulmonary edema that reduces oxygen saturation and disposes patients' respiratory failure and COVID -19 affects primarily the lung, the two conditions resulting from adverse clinical outcomes (30).

According to this study advanced maternal age was significantly associated. Furthermore, Women who were of advanced age were 2.39 times more likely to have adverse clinical outcomes compared with their counterparts (AOR=2.39, 95% CI: 1.36, 4.18). This finding is consistent with studies conducted in Brazil (13), Mexico (22), and France (26). This could be the fact that an

increase in maternal age in addition to pregnancy reduces the production of B-cells and T-cells in the immunity system which makes it vulnerable to viral replication and worsening of the disease in women (31).

Conclusion and recommendations

The overall magnitude of adverse clinical COVID--19 infected pregnant and postpartum women was high compared to a study conducted on six continents. One out of five pregnant and postpartum women develops adverse clinical outcomes. This indicates that COVID-19 has a significant impact on maternal health. Advanced maternal age, chronic hypertension, diabetes mellitus, and preeclampsia were factors of adverse clinical outcomes.

The following recommendations will be forwarded; Pregnant and postpartum women with a chronic illness and who are of advanced age should apply preventive measures for COVID-19 infection. A special focus on pregnant and post-partum women should be given while screening and educating the population. Strengthening and advocating the culture of screening for chronic medical illness to apply COVID-19 preventive measures and proper management of patients when the infection occurs.

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Table 1: Bivariable and multivariable logistic regression analysis for factors associated with adverse clinical outcomes among COVID-19-infected pregnant and postpartum women at Eka Kotebe General Hospital Addis Ababa, Ethiopia, 2022.

Variables	Category	Adverse clinical outcomes Frequency		COR(95%CI)	AOR(95%CI)	p-value
		Yes	No			
Maternal age	≥35 years	26	47	2.52(1.47,4.33)	2.39(1.36,4.18)	0.002*
	<35 years	74	337	1	1	
Chronic hypertension	Yes	8	10	3.25(1.25,8.47)	3.13(1.15,8.51)	0.025*
	No	92	374	1	1	
Diabetes mellitus	Yes	10	12	3.44(1.44,8.22)	2.97(1.19,7.36)	0.019*
	No	90	462	1	1	
Preeclampsia	Yes	11	11	4.19(1.76,9.98)	3.94(1.61,9.68)	0.003*
	No	89	373	1	1	
BUN	≥18 mg/dl	15	32	1.94(1.01,3.75)	1.83(0.92,3.64)	0.087
	<18 mg/dl	85	352	1	1	
Platelet	<150000/ml	27	70	1.66(0.99,2.77)	1.51(0.87,2.63)	0.14
	≥150000/ml	73	314	1	1	
ALT	>63u/l	13	22	2.46(1.19,5.07)	1.73(0.79,3.81)	0.17
	≤63u/l	87	362	1	1	
Asthma	Yes	6	11	2.16(0.78,6.0)	2.12(0.73,6.18)	0.167
	No	94	373	1	1	
Other comorbidities	Yes	5	10	1.97(0.66,5.9)	1.69(0.52,5.55)	0.383
	No	95	374	1	1	
Parity	Multipara	61	195	1.91(0.95,3.84)	1.36(0.64,2.90)	0.420
	Primipara	28	122	1.4(0.66,2.98)	1.45(0.66,3.19)	0.355
	Nullipara	11	67	1	1	
AST	>37u/l	20	42	2.04(1.13,3.66)	1.13(0.48,2.65)	0.782
	≤37u/l	80	342	1	1	

N.B mg/dl-milligram per decilitre, COR-crude odds ratio, u/l- unit per litre, /ml- per microliter * -significantly associated

Post COVID-19 Vaccination Side Effects among Individuals with Chronic Comorbidities in Central Oromia, Ethiopia.

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Abstract

Introduction: Safe and effective vaccines are important to halt the negative impacts of COVID-19. Ethiopia has been providing the COVID-19 vaccine since February 2021 for priority population groups like individuals with chronic comorbidities and the health workforce. There is sparse information on the adverse effects of the vaccines provided yet.

Objective: The objective of this study was to determine post-COVID-19 vaccination adverse effects and associated factors among individuals visiting hospitals for chronic care in the central Oromia region, Ethiopia.

Methods: A cross-sectional study was conducted among 604 study participants with comorbidities. The data were entered into the computer using EPI info 7.1 software and then exported to SPSS V22 for analysis. A descriptive analysis was done using frequencies, percentages, and measures of dispersion such as mean. Logistic regression analysis was also employed to determine the associations between dependent and independent variables.

Results: Among the study participants, 87.6% and 78.8% experienced at least one side effect in the first and second doses of the vaccine, respectively. The most reported side effects were joint pain (84.6% 1st dose, 50.2 % 2nd dose), fatigue (84.1% 1st dose, 62.0% 2nd dose), headache 78.5% 1st dose, 45.8% 2nd dose) and back pain (75.5% 1st dose, 59.8% 2nd dose). About 17.4% and 13.3% were infected and admitted post-COVID-19 vaccine, respectively. Adherence to COVID-19 infection preventive protocols decreased dramatically post-COVID-19 vaccine. Occupational status, chew chat, and engaging in vigorous-intensity physical activity were variables that remained significantly associated with post-vaccination side effects.

Conclusions and recommendations: The majority of the participants experienced at least one side effect in both the 1st and 2nd doses of the COVID-19 vaccine. Occupational status, chewing chat, and engaging in vigorous-intensity physical activity were variables that remained significantly associated with post-vaccination side effects. Establishing a post-vaccine tracking mechanism using a standard longitudinal study design is recommended.

Keywords: COVID-19 vaccine, Side effects, Comorbidities, Oromia, Ethiopia

Introduction

Since the outbreak of COVID-19 in December 2019, the virus has claimed more than six million lives and caused more than 450 million morbidities (1). In addition to being a health crisis, the pandemic is also a humanitarian and development crisis that is threatening to leave deep social, economic, and political scars for years to come, particularly in countries already weighed down by fragility, poverty, and conflicts (2, 3). COVID-19 is especially worrisome in countries with lowcapacity and humanitarian settings ill-equipped to cope with COVID-19 due to weak health infrastructure and workforces that rely heavily on the support of donors, the United Nations (UN), and Non-governmental Organizations (NGO) partners (4)

The rapid development of several COVID-19 vaccines is a surprising and remarkable accomplishment since the pandemic, in late 2019. In late 2020, more than 214 vaccines were developed to combat this pandemic candidate (5-7). Previously, the rapid development of vaccines has been linked to adverse issues. People still have doubts about the safety and efficacy of vaccines, including the longevity of protection against COVID-19, as several cases of reinfection have been reported (8,9). For example, the swine flu vaccine increased the risk of Guillain-Barre syndrome (10). Moreover, the rapid development of vaccines casts doubt on safety. Previously, the rejection of vaccination programs in both developed and developing countries exposed more individuals to infectious illnesses (11). In the USA, Canada, and Europe vaccine reluctance led to an increased measles outbreak (12, 13), in Africa (Nigeria and Kenya) polio vaccine refusal increased the polio incidence by five-fold (14). Our country Ethiopia has been providing vaccination to health workforces, individuals with comorbidities, and officials since February 2021.

Objective

The objective of this study was to determine post-COVID-19 vaccination adverse effects and associated factors among individuals with comorbidities visiting chronic care at hospitals in the central Oromia region, Ethiopia.

Methods

Study setting

The study was conducted at Asella Referral and Teaching Hospital, Adama Hospital and Medical College, and Shashemene Referral Hospital from November to December 2021, in Ethiopia.

Study design and population: A facility-based cross-sectional study was among the adult population with chronic comorbidities who received at least one COVID-19 vaccine.

Sample size and sampling procedure

The sample size was calculated using EPI info 7 stat calc for the population survey, considering proportion(p)=50%, margin of error (d)=4, Z=1.96(the desired confidence level at 95% CI), design effect of 1.5, and adding 10% of non-response rate the final sample was 634**.**

Since the majority of the clients visiting the chronic care clinic did not receive the COVID-19 vaccine. First, the participants were identified by asking whether they had received at least one dose of the COVID-19 vaccine and then the participants were asked for their consent to be part of the study for the survey being undertaken. Clients were approached conveniently until the allocated sample size to the facilities was fulfilled based on their voluntary consent.

Data management

The data were entered into Epi Info version 7.1 and exported to SPSS version 21 for analysis. Descriptive statistics were performed to describe the study population. Logistic regression was done to see the independent predictor of post-COVID-19 vaccine side effects. Finally, the association was expressed in adjusted odds ratio (AOR) with a 95% confidence interval, and P -value <0.05 will be used as cut-off points to declare significance in the final model.

Result and discussions

In this study, among the study participants, 87.6% and 78.8% experienced at least one side effect in the first and second doses of the vaccine,

respectively. The most reported side effects were joint pain (96.6% 1st dose, 50.2 % 2nd dose), fatigue (96.0% 1st dose, 62.0% 2nd dose), headache 89.6% 1st dose, 45.8% 2nd dose), back pain (86.6% 1st dose, 59.8% 2nd dose), nightmare (80.0% 1st dose, 31.4% 2nd dose), sleeping disorder(76.9% 1st dose, 37.3%), fever(76.2% 1st dose, 35.4% 2nd dose), pain at vaccination site(57.3% 1st dose, 41.0% 2nd dose), redness at vaccination site (53.5% 1st dose, 38.0% 2nd dose), nausea(43.3% 1st dose, 17.7 2nd dose) and chills (42.5%1st dose, 10.7% 2nd dose).

In a study done in Saudi Arabia,60% of the study subjects reported side effects after receiving Oxford-AstraZeneca and Pfizer-BioNTech vaccines, and most of them reported fatigue 90%, and pain at the site of the injections 85% (15). A similar study in Saudi Arabia reported that 68.5% suffered post-vaccine. Fever was the most reported side effect (41.2%), followed by fatigue (36.1%), headache (24.2%), malaise (36.7%), myalgia (36.7%), and muscle and joint pain (23%). About 5.1% became infected with COVID-19 after vaccination (16).

A study conducted in the United Arab Emirates indicated that pain at the vaccination site; fatigue, lethargy, headache, and tenderness were the most common side effects. The most common reason for being unwilling to take the COVID-19 vaccine was vaccines are not effective (17). In a study done in South Korea, the reported side effects were muscle aches (77.7%), fatigue (74.7%), headaches (67.4%), chills (63.5%), and fever (49.2%) (18).

In a study done in India, the majority experienced pain at the injection site (88.8–100%), tiredness (87.7–60%), and body ache (86.6–40%) at post-vaccination of COVID-19 (19). A study done in Indonesia reported side effects from severe to less severe were muscle pain (39.6%), tiredness (35.8%), headache (22.1%), swelling (9.1%), coughing (7.9%) and tingling (6.9%)(20). In a study done in Germany; Fatigue (44.8%), chills (36.1%), exhaustion (34.9%), and fever (30.4%) were the most accompanying symptoms (21). A study done in Slovakia, 91.6% reported at least one side effect. Injection site pain (85.2%) was the most common local side effect, while fatigue (54.2%), headache (34.3%), muscle pain (28.4%), and chills (26.4%) were the most common systemic side effects (22).

In this study, among the participants who experienced side effects, 39.3% received treatment for the side effects in the 1st dose and 19.1% in the 2nd dose. In addition, 2.8% of the respondents were hospitalized due to side effects after receiving the first dose. The majority of the respondents felt some fear when they were vaccinated COVID-19 vaccine. Similar to this finding, the study done in Jordan indicated that 52.9% of participants suffered before vaccination from vaccine hesitancy and anxiety (23).

The multivariate analysis showed that occupational status, chew chat, and engaging in vigorous-intensity physical activity were variables that remained significantly associated with post-vaccination side effects.

Conclusions and recommendations

Among the study participants, the majority of them experienced at least one side effect in the first and second doses of the vaccine. The most reasons to receive COVID-19 vaccination were recommendations by health professionals followed by fear of being infected and not spreading infections to others. Since the study was conducted retrospectively, it is difficult to characterize the side effects and to measure the exact duration of the problems. It is better to plan monitoring and evaluation of the post-vaccine effect using standard longitudinal study designs to measure the effect. Further research on the cold chain of the vaccine, the reported side effect may be due to the problem of storage, transportation, and problems related to the administration of the vaccine.

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Understanding Gender and other Socio-cultural Barriers to Increase RMNCH Service Utilization in Developing Regional States

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Abstract

Background: Though there are several studies on determinants of RMNCH/FP in agrarian communities, Gender intersectionality with multilevel factors remained less studied in Developing Regional States (DRS) in particular. This study aimed to explore gender intersectionality influencing the access uptake of RMNCH in Afar, Benishangul Gumuz, Gambella, and Somali regional states.

Method: The study used a qualitative study design to assess the connection between gender and other socio-cultural affecting access and utilization of RMNCH/FP services in DRS. A purposive sampling technique was employed to select geographic locations and participants in 20 woredas and 40 kebeles of the 4 DRS of Ethiopia. Focus Group Discussion (FGD) (20 sessions) and Key Informant Interview (KII) (32 interviews) were conducted to collect information from men and women of the reproductive age group. Qualitative data analysis involved thematic coding of translated In-Depth Interviews (IDIs) and FGDs.

Findings: The study revealed that FP was the less utilized service compared to ANC, delivery services, and child health in DRS, and determined by socio-cultural, structural, and programmatic inter-sectionality of gender. Gender norms in DRS dictate that women were responsible for children's and families health, seeking information and health services, and household chores whereas men mainly engage in income generation, decision-making, and controlling resources. Women who were overburdened with household chores, and who cannot make decisions and control resources, especially from pastoralist and rural settings, were less likely to uptake RMNCH/FP services. There were women-focused RMNCH/FP education initiatives that marginalized the men in DRS. In addition, social construction reinforced by gender norms highly empowers men to have decision-making power. Such decisions affect access and control over resources.

Conclusions: This study revealed, across the four regions, patriarchal culture and gender inequities are reflected in gender roles and responsibilities, access to and control over resources, decision-making power, cultural norms and practices, laws and regulations surrounding inheritance rights, and common customs and traditions related to reproductive health. Gender norms shaped by structural, sociocultural, religious, and programmatic conditions were key influencing factors in access-use to RMNCH/FP services. Men's dominance in resource control and decisions, and sociocultural-religious affairs, but marginal engagement in women empowerment initiatives was intersecting barriers of RMNCH/FP uptake in DRS in general and Somali region in particular for FP services. Improved access to and uptake of RMNCH would best result from gender-responsive strategies established through a systemic understanding of intersectional gender inequalities in the DRS of Ethiopia.

Keywords: Gender, sociocultural barriers, developing regions, reproductive maternal and child health

Background

It is recognized that gender and other socio-cultural factors are among the key determinants of RMNCH/FP service seeking and utilization. Gender inequity and women's low social status and disempowerment have a significant impact on women's health, maternal health, and overall demand for maternal healthcare services. (Tolhurst et al., 2009). The fundamental role of pastoral women in agriculture and livestock production has been systematically ignored and undervalued (Adugna & Silesh: 2013). In pastoral communities of Ethiopia, women and girls have limited decision-making power. As a result, factors that are very critical to women, such as proximity to water and health centers, are not even considered and women suffer from a lot of health and sanitation issues during migration to areas, which are selected by male scouts (Hailu et al. 2008).

Even though gender and other sociocultural determinants continue to play major roles in poor RMNCH health outcomes in the four DRS, there is a lack of recent evidence to showcase how these factors affect RMNCH/FP service-seeking and utilization in the regions. Thus, USAID Transform Health in Developing Regions (USAID Transform HDR) activity initiated and conducted this assessment on gender and other sociocultural barriers to RMNCH/FP service utilization in the four regions.

Transform Health in Developing Regional States (Transform HDR) is a USAID-funded Maternal, Neonatal, and Child Health and Family Planning (MNCH/FP) program aimed at reducing child and maternal deaths in the four developing regions of Ethiopia: Afar, Benishangul-Gumuz, Gambella and Somali. The overall goal of the project was to contribute to the countries, effort as stipulated in the HSTP I (2016-2020), to approximate the disparity in health outcomes.

Study Design

The gender and sociocultural assessment used a cross-sectional study design that employs mixed methods of primarily qualitative data collection and analysis. The main approaches used for data collection were key informant interviews (KIIs), in-depth Interviews (IDIs), exit interviews (EIs), and focus group discussions (FGDs) to assess gender and sociocultural barriers and facilitators of RMNCH across the four DRS. In addition, the study used a gender analysis framework for health systems as eliciting concepts. Gender norms along with contextual (structural and sociocultural) and programmatic conditions were explored in relation to access and uptake of RMNCH/FP services.

Geographic Area of the Study

The assessment was undertaken in 20 selected USAID Transform HDR intervention woredas in DRS. A purposive sampling technique was used to select the 20 target woredas from the 20 zones located across the four regional states.

Study Participants and Sampling

The profile of study participants included men and women (including boys and girls) within reproductive age groups (15-49) currently living in the 20 selected woredas in Afar, Benishangul-Gumuz, Gambella, and the Somali Regional States of Ethiopia. Furthermore, representatives of regional, zonal, and woreda level government offices (health, women and children affairs, and labor and social affairs), health facility representatives, religious and community leaders, and kebele representatives participated in the assessment.

Findings:

Gender roles, norms, engagement inequalities, and RMNCH

The Gender norms in DRS dictate that women were responsible for household chores and children and families' health, whereas men mainly engage in income generation, decision-making, and controlling resources. Women who were overburdened with household chores, and who cannot make decisions and control resources, especially from pastoralist and rural settings, were less likely to uptake RMNCH/FP services. They missed their follow-up dates for ANC, FP services, delivery, and postnatal care schedules due to the high burden of household chores.

In addition, women lack financial resources for transport expenses to visit health facilities. Furthermore, the limited availability of female health workers who can provide culturally acceptable service at the nearest possible RMNCH/FP facilities affected access and utilization. The assessment revealed that women in DRS were less powerful to go out of the home to seek health care, participate in income-generating activities, and social-cultural occasions, and limited power over resources.

Laws and policies, gender, and RMNCH

Although legal frameworks addressing gender norm challenges and inequalities in RMNCH are in place, the knowledge and implementation of the laws across respondents including health workers are limited except for the laws on HTPs such as rape, and early marriage. The community and religious leaders adopted the legal laws on HTPs for use in local socio-cultural contexts. According to the information from Women, Children and Social Affairs of the Afar region, If a husband beats his wife, the punishment is 180 Birr, but if he causes a head injury, he will provide her with broth made from goats through a process called 'Erro' and will pay the 180 Birr. In the case of rape, the punishment will be 12 cows and he will be free." (WCS Affairs Office, Gulina District)

Control-over resources and decision-making, gender, and RMNCH

The power to control-over resource intersected gender norms in influencing access-use to RMNCH/FP services. The social construct in regions highly empowers men to have decision-making power and placed them in a better position to have control over resources. Usually, men/husbands make decisions on various affairs and resources.

Participation in leadership, gender, and RMNCH

Even though nowadays women are holding important positions in their communities in DRS, men continued to hold important leadership positions such as administering customary and religious institutions, kebeles, and meetings and events. Hence, matters against religious dogmas or customs will be checked by men's leadership irrespective of the women's knowledge and demand for RMNCH/FP services. The leadership role of women is limited to women's network/HDA leaderships that are supportive of HEWs.

Empowerment and education opportunities, gender disparity, and RMNCH

The assessment revealed gender disparity regarding access to reliable information on RMNCH/FP services. In all the DRS, RMNCH services are considered women issues. RMNCH/FP information and education opportunities are mainly targeted and provided to women. The health extension program (HEP) uses different educational strategies such as home visits, HDA schemes, trained TBAs, and traditional means of exchanging information to empower and access the women with RMNCH information. Moreover, mobility in pastoralist communities has predominantly marginalized the men from education opportunities which interacted with the men's restriction on women's FP uptake.

Programmatic factors intersecting gender on RMNCH uptake

The health system in general and the facilities by which RMNCH/FP services are delivered determine the utilization of services. The absence of female service providers, lack of compassionate and respectful care at facilities, perceived lack of skills among providers, distance, lack of water and electricity at health facilities combined with lack of essential drugs and supplies are some of the factors of RMNCH access-use.

Recommendations

The following major recommendations seek to provide ideas and considerations based on the study findings to help shape future gender-related programming by various stakeholders including health, education, legal sectors, and communities to address gender issues.

1. **Reinforce implementation of existing policies and procedures:** the health, education, and legal sectors have enacted various policies and procedures to ensure gender equity and equality. Implementing these policies and procedures will help address gender issues that hinder women and girls from accessing and utilizing health services.

2. **Design and implement gender transformative SBCC strategies** to change norms related to girls' education, early marriage, and other harmful marriage practices, family planning, and reproductive choice and images and norms of motherhood and fatherhood. It's also important to ensure SBCC strategies include working with the wives of religious leaders.

3. **Improve prevention and response to GBV,** including early/forced marriage, FGM, wife battery, disrespect and abuse of pregnant and laboring women, and potential sexual harassment of female community health workers remain critical issues for young women and girls in these regions. Coordination and collaboration among the different stakeholders are very important in this. The One Stop Center model in the different health facilities introduced by MoH should be further strengthened and scaled up to reach more facilities.

4. **End early/forced marriage, decrease married girls' vulnerability and keep girls in school:** There is a need to initiate and strengthen youth SRH programs. Keeping girls in school is one of the High-Impact Practices for improved RH/FP. The Education sector should work with MoH and community leaders to promote girls' education and support girls staying in school.

5. **Increase constructive engagement of religious leaders in FP/RMNCH.** These assessment activities found that religious leaders play a large role in shaping attitudes around the family size and SRH issues. For religious leaders to better serve as role models for support to FP/RMNCH, it's important to engage with them using a religious leaders' curriculum and program model.

6. **Promote women's economic empowerment through "green livelihoods".** Gender-transformative strategies should increase individual women's and girls' access to information, education, skills, economic resources and assets, social capital and support, and political agency while also increasing stewardship of the environment. This includes the introduction of time and energy-efficient income generation sources that will also decrease women's and girls' workload and time poverty.

Malaria financing in Ethiopia: Results from the 2019/20 National Health Account Study

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Abstract

Introduction: Malaria is transmitted through female mosquitos and can lead to severe illness or death. In 2019, 85 malaria-endemic countries reported an estimated 227 million malaria cases. Between 2019 and 2020, the expected number of malaria cases in Africa rose from 213 million to 228 million. Malaria is one of the major public health problems in Ethiopia. It particularly affects vulnerable groups such as children and pregnant women. The malaria death rate per 1000,000 population at risk has varied across time which is 7.26 in 2017, 9.83 in 2018, 12.18 in 2019, and 9.76 in 2020.

Objective: This provides a systematic description of the malaria financial flows related to the consumption of healthcare goods and services in Ethiopia.

Method: The analysis is done based on the results from the recent National Health Account (NHA) studies.

Result: In 2019/20, The total malaria expenditure has declined compared to the 2013/14 and 2016/17 fiscal years, from USD 224 million in 2013/14 and USD 240 million in 2016/17 to USD 194 million in 2019/20. The major source of financing for malaria care services was donors (the rest of the world) accounted for 44.4 percent, followed by households and the government, which contributed 30.6 and 24.5 percent, respectively, in 2019/20. The government and households were the major managers of malaria resources in 2019/20. Furthermore, health centers and health posts were the major recipients of malaria resources, and most of the services were delivered as outpatient curative care.

Policy Implications and recommendations: The government's contribution to malaria has been highly fluctuating and unpredictable in the last decade. There should be a clear financing plan for malaria aligned with the national malaria strategy. Domestic resource mobilization initiatives, including innovative financing, should be implemented to raise more money for malaria prevention and control. The largest share of spending on malaria is covered by households through direct out-of-pocket payments. There should be a mechanism to protect households from catastrophic spending because of malaria.

Keywords: National Health Account, total malaria expenditure, source of financing

Introduction

A parasitic disease, malaria is transmitted through female mosquitos and can initially lead to severe headaches, fever, chills, and vomiting, followed by severe illness or in some cases death (WHO, 2022a). Despite being preventable and treatable, malaria continues to have a devastating impact on people's health and livelihoods around the world. In 2019, 85 malaria-endemic countries reported an estimated 227 million malaria cases. The anticipated number of malaria cases in 2020, one year after the COVID-19 pandemic and service delays, has risen to 241 million, a 14 million case increase over 2019. (Table 1).

Furthermore, the malaria case incidence increased by 5 percent from 56 per 1000 population at risk in 2019 to 59 in 2020. Between 2019 and 2020, the expected number of malaria cases in Africa rose from 213 million to 228 million, while the number of deaths rose from 534 thousand to 602,000. Africa accounted for over 95% of cases and 96% of deaths worldwide; 80% of all deaths in Africa are among children under the age of five (Table1).

Table 1: Basic malaria Indicators

Year		2017	2018	2019	2020
Ethiopia	Malaria death rate per 100,000 population at risk	7.26	9.83	12.18	9.76
	Malaria - disability-adjusted life-years (DALYs) per 100,000 population	664	877	1,072	871.0
	Total Clinical and Confirmed Malaria Cases	1.8 million	1.2 million	0.9 million	1.22 million
	Malaria incidence per 1,000 population at risk	18.6	12.2	15.0	11.9
Africa	Malaria death rate per 100,000 population at risk	56.4	57.9	56.0	61.5
	Malaria - disability-adjusted life-years (DALYs) per 100,000 population	4,197	4,053	4,006	4,006
	Total Clinical and Confirmed Malaria Cases	213 million	211 million	213 million	228 million
	Malaria incidence per 1,000 population at risk	2230	226	223	233
Global	Malaria death rate per 100,000 population at risk	14.20	14.00	13.8	15.3
	Malaria - disability-adjusted life-years (DALYs) per 100,000 population	654	630	608	608
	Total Clinical and Confirmed Malaria Cases	231 million	227 million	227 million	241 million
	Malaria incidence per 1,000 population at risk	58	57	56	59

Source: Authors Compiled from the Ministry of Health's health and health-related indicators, global malaria reports, and GBD Compare

Malaria is one of the major public health problems in Ethiopia. It particularly affects vulnerable groups such as children and pregnant women. The malaria death rate per 1000,000 population at risk has varied across time which is 7.26 in 2017, 9.83 in 2018, 12.18 in 2019, and 9.76 in 2020.

With significant investments and efforts to limit malaria as a highly prevalent disease in Ethiopia, the disease's incidence rate fell by 36% (4.4% in Africa) while the malaria mortality rate was stagnant in Ethiopia (7.7% in Africa) from 2017 to 2020 (WHO, 2021).

- Ultimately, tracking expenditures on malaria control and care can help clarify how cost-effective the allocation of malaria funds is, considering the impact on malaria incidence and mortality rates. Tracking malaria spending informs policy and decision-makers and researchers how much and where resources are disbursed to limit the incidence of malaria. In turn, such data illustrated whether malaria interventions are over- or under-funded relative to the prevalence of malaria in the country versus other diseases. Thus, this brief expenditure data on malaria from the recent national health accounts studies can help answer questions such as:

- Who finances malaria healthcare and how much do they spend?
- How malaria services are financed and what are the implications for sustainability?
- What types of malaria services are being provided to who and by whom?

How much is being spent on different malaria services and how do these compare with predefined priorities?

Overview of malaria Expenditure in Ethiopia

On average, the last one decays, and the per capita and case (diagnosed and reported) malaria expenditure is USD 2.2 and USD 1620, respectively. In 2019/20, The total malaria expenditure declined compared to the 2013/14 and 2016/17 fiscal years, from USD 224 million in 2013/14 and USD 240 million in 2016/17 to USD 194 million in 2019/20. Furthermore, the share of total health expenditure spent on malaria has also decreased from 8.9 percent in 2013/14 to 7.7 percent in 2016/17 to 5.3 percent in 2019/20. However, the malaria expenditure per case (diagnosed and reported) has increased from USD 851 in 2013/14 and USD 1569 in 2016/17 to USD 2,143 in 2019/20, but the per capita malaria expenditure has decreased from USD 2.56 in 2013/14 and USD 2.57 in 2016/17 to USD 1.94 in 2019/20 (Table 2).

Table 2: Malaria Expenditure in Ethiopia

Key indicator	2007/08	2010/11	2013/14	2016/17	2019/20
Total expenditure on health (In Billion ETB)	11.1	26.50	49.57	72.05	127.47
Total expenditure on health (In Billion USD)	1.2	1.60	2.50	3.10	3.63
Total expenditure on Malaria (ETB million)	520	4,008	4,434	5,579	6,813
Total expenditure on Malaria (Million USD)	56.2	242	224	240	194
Total Expenditure on Malaria as % Total Health Expenditure (THE)	4.7%	15.1%	8.9%	7.7%	5.3%
Total Clinical and Confirmed Malaria Cases	986,343	814,501	2,627,182	1,530,739	904,495
Malaria expenditure per case (diagnosed and reported) in USD	569	2,971	851	1,569	2,143
Malaria expenditure per Capita in USD	0.76	3.14	2.56	2.57	1.94

Source of Malaria Health Financing

Malaria is predominantly donor-financed. As shown in figure 2, the major source of financing for malaria care services was donors (the rest of the world) accounting for 44.4 percent, followed by households and the government, which contributed 30.6 and 24.5 percent, respectively, in 2019/20. The share of donors in malaria spending has varied between 25 percent and 79 percent since 2007/08. This is the maximum donor share score of 79% in 2010/11, whereas the minimum donor share is 25% in 2007/08. Unlike other diseases, the government has a relatively small contribution, with the lowest contribution of 7 percent in 2010/11 and the highest of 34.9 percent in 2013/14. Similarly, the spending by the household (OOP payments) has also varied across time, which is 30 percent in 2013/14, 35.1 percent in 2016/17, and 30.6 percent in 2019/20. However, this OOP's share of the total spending (either specific program or the overall health system) is higher than the 15% and 20% thresholds suggested by the WHO to minimize financial catastrophe and impoverishment due to accessing health care services (WHO, Health System Financing, 2010).

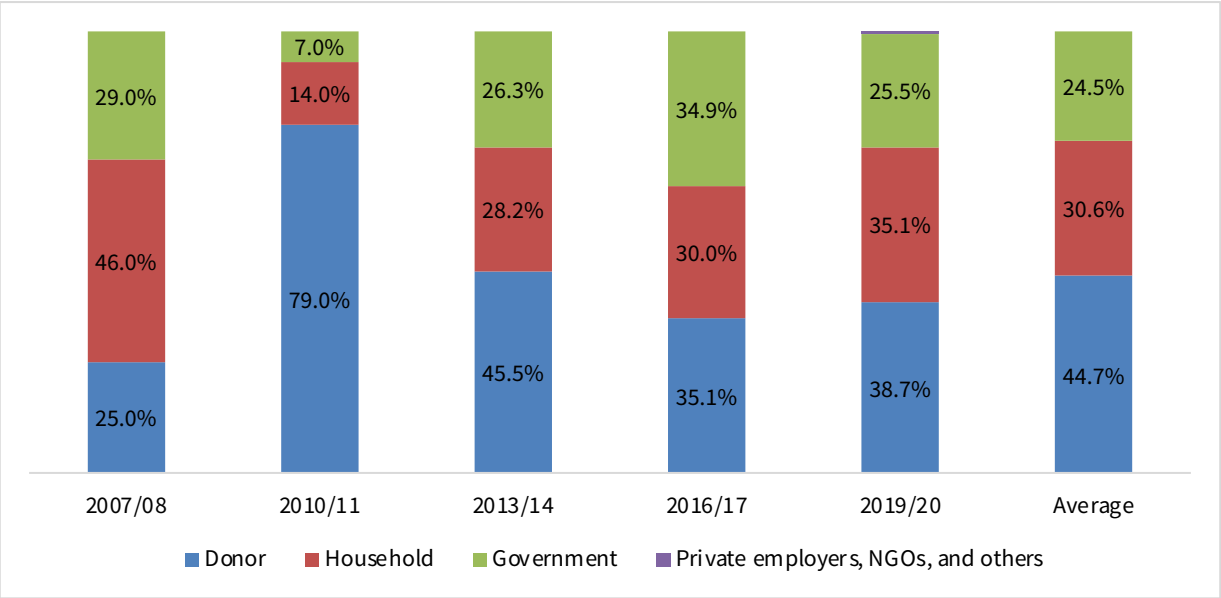

Figure 2: Malaria Expenditure by Source of Financing

1. Management of the Malaria resources

Government and households were the major managers of malaria resources in 2019/20. Government and Households had managerial responsibility for 44 percent and 34 percent of the total spending respectively. The Donor including NGOs managed about 21 percent of the malaria resources.

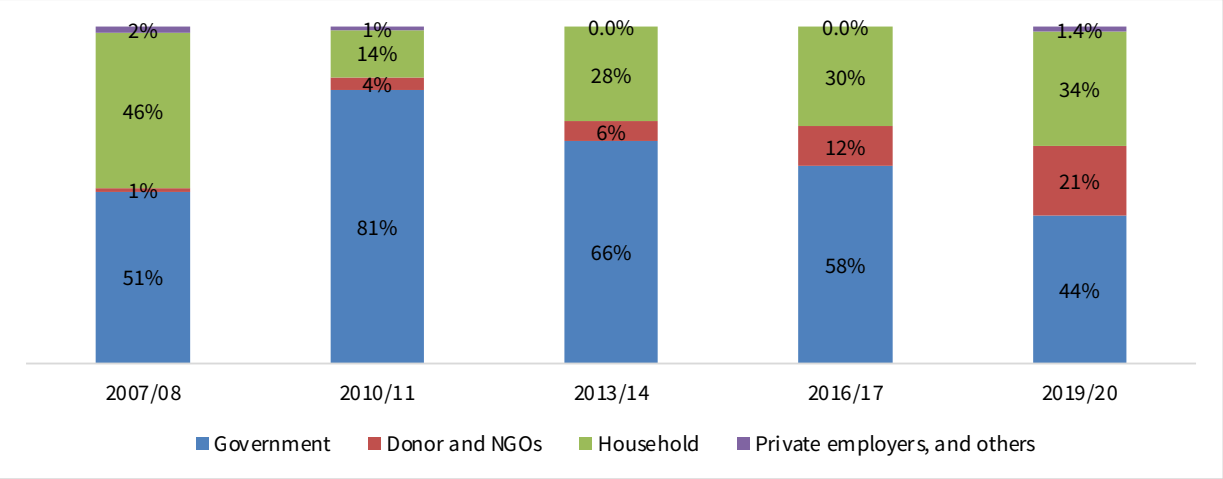

Figure 3: Malaria Expenditure by Financing Agent

2. Providers of Malaria Care

Health centers and health posts were the major recipients of malaria resources in the last decade: On average, the last one decayed. Health centers and health posts were the primary recipients of malaria resources, accounting for approximately 39.1 percent of total malaria spending. About 15 percent went to public hospitals (primary, secondary, and tertiary). Providers of preventive care providers received 20 percent of total malaria expenditure, followed by 10.4 percent of private and NGO clinics, 9.4 percent of government health administration, 2.4 percent of providers of ancillary services, 2.1 percent of private and other hospitals, and 2.0 percent of independent pharmacies.

Table 3: malaria expenditure by health care providers (%): 2007/08-2019/20

Provider	2007/08	2010/11	2013/14	2016/17	2019/20	The last one decays on average
Health center and health post	36.3%	44.3%	30.3%	38.5%	46.0%	39.1%
Primary hospital	16.4%	19.1%	9.0%	14.0%	8.2%	13.3%
Secondary hospital	0.0%	0.1%	0.0%	0.3%	4.3%	0.9%
Tertiary hospital	0.3%	0.3%	0.1%	0.5%	1.3%	0.5%
Private and NGO clinics	7.0%	3.5%	11.5%	16.3%	13.8%	10.4%
Government health administration	10.0%	2.9%	5.3%	9.0%	19.5%	9.4%
Providers of ancillary services	3.0%	0.5%	1.8%	3.1%	3.4%	2.4%
Private and other hospitals	6.0%	1.2%	0.6%	1.9%	0.7%	2.1%
Providers of preventive care	18.0%	26.1%	40.2%	12.8%	2.8%	20.0%
Independent pharmacies	3.0%	2.0%	1.1%	3.6%	0.1%	2.0%

Total malaria expenditure by healthcare function The bulk of malaria spending has been used for outpatient curative care in the last decade. On average, the last one decayed. About 50 percent of malaria funds were used for malaria outpatient care, followed by preventive care, which accounted for 34 percent, inpatient care for 4 percent, and other functions, including governance, health system financing, and others, for 13 percent.

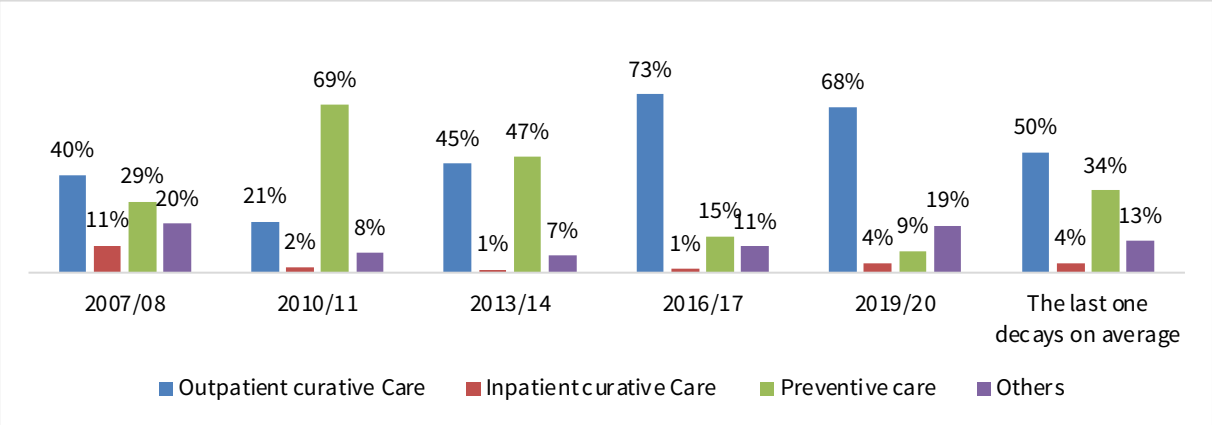

Figure 4. Share of total Malaria expenditure by healthcare function

Policy Implications and recommendations

- The government's contribution to malaria has been highly fluctuating and unpredictable in the last decade. Therefore, there should be a clear financing plan for malaria aligned with the national malaria strategy.
- Domestic resource mobilization initiatives, including innovative financing, should be implemented to raise more money for malaria prevention and control in the era of malaria elimination and eradication.
- The effort was commendable and substantially reduced the incidence of malaria in Ethiopia. However, malaria continues to be a major public health problem, and there is a need for all stakeholders to maintain efforts to ensure further reduction of malaria incidence.
- Still, the largest share of spending on malaria is covered by households (direct OOP payment), mainly households. Therefore, there should be a mechanism to protect households from catastrophic spending because of malaria.

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Effectiveness of the Integrated Data Quality, Use, and DHIS2 Training: A Rapid Assessment

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Abstract

Background: Most of the focuses of HIS-related training provided by the sector were on HIS professionals with limited emphasis on health program experts and health care providers. Taking this gap into consideration, the ministry of health designed a tailored training entitled' Integrated Data Quality, Data Use and DHIS2 Training' which was aimed at health program experts at health administrative units and health care providers at health facilities. Given the huge investment made in this training and the peculiar intention, the ministry strongly believed that it was worthwhile to assess its effectiveness.

Objective: To assess and provide information on the process and effectiveness of the Data Quality, Data Use, and DHIS2 training so that it informs future planning and execution of related HMIS training

Methods: A rapid assessment using both quantitative and qualitative methodologies was employed to collect the data. The study was conducted at the national level (MOH) and in selected regions, Zones, woredas Referral, General and district hospitals, and health centers drawn from the aforementioned areas. The study population of this assessment was HMIS and program experts or health care providers of health administrative units, hospitals, and health centers that were trained on the training under investigation. Data were collected from 3-7 January 2022 from five regions (Oromia, SNNPR, Sidama, Harari, and Somali) and two city administrations (Addis Ababa, Dire Dawa).

Results: Most aspects of the training preparations were adequate. Of the 131 respondents, 127 (97%) of the respondents agreed (16.8%) or strongly agreed (80.2%) that the training given was relevant to their work or the unit function where they are working. Although all DHIS2, data quality, and data use-related key knowledge included in the assessment is low or sub-optimal which might not be attributed to the training quality, the self-reported data use and quality-related skills included in the assessment were much better than the knowledge investigated though attribution has to be carefully looked at. There is also an indication that the training has contributed to institutional and unit-level practices such as PMT meetings and the use of DHIS2 dashboards beyond improvements in individual-level knowledge and skills. The training was nearly unanimously recommended by the study participants to be provided to other healthcare workers who were not trained

Conclusion and Recommendation: The training needs to be considered with better coverage of relevant health care workers by addressing the major gaps identified by the assessment such as a systematic and formal need assessment and post-training follow-up and support.

Keywords: Data Quality, Data use, District Health Information System 2 (DHIS2)

Background

Most of the focus of the HIS-related pieces of training provided by the health sector were on HIS professionals with limited emphasis to enhance data use related to attitude, knowledge, skill and behavior/practice by health program experts and health care providers. Taking this gap into consideration, the ministry of health designed tailored training entitled' Integrated Data Quality, Data Use and DHIS2 Training' which was aimed at health program experts at health administrative units and health care providers at health facilities. The ministry of health in conjunction with key HIS stakeholders invested huge amounts of financial and technical resources to provide the training which followed the typical master TOT, TOT, and basic training cascading fashion. Following the master TOT and TOT training at the national level, a substantial amount of the budget has been transferred to regions to cascade the training to all levels from ZHDs to WrHOs and health facility levels. Given the huge investment made in this training and the peculiar intention, the ministry strongly believed that it is worthwhile to assess its effectiveness.

General objective: To assess and provide information on the process and effectiveness of the Data Quality, Data Use, and DHIS2 training so that it informs future planning and execution of related HMIS training.

Methods:

A rapid cross-sectional assessment using primarily quantitative methods was employed to collect the data complemented by a qualitative method. A semi-structured key informant interview and structured observation methods were employed. The study was conducted at the national level (MOH) and in selected regions, Zones, woredas and Referral, General and district hospitals, and health centers drawn from the aforementioned areas.

The study population of this assessment was experts at MOH/PPMED and which coordinated and conducted the training, program experts of the MOH directorate and all HMIS and program experts of health administrative units and HMIS experts and health care providers of hospitals and health centers which were trained on the training under investigation.

Given the rapid nature of the assessment, limited time and resources, and the security situation of the country, a conservative sample was considered with no specific sample size formula. Accordingly, MOH and one referral hospital from the federal level, five regions (Oromia, SNNPR, Sidama, Harari, and Somali), and two city administrations (Addis Ababa, Dire Dawa) which represent agrarian, pastoralist, and urban settings were included in the study. The rest of the regions were excluded due to security concerns and as the new region, South-West Ethiopia is yet under formation. The final sample size determined for the assessment was 66 institutions, 198 departments/units, and 198 respondents.

The selection of institutions employed purposive sampling to allow different levels of performance and experience in the implementation of IR and specific data quality and use practices. Using convenient sampling, those trained experts who are readily available and willing to be engaged in the assessment during the time of collection of data were included in the assessment.

The data collection was guided by a field guide in addition to an orientation for data collectors three days ahead of the field visit. Data was collected using Google Forms for both quantitative and qualitative data. Data were collected from 3-7 January 2022.

Results and discussion:

Data were collected from 62 health institutions of which were 23 health administrative units from MOH down to WorHOs and 39 health facilities (Hospitals and health centers) which make up 94% of the sample size planned. Hundred and thirty-two trained professionals were contacted for the data collection.

Training preparation

The finding shows that most aspects of training preparation were adequate. Nearly 98% and

97% respectively responded favorably (agree or strongly on the Likert scale) that the course aims and objectives were clearly defined and the training was based on an organized schedule respectively. In addition, 92% and 96% of respondents agree or strongly that the training materials were adequate and the quality of the training materials was adequate respectively. The finding of the adequacy of training materials is, however, somehow contrary to the general reflections of the significant number of respondents that hard copy/printout materials such as participant's manuals were inadequate. Eighty-seven percent of respondents agree or strongly agree that the training facilities (venue, computer/computer lab, LCD) were up to expectation. However, the health facilities and WorHOs tend to disagree more than the other health institutions about the adequacy of training facilities.

Although all except one of the respondents agreed or strongly agreed that the coverage of expected training audiences in the training plan/program was adequate, it was contrary to the observation that not many healthcare providers were found to be trained and it was one of the major recommendations by the study participants to train as much more health care providers as possible.

Among the major preparation-related gaps include the absence of a formal and systematic training need assessment, and inadequate time for the training, particularly at lower levels where up to 60% of respondents from Woredas disagreed on the adequacy of the time allotted. Training quality monitoring mechanisms also tended to be inadequate where only 77%, 65%, and 76% of respondents mentioned the presence of pre-post, daily and overall course evaluations during the training undertakings.

Training content and process

With regards to the training content and process, except for the inadequacy of budget (only 4% agree or strongly agree on adequacy) and cascading as planned (only 45% agree or strongly agree on adequacy), most aspects were adequate or acceptable by the study participants.

Nighty seven, 96%, 98%, and 99% of the study participants agree or strongly agreed that the training course was relevant to their current work or unit's function, the training was adequately hands-on, the trainers were Knowledgeable of the subject matter and the trainers were well prepared and able to explain and illustrate concepts respectively.

Training output and outcome

The training outcome was measured in terms of data quality, use, and DHIS2-related knowledge and skill of respondents and the possible translation of their knowledge and skills to institutional practices such as LQAS, institutional, directorate, and case team-level PMTs and dashboards.

Knowledge and skill

Generally, all DHIS2, data quality, and data use-related key knowledge included in the assessment was low or sub-optimal. This might not necessarily indicate the quality of the training since retention of knowledge in adults quickly fades away as time goes by and this assessment was done more than a year after the training has been concluded. Early assessment or a regular mentorship would have changed the status.

Self-reported data quality, use and DHIS2-related skills, however, showed significant improvement.

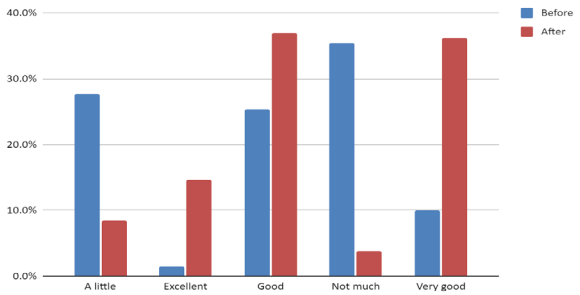

Figure 1. Rating of self-reported skill in carrying out data analytics and dashboard creation on DHIS2 before and after the training

A self-reported skill of data analysis and dashboard creation improved at all levels of the health system hierarchy after the training although there are few cases of 'not much' improvement response after the training by health facilities. A self-reported skill

of data analysis and dashboard creation improved by respondents of all departments except 5 (~4%) responses of 'not much' and 11 responses (8.5%) of 'little improvement responses after the training most of which are in ' other ' departments than HMIS, MCH and DPC (Fig. 10). One respondent said, "After the training, I can generate the data I need from DHIS2 and follow the facility's performance". The assessment showed that the rating of self-reported skill of conducting LQAS based on five Likert scale measures has increased substantially after receiving the training.

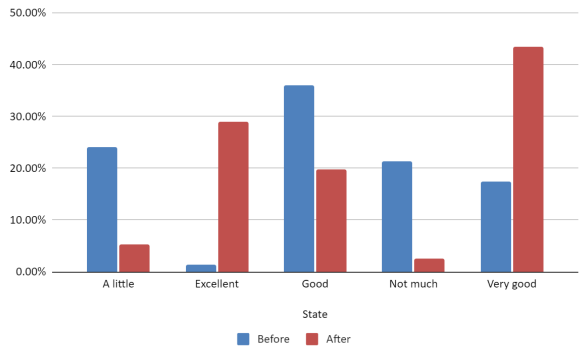

Figure 2. Rating of self-reported skill in conducting LQAS before and after the Training

Institutional, Directorate, and Case team-level PMT practices

All the HMIS/Plan unit focal persons of the health institutions in the assessment responded that they have conducted institution-level PMT meetings in the EFY 2014. Observations also showed a substantial number of institutions conducting the institution-level PMT regularly every month although a few institutions conducted the meeting as few as only once in the first five months of the EFY 2014. Among the study participants who claimed that institutional PMT meetings were conducted in the first six months of EFY 2014, 115 (95%) responded that they had a role and contributed to the PMT meetings. Out of the 115 respondents who claimed engagement and a role in the institutional level PMT meetings, the rating of the contribution of the training in enabling them to contribute was 'very good, 'good', and 'excellent' by 46.5%, 28.1% and 21.1% respectively which totals about 96%.

Out of 131 respondents, 47 (36%) claimed that their respective units/departments/directorates conducted PMT meetings in the first six months of EFY 2014. MCH and DPC departments looked better than the HMIS units in conducting unit-level PMTs, which could be that the later tend to think they are not expected to conduct a department/unit-level PMT as they lead the institution-level PMT. Nearly all respondents (98%), who claimed unit / departmental level PMT is happening, responded that they contribute to the meetings. Out of the 44 respondents who asserted a contribution to the unit/departmental PMT meetings, the rating of the contribution of the training was a 'little' only by about 2% of the respondent; nearly 98% rated the contribution as 'good' and beyond (Good (21.4%), very good (45.2%) and excellent (31%).

Among the regional health bureau and Ministry of Health case team respondents, 53% responded that case team/sub-unit level PMT is happening in their units/departments. Similarly, 8 (42%) of the 19 respondents from hospitals claimed that case team-level PMT is happening in their respective units/departments. Nearly all respondents of MOH, RHBs, and hospitals who claimed that a case team level PMT is practiced in their units/departments also claimed a contribution to their respective case team level PMTs. All respondents who claimed a contribution to their respective case team level PMTs rated the contribution of the training 'Good" and above.

Institutional, Directorate, and Case team-level dashboard creation and use

Thirty-five (66%) of the HMIS/Plan unit focal persons of the health institutions responded that their respective institutions have a regularly updated DHIS2 dashboard. All respondents who claimed the presence of institution-level dashboards also claimed a contribution to the creation of the dashboards. Out of the 35 respondents who claimed a contribution to the institutional level dashboard, the rating of the contribution of the training was 'very good', 'excellent', and 'good', and by 45.5%, 30.3%, and 18.2% respectively which makes the total positive rating around 94%.

Forty-two percent of the respondents mentioned that a regularly updated departmental/unit-level dashboard exists. MCH departments seem to practice the departmental dashboard relatively better than other units do. About 85% of respondents who claimed the presence of departmental/unit-level dashboards also claimed a contribution to the dashboards.

Out of the 32 respondents who claimed a contribution to the departmental/unit level dashboard, the rating of the contribution of the training was 'very good', 'good' and 'excellent' by 40.6%, 25%, and 21.8% respectively that makes the total positive rating 87.5%.

Only 39% of MOH and RHB and 37% of hospital respondents mentioned that a regularly updated case team/sub-unit level dashboard exists. Almost all respondents of MOH, RHB, and hospital, who claimed the presence of case team/sub-unit level dashboards, also claimed a contribution to the dashboards. Out of the 12 respondents who claimed a contribution to the case team/sub-unit level dashboard, the rating of the contribution of the training was 'very good', 'good', and 'excellent' by 83.3%, 8.3% and 8.3% respectively that makes the total positive rating 100%.

The Presence of a regularly updated dashboard tends to decline as we go down to health facilities which could be an indication of limited capacity at lower levels and inadequacy of mentorship and capacity-building efforts by upper levels.

Nearly all (93.3%), except one health facility from each SNNPR and Somali region, indicated that they have been conducting LQAS in 2014 EFY. All (100%) rated the contribution of the training 'good' and above where 'good', 'very good 'and 'excellent' were 14.3%, 57.1%, and 28.6% respectively.

Many believed that the training has contributed to the data quality checking and data use practice such as the functionality of a PMT and generally to the progress made on data quality and information use towards the IR modeling institution. One respondent said, "The training helped the hospital to become a model in IR". Another one said, 'we are now model Woreda in IR assessment due to the training and mentorship'. Others mentioned specific gains in IR model institution scores contributed by the training. E.g. from 62% to 95%, from 52% to 92%, from 56.5% to 96% and from <15% to 90%

More than 98% of the respondents recommended the training to their colleagues which indicates an overall positive attitude of the respondents towards the training conducted.

The major limitation of this assessment is a possible recall bias as more than a year has elapsed since the training has been conducted which makes it a bit difficult to recall the training process and answer related questions accordingly. Due to the rapid assessment nature and limited time for the fieldwork, the individual-level data quality checking, analysis, and interpretation skills of the respondents could not be assessed objectively and the assessment relied mostly on subjective responses.

Conclusion and recommendation

Any undertaking of a training program without a formal and systematic need assessment can have a substantial bearing on the process, the meager resource the health sector has, and the intended outcome in general. The self-reported data quality and use-related skills are encouraging although it was not verified and difficult to attribute the status to the particular training under investigation. Although the practice of PMT meetings and regularly updated dashboards tend to decline as we go down from institutional, departmental/unit to case team/subunit levels, the training seems significant support to the health care workers' contribution to the three levels of PMT meeting at all levels.

The fact that the training was not adequately cascaded coupled with the finding that most respondents had a positive opinion on the relevance of the training and their recommendation of the same training to other colleagues is an impetus for the ministry or RHBs in conjunction with HIS stakeholders to consider further undertaking of the training by addressing the gaps identified.

Post-traumatic Stress Disorder and its Association with Quality of Life in Amhara Region, Ethiopia

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Abstract

Background: War and conflict environments result in long-term physical and psychological consequences. Many people have lost their lives and thousands of people have been displaced as a result of the war. Hence, evidence-based interventions are required particularly to monitor mental health disorders. Thus, the study aimed to assess the prevalence of post-traumatic stress disorder (PTSD), associated risk factors, and its relationship with quality of life in war-affected districts of North Shewa Zone, Ethiopia, 2022.

Method: A community-based cross-sectional study was done among 812 participants from April 1 to May 15, 2022. Eight data collectors and three supervisors collected the data through face-to-face interviews using a structured and pre-tested tool. Data were cleaned and entered into Epi-Data version 4.6 and exported to SPSS version 25 for analysis. Binary logistic regression analysis and independent-samples T-test were performed to model PTSD and quality of life (QOL), respectively. The Hosmer-Lemeshow goodness-of-fit was applied to test for model fitness and a p-value of <0.05 was considered statistically significant.

Result: The prevalence of PTSD was 42.4%, 95% CI (39.2-45.8). Older age, khat use, having friends/family who died from mental illness, being in a fight with family/ friends/ people who love, poor social support, witnessing the murder of family member/ friends, and being made to accept ideas against their will were significant associates of PTSD. Further, PTSD significantly lowered quality of life, t(810) =12.279, p=0.000.

Conclusion: In this study, the prevalence of PTSD was high and significantly reduced the QOL of people in war-affected areas. Strategies to reduce substance use and provision of psychotherapy for improving QOL in war-related PTSD are recommended. Furthermore, PTSD-focused regular screening and linkage with mental health service providers by trained health professionals are also needed.

Keywords: PTSD, Quality of life, Factors, Ethiopia.

Introduction

There is a conflict in different parts of Ethiopia including the Amhara, Afar, Oromia, Somali, and Benishangul Gumuz regions. During this period, terrorists (TPLF, OLF, and Al-Shabaab) were responsible for the vast majority of terrorism-related events in these regions. Due to the violence and conflict environment, thousands of people have lost their lives and millions have been displaced. Others faced sexual violence, malnutrition, illness, injury, torture, disability, stress, depression, aggressive behaviors, anxiety, and post-traumatic stress disorder (PTSD). PTSD remains the most prevalent psychological complication. Post-traumatic stress disorder (PTSD) is a serious mental health problem that develops in people who have experienced or witnessed a traumatic event (1). The prevalence of PTSD among Syrian refugees was 60% (2), while 78% in Nigeria (3), 11.8% in Uganda (4), and 58.4% in Southern Ethiopia (5).

Post-traumatic stress disorder can disrupt the whole life, occupation, and relationships including marital difficulties, health, and enjoyment of everyday activities. It is responsible for substantial financial losses, that extend beyond the individual level to future generations, due to the cost of medications, medical care, and

decreased productivity (6). PTSD also increases the risk of other mental health problems, such as depression and anxiety, substance use, eating disorders, and suicidal thoughts and actions (7). Individuals with PTSD symptoms are more likely to have poorer social support. PTSD is also associated with a significant body of physical morbidity in the form of chronic musculoskeletal pain, hypertension, hyperlipidemia, obesity, and cardiovascular disease (8). This makes PTSD highly associated with a lower quality of life, even after the end of the actual hostilities in a post-disaster setting (9). Significantly lower quality of life was observed in PTSD patients in India (10). Thus, we aimed to assess the prevalence of PTSD, associated factors, and its relationship with quality of life in war-affected districts of Northern Ethiopia.

Method

A community-based cross-sectional study design was employed from April 1 to May 15, 2022, in the North Shewa Zone of the Amhara region. The zone has 24 districts/woredas. Of these, 10 districts were invaded by TPLF during the war, and four districts were selected using a simple random sampling technique. All people living in war-affected districts of the North Shewa Zone were the source population. All people aged above 18 years irrespective of their sex and who lived for a minimum of six months in the selected districts were included. The sample size was determined using Open-Epi version 3.03 statistical software and equals 822. The study participants were selected using a multistage sampling technique.

The participation was voluntary and informed written consent was obtained from the study participants. This study was conducted in collaboration with Debre Berhan University (DBU), Asrat Woldeyes Health Science Campus. Ethical approval was obtained from the Institutional Review Board of DBU, Asrat Woldeyes Health Science Campus.

Post-traumatic stress disorder: Measured using the Post-Traumatic Stress Disorder Checklist (PCL-5), which is a standardized instrument for assessing the 20 DSM-5 symptoms of PTSD (11).

Quality of life: Measured using the World Health Organization (WHO) Quality of Life-brief version (12).

Result

A total of 812 participants were interviewed, making a 98.8% response rate. The mean (±SD) age of respondents was 31.13 ± 9.62 and ranged from 18 to 75 years. Forty-four (5.4%) of participants had a history of childhood physical and/or sexual abuse. In addition, more than three-forth (77.6%) of respondents experienced adequate sleep, 236 (29.1%) consume alcohol, and 22 (2.7%) had a medically diagnosed history of mental illness.

Nearly three-fourths (73.4%) of respondents' personal property was destructed during the invasion. In addition, 75.9% of them faced a lack of food and/or water, 37.4% witnessed the murder of a family member/friend, 52.5% were unable to access medical care, and 31% of participants were made to accept ideas against their will (Table 1).

Table 1: Distribution of trauma-related characteristics of participants living in war-affected districts of North Shewa Zone, 2022

	Traumatic events experienced	Yes, n (%)	No, n (%)
1	Destruction of personal property	596 (73.4)	216 (26.6)
2	Lack of housing or shelter	488 (60.1)	324 (39.9)
3	Lack of food and/or water	616 (75.9)	196 (24.1)
4	Witness murder of family member/friends	304 (37.4)	508 (62.6)
5	Witnessing the murder of a stranger	322 (39.7)	490 (60.3)
6	Ill health without medical care	426 (52.5)	386 (47.5)
7	Forced isolation from family/other people	184 (22.7)	628 (77.3)
8	Tortured or beaten	234 (28.8)	578 (71.2)
9	Made to accept ideas against the will	252 (31.0)	560 (69.0)
10	Unnatural death of family, friends, or people you love	498 (61.3)	314 (38.7)
11	Being abducted or kidnapped or imprisoned	240 (29.6)	572 (70.4)
12	Rape or sexual abuse	132 (16.3)	680 (83.7)

The prevalence of PTSD was 344 (42.4%), 95% CI (39.2-45.8). Older age, khat use, having friends/family who died from mental illness, being in a fight with family, friends, or people who love, poor social support, witnessing the murder of a family member/ friends, and being made to accept ideas against their will have shown a statistically significant association with PTSD. In addition, this study found that participants who develop PTSD had significantly lower quality of life (75.54 $\pm$ 13.37) compared to those who don't develop PTSD (87.56 $\pm$ 14.08), t(810) =12.279, p=0.000.

Discussion

The prevalence of PTSD was 42.4%. This is comparable with the findings in Nigeria where 42.2% of the population had PTSD (7). However, it was lower than 60% in Iraq (12) and higher than 11.8% in Uganda (4). Participants aged 45 years and above were 96% more likely to develop PTSD compared to those aged 18 – 24 years. The odds of PTSD were two times higher among khat users than their counterparts. It was observed that having friends/family who died from mental illness increased the risk of PTSD by fourfold. There are 89% more odds of developing PTSD among participants who were in a fight with family, friends, or people who love. Participants who had poor social support were approximately four times more likely to develop PTSD than those with strong social support. Additionally, there are 59% increased odds of developing PTSD among participants who witness the murder of a family member or friend. Further, PTSD was two times more common in participants made to accept ideas against their will. Finally, the association between PTSD and quality of life was examined and PTSD was found to significantly lower the quality of life (QOL).

Limitation and implication

We did not consider other psychiatric comorbidities, i.e., anxiety and depression that could facilitate the development of PTSD or influence its manifestation and severity. Some sensitive traumatic events, such as rape or sexual abuse may have been under-reported, especially among females. As it is done in one zone, it lacks national representativeness. The study has implications for policy and practice of programs to alleviate the impacts of traumatic war events and improve the QOL in people residing in post-conflict areas. Post-traumatic symptoms should be a primary target for treatment aimed at improving QOL in war-related PTSD.

Conclusion and recommendation

In this study, the prevalence of PTSD was high and was found to significantly lower QOL. The federal government should start peace talks to end the war. The regional and local governments better promote the community reducing substance use

and provide psychotherapy for improving QOL in war-related PTSD. In addition, we suggest a PTSD-focused regular screening by trained health care professionals and effective community-based treatment approaches of institutions for the current PTSD and its consequences. Moreover, longitudinal studies are recommended for more representative results, which will help in planning and programming interventional activities on PTSD and its impact, i.e., lower QOL.

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Network for Improving Quality of Care for Maternal, Newborn, and Child Health in Ethiopia

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Abstract:

Introduction: Aligned with the country's commitment to providing high-quality health care to women and children, in 2017 Ethiopia joined the newly formed "Network for Improving Quality of Care for Maternal, Newborn and Child Health" (QCN) and started implementation in 48 health facilities in 2018. The Network aimed to build a cross-country platform for joint learning around quality improvement implementation approaches and subsequently, within five years, to reduce in-facility maternal, neonatal, and stillbirth case fatality rates by 50% and improve user experience. The objective of this study was to assess how the Network operated in Ethiopia, what it achieved, and understand what influenced its implementation to better achieve its goals.

Methods: A mixed-method study was conducted between 2020 and 2022. Three data collection methods included (1) a structured quantitative survey of Network actors in 41 learning facilities; (2) 41 key informant interviews at different levels of the health system; (3) non-participant observations in four diverse case study learning facilities.

Results: The perception of the Network was positive and respondents felt that the quality of care in learning facilities had improved as a result of Network implementation. Successful implementation was attributed to the government's prioritization of maternal and child health policies, effective integration of existing activities, leadership commitment at the national level, and partner engagement at national and sub-national levels. But challenges were also experienced including a lack of awareness and engagement at sub-national levels, reshuffling of staff, the withdrawal of externally funded partners, limited resources and basic amenities in facilities, parallel data systems, and extreme events such as COVID-19 and conflict in the country.

Conclusion: The QCN Network had strong national political leadership and good policy alignment, providing multiple opportunities to link related activities and facilitate learning. However, more work was needed to build Network awareness and capacity at sub-national levels.

Keywords: healthcare quality; network; maternal; newborn.

Introduction

The Ethiopian Ministry of Health has made transforming the quality of healthcare a top priority agenda since 2016, endorsed through the National Health Care Quality Strategy 2016-2020 and subsequently the Quality and Safety Strategy 2021-2025. Particular emphasis has been placed on improving maternal and newborn health outcomes through high-quality, equitable health services. Recognizing that this Ethiopian priority is also shared by other countries, in 2017 the World Health Organization and its partners formed a 'global network' called The Network for Improving Quality of Care for Maternal, Newborn and Child Health (QCN). The Network aimed to build a cross-country platform for joint learning around quality improvement implementation approaches and subsequently, within five years, to reduce in-facility maternal, neonatal, and stillbirth case fatality rates by 50% and improve user experience. Ethiopia was one of the eleven Network member countries to implement the initiative, actively working in 48 focal health facilities since May 2018. Hence, in Ethiopia, the implementation of the quality of care network initiative was implemented in 48 health facilities selected from 15 districts of seven regions and one city administration; Afar, Amhara, Benishangul-gumuz, Gambela, Oromia, SNNP and Tigray and Addis Ababa.

Although purposefully created global networks that focus on improving health outcomes do exist in low- and middle-income countries, studies on whether and how they might leverage change are sparse. Therefore, the objective of this study was to fill evidence gaps by investigating how the quality of care Network operates in Ethiopia, what it achieved, and understand what influenced its implementation to better achieve its goals in the future.

Methods

Study design and study population. This mixed-method study was conducted between 2020 and 2022. Data were collected in two rounds from December 2020 to March 2021, then repeated during September - December 2021. The same three methods were applied at each time point. A structured quantitative survey of facility and woreda-level Network actors was conducted in 41 of the 48 learning facilities (excluding Tigray due to the regional conflict); 5 participants who were involved in Network activities were invited to be interviewed from each facility. Key informant interviews were carried out at different levels of the health system including with 18 national-level technical experts and officials, 15 Regional Health Bureau representatives, and 8 respondents from learning health facilities. Finally, non-participant observations were conducted in four case-study learning facilities that were selected to represent diverse environments, including both hospitals and health centers.

Data analysis the quantitative data were analyzed for frequencies and summary statistics using STATA 14 while the qualitative data were managed and analyzed thematically using NVivo 12. *Ethics* Ethical approval was obtained from EPHI, LSHTM, and UCL ethical review boards. Respondents were informed about the study and consent was taken for their participation. Voluntary participation was ensured during interviews.

Results and discussion

Study participants perceived that the overall attention on quality improvement in QCN facilities, and inter-facility learning, had contributed to an improvement in maternal and neonatal health care in those settings, thereby reducing the mortality rate.

The QCN Network emerged in the context of strong political leadership and commitment to supporting improvements in the quality of facility-based health care. Multiple opportunities for linking related activities and policy commitments were harnessed, for example, individual programs from WHO, CHAI, USAID-Transform PHC, and HDR were brought together through the QCN initiative. The Network initiated the establishment of a quality committee whose regular meetings were designed to target problem-solving. The Network also had the added value of improving health data documentation and reporting. Learning facilities were observed to engage in regular data collection and reporting, which helped with decision-making processes. The data collected was used as a system of maternal and neonatal

service monitoring through mortality auditing; it was noted that further improvements could be made by reducing duplication between routine data systems.

Successful implementation of the Network was attributed to several factors, including: maternal and child health being a priority in the health care system of the country; extensive attention from the Ministry of Health; formation of a technical working group; leadership commitment at the national level; and partner engagement at national and sub-national levels. In addition, the existence of related policies and platforms in the country before the launch of QCN facilitated the smooth integration of the Network activities into the health system.

An important finding to emerge was the difference in engagement between national and sub-national levels. The study found high levels of leadership commitment at the national level. The MoH played a crucial role by harmonizing partners, coordinating actions, and promoting QCN as a flagship program within the country. But there were some reports to suggest that leadership at sub-national and facility levels was sub-optimal, with negative implications for Network success. The reasons for the low commitment were related to inadequate governance structures and a lack of capacity for facilities about human and financial resources. Regional Health Bureaus were not always sufficiently engaged in the Network activities due to high workloads and a shortage of workforce; activities at the sub-national level often depended on the presence of an active partner. Furthermore, accountability mechanisms for Network implementation at subnational levels were lacking. Almost all regional respondents mentioned a lack of a regular budget for the Network activities, resulting in minimal learning forum activity at the local levels. From the second round of data collection, conducted when Network implementation was well established, the survey showed that more than 86% of the respondents within learning facilities were aware of the Network, although knowledge of specific elements was relatively low. Only 31% of respondents were aware of the maternal and neonatal health quality of care learning district implementation guide and just 46% were aware of the quality of care standard for a maternal and neonatal health assessment tool. The participants of the study reported that the Network leaders were participatory and established a good relationship with clinicians, patients, and health facility management. About half (49%) of the participants believed that the Ministry of Health Quality Directorate provided them with strong leadership and clear strategic direction. Approximately half (53%) of the participants thought there was strong support from health facility management for the Network committee.

Multiple factors hindered implementation, including the following challenges: lack of awareness and engagement at the sub-national level, reshuffling of staff in the learning health facilities, the withdrawal of externally funded partners, limited resources and basic amenities in facilities, parallel reporting systems, poor data quality and timeliness, COVID-19 and conflict in the country. A lack of awareness, accountability, commitment, engagement and partner withdrawal were thought to threaten the sustainability of the Network.

Conclusions

Overall, the perception of the Network was largely positive and respondents believed that the Network effort had improved the quality of care and health outcomes. Leadership at the national level was considered to be strong. Some elements of the QCN Network had become routine practice, for example paying greater attention to facility-level data. But awareness of the Network at sub-national levels was suboptimal, and the engagement of individuals in quality improvement activities was weakened because of competing responsibilities and other unforeseen challenges, including the COVID-19 pandemic. Moving forward it will be important to strengthen engagement at the sub-national and facility-level, protect the funds needed to provide learning forums for facilities and decision-makers, streamline data systems, and continue to commit to providing the resources needed that support the work of health staff in health facilities. Finally, this study did not attempt to assess the impact; hence additional research is required to investigate the impact of the network on mortality.

Client Retention in the Continuum of Maternal Health Services and Associated Factors in Ethiopia

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Abstract

Introduction: Even though global maternal mortality has shown an impressive decline over the last three decades, the problem is still pressing in low-income countries. To bring this to an end the women in a continuum of maternity care should be retained. This study aimed to assess the status of Ethiopian women's completion of care with their possible predictors.

Methods: We used data from the 2019 Ethiopian mini-Demographic and Health Survey. The outcome variable in this study was retention in the continuum of maternity care, which consists of at least four ANC contacts; delivery in a health facility; and postnatal check within 48 hours of delivery. We analyzed the data using STATA version 14, and a binary logistic regression model was used. A p-value ≤ 0.05 was considered to declare an association with the outcome variable. A weighted analysis was also done.

Results: Of the 3917 women included in this study, only 20.8% of women completed all of the recommended services. The overall completion of care was associated with women's level of education, wealth status, timeliness of ANC, and birth order.

Conclusions: Despite the efforts by the Ethiopian government and other stakeholders, the overall completion of care was quite low. There is also a clear inequality in terms of remaining in the continuum of maternity care because of women's background characteristics and regional variation.

Keywords: Continuum of care, EDHS, Ethiopia, Maternity care

Introduction

Even though the global Maternal Mortality Ratio (MMR) and neonatal mortality over the last two to three decades have shown an annual 2.9% and 2.5% decline respectively,[1,2] the problem is still pressing in Low and Middle-Income Countries (LMIC). To end this, the World Health Organization (WHO) launched a strategy to End Preventable Maternal Mortality (EPMM) through a maternal health service continuum across the stages of pregnancy, delivery, and postpartum periods in 2015.[3]

In Ethiopia, as part of the strategies, the government identified maternal, newborn, and child health as a priority agenda aiming to reduce the MMR from 412 in 2017 to 70 per 100,000 live births by the end of 2030.4 Although studies are showing that status of completion of maternity services in Ethiopia, the findings present inconsistent figures ranging from 14% to 47%5 and predictors are not studied at each stage yet.

Objective

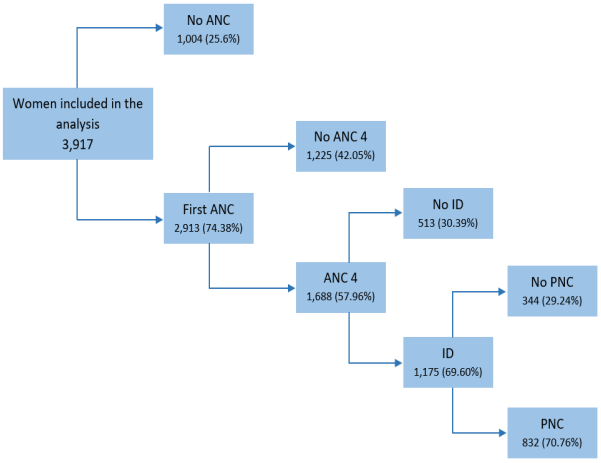
In this paper, we examined the degree of retaining clients within the continuum of maternity care with possible predictors in Ethiopia using recent nationally representative data.

Method

The 2019 mini demographic and health survey (DHS) data was used. All women aged 15-49 years were eligible for this study. The outcome variable in this study was the continuum of maternal health care. It involves attending at least four ANC contacts, delivery in a health facility, and post-natal check within 48 hours of delivery. We used a binary logistic regression model in two steps to identify predictors of completion of maternity care. A p-value ≤ 0.05 was considered to declare association. The data were analyzed using STATA version 14. Weighted analysis was also done.

Result

Of the 3,917 women included in the analysis, three-fourths of 2,913 (74.38%) of them had their first ANC contact. More than half (57.6%) of those who had the first ANC contact made it to the fourth or more ANC contacts. About 70% of women who had four or more ANC contacts gave birth in a health facility. Furthermore, more than 70% of mothers who delivered in a health facility had PNC within 48 hours of their delivery. Overall, 20.8% of pregnant women who were included in this study completed the continuum of care for their latest child. (Figure 1)



ANC=Antenatal care, ID= Institutional delivery, PNC= post-natal care

Figure 1: Decision tree depicting the degree of retention and dropout along the continuum of maternity care in Ethiopia, 2019 mini–Ethiopian Demographic Health Survey.

Completion of the maternal health service has shown to be higher in the capital city of Ethiopia, Addis Ababa, followed by the Tigray region and Dire Dawa city administration. (Table 1)

Table 1: the level of completion of maternal health services across the nine regions, and two city administrations, EMDHS, 2019, Ethiopia.

Region	>= 1 ANC (n = 3,917)	ANC 1 & 4 (n = 2,913)	ANC 1,4 & ID (n = 1,688)	ANC 1,4, ID & PNC (n = 1,175)	Continuum (n = 3,917)
Tigray	270[94.7]	183[67.8]	152[82.9]	129[84.9]	129[45.2]
Afar	32[62.8]	16[49.7]	10[61.6]	6[64.6]	6[12.4]
Amhara	711[84.9]	426[59.9]	298[69.9]	207[69.4]	207[24.7]
Oromia	1076[70.8]	617[57.4]	379[61.5]	233[61.4]	233[15.3]
Somali	63[29.2]	24[38.5]	14[58.7]	6[43.7]	6[2.9]
Benishangul	39[83.2]	26[67.5]	16[59.5]	11[73.2]	11[24.5]
SNNPR	558[71]	269[48.2]	185[69]	128[69.1]	128[16.3]
Gambella	16[86.3]	6[36.9]	5[83.2]	4[70.5]	4[18.7]
Harari	9[80.6]	4[48.6]	4[89.9]	3[71]	3[25]
Addis Ababa	121[96.8]	104[85.4]	101[97.7]	80[79.4]	80[64.1]
Dire Dawa	18[84.3]	13[73.7]	11[85.5]	7[63.1]	7[33.5]
Total	2913[74.4]	1688[74.4]	1175[69.6]	814[69.3]	814[20.8]

As found in this study, for women who started their first ANC in the early 8 weeks, the chance of completion of the continuum was highest, and the chance of completion starts to go down as the weeks of first contact increased. (Figure 2)

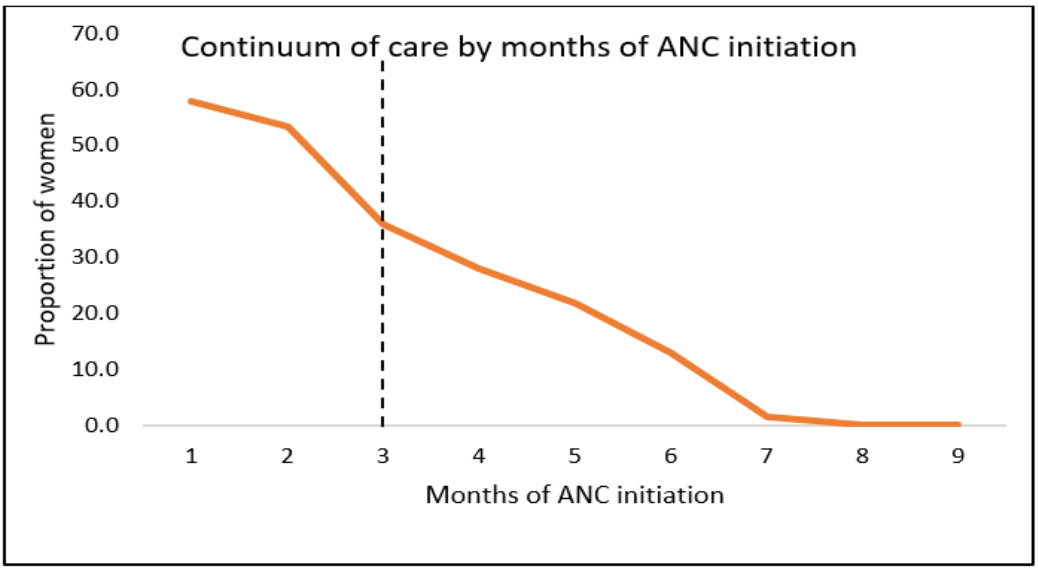


Figure 2: Time of ANC initiation versus completion of the continuum of maternity care among women aged 15-49 years, 2019 mini–Ethiopian Demographic Health Survey, Ethiopia.

Finally, women's level of education, the wealth status of the women, and early initiation of the first ANC explained the overall completion of care. (Table 2)

Table 2: Predictors of completing the continuum of maternity care among women aged 15-49 years, EDHS, 2019, Ethiopia.

Variables	Category	ANC>=4	ANC>=4 + ID	ANC>=4 + ID + PNC	Continuum
		(n = 3,962)	(n = 1,656)	(n = 1,202)	(n = 3,962)
		AOR[95%CI]	AOR[95%CI]	AOR[95%CI]	AOR[95%CI]
Age group	15-19	1		1	1
	20-24	1.19[0.59,2.39]		2.07[0.69,6.19]	1.69[0.79,3.61]
	25-29	1.55[0.73,3.29]		1.02[0.37,2.81]	1.4[0.69,2.83]
	30-34	1.88[0.87,4.05]		1.54[0.54,4.35]	1.87[0.81,4.33]
	35-39	1.77[0.77,4.09]		1.28[0.42,3.92]	2.33[0.92,5.92]
	40-44	2.11[0.84,5.29]		2.23[0.54,9.29]	2.54[0.94,6.86]
	45-49	2.75[0.84,8.97]		3.73[0.32,42.76]	5.03[1.01,23.31]
Level of education	No education	1	1	1	1
	Primary	1.28[0.96,1.72]	1.05[0.68,1.64]	1.04[0.65,1.66]	1.25[0.9,1.75]
	Secondary	2.54[1.42,4.54]*	1.43[0.71,2.89]	1.39[0.65,2.97]	2.27[1.43,3.61]*
	Higher	1.85[0.92,3.7]	1.42[0.3,6.63]	1.94[0.8,4.7]	2.12[1.08,4.25]*
Birth order	1	1	1		1
	2	0.78[0.49,1.24]	0.75[0.39,1.43]		0.8[0.55,1.14]
	3	0.88[0.49,1.57]	0.32[0.18,0.6]		0.58[0.35,0.97]*
	4 or more	0.89[0.5,1.59]	0.4[0.23,0.71]		0.64[0.35,1.18]
Place of residence	Urban	1	1	1	1
	Rural	1.05[0.76,1.46]	0.85[0.44,1.64]	0.96[0.51,1.83]	0.96[0.59,1.54]
Wealth quintile	Poorest	1	1	1	1
	Poorer	1.6[1.04,2.44]	2.31[1.29,4.13]*	1[0.37,2.7]	2.22[1.31,3.75]*
	Middle	1.22[0.76,1.95]	2.34[1.18,4.65]*	1.23[0.39,3.88]	1.98[1.06,3.7]*
	Richer	1.6[1.11,2.32]*	4.57[2.25,9.26]*	1.59[0.56,4.52]	3.5[1.93,6.33]*
	Richest	2.59[1.45,4.62]*	8.64[4.07,18.36]*	1.53[0.53,4.4]	5.16[2.65,10.07]*
ANC1 at 1st trimester	No	1	1	1	1
	Yes	3.29[2.55,4.24]*	1.03[0.71,1.47]	1.2[0.76,1.89]	2.17[1.66,2.85]*
Marital status	Currently not in union	1		1	
	Currently in union	1.95[1.16,3.29]*		0.66[0.2,2.18]	
Head of the household	Male		1		
	Female		1.36[0.72,2.57]		
History of child death	No	1	1		1
	Yes	1.08[0.76,1.52]	1[0.63,1.59]		1.07[0.66,1.72]
Birth by CS	No			1	1
	Yes			2.74[1.24,6.07]*	2.48[1.41,4.36]*
Constant		0.17[0.08,0.35]	1.25[0.54,2.89]	1.35[0.2,9.11]	0.06[0.02,0.12]

Conclusion and recommendation Despite the efforts by the Ethiopian government and other stakeholders, the overall completion of the maternity care continuum is quite low. There is also a huge regional variation, where the completion of care is higher in the two city administrations, Addis Ababa, Dire Dawa, and Tigray region. We have also found a clear inequality of service use because of women's background characteristics like level of education and wealth status. To retain women in the continuum, approaches should aim to empower women through improved educational experience and economic standing by working with other relevant sectors.

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Survival Status and Predictors of Time to Death among Neonates Admitted to Neonatal Intensive Care Units.

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Abstract

Background: Neonatal mortality is the death of neonates that happens within the first 28th day of life. The first 28 days of life is the most vulnerable time for a child's survival. Despite a global decline in newborn mortality, there are still noticeable differences between areas and nations.

Method: From August 1 to December 30, 2019, 495 babies hospitalized in the neonatal intensive care unit of a public hospital participated in a hospital-based prospective cohort study. EPI info version 7.1 was used to enter the data, and Stata version 14 was used to analyze it. To quantify the infants' survival time, the Kaplan-Meier survival curve and log-rank test were utilized. Cox-proportional hazard regression analysis was then performed to find independent predictors of death.

Result: The newborn mortality rate (NMR) was 157 per 1000 live births among 495 neonates who were monitored for 28 days in the NICU. 20 neonates (25.6%) died during the follow-up on the first day, 39 (50%) died within three days, and 70 (89.7%) died within a week. The following factors were independent predictors of death: maternal hypertension during pregnancy (AHR: 1.78 (95% CI: 1.04-3.03), maternal anemia during pregnancy (AHR: 2.00 (95% CI: 1.13-3.54), having a severe APGAR at five minutes (AHR: 2.59; 95% CI: 1.53- 4.38), having a short term birth interval (AHR: 1.55; 95% CI: 1.03-2.34), inducing labor (AHR: 3.25; 95% CI: 1.87-5.65), not starting breastfeeding within an hour (AHR: 1.8; 95% CI: 1.13-2.99), and neonates born to mothers who skipped ANC visits (AHR 2.06, 95%, CI: 1.26-3.38).

Conclusion and recommendation: Neonates admitted to NICUs have a high mortality risk. Shorter intervals between births, neonates with lower Apgar scores, neonates who don't start breastfeeding within an hour, neonates born to mothers who had hypertension and anemia while pregnant, neonates born to mothers who skipped ANC visits while pregnant, and neonates born by induction are all factors that increase the risk of death in the NICU. Therefore, women better get screened for illnesses regularly & managed accordingly.

Keywords: Neonatal mortality, NICU, Public hospital.

Introduction

Neonatal mortality (NM) indicates the death of neonates that happens within the first 28th day of life. It is also divided into early NM which is before the seventh day of life and late NM which is occurring there after till 28th day(1). Globally, in 2019 alone, an estimated 4.01 million children died, mostly from preventable causes. Real progress in reducing deaths of new-born babies in a country with higher neonatal mortality like Ethiopia demands a higher coverage of optimally standard neonatal services with a special focus on the poorest segment of the population and at the time of greatest risk, which is at birth and in the first few days (2-3) of life. The Ethiopian government and other stakeholders involved in the reduction of neonatal mortality focus and delivered integrated health service packages of health as evidence-based interventions across a continuum of care at different levels like at the level of family, community, and facility levels by enhancing the availability and accessibility of health services such as maternal health promotion, skilled birth attendance, and essential new-born care/treatment but neonatal mortality are still high in Ethiopia (3.5). Other similar studies (6-10) have been conducted in Ethiopia using a retrospective design &there is a risk that some of the records studied were not correctly filled with resultant inaccurate results on neonatal hospital mortality and incomplete recording may have an impact on the number of cases for final logistic models. Moreover, despite the high magnitude of NM, and the survival time of neonates, the incidence of mortality among neonates admitted to NICU was not well investigated and most studies either included only low birth weight and preterm though NM is not limited to these groups. Therefore, this prospective cohort study aimed to fill these gaps by determining the hospital NICU neonatal mortality rate and its predictors by taking accurate information from the study participants.

Methods

Study setting, period, and design: A Hospital-based prospective cohort study was carried out at the neonatal intensive care units from August 01 to December 30, 2019at public Hospitals in the west Shewa zone, Oromia region.

Sample size determination and Sampling Procedure: Epi Info 7.1 was used to determine the sample size, with the assumption of 1.81 adjusted hazard ratios, a 95% confidence level, 80% of power, a ratio of 1:1, a minimum sample size of 460, and a 10% non-response rate, the final sample size was 506. Five hospitals (Ambo General, Ambo University Referral hospital, Guder, Gedo, and Gindeberet Hospitals) that provided neonatal intensive care unit services in the zone were selected by lottery method.

Data collection instrument, procedures, and follow-up: Data were gathered from all women who gave birth to live babies (from parents or guardians), and clinical data were acquired by reviewing secondary data. While the neonate was in the hospital, the data collector daily visits the patient. After the mother was released from the hospital, the data collectors did follow up on the7, 14, 21, and 28 days either in person or over the phone to discuss the newborn's health and survival. The time and cause of death were noted when happened. The questionnaire was collected by census and survey processing system (CS-Pro) version 7.1

Data processing and analysis: EPI info version 7.1 was used for data entry. The data was then exported to Stata version 14 statistical software for analysis, the Kaplan -Meier survival curve with a log-rank test fitted &Cox regression model was used to examine the independent predictors of death.

Results

Socio-demographic characteristics: A total of 495 of the 506 neonates and their mothers that were enrolled in the study fully participated, yielding a response rate of 97.8%. The mean &standard deviation (SD) of the mother's age was 26.6 ± 4.9 years. 481 (97.2%) of the study's participants were married, and 262 (52.9% of them) lived in rural areas. Regarding their level of education, 131 participants (26.5%) completed primary school, 59(12%) completed secondary school and 167 (33.7%) did not complete any formal education. One hundred thirty-eight (27.9%) attended college and above

Incidence of death during the follow-up: A total of 495 neonates at NICU were followed for 28 days and 78 died, making the neonatal mortality rate (NMR) 157 per 1000 live births. During the follow-up, 20 neonates (25.6%) died on the first day, 39 (50%) died within three days, and 70 (89.7%) died within a week. The median (IQR) follow-up time for the neonates who died was 3 (1-5) days. The incidence rate of neonatal mortality was 27 per 1000 person-days-of observation. The most common causes of neonatal death at the NICU were neonatal sepsis (44%), prematurity (25.7%), and respiratory distress syndrome (26.1%).

Predictors of neonatal mortality admitted to NICU: Neonates with poor fifth-minute APGAR scores were 2.9 times more likely to die within the first 28 days [AHR: 2.9 (95% CI: 1.1-7.5)]. Neonates born from mothers diagnosed with hypertension and anemia during their pregnancy were 1.78 and 2.00 times more likely to die [AHR: 1.78 (95% CI: 1.04-3.03)] & AHR: 2.00 (95% CI: 1.13- 3.54)] respectively. Neonates born from mothers who skipped ANC visits during their pregnancy were 2.06 times more likely to die [AHR: 2.06 (95% CI: 1.26-3.38)].Neonates born by induction were3.25 times more likely to die [AHR: 3.25 (95% CI: 1.87-5.65)].Neonates who initiated breastfeeding after 1hour wer1.8 times at higher risk of death[AHR: 1.97 (95% CI: 1.16-2.9)].

The Kaplan -Meier estimates of mean survival time

The median survival time of neonates born from mothers who didn't attend ANC visits during their pregnancy while neonates born from mothers who attend ANC visits5days (95% CI: 4.2-5.8(Figure 1. The median survival time of neonates who breastfed within one hour was found to be higher by two days than those who didn't breastfeed, 5 days (95% CI: 4.1-6.0), and 3 days (95% CI: 2.1-4.0) respectively. (Table1)

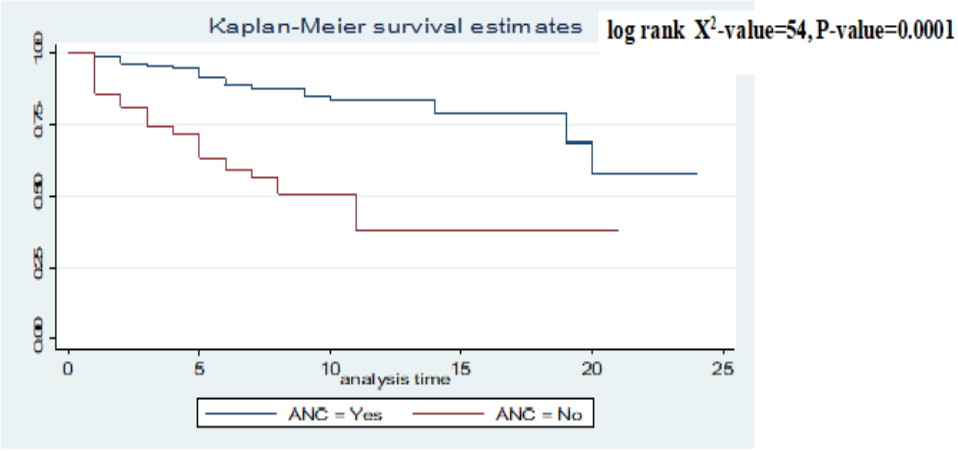

Figure1, Kaplan -Meier estimate of survival neonates among mothers who didn't attend ANC visit Oromia, regional State, 2019

Table 1. The Kaplan -Meier estimates of mean survival time among different groups of neonates admitted at NICU centers in Oromia regional State, 2019

Characteristics	Dead Number (%)	Median survival time Estimate (95 % CI)	log-rank X^2-value	P-value
Supported by a partner during pregnancy				
Yes	70(89.7)	4(2.8-5.2)	5.58	0.01
No	8(10.3)	2(0.0-4.8)		
Birth interval				
Within 24 month	53(67.9)	4(2.7-5.3)	10.97	0.001
Greater than 24 month	25(32.1)	3(1.4-4.6)		
Labour onset				
Spontaneous	33(42.3)	5(4.5-5.5)	122.04	0.0001
Induced	45(57.7)	3(2.2-3.8)		
Brest feeding within 1hr				
Yes	25(32.1)	5(4.0-5.9)	10.97	0.001
No	53(67.9)	3(2.1-3.9)		
Fifth minute APGAR				
Normal	4 (5.1)	5.0 (4.1-5.8)	138.1	0.0001
Moderate Asphyxia	37 (47.4)	4.0 (2.6-5.3)		
Sever Asphyxia	37 (47.4)	3.0 (1.9-4.1)		
Has been diagnosed with Anaemia				
Yes	35 (44.9)	4.0 (3.1-4.8)	119.3	0.0001
No	43 (55.1)	3.0 (2.8-3.9)		
Has been diagnosed with Hypertension				
Yes	34 (43.6)	4.0 (3.1-4.9)	83.8	0.0001
No	44 (56.4)	3.0 (1.8-4.2)		
Cry at birth				
Yes	49 (62.8)	4.0 (2.8-5.1)	5.9	0.015
No	29(37.2)	2.0 (1.2-2.9)		

Discussion This study found that newborns admitted to the NICU had an NMR of 157 per 1000 live births. Similar results have been recorded for Cameron (157 per 1000 live births), Nepal (200), the Amhara region (186), and Wolaita Sodo (173) (11-14). The results of the current study, however, were higher than those of earlier ones conducted in Iran (91), Suriname (129), and Indonesia (52) (12-14).

According to this study, neonates with poor fifth-minute Apgar scores were three times more likely to die. Other studies conducted in Brazil, the United States, New York, Sweden, Debremarkos referral Hospital, and Black Lion Specialized Hospital (15-20) have supported this conclusion. For instance, Black Lion Specialized Hospital reported a threefold increased risk of neonatal death for this group compared to children who had normal Apgar scores (19). Additionally, newborns from mothers with medical conditions had a 28% higher risk of dying than the corresponding referent group (AHR = 2.8, 95%CI) (1.3-5.7). This result is consistent with research done in the Tigray region, the Aroresa district, and North Shewa, of the Amahara region (10, 21-22). Compared to neonates born to women who attended ANC visits, those who did not were more likely to die. This result is consistent with earlier research done in Nigeria, Uganda, North Shewa, and Debra Markos areas of Amhara, (14, 15, 23-25). It's most probably because ANC visits will help in the screening, diagnosis, and management of risk factors that could negatively impact the

pregnant woman and the pregnancy. This study demonstrated that compared to spontaneous labor, inducement of labor results in a higher rate of neonatal mortality. An investigation carried out in the Netherlands and a southern part of our country, Ethiopia, supports these conclusions (26, 27). According to the findings of further research conducted in Iran and the United States, moms with hypertension had a higher risk of newborn mortality than mothers without the condition (28-29) which is consistent with this study. This could result from less utero-placental blood flow in hypertensive. Less than 24-month spacing between births was linked to higher neonatal and stillbirth mortality rates. When compared to the appropriate reference, neonates born to mothers who waited less than 24 months before trying for a subsequent pregnancy had a twofold increased risk of dying according to an investigation by WHO and Bangladesh (30), similar to this study's finding.

Conclusion and recommendation

Neonates admitted to NICUs have a high mortality risk. Shorter intervals between births, neonates with lower Apgar scores, neonates who don't start breastfeeding within an hour, neonates born to mothers who had hypertension and anemia while pregnant, neonates born to mothers who skipped ANC visits and neonates born by induction are all at an increased risk of neonatal mortality in the NICU. Therefore to lessen the effects of those variables, adequate inter-pregnancy interval through family planning counseling and provision, having the recommended ANC follow-up with anemia & blood pressure screening & management &providing all initial newborn care were recommended.

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Health Professionals' Licensing: the Practice and its Predictors among Health Professional Hiring Bodies in Ethiopia

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Abstract

Background: Evidence suggests that not all human resource departments have hired their facility staff based on federal licensing standards, with some hiring without an active license. This is common in some, if not all, parts of the country. The paucity of healthcare experts, high turnover rates, employee burnout, and challenges in training and development issues were all key recruiting challenges globally.

Objectives: To assess the practice of health professionals' licensing and its predictors among hiring bodies in Ethiopia, March 24/2021 –May 23/ 2021.

Methods: A cross-sectional study was conducted in privately and publicly funded health facilities throughout Ethiopia. A stratified sampling strategy was used to select the regions, followed by the selection of hiring bodies using a simple random sampling method. Documents from the recruiting bodies for health professionals were reviewed. Hiring body characteristics were analyzed in bivariate and multivariate logistic regression to identify factors associated with the practice.

Results: The analysis included 365 hiring bodies and 4991 files of health professionals (1581 from private and 3410 from public health organizations). Out of 365 hiring bodies studied, 66.3 % practiced health professional licensing. A total of 33 % of the 4991 professionals whose files were reviewed were found to be working without any professional license at all. Furthermore, about 55 % have an active professional license, and about 12 % were found to work with an expired license. Being a private facility (adjusted OR=21.6; 95 % CI= 8.85–52.55), supervision from a higher organ (adjusted OR=19.7; 95 %CI: 2.3–169.1), and conducting an internal audit (adjusted OR=2.7; 95 % CI: 1.15–6.34) were predictors of good licensing practice.

Conclusion: The licensing of health practitioners was poorly practiced in Ethiopia as compared to the expected proclamation of the country. A system for detecting fake licenses and controlling revoked licenses does not exist in all regions of the country and that needs serious attention from the government.

Keywords: licensing, licensing practice, health professionals licensing, hiring bodies

Introduction

The World Health Organization (WHO) under its "Global Strategy on Human Resources for Health 2030" acknowledges the following as one of its objectives: "To optimize performance, quality and impact of the health workforce through evidence-informed policies on human resources for health".

As we inhabit the current fast-paced period, we are confronted with new infectious, environmental, and behavioral hazards, as well as rapid demographic and epidemiological transitions that jeopardize everyone's health and security. With these issues, it's clear that the healthcare system is failing to keep up, becoming more complex and expensive, and putting more strain on healthcare workers.

Putting in place a regulation can be a powerful weapon and policy instrument for safeguarding the public from unqualified, inept, or dangerous health care professionals.

In Ethiopia, the government established the Food, Medicine, and Healthcare Administration and Control Authority (FMHACA) in 2010 with the mandate to protect population health by ensuring the competence and ethics of health professionals. Furthermore, Health professionals' licensing was governed by the FMHACA proclamation (661/2009) up to the end of 2018 and this mandate is disaggregated into food and drug administration, clinical service regulation, and health professional regulations (Proclamation No.1112/2019).

The Health Professionals' Licensing Examination was put in place in July 2019 by the Ministry of Health Ethiopia being considered a critical step that should be undertaken for licensing new graduates.

To the best of our knowledge, little or no evidence exists in Ethiopia about the practice of hiring bodies of licensed health professionals. This context necessitates primary research.

Objectives

The study is primarily aimed to determine the proportion of hiring bodies with good licensing practices and identify the predictors of health professionals' licensing practices among hiring bodies in Ethiopia from March 24/2021 –May 23/2021.

Methods

A cross-sectional study design was utilized with a structured questionnaire between was carried out between March 24th and May 23rd, 2021.

The study was conducted at selected health institutions, district health offices, zonal health departments, and regional health bureaus in all regions of Ethiopia. The study units were randomly selected health professional hiring bodies in those health institutions found in Ethiopia who are represented by human resource managers at the institution. Moreover, a document review of health professionals hired at specialized, general, and referral hospitals was done.

Sampling and sample size

Document review sampling

A random sample of 30 files was taken for regional health bureaus and zonal health departments. All files of health professionals hired after June 2019 were reviewed at government-owned specialized hospitals, referral hospitals, and general hospitals.

Hiring bodies sampling

The sample size was calculated using a single population proportion formula based on assumptions of an average effect size of 50% (5% margin of error) and a normality assumption of the distribution around the effect size. A sample size of 384 was required to use the hiring bodies' units of analysis.

Data collection methods and outcomes

Licensing practice of health professionals among hiring bodies in Ethiopia. The outcome was ascertained by the proportion of hiring bodies that have complete (100%) documents of their professionals with an active license considered as good practice otherwise it was operationalized as poor practice.

Data analysis

Descriptive statistics were reported using frequencies, proportions, cross-tabulations, and mean for the basic characteristics of the participants and then presented using tables and graphs. A logistic regression analysis was conducted to identify predictors of the practice. Moreover, a stratified analysis was done by region and profession category among the hiring bodies to identify the status of the license of health professionals.

Result and discussion

Socio-demographic characteristics of study participants

A total of 365 human resource managers (One from each hiring body) took part in the study, yielding a 95 % response rate. Females made up three out of four respondents (78.9%). The respondents' mean age was 40.67 years with a standard deviation of 10.1 (95 % CI: 39.58, 41.74).

Health professionals' hiring structures and readiness

Two hundred and eighty-eight (78.9%) of the respondents believed that they had a well-organized health professional hiring system, while 16.7% responded that they do not have a well-structured hiring system, and 4.4% do not have a structured health professional recruitment system at all in their institution.

Health professionals' licensing practice among hiring bodies

One-fifth of recruiting bodies (20.55 %) had experience in hiring health professionals without a license. Moreover, 37.3 % of the health professional hiring bodies had a mechanism in place to verify the license's originality, of which, 29.4% experienced fake licenses during recruitment. Fifty-seven (15.62%) of respondents had seen a health professional being recruited without a license in their institution, and 10.9% themselves had participated in the hiring of professionals without a license. Our research indicated that half of the health professional hiring bodies still have poor license practice, and licenses not being as an essential requirement for health professional employment.

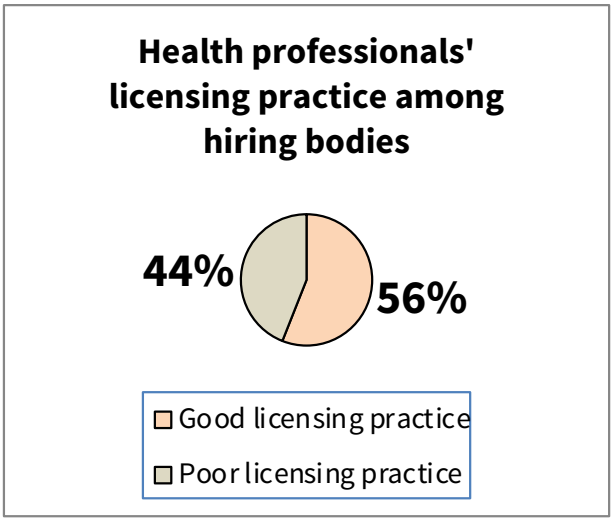

Figure 1: Health professionals licensing practice among hiring bodies of Ethiopia, 2021.

Findings from health professional documents review

Licensing status of health professionals

The files of 4991 health professionals were reviewed and 66% of them have active licenses at the national level. Licensing of health professionals at the regional level varied from 20% in the Benishangul-Gumuz region to 91% in Addis Ababa (Figure 2).

Status of unlicensed practice by profession

Over 61 % of Anesthesia practitioners practice without a license or with an expired license at the national level. On the contrary, from the reviewed documents of professionals, only about 25% of nursing practitioners work without a license. (Figure 3)

Determinants of licensing practice in Ethiopia

As compared to public-owned hiring bodies, private-owned hiring bodies were more likely to have good licensing practices (adjusted OR=21.6; 95% CI= 8.85 - 52.55), and our triangulation with the document review verifies this finding.

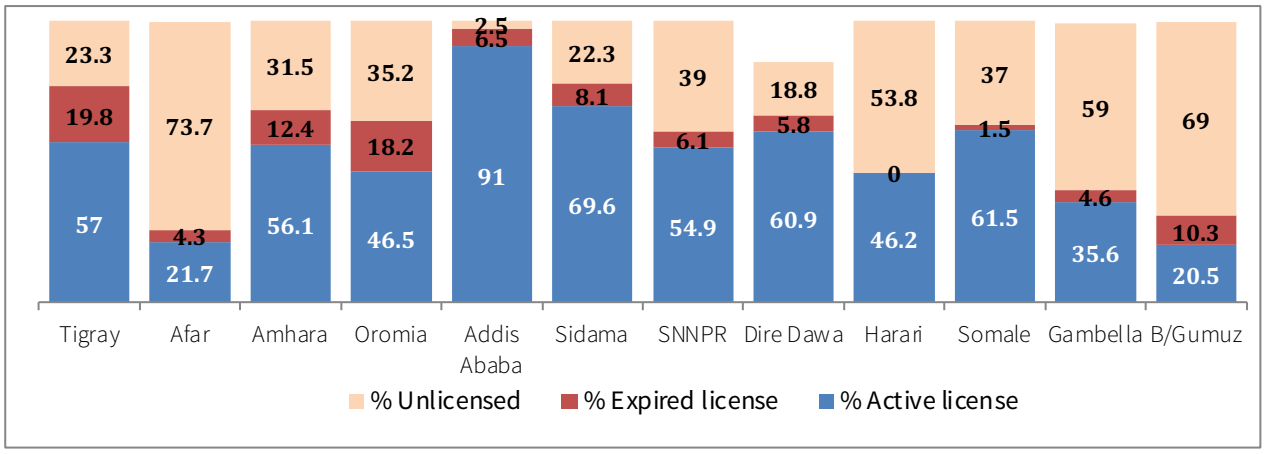

Figure 2: Licensing status of health professionals by region among hiring bodies of Ethiopia, 2021

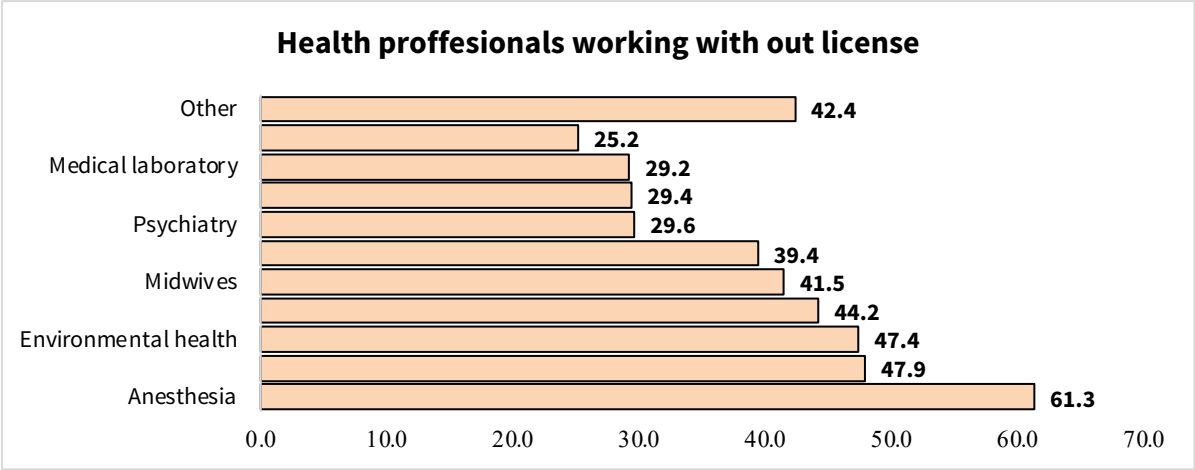

Figure 3: proportion of professionals' working without a license by profession among hiring bodies of Ethiopia, 2021.

Having supervision from a higher authority has a strong link to effective licensing practice (adjusted OR=19.7; 95 % CI: 2.3 – 169.1), highlighting the necessity for various responsible bodies to focus on strategies to sustain and strengthen the existing supervision from regional and federal health system regulatory.

Moreover, the findings showed that health professional hiring organizations that perform internal audits are three times more likely than those that do not have appropriate licensing practices (adjusted OR= 2.7; 95% CI: 1.15– 6.34).

Conclusion and Recommendations

In comparison to the expected full practice of licensing for health professionals as per the country's proclamation, Ethiopia's licensing system by hiring bodies of health professionals was found to be deficient. A system for identifying forged licenses and managing revoked licenses is also lacking in Ethiopian hiring organizations for health professionals. By promoting ongoing internal audits among hiring bodies and providing a reporting mechanism to the higher authorities, it is possible to prevent the majority of Ethiopia's public sector health professionals hiring bodies from falling behind the expected licensing practice. Furthermore, if coordinated with internal audits from the hiring bodies for health professionals, rapid supervisory visits from higher authorities aid in the improvement of the licensing practice.

Determinants of mortality among preterm neonates admitted with respiratory distress in Addis Ababa public hospitals

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ABSTRACT

Background: Respiratory distress is a breathing problem that affects mostly preterm babies. Some studies explored the incidence and associated factors of respiratory distress in preterm neonates, but there are constraints of studies regarding determinants of preterm mortality admitted with respiratory distress. Thus, this study provides an important input to improve treatment practice and increase neonatal survival for highly vulnerable neonates.

Objective: To identify determinants of mortality among preterm neonates admitted with respiratory distress in Addis Ababa public hospitals neonatal intensive care units, 2021.

Methods: Institution-based prospective follow-up study was conducted in Addis Ababa public hospital neonatal intensive care units among all preterm neonates admitted with respiratory distress from February 12-May 12, 2021. The cut point to declare the presence of statistical significance between the variables was p-value<0.05.

Results: This study revealed 43.7 % (CI: 0.38-0.50) of preterm mortality. Pre-eclampsia/eclampsia (AOR=2.9, 95%CI: 1.32-6.39), feeding initiation time >24hours of admission (AOR=5.4; 95%CI: 2.24- 12.86), Necrotizing enterocolitis (AOR=4.4; 95%CI: 1.67-11.59), thrombocytopenia (AOR= 3.7, 95%CI: 1.45-10.27) and hyperbilirubinemia (AOR=0.19; 95%CI: 0.08-0.46) were statistically significant determinants for preterm mortality admitted with respiratory distress.

Conclusions: In this study, mortality among preterm neonates admitted with respiratory distress was high compared with other related studies. Therefore, major interventions for the prevention and active management of preeclampsia/ eclampsia, necrotizing Enterocolitis, and thrombocytopenia shall be implemented. Based on the finding of this study, feeding initiation shall be considered as early as possible based on the bowel sound of the neonates, and further studies shall be conducted on preterm neonates with neonatal hyperbilirubinemia.

Keywords: Preterm, Respiratory distress, Determinants, Mortality, Addis Ababa

Background: Respiratory distress is a breathing problem that affects newborns, mostly those born preterms (1–3). Prematurity is a leading risk factor that can increase the likelihood of respiratory distress (4). Treatment options are resuscitation, oxygenation, surfactant replacement, ventilation, and antibiotics initiation based on the case (5).

Respiratory distress is one of the most common reasons an infant is admitted to the neonatal intensive care unit in which 15% of term infants and 29% of late preterm infants are admitted to the neonatal intensive care unit; this is even higher for infants born before 34 weeks gestation(4). The incidence of respiratory distress in different parts of the world is high, especially in Ethiopia, which ranges up to 42.9%(6–8).

Different studies were conducted about the incidence and associated factors of respiratory distress in preterm neonates; however, there are constraints on evidence about determinants of mortality in preterm neonates admitted with respiratory distress. Therefore, this study was designed to determine determinants of mortality among preterm neonates admitted with respiratory distress in Addis Ababa public hospital neonatal intensive care units.

Objectives

Assessing the magnitude and identifying the factors associated with mortality among preterm neonates admitted with respiratory distress in Addis Ababa public hospital neonatal intensive care units from February 12-May 12, 2021, were the objectives of the study.

Methods

This institution-based prospective follow-up study was conducted from February 12-May 12, 2021, in randomly selected public hospitals in Addis Ababa. These randomly selected public hospitals are Tikur Anbessa Specialized Hospital, Gandhi Memorial Hospital, Ras-Desta Damtew Memorial Hospital, Yekatit-12 Hospital Medical College, and Kidus Petros Specialized Hospital. All preterm neonates diagnosed with respiratory distress were included. Bi-variable and multi-variable logistic regression analyses were carried out. Variables with a p-value ≤ 0.25 were taken into a multi-variable model to control for possible confounders. The cut point to declare the presence of statistical associations between the dependent and independent variable were p-value<0.05 or AOR, 95% CI.

Ethical Consideration: Ethical clearance was obtained from St. Peter specialized hospital institutional review board (IRB) with version number V231/12/02/2021.

Results and Discussion

A total of 277 preterm neonatal admissions with respiratory distress were recruited in this study. Most of the preterm neonates (82.3%) were born to mothers at the age of 20-35 years old. Significant majorities (90.6%) of the indexed mothers were married, and only 19.5% of them had higher education. Mothers with urban residency cover 87%, and 34.1% of the total were housewives. At the end of this cohort, a high proportion of preterm death admitted with respiratory distress was recorded. Of the total study participants, only 56.3% of the neonates survived. Death may not be from a single cause but also a combination of medical problems. As it was recorded on the death summary chart, the immediate causes of 23.1 % of the deaths were respiratory failure secondary to respiratory distress, 17.3% of the deaths were multi-organ failure secondary to sepsis, DIC, and pulmonary hemorrhage covered 1.4 each with 0.4% of unexpected death. Neonates admitted with respiratory distress in Addis Ababa public hospitals neonatal intensive care units, 2021.

Pre/eclampsia (AOR: 2.9; 95% CI:1.32, 6.39), feeding initiation time >24hours of admission (AOR: 5.4; 95% CI: 2.24, 12.86), necrotizing enterocolitis (AOR: 4.4; 95% CI: 1.67, 11.59), thrombocytopenia (AOR: 3.7; 95% CI: 1.45, 10.27) and hyperbilirubinemia (AOR: 0.19; 95% CI: 0.08, 0.46) were statistically significant variables with p-value<0.05 for preterm death admitted with respiratory distress.

Discussion

In this study, the proportion of mortality among preterm neonates admitted with respiratory

distress was high. Mothers with pre-eclampsia / eclampsia had higher odds of preterm death almost threefold than those neonates born from mothers without pre-eclampsia /eclampsia. This finding is supported by the fact that the anti-angiogenic intrauterine environment of pre/eclampsia affects fetal lung development. This may predispose premature infants to severe respiratory failure shortly after birth and, later, to abnormal development of the lung vascular and alveolar structures (13). As a result, cardiopulmonary failure may end with death in preterm neonates, which will be expected.

Delay in breastfeeding initiation time was one of the significant determinants of mortality among preterm neonates admitted with respiratory distress. This is supported by scientific evidence, which says that early initiation of feeding can stimulate gut maturation and generalized organ development, and breast milk has its immunoglobulin, which can increase the immunity level of preterm neonates (14).

Preterm neonates with necrotizing enterocolitis had more than fourfold higher odds of mortality compared with preterm neonates without necrotizing enterocolitis. This finding is supported by the fact that the patient may experience systemic signs related to respiratory failure and circulatory collapses, such as cyanosis and unresponsiveness since necrotizing enterocolitis affects multi-organ systems and leads to mortality (15, 16).

Preterm neonates developing thrombocytopenia after they were admitted with respiratory distress had about four times more odds of dying. This finding is supported by the fact that platelets for lung injury in respiratory distress are predicated mainly, there is substantial evidence that links platelets to the development of lung injury. Inhibition of platelet-neutrophil aggregation resulted in reduced neutrophil recruitment, increased animal survival time, and less hypoxia(12).

Preterm neonates with hyperbilirubinemia were 81% (AOR: 0.19, CI: 0.08, 0.46) lower odds of dying than their counterparts. This may be due to over-cared neonates with neonatal jaundice.

Conclusion and Recommendations

Generally, the mortality of preterm neonates admitted with respiratory distress was high. Being born from pre-eclampsia/ eclampsia mothers, feeding initiation after 24 hours of admission, necrotizing enterocolitis, and thrombocytopenia were the identified determinants of death, whereas hyperbilirubinemia was the factor identified as a protective variable. Service providers should give due focus on the prevention of preëclampsia/ eclampsia during antepartum consultation; promote early initiation of breastfeeding per the neonates' vital signs of the abdomen, and prevention and early management of thrombocytopenia and necrotizing enterocolitis. Program managers and policy-makers should give high emphasis to preterm neonates with respiratory distress. Further investigation of the relationship between neonatal jaundice and respiratory distress in relation to preterm outcomes is recommended.

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Mentorship: Highly Appealing Approach for Successful Electronic Community Health Information System Scale-up

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Abstract

Background: The government of Ethiopia launched an electronic Community Health Information System (eCHIS) for the Health Extension Program (HEP) to maximize data-informed decisions. John Snow Inc (JSI) Research and Training Institute Inc. through funding from Child Investment Fund Foundation (CIFF) has been supporting the Ministry of Health (MoH) in scaling up eCHIS and ensuring its optimal use. This project has designed and tested a customized mentorship approach to equip the Health Extension Worders (HEWs) with the knowledge and hands-on-skills required to master eCHIS, improve maternal and child health (MCH) service provision, and share lessons. In designing the mentorship approach, early phase challenges in technology adaptation; the need for intensive engagement to ensure skills and knowledge acquisition; the limitation on the existing health system implementation strategies, and devising an approach to be owned by the system were taken into account.

Approach and methods: The mentorship approach has been designed in three phases. Pre-mentorship; customization and standardization of mentorship checklist; equipping mentors with required knowledge and skills through two-day basic mentorship training. Mentorship; intensive interaction between the mentors and HEW to identify and fill knowledge and skill gaps. Post-mentorship; discussions on the mentorship findings accompanied by re-fresher training for HEWs and health center (HC) focal persons; address problems and draw an action plan. The study used qualitative and quantitative data. The quantitative data compared pre and post-mentorship eCHIS use, while the qualitative data presented the post-mentorship experiences.

Results: As a major woreda-level eCHIS implementation strategy, 115 experts from 17 woredas and 96 cluster HCs received mentorship training. Mentors supported 68 HPs in Gimbichu and Lume woredas from Nov-Dec, 2021 and 59 HPs in Awabel and Dembecha woredas in February-2022. Following mentorship support and post-mentorship review and refresher training, the number of HPs using eCHIS for household and member registration showed a 4.2- and 4.7-fold increase respectively, while ANC1 and Penta3 service provision showed a 5.2- and 4.2-fold increase respectively with a peak in February-2022. The qualitative informants perceived the mentorship supports as an ideal approach to increase commitment, to improve communication and team work, improve referral linkage, problem-solving, and friendly working relationships. Lack of dedicated resources and consistency were the challenges the informants identified that could affect its success.

Conclusion and recommendations: Mentorship offers need-based support, and hands-on skills with the demonstration in a friendly supportive spirit and is an ideal approach for scaling up eCHIS. The early phase of eCHIS implementation requires frequent mentorship support for the HEWs to master the system. Addressing identified challenges to its use is commendable for the successful scale-up of eCHIS and the realization of paperless HEP.

Key words: eCHIS, mentorship, HEP, HEW, Ethiopia

Background

Information revolution (IR) is among the four major agendas' of HSTP-I, and II, concerned with the use of timely, accurate and reliable information for decision-making at all levels in the health sector. The IR roadmap outlines the need to bring about a radical shift in information management using the opportunities created by the advancement in information and communication technologies and infrastructures. Ethiopia launched eCHIS for its flagship HEP to maximize data-informed decisions. eCHIS also replaces the manual community-based information system (CHIS), which has highly demanding and cumbersome recording, reporting and service provision modules contributing to the production of poor-quality data, compromised data use, and poor service quality. eCHIS has the momentous potential not only to improve data capturing, sharing, and data-informed decisions but also to improve the quality of services provided at the HPs and community including referral linkages and ultimately improve health outcomes.

JSI Research and Training Institute Inc. through funding from Child Investment Fund Foundation (CIFF) has been supporting the MoH in scaling up eCHIS and ensuring its optimal use. The project run in 110 woredas selected from four regions in a five-year project started in 2021. During its first-year implementation period, the project has enrolled 20 Woredas whereby a total of 1,013 HEWs and 527 supervisors received training for eCHIS implementation.

The mentorship approach proved to be successful in HIV/AIDS programs in different settings in improving providers' knowledge and skills. In Ethiopia, there has been some initiative to customize the mentorship approach for improving maternal and child health services. "Mentorship is a collaborative learning relationship and working alliance based on intentionality, trust, and shared responsibility. Effective mentorship provides aspects of both psychosocial and career support and may include role modeling, advising, and helping the mentee develop a supportive network. This project has designed and tested a customized mentorship approach for improving eCHIS implementation and presents lessons learned from eCHIS scaleup in four selected woredas and outcomes in using eCHIS for household and member registration and MCH services provision.

Approach and methods

According to the technology acceptance model (TAM), technology users come to accept and use technology, when they perceive the technology is useful and easy to use. In the context of eCHIS implementation, the perceived usefulness and ease of use of the system vary from one HEW to another, while all the HEWs were naïve to eCHIS as the application is new to them. For HEWs to master the eCHIS application for registration, service provision, and referral, intensive early-phase support is important. On the contrary, existing performance management strategies have limitations to ensure easy technology adaptation and a high level of knowledge and skills required to use the eCHIS. Taking these challenges as a point of departure and focusing on the need for intensive engagement in the early phase of eCHIS implementation, the project designed and tested a customized three-phased mentorship approach as shown in table 1.

Table 1: Mentorship phases and respective activities

Phases	Activities
Pre- mentorship	• Customizing existing supportive supervision checklist and developing standards, mentorship guidelines, and training materials • Engaging in implementing woredas to review the checklist • Selection of mentors through discussion with woreda offices • Training mentors on basic mentorship skills
Mentorship (undertaken) by mentors at the HPs)	• Identify knowledge and skill gaps using the checklist • Request HEWs to demonstrate • Provide support for those who failed to demonstrate • Re-demonstration by HEWs • Develop follow-up plan
Post- mentorship review and refresher training	• Presenting overall mentorship findings at the Woreda performance review meeting session • Discussion on challenges and facilitators • Refresher training based on gaps identified during mentorships • Setting action plan

Selected mentors from the woredas and cluster HCs received two days of basic mentorship training in their respective woredas. Mentors supported 828 HEWs using checklists, by identifying knowledge, skill, and technical gaps in using the tablet, HEW application, and problems in household and member registration, service initiation/provision, and troubleshooting. For this study, the quantitative data obtained from the eCHIS application for Awabel, Dembecha, Gimbichu, and Lemo woredas were analyzed using descriptive statistics and trend analysis, which compared pre- and post-mentorship eCHIS use. The qualitative data were collected through observation, site visits, site reports, group discussions, and interviews with 22 woredas, HC, and HP informants. The informants were from Awabel, Dembecha, Gimbichu, Lume, Lemo, Mirab Abaya, and Dale woredas. The qualitative data were analyzed manually using content analysis, which presented the post-mentorship experiences.

Results

As a major woreda-level eCHIS implementation strategy, 115 experts from 17 woredas and 96 HCs received mentorship training. Using the standardized checklist, mentorship supports were provided for 59 HPs in Awabel and Dembecha woredas in February 2022; and for 68 HPs in Gimbichu and Lume woredas from 15-Nov-2021 to 15-Dec-2021. Following the mentorship support, HPs using the eCHIS platform for registration and service initiation/provision have shown a significant increase from mid-November, 2021 with a peak in February 2022, which marked the post-mentorship review and refresher training period as shown in Fig1. The number of household and members registered on eCHIS have shown a 4.2- and 4.7-fold increment in the six months in 2022 compared to the six months in 2021 with a peak in February 2022. The peak could be explained by clearing the backlogs, whereby the HEWs transferred household and members registered and services provided on paper-based CHIS to eCHIS when they became well acquainted with the eCHIS through the mentorship support and with the follow-up gap-filling refresher training. There was an increment in the number of MCH services recorded on eCHIS in the first half of 2022, compared to the second half of 2021 (Figure 2). According to the qualitative accounts, the mentorship support was highly appreciated by the HEWs and the mentors. It was perceived as an ideal approach to increase commitment, improve communication and team work, improve referral linkage, and created a mutual learning opportunity between mentors and mentees. The mentorship used a problem-solving and friendly approach that enabled the HEWs to initiate/maintain service provision and improve registration on the eCHIS.

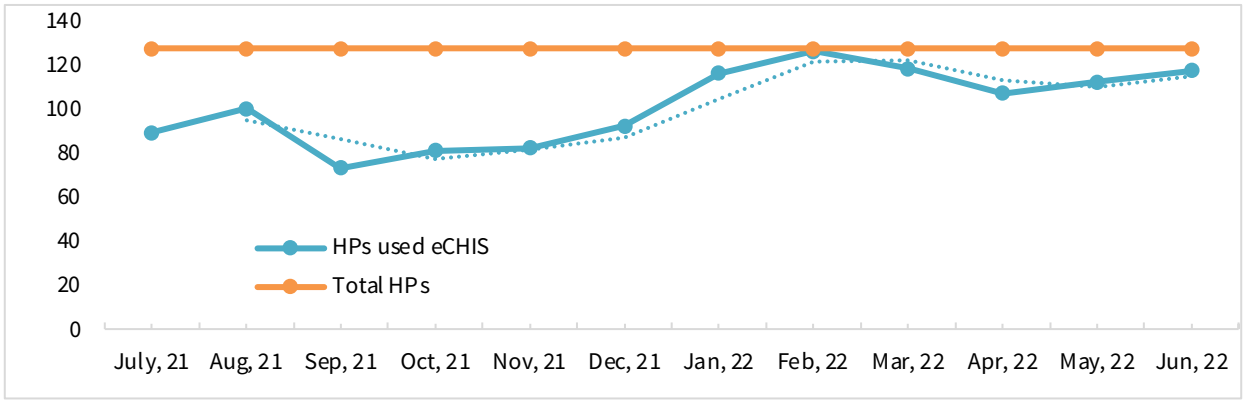

Figure 1. Trends in the number of HPs using eCHIS between July 2021 and June 2022 in Awabel, Dembecha, Gimbichu, and Lemo woredas and two-time moving average.

According to the qualitative informants, implementation and adaptation of mentorship were affected by transportation problems as it was not budgeted at woreda and HC; poor internet connectivity, which forced the mentors to use their own data/airtime or to carry the tablets from the HPs to where internet network was available to synchronize data; poor performance capacity tablets, which affected registration and service provision. The current eCHIS app lacks reporting features and has limited HEP modules; hence it demotivates the HEWs from using eCHIS as they should also use the paper-based CHIS.

Lessons learned and recommendations

The mentorship support addresses the major technical challenges the HEWs encounter during eCHIS implementation including technology adaptation and gaps in knowledge and skills as it offers tailored support. Although HEWs have shown improvement in household and member registration and service provision following the mentorship and refresher training, other factors

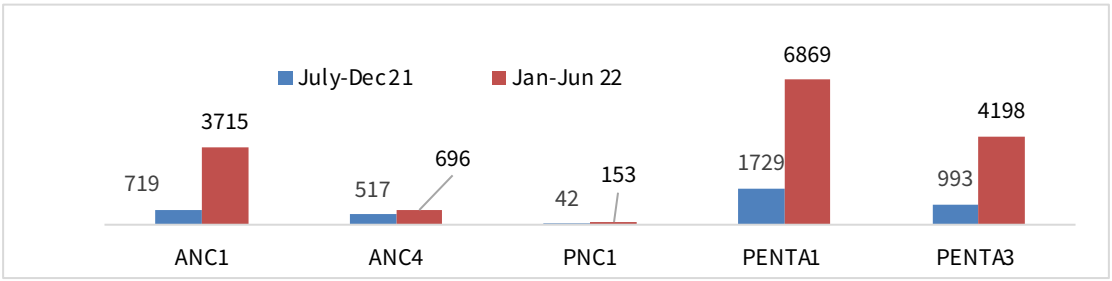

Figure 2. Maternal and child health services were recorded on eCHIS from July 2021 to June 2022.

not explored in this study could also be played a role. In the early phase, it is commendable to provide frequent mentorship support until the HEWs masters the eCHIS, where it can be tapered as they become more experienced. Addressing identified challenges that affect the implementation of the mentorship approach has paramount importance for the successful scale-up of eCHIS, to ensure sustainability, and for the realization of paperless HEP.

Time to Rethink Alternative Service Delivery Modality: Experience from Afar and Somali Regions of Ethiopia

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Abstract

Background: Ethiopia has been implementing Mobile Health and Nutrition Teams (MHNTs) to improve the accessibility of essential healthcare services for unreached populations such as Pastoralists and Agro pastoralists with poor or limited basic infrastructure to ensure health for all targets by Universal health coverage (UHC). However, the current implementation status of this MNHT is not assessed.

Methods: We conducted an exploratory qualitative study. The interview guides were developed based on the elements of the Consolidated Framework for Implementation Research (CFIR) framework. Additionally, program documents and reports were reviewed.

Results: Based on this assessment MHNT strategy has high demand and acceptability by the community and the service provider. The main barrier to program implementation is the gap in service integration within and across sectors at all levels of the health sector. The inadequate staffing of the MHNT, gaps in ensuring a proper professional mix as per the standard, frequent turnover of contract health workers, and skill gaps hamper the effective and sustainable implementation of the program in both Afar and Somali regions.

Conclusions: Based on the current assessment MHNT establishment, effectiveness, acceptability, and sustainably in the implementing woredas of Afar and Somali region is very promising. Community engagement and government ownership are good drivers for the sustainability of MHNT service provision. Standardizing and adding additional professionals with capacity building through mentoring, coaching and continuous professional development is curial to ensure service quality. Finally, a national scale-up of this alternative strategy is recommended through a standardized implementation modality.

Key words: Mobile Health and Nutrition Team, Consolidated Framework for Implementation Research, Implementation, and Ethiopia.

Background: Most countries proclaim as their citizens should enjoy universal and impartial access to the highest acceptable quality care (1–3). Mobile health units are an alternative approach for delivering healthcare services to underserved and hard-to-access locations and have been traced back to the 12th century. The mobile health unit is defined as bringing health care to the client without the client having to travel for receiving it (4–6).

Ethiopia is the second most populous nation in Africa with an estimated 115 million population in 2021(7). The majority (79.2%) of the population resides in rural settings. In addition, pastoralist communities are estimated to be 12% of the Ethiopian population. Despite the progress in the past two decades, the country is one of the poorest countries in the world with absolutely feeble human development metrics (8,9)"issue":"1","page":"2-31","title":"Internal Displacement in Ethiopia: A Scoping Review of its Causes, Trends and Consequences. Journal of Internal Displacement.","volume":"12","author":[{"literal":"Tesfaw TA."}],"issued":{"date-parts":[["2022"]]},"label":"issue"}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} . The constitution and health policy of Ethiopia also stated that all citizens have the right to access healthcare services (10–12). The government of Ethiopia implementing Mobile Health and Nutrition Teams (MHNTs) to improve the accessibility of essential healthcare services for unreached populations such as Pastoralists and Agro pastoralists with poor or limited basic infrastructure to ensure universal health coverage UHC. However, the current implementation status of this MNHT is not assessed comprehensively.

Objectives

The purpose of this study is to capture the current implementation status in terms of effectiveness, Facilitators and barriers, acceptability and sustainably of the MNHT from the program managers, supporting partners, and decision-makers at each level of the health system structure in Afar and Somali regions to inform policy and practice at a national level.

Methods

The study was conducted in the Afar and Somali regions of Ethiopia from January 1-30, 2022. A total of six woredas from Afar and Somali Regions having the MHNT program were included. A total of 17 participants were selected purposively for the key informant interviews. The study consists of a document review and interviews of people who have been involved in the implementation of the MHNT program. The study participants were grouped into RHB MHNT coordinator, woreda health office MHNT coordinator, MHNT leader, and representatives from active implementing partners. The interview guides were developed based on the elements of the Consolidated Framework for Implementation Research (CFIR) framework. Accordingly in the framework, the intervention is the MHNT program; the outer setting entails the political commitment and donor support; the inner setting encompasses the health office and health facility readiness along with the functionality of MHNTs; characteristics of individuals refer to the health workers commitment and perception of the community about the MHNT and the process of implementation has been considered in terms of facilitators and barriers of implementation. We undertook in-depth interviews with key informants. Additionally, data were extracted from activity reports, supervision reports, and management documents. Initially, audio records of interviews were transcribed verbatim and translated into English. The investigator read the translated data repeatedly to understand the concept and related meanings of the data. We used Open code software for data analysis. Line-by-line coding was done to identify related patterns. The codes with similar patterns were merged to identify themes from the data. During analysis, modifications to existing codes and themes were made based on the information from subsequent interviews. Finally, thematic analysis was considered to organize the findings.

Results and Discussion

The assessment summarized the facilitators, and barriers of the service provision modality and the overview of respondents' perception of the

effectiveness, acceptability, and sustainability of the MHNT program. The results are organized by four major domains as presented below.

Program establishment and implementation process

Almost all the respondents from regional level coordinators to MHNTs level indicated there is aligned planning of MHNT service with all concerned stakeholders at the woreda level. The planning follows annual Woreda-based planning and the MHNT-specific plan disaggregated by the identified hard-to-reach areas.

One of the Woreda MHNT coordinators explained that "Following annual woreda-based planning; the monthly and weekly plan of MHNTs is prepared at woreda and PHCU level. A detailed movement plan and schedule were communicated to the community through the social mobilizer and kebele leaders (AR01). Most of the visited MHNTs reported that the logistics and supply for providing service packages are always at hand; especially essential drugs and vaccines are always available. But most of the teams missed having anthropometric measurements, vital sign measurements, other diagnostic aids, registration, and recording materials which implies a compromise on service quality.

Program Effectiveness

The MHNTs are effective in ensuring access to and quality of health services. "A respondent from Somali showed that in addition to ensuring access and quality of health service the program also helped in responding to health emergencies." (SMO3). A study from Afghanistan also showed that sustained and scheduled MHNT services to conflict-affected and remote regions were associated with improved coverage of important maternal and child health interventions (5). Similarly in Nigeria, dedicated mobile teams increase service access for remote settings (13). This implies that it's an essential service and not just an 'optional extra' for the most deprived mothers and children. It has also been reported that mobile health teams are successful in reaching vulnerable populations, by delivering services directly at the curbside in communities of need and flexibly adapting their services based on the changing needs of the target community (14). In another study, MHNTs were effective as compared to static facilities in creating access to previously unreached population groups for health services(15). There is also a universal acknowledgment of the value of MHNTs in reaching the unreached and underserved communities in this particular study. One of the respondents mentioned: "The services provided by the MHNTs to the community remain adequate in terms of scope and addressing priority health services. In particular, service uptakes increment in most service delivery indicators has been observed especially in maternal and child health service areas." (SM01). In terms of cost-effectiveness, "A respondent from Afar mentioned that the program incurs a huge budget related to the vehicle, fuel, and per diems" (A01). On the other hand, the majority of the key informants believe that it is still cost-effective since the MHNT is designed and implemented to address population groups that are not reached with formal facility-based health service provision. Evidence also suggests that mobile health teams represent a cost-effective care delivery model that improves health outcomes in underserved groups (14).

Facilitators and Barriers

There have been several success factors in the functioning of MHNTs in both regions. "A respondent from Afar MHNT woreda coordinator emphasized the inclusion of the service delivery modality in the annual plan and close follows is a game changer" (A06). The installation of government ownership of the program and institutionalization using reviewing performances and supportive supervision platforms is one of the facilitators for the successful implementation of the program. The inadequate staffing of the MHNT, gaps in ensuring a proper professional mix as per the standard, frequent turnover of contract health workers, and skill gaps hamper the effective and sustainable implementation of the program in both Afar and Somali regions. "A respondent from Somali MHNT indicated the absence of sectoral collaboration for the integrated work as the main barrier for the overall performance" (SM04). The other challenge that hampers MHTNs' service

delivery is movement restriction due to issues related to recurrent conflicts in both regions. On top of this, the unpredicted mobility of the community has also affected the service provided through the MHNT. It is similar to a finding from another study that challenges to this healthcare delivery model must be addressed and overcome before they can be more broadly integrated into the national healthcare system (14).

Acceptability and sustainability

Based on this assessment MHNT strategy has high demand and acceptability by the community and the service provider. A respondent explained his perception by saying; "There is no doubt about the acceptability of the mobile health service in the community, MHNTs service providers and woreda experts as it is the only way in my view... We can reach the unserved community in all parts if the woreda" (A06). Another respondent expressed his opinion about MHNT as "…The backbone of Afar people" (A02). A respondent shared his experience of helping a mother through delivery and he said "The mother called her newborn name following his name." (SMO5) A study by Oladeji et al. also showed that mobile health and nutrition strategy is recognized as a useful strategy to deliver health and nutrition services in the pastoral areas of Ethiopia(16).

Conclusion and Recommendations

Based on the current assessment MHNT establishment, effectiveness, acceptability, and sustainably in the implementation woredas of Afar and Somali region is very promising. Community and service provider satisfaction and perception of the MHNT is huge and their testimonial is heart-warming. The standard professional mix and number of MHNTs are not being abided in by most of the teams. The culture of MHNT reporting, documentation, and archiving in the two regions needs some improvement. Besides, community engagement and Government ownership is the good driver for the sustainability of MHNT service provision. In addition, capacity building through mentoring, coaching, and continuous professional development is curial to ensure service quality. Furthermore, community mobilization and woreda leadership commitment boosting will be needed for granting sustainability. Finally, a national scale-up of this alternative strategy is recommended through a standardized implementation modality.

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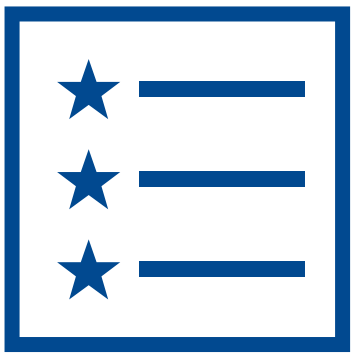

Section Two: Best Experiences

Digital Response to the COVID-19 Pandemic: Lessons to Inform On-going and Future Digital Health Investments

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Introduction: Following WHO's a declaration of the novel coronavirus disease (COVID-19) as a Public Health Emergency of International Concern, the pandemic has exposed critical challenges in the global public health system.

The first case of COVID-19 was reported on March 12, 2019. Since then, 493,190 COVID-19 cases have been confirmed, of which 7,572 (1.54 %) died as of August 31, 2022. Right from the date the first case was detected in Ethiopia, the government has been implementing various measures to prevent and control the pandemic.

Approach: When the Ministry of Health (MOH) identified digital tools as part of the public health emergency management (PHEM) response, DHA, a John Snow, Inc.-led project with funding from USAID, supported the MOH in leveraging existing digital tools and developing new technologies for COVID-19 preparedness, prevention, care, and treatment efforts.

Preparedness: DHA supported the Ethiopian Food and Drug Administration (EFDA) and the Ethiopian Pharmaceutical Supply Services (EPSS) in customizing existing upstream electronic logistic management information systems (eLMIS) and the electronic regulatory information system (eRIS) to fast-track the registration and importation of COVID-19 prevention related items like face masks, hand sanitizers, goggles, and other critical supplies.

Early Warning and Surveillance: DHA customized the electronic community health information system (eCHIS) for house-to-house case detection surveys, supported the scale-up of the DHIS2-based COVID-19 tracker application, and developed **the** COVID-19 vaccine adverse side effect tracking tool.

Public Health Emergency Response: DHA developed a quality control system, part *i-license*, for controlling the quality of hand sanitizers produced by different manufacturers. The project supported the scaling up of the DHIS2-based COVID-19 tracker application. The system has a dashboard that summarizes the status of the COVID-19 situation in the country for decision-makers and the general public.

A DHIS2-based application for screening and registering travelers was created to track individuals at ports of entry during home-based isolation. To ensure end-to-end visibility of COVID-19 vaccine distribution, DHA customized existing eLMIS tools such as mBrana and Vitas. Moreover, a patient queue management system was created and put to use in COVID-19 treatment centers to provide reliable and equitable access to mechanical ventilators.

Health workforce capacity building: DHA provided capacity-building support to health professionals on different digital tools used for COVID-19 prevention and control

Results: Generally, DHA's multi-faced response contributed significantly to the fight against the COVID-19 pandemic. In the first few weeks after the first COVID-19 case was detected, over 80 manufacturers and importers were registered to import and supply items for both the private and the public sectors. *Vitas*, used by EPSS, was quickly customized to ring-fence commodities required for the national response. Data from Vitas quantified the national demand based on the available resources and helped in scenario planning.

The national broadcast services and toll-free short codes (8335 & 994) were launched and run 24 hours a day. Telegram channels and SMS

services provided daily updates on confirmed cases, fatalities, and recoveries. As of April 6, 2022, close to 10,000 rumors had been reported, and more than 1.3 million people received health information through the toll-free lines. Similarly, the number of Telegram subscribers receiving health information exceeded 7,000 per day. These platforms were also used to disseminate health information and educate the community on protective measures and encourage individuals to follow preventive measures.

As of June 30, 2022, 1,070,911 travelers were registered and tracked at the ports of entry into the country. The DHIS2 tracker, which is integrated into the lab system, is being used as a single source of truth for all national and subnational level reporting and public consumption. All of the COVID-19 cases and deaths were captured and reported using the digital tools developed with the support of DHA.

During the house-to-house survey, data from over 3 million households were captured using eCHIS. This helped uncover the huge potential for asymptomatic transmissions in the community and reaffirmed the need for a coordinated and multi-sectorial response.

The mBrana application helped to digitally track the distribution of 77,233, 156 doses of COVID-19 vaccines in 338 woredas as of June 30, 2022. This helped to remotely track the stock status of vaccines in the woredas. As of August 31, 2022, a total of 52,580,683 vaccine doses were administered and 43,131,421 beneficiaries were vaccinated. These data were captured using the DHIS2 aggregate from over 570 woredas. Using dashboards created with DHA's assistance, these reports have been distributed to the general public via social media and mainstream platforms, including Telegram. DHA also created the capacity for 4,190 individuals to use various digital tools.

In addition, the DHIS2 beneficiary level tracker has been deployed at selected health facilities in Addis Ababa. The tracker has shown potential for improving the quality of the data and providing verifiable electronic certificates for travelers. Over the past few months, nearly 50,000 electronic certificates have been generated and provided to beneficiaries.

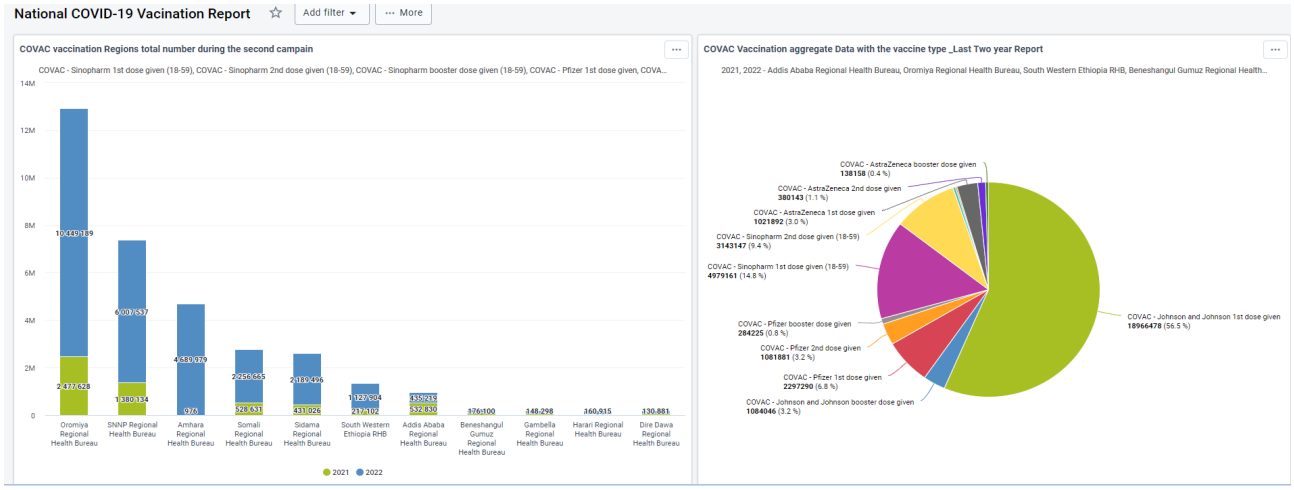

Figure 1: Sample COVID-19 vaccination dashboard used for decision making

During the second COVID-19 vaccination campaign, the daily data was digitally captured. Moreover, the reporting rate was consistently monitored and was presented timely to the national taskforce for informed decision-making.

Vaccination data coming through DHIS2 was disaggregated by regions, types of vaccines, age, sex, and other dimensions.

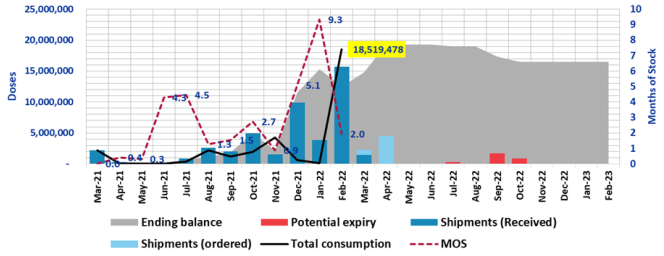

Figure 2: Sample dashboard developed by DHA showing the stock status of the COVID-19 vaccine

Lessons learned: The experience of DHA indicates the positive role of digital health interventions in times of crisis like the COVID-19 pandemic. Digital health interventions have been used to provide quality information for timely epidemic response decisions including improved visibility of essential supply chains at many levels. The digital health tools helped to reach various segments of the community with targeted messages on COVID-19 prevention methods. It is believed that the following six factors led to the rapid development, implementation, and adoption of digital tools:

1) **Coordination:** There was an expressed need in the health system for a rapid, more organized, data-driven and seamless collaboration among different actors to halt the spread of the infection. The systems approach to pandemic response is very important to ensure that all facets of the response pillars are not left unaddressed. The national COVID-19 response was designed with a systems approach and the success of the digital response is largely due to the comprehensiveness of the planning process which was organized into seven pillars including the digital response.

2) **Government-led:** The government's commitment and consideration of the pandemic as health, social, economic, and political priority paved the way for a swift digital health response.

3) **Demand for Digitalization:** The panic and the complexity surrounding possible COVID-19 transmission in paper-based information exchange accelerated the adoption of digital tools.

4) **Resource allocation:** The shifting of already limited resources by the government, partners, the private sector, and communities was crucial to fight the spread of the pandemic.

5) **Building on existing investments:** Previous and ongoing digital health investments played a critical role in serving as a springboard, rather than starting from scratch, in responding to public health emergencies and,

6) **One plan, one budget, and one report:** The government-led one plan, one budget, and one report approach augmented a rapid mobilization of financial, human, and other resources including digital platforms for timely, coordinated, and robust emergency response.

However, recurrent waves of the pandemic continue to hit the country causing significant morbidity and mortality. Hence, preventive measures such as vaccinations and the use of personal protective equipment remain the mainstay of the current prevention strategy. There are going to be new digital health innovations from all corners of the world to put an end to the pandemic.

It is important to continuously adapt to the context and improve digital tools by being responsive to evolving user needs for holistic epidemic response. Ongoing and future digital health interventions need to take these lessons from the COVID-19 digital health response to accelerate the overall health system digitization in Ethiopia.

Experiences from Health Posts' Mapping in Ethiopia

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Background

Health facility distribution plays a significant role in health service delivery, especially in low- and middle-income countries like Ethiopia. Linking health facilities with locations of health facilities allows for a more refined metric of health access, defines geographic inequalities in service provision, and informs planning (1). One of the strategic objectives of the Health Extension Optimization (HEP) roadmap is to improve access to essential health services by restructuring the existing health posts into three namely basic, comprehensive, and merged health posts (2) (3).

The categorization of health posts is based on their distance from the supervising health centers or primary hospitals (4). As per the roadmap, health posts that are located more than or equal to an hour (1 hour) walking time from the supervising health center or primary hospitals are categorized as comprehensive while health posts located in kebeles where the health centers or primary hospitals are existed supposed to be merged and become units in the health facilities. Health posts that are at reasonable distances from the supervising health centers or primary hospitals are categorized as basic health posts.

Basic health posts provide the current HEP service packages by improving their quality. Whereas comprehensive health posts provide services like delivery services and selected adult treatment besides services provided at the basic health posts. Merged health posts become units in health centers and provide HEP service through outreach (2). Hence, in Health Sector Transformation Plan (HSTP)-II, the MOH has planned to upgrade about 1500 health posts to comprehensive health posts. (5)

Geographic information about the health facilities was needed to measure the distance between the health posts and the health center or primary hospital. Therefore, exploring and analyzing the geospatial relationship or distance between locations of health centers or primary hospitals and catchment health posts is a principal factor to decide the type of health posts (4). The Ministry of Health in collaboration with its stakeholders has been engaged in mapping the health posts using geospatial data.

Successful decisions in locating health posts will improve the availability and use of essential health services by the community (1). In addition, the geo-location data of the facilities will help to build the Master Facility Registry (MFR) which serves as a major source of information for stakeholders for evidence-based decision-making.

This document aimed to describe the approaches, findings, challenges encountered, and lessons learned during health post-mapping.

Methods

Initially, the plan was to conduct a nationwide survey to map the existing health posts. Considering the time and cost needed to conduct the survey, the MOH decided to use the secondary data (geospatial data) collected for different purposes to analyze the distance between health posts and health centers or primary hospitals. We identified databases from government and non-governmental institutions like the Central Statistical Authority (CSA), the Ethiopian Public Health Institute (EPHI), and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) to explore the geospatial information of health facilities with their corresponding names.

With the careful investigation of digital tools, the Global Facility Reconciliation digital tool (GoFR) was selected and used to match and reconcile the name of health facilities from different data sources with the MoH facility name list. A team of experts from the Ministry of Health (MoH), the Ethiopian Geospatial Information Institute (GII), and partner organizations took part to reconcile and validate the facility lists through a series of workshops. In addition, we validated the GIS coordinates from different data sources representing the actual facility on a map using ArcGIS.

To facilitate the coordination and guide the implementation of this activity, a steering committee led by ministers from MOH, the Ministry of innovations and Technology, and CSA was set up, and the first ministerial-level meeting was held on January 27, 2021(fig.1).

Besides, a technical working group that includes experts from these ministries was formed to conduct the details of the activities. The technical working group met on weekly basis to review the accomplishments and challenges and identify issues that need intervention by the steering committee.

The technical team also prepared a guideline to decide the scope of work and guide the analysis processes. In parallel, GIS-based road network analysis was conducted from open data sources to estimate the distance and travel time from the health posts and supervising health centers or primary hospitals.

To validate the estimated distance and travel time using health facilities' geo-coordinates, we conducted a field verification by taking sixty-eight purposefully selected health facilities.

Table 1: Health facilities matched by name, 2022

Regions	Total identified public health Facilities with geo coordinates	Total Matched facilities by name
Gambela	300	170 (57.2%)
Benishangul-Gumuz	573	469 (83.9%)
Afar	453	369 (85.8%)
Addis Ababa	118	97 (86.6%)
Oromia	8345	6,826 (87.7%)
SNNP	4099	3,500 (88.0%)
Harari	40	36 (90.0%)
Amhara	4671	4,104 (92.1%)
Somali	1400	1,302 (93.0%)
Dire-Dewa	54	51 (96.2%)
Sidama	706	672 (96.6%)
Tigray	1006	961 (96.6%)
Total	21,765	18,557 (87.7%)

Result

More than twenty-one thousand public health facilities from twelve regional states were processed in the matching algorithm using CSA, EPHA, and OCHA databases as the major data source. Out of these, 18,557 (87.7%) of public health facilities were matched by name using the GoFR tool and manually (Table 1).

However, from a total of 18,557 health facilities that were matched by name from various sources, only 14,635 (67%) public primary-level healthcare facilities (11,103 health posts, 3,402 health centers, and 130 primary hospitals) were identified with correct geo-locations.

We analyzed travel time on foot and distance in kilometers of 11, 103 health posts from their supervising health centers or primary hospital based on their geocoordinates. The average distance between health posts and health centers or primary hospitals was 10.7 kilometers. The average time it takes to walk was 2.14 hours, the

lowest distance seen in the Sidama region (5.5 kilometers) and the highest in the Somali region (29.2 kilometers) (Fig 1).

The mapping exercises have shown that the proportion of health posts categorized as comprehensive health posts based on the recommended distance on the national HEP optimization roadmap (>/= 1 hour) is 64%. This number is far greater than the target estimated on the roadmap which is 5,276 health posts by 3035 GC.

We have also conducted field-level verification to confirm whether the calculated distance was correct or not by taking a sample of sixty-eight facilities from five woredas of Oromia, Sidama, and SNNPR. The finding showed that 95% of the health facilities were correct in terms of their location and the distance from the supervising facilities.

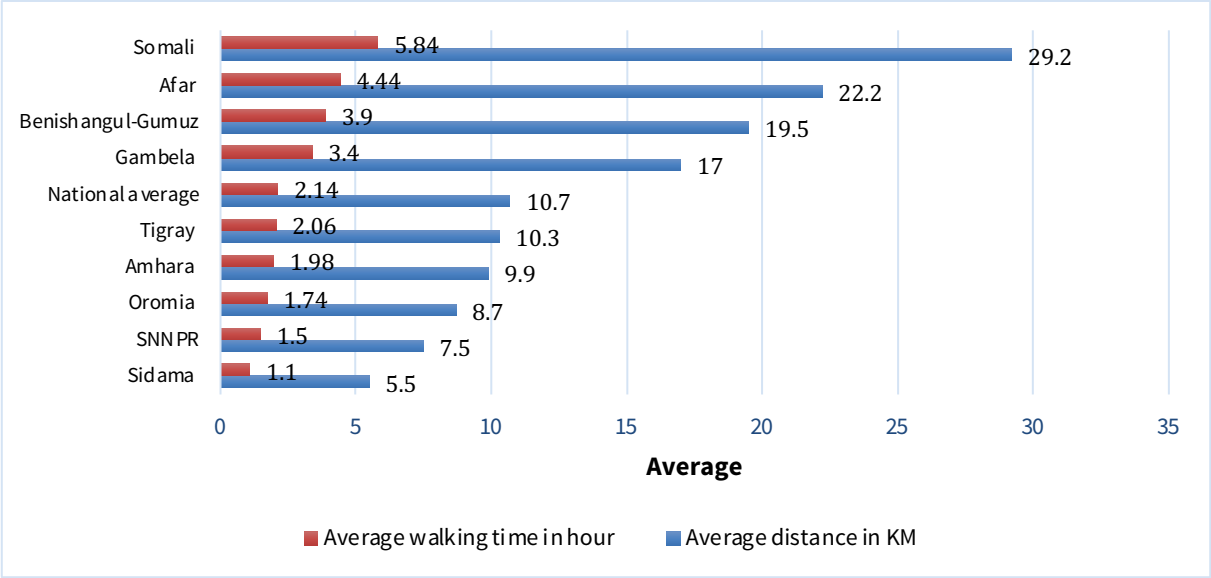

Fig. 1: Average distance and walking time of health posts from their supervising health Health Centers or primary hospital

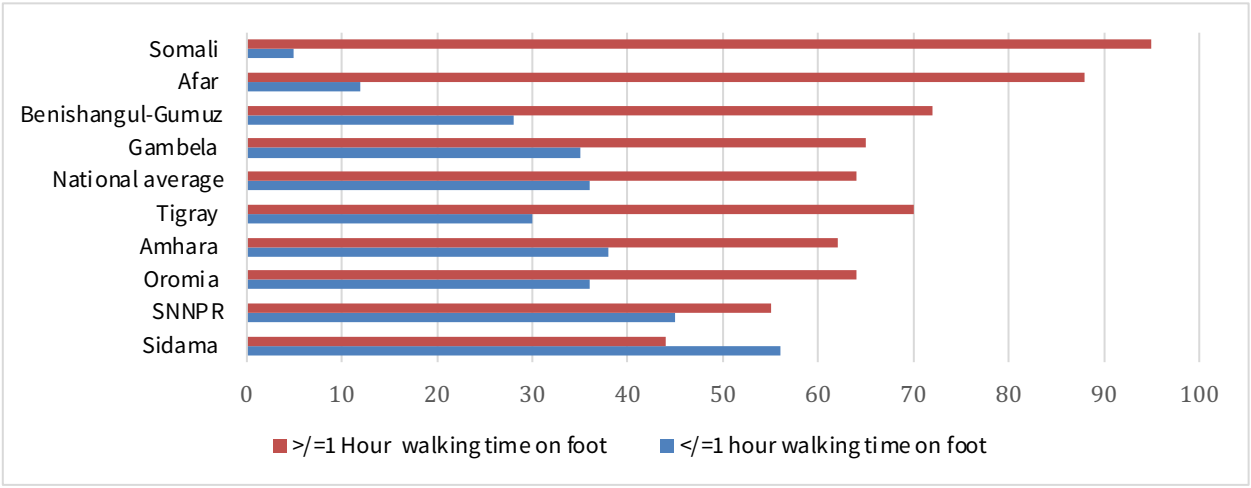

Fig.2: Average travel time between health posts and supervising health centers or primary hospitals

Conclusion and recommendations

The geospatial data for health facilities will enhance the Master Facility Registry (MFR) which will serve as a central authority to collect, store, and distribute updated and standardized health facility data. The outputs from these processes will also enhance GIS-enabled data analysis, quality, and use. GIS-enabled

Strong collaboration between the stakeholders and leadership commitments enabled us to successfully map out about 60% of the health posts efficiently. However, collecting primary data and using other various sources to map the remaining 40% of the health posts is recommended.

Even though, there are multiple data sources to abstract health facilities with their geo locations and conduct further analysis including their distributions and accessibility-related information, reconciling these data with the standard nationally accepted names of the health facilities was exceedingly difficult due to the inconsistent use of facility naming and administration boundary.

Using only distance or walking time between the health posts and health centers or primary hospitals as criteria to categorize the health posts per the HEP optimization roadmap might not be realistic. Therefore, criteria such as catchment population, disease burden, facility distributions, or distance between them must be considered to categorize the health posts.

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Mapping of Early Childhood Development Actors and Programs at the National Level in Ethiopia

Early Care International (https://www.earlycareinternational.dk) and Civil Connections Community Foundation (https://civilconnections.org), Copenhagen, Denmark

Introduction: This report presents a high-level summary of findings and recommendations from a recent mapping study of Early Childhood Development (ECD) Programs and Actors at the national level in Ethiopia. The study was initiated and supported by Early Care International (ECI): https://www.earlycareinternational.dk) and Civil Connections Community Foundation (CCCF): https://civilconnections.org), with financing from CISU-Civil Society in Development and implemented in collaboration with a local partner, Education for Sustainable Development (ESD).

Study Objectives and Methods

The objective of the mapping study was to identify the various government and civil society organizations (CSOs) engaged in early childhood development (ECD) programming, the existing ECD program coordination mechanisms at the national level in Ethiopia, and potential opportunities for effective collaboration.

Respondent Categories	Sampled Institutions
Government actors engaged in ECD	Ministry of Education (MoE) Ministry of Health (MoH) Ministry of Women and Social Affairs (MoWSA)
International actors engaged in ECD programming	UNICEF The World Bank Group Save the Children Child Fund PATH Partnership for Change (PFC) USAID Transform Primary Health Care (TPHC) Imagine One Day
Local CSOs engaged in ECD	WhizKids Ethiopian School Readiness Initiative (ESRI)

The study used a participatory qualitative design. A mapping team was established involving representatives of key ECD actors from government sector ministries, CSOs, academics, and research Institutions. The team led the design, data collection, as well as review and validation of findings and recommendations drawn from the study. Key Informant Interviews were undertaken with representatives of selected ECD actors and the information was substantiated with a document review. The study was conducted in July 2022.

Main Findings

ECD policy landscape and operationalization in Ethiopia.

Demonstrating its commitment to ECD, the Ethiopian government developed the first cross-sectoral national policy framework for Early Childhood Care and Education (ECCE) in 2010. Furthermore, additional policy measures, including the development of the national ECCE curriculum and endorsement of a civil service proclamation (number 1064/2010 E.C.), which requires government institutions to establish a workplace nursery and day care center where female civil servants could breastfeed and care for their babies, was realized.

A guideline and a minimum standard of services for a day care center at the workplace have also been developed following the passing of the proclamation. In 2021, Ethiopia revised the 2010 policy framework and developed the new "Early Child Development and Education Policy Framework". The National Health Sector Transformation Plan for Early Childhood Development (2021-2025) has also been developed recently following the revision of the national ECDE policy framework.

However, the mapping study revealed that ECD policy implementation has generally been low at all levels, despite better national implementation than sub-national levels. Weak multisectoral coordination, absence of solid implementation structure, budget and human resource constraints, lack of an effective system for performance monitoring and accountability, and

low policy adoption at sub-national levels were critical barriers to ECD policy implementation.

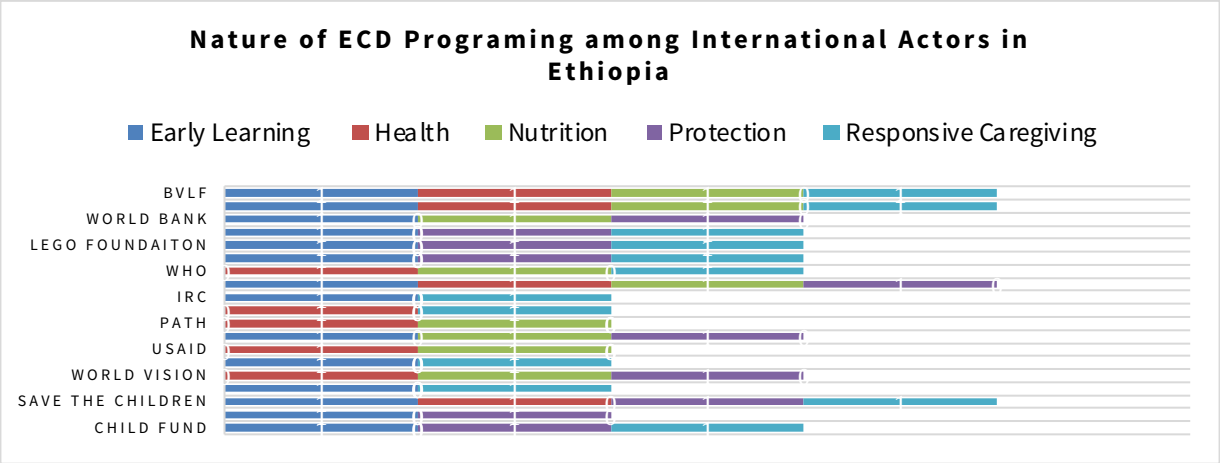
On the other hand, increased government political will for ECD and the inclusion of ECD in social sector plans, other supportive policies, the interest, and influence of international actors, and existing grassroots structures that support ECD policy implementation are among the key opportunities to enhance implementation of the ECD policy framework at the national level.

Key ECD actors and programs in Ethiopia

The Ministry of Education (MoE), Ministry of Health (MoH), and Ministry of Women and Social Affairs (MoWSA) are the main government actors engaged in ECD policy and programming at the national level. UN agencies such as UNICEF and WHO; bi-lateral agencies such as USAID and DFID; donors and embassies such as the World Bank Group, Big Win Philanthropy, BvLF; Embassies such as the Embassy of Finland, Ireland, Sweden, Denmark, Norway, and the Netherlands; INGOs such as Save the Children, Partnership for Change (PFC), World Vision and Child fund were identified by key informants as among the key international actors influencing ECD policy and programming in Ethiopia.

While the priority area of interest in ECD programming among these actors varied, they demonstrated high interest and power to influence ECD policy and programming at the national level through financing ECD programs of government and partners, provision of technical support during ECD policy development and implementation as well as advocacy and lobbying for policy revision and improved ECD implementation.

The study showed that early learning programs, followed by responsive caregiving and health, were the major program focuses among international actors. In contrast, only nine of the 19 international actors identified implemented or supported nutrition programs or interventions.



Very few local CSO actors are engaged in implementing ECD programs at the national level. The main local CSO actors identified include the Ethiopian School Readiness Initiative (ESRI), WhizKids, Ratson, Addis Development Vision, Women Health Association of Ethiopia, Education for Sustainable Development (ESD), etc. Most of these local CSOs were engaged in supporting play-based early learning programs, as indicated in the key informant interviews. Existing ECD program coordination mechanisms

Since the launch of the national ECCE policy framework in 2010, the three key ministries have established a few government-led mechanisms and platforms to coordinate the implementation of the policy framework, regularly review the policy framework, and discuss improvement areas for better implementation and achievement of outcomes. The mapping study identified coordination mechanisms for ECD programming in the government ministries.

The National ECCE/ECDE taskforce is one of the existing government-led ECD coordination mechanisms identified. Established to facilitate the development and implementation of the 2010 ECCE policy framework, the task force served as a robust coordination mechanism under the leadership of the MOE with technical support from UNICEF and other partners. Furthermore, the MoH is currently leading a national TWG on ECD, which involves members from the key government ministries, international NGOs, UN agencies, and local CSOs engaged in ECD programming at the national level. These coordination platforms involve a diverse group of relevant actors where representatives actively participate during coordination meetings, and decisions of the TWG are mostly implemented. However, these coordination platforms have limitations concerning inconsistent participation of members and lack of regularity of meetings. The existing government-led coordination platforms also lack a shared vision and a transparent system for accountability of members involved and demonstrate limited efforts to ensure harmonization and alignment of resources and funds for better ECD outcomes among members, ECD partners, and stakeholders.

The national ECD policy framework stipulates that government actors should play a leading role in enhancing coordination among key government, and international and local CSOs engaged in ECD programming. However, the efforts and initiatives carried out so far in ensuring functional and sustainable multisectoral coordination among key actors have generally been ineffective. The coordination and collaboration effort on ECD between the national government actors, international NGOs, and local CSO actors has generally been need-based, irregular, intermittent, and weak.

The study also showed that level of representation of local CSOs in government-led coordination mechanisms has generally been low. The government has given limited attention to establishing common coordination mechanisms or forums that ensure the meaningful involvement of a representative number of local CSOs and that their voices are heard in such forums. The role of CSOs in using government coordination platforms for advocacy and influencing government actors on ECD policy and programming has generally been insignificant. Limited representation of CSOs in government-led coordination platforms and gaps in government sector offices concerning mapping ECD program partners were some of the reasons for the limited CSO advocacy role.

There are several approaches through which INGOs are partnering with local CSOs to advance ECD programming and implementation at the national level. Advocacy, sub-granting, provision of technical assistance, and piloting of new ECD models are some of the main mechanisms through which INGOs collaborate with local CSO actors engaged in ECD programming. However, none of the key informants interviewed were aware of any existing and currently functional ECD coordination mechanism led by INGOs or local CSO actors. Key informants also stated that most local CSOs engaged in ECD programming do not know what specific ECD programs or activities each INGO or local CSO is engaged in.

The study identified major weaknesses, existing opportunities and potential threats associated with existing ECD coordination mechanisms led by government actors. The figure below summarizes some of these finding.

Major weaknesses	Existing Opportunities	Potental Threats
•Absence of ECD structure and workforce in key government ECD sectors, particularly at sub national levels •Budget constraints; •Unavailability of functional and effective system for joint performance monitoring and accountability; •Irregularity of coordination meetings •Limited representation and role of local CSOs in government led coordination platforms •High staff turnover	•Availability of National policies and strategies that support multisectoral coordination for ECD •Growing interest and commitment of INGOs and local level civil society organizations •Availability of functional grassroot level structures such as HEWs,WASHCO, HDA, community based Child Protection Committees	•Weak institutional capacity and structure on the part of government sectors to effectively and sustainably lead a strong multi sectoral coordination platform for ECD; •Limited funding for ECD programming; •Lack of collective outcomes and lack of shared vision among the ECD actors; •Internal conflict and political instability •Decreased donor interest and funding due to the ongoing conflict and security situation in the country

Recommendations

In light of the main findings, the following recommendations are made to enhance ECD programming and multisectoral coordination at the national level.

- Establishing and strengthening multisectoral joint planning, monitoring, reporting and accountability systems and frameworks
- Enhancing CSO representation and role in ECD coordination mechanisms.
- Supporting validation, familiarization, and dissemination of the Revised ECDE Policy Framework (2021) at national, regional and sub-regional levels
- Strengthening Addis Ababa University knowledge hub on Early Childhood Development and Education.
- Provision of technical assistance and advocacy efforts targeting key government ECD actors.
- Budget Advocacy to influence key government sectors.

Reproductive Health Financing in Ethiopia: Results from 2019-20 National Health Account Study

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Introduction

This brief is intended to give guidance to sexual and reproductive health policymakers on the critical issues in health-care financing that affect the financial sustainability of sexual and reproductive health services and programs.

Ethiopia has made significant progress in improving many health indicators including reproductive health [4]. The government of Ethiopia ensures its commitment towards reproductive health by making available the service in all public health facilities and also about 82 % of the private health facilities are providing family planning services [1]. A significant improvement has been achieved in various reproductive health indicators between 2000 and 2019 such as the contraceptive prevalence rate increased from 8.1% to 41%[2], life expectancy at birth increased from 45 to 65.5 years, total fertility rate reduced from 7.7 to 4.6, and maternal mortality ratio reduced from 1,400 to 401 per 100,000 live births [6]. However, utilization of reproductive health services varies significantly across regions. Despite these improvements, Ethiopia should attempt to sustain the achievements by allocating an adequate budget to reproductive health services. Because these services are provided free of charge and their commodities are highly donor-funded, given the current funding landscape with declining external assistance, the government may not adequately finance programs in the absence of external assistance unless other innovating financing mechanisms are implemented.

The eighth health account (2019/20) study breaks down spending by the standard disease classifications, financing sources, financing schemes, financing agents, level, type of provider, and health function [3]. Total health expenditure (THE) increased from ETB 72 billion (USD 3.1 billion) in 2016/17 to ETB 127 billion (USD 3.62 billion) in 2019/20. In 2019/20, total health expenditure accounted for 6.7% of the country's GDP. The share of financing by source among government, households, and donors was 32.2%, 30.3%, and 33.9% respectively [3].

Reproductive health spending in Ethiopia

The SHA 2011 framework is an internationally comparable standard for reporting expenditure on health. It classifies health expenditures according to the tri-axial accounting framework of consumption, service provision, and financing to provide policymakers with timely and accurate information [7].

EPI expenditure was analyzed based on the NHA data for which the data was collected from various sources grouped as primary and secondary that includes All line ministries/agencies with health-related activities and universities; bilateral and multilateral donors, International and local NGOs, employers, and insurance companies. Furthermore, the HSTP II document, government expenditure from IBEX/IFMIS database, OneHealth tool, DHIS2, ARM reports, SDG pool fund reports, and others are used as data sources.

This reproductive health sub-account review is an exercise to analyze and compare all reproductive health sub-accounts to better understand how much money was spent on reproductive health as a share of total health expenditure. Likewise, it discusses who finance, who manages the resources, and where the resources were invested. The total spending on reproductive health showed an increasing trend from US$ 228 in 2016/17 to US$ 453 in 2019/20 which is almost a 100% increase [3,4].

Reproductive health took 12.5% of THE, of which 44% went to maternal conditions and 29% to family planning programs. Perinatal care shared 13% of total spending on reproductive health, while 11% of reproductive health expenditures was spent on unspecified reproductive activities.

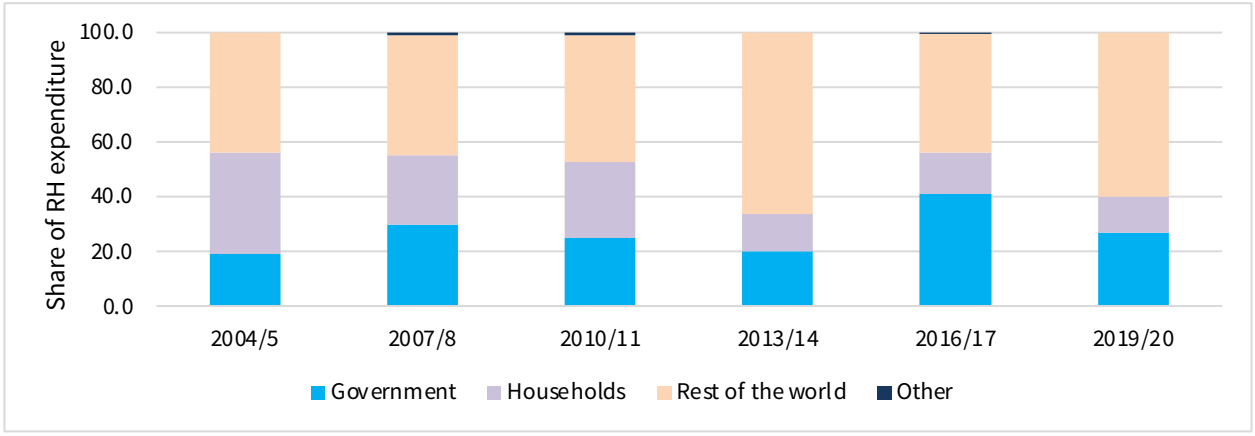
Table 1: Reproductive Health Expenditures: Findings from the Health Accounts, 2019/20 [3]

Total Health Expenditure on Health	ETB127.47 billion (US$ 3.63 billion)
Total Expenditure on Reproductive Health	ETB 15.89 billion (US$ 0.453 billion)
Total Expenditure on Reproductive Health as % Total Health Expenditure	12.5%
Sources of Reproductive Health spending	27.3% government, 60.1% rest of the world, and 12.7% households.
Entities that manage reproductive health spending	62.7% government, 23.9% Donors and NGOs, 12.3% Households and others unspecified 1.1%
Health care providers of Reproductive Health services	37.7% providers of ambulatory health care, 41.8% providers of health care system admin & financing, 21.5% hospitals, 0.3% retailers & other providers of medical goods, providers of preventive care 1.1% and unspecified healthcare providers 3.1%.
Types of Reproductive Health services/functions	31.5% curative and rehabilitative care, 22.3% preventive care, 44.8% governance, health system financing, and 0.8% others.

Source of reproductive health expenditures

In 2019/20, thanks to development partners and major bilateral and global health initiatives, resources for reproductive health have grown substantially. Unlike the seventh NHA, development partners spending on reproductive health increased while the government spending on reproductive health substantially reduced from 41.2% (2016/17) to 27.2 % (2019/20). When more resources from development partners are available to reproductive health programs, the government share decline in 2019/2020 could be manifested as appropriate allocative efficiency by relocating government resources to other programs.

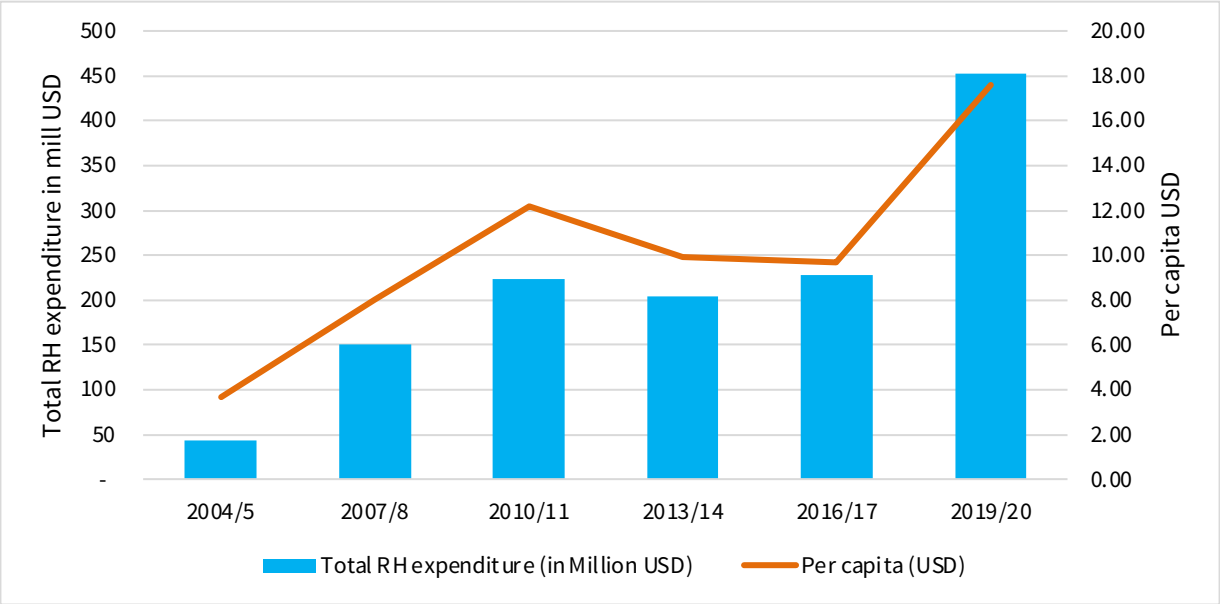
Figure 1: Source of reproductive health finance (in million USD)



Patterns of reproductive health spending over time

The donor spending on reproductive health which increases from 43.6% in 2016/17 to 60.1% in 2019/20 reflects the reliance of the program on external assistance. The expenditure trend has shown a volatile share among donors and government on reproductive health spending while households' expenditure shares substantially decrease over the last two decades.

Figure 2: Reproductive health expenditure trend



The per capita spending on reproductive health increased from US$3.7 in 2004/5 per woman at reproductive age to US$12.2 in 2010/11 but declined to US$9.9 in 2013/14 and again slightly declined to US$ 9.7 in 2016/17. However, in 2019/20, with a more than 80% increase, the per capita expenditure on reproductive health was US$ 17.59.

The per capita reproductive health expenditure trend has shown that the substantial increase on reproductive health expenditure was still not adequate compared to population growth, especially for women in reproductive health.

Recommendations and Policy Implications

1. Reproductive health expenditure must continue to increase in line with population growth.
2. Continuously measure the commitment of resources being allocated to FP and RH activities by the government, donors, and the private sector.
3. Regardless of a one-time project-based budget increase on reproductive health from development partners, government spending on reproductive health should be significantly increased.
4. Develop an appropriate exempted health service financing scheme to sustain the reproductive health results.
5. Reproductive health program requires a functioning health system and effective delivery of an integrated package of services that can be revitalized through a performance-based financing mechanism.

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COVID-19 financing in Ethiopia: results from the 2019/20 National Health Account Study

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Introduction

This policy brief is intended to give guidance to COVID-19 resource mobilization and allocation that affect the effective use of the resources and alignment and harmonization with the regular healthcare financing system.

Ethiopia is currently experiencing a range of hazards as a result of climatic conditions, conflict, and most recently the COVID-19 pandemic. Addressing these hazards and their impacts has inevitably diverted resources from planned development investments including health system strengthening, to emergency response. Although Ethiopia has made significant progress on various health indicators in the past several years, the COVID-19 pandemic disrupts the health system and challenges it to maintain its achievements so far. However, the Government of Ethiopia, over the past two years, has strengthened its preparedness efforts and has set up national preparedness and response coordination mechanisms.

COVID-19's first case was reported in Ethiopia in March 2020 but according to the NHA VIII calendar, it includes the 2012 E.C (2019/2020 G.C) expenditure which has about half-year COVID-19 expenditure.

Table 1: COVID-19 Expenditures: Findings from the Health Accounts, 2019/20

Total Health Expenditure	ETB127.47 billion (US$ 3.63 billion)
Total Expenditure on COVID-19	ETB 6.6 billion (US$ 189.4 million)
Total Expenditure on COVID-19 as % Total Health Expenditure	5.2%
Sources of COVID-19 spending	50% government, 42% rest of the world, and 8% Private.
Entities that manage COVID-19 spending	91.3% government and 8.7% by development partners
Health care providers of COVID-19 services	56.4% Hospitals, 24.8% providers of ambulatory health care, 15.7% providers of health care system admin & financing, and providers of preventive care 2.4%.
Types of COVID-19 services/functions	70.6 % preventive care, 15.4 % curative and rehabilitative care, 13.1 % governance, health system financing, and 0.8% others.

The COVID-19 pandemic control and prevention program in the Ethiopian national health system is financed through domestic funds from the state budget, private sector investments, and external funds received from bilateral and multilateral donors. In addition to this, the Ministry of Health by repurposing existing resources, avails resources for COVID-19 purposes.

In the eighth round of HA (2019/20), for the first time, COVID-19 pandemic expenditure was tracked. Accordingly, the total (recurrent and capital) COVID-19 expenditure in Ethiopia was estimated at Birr 6.6 billion (US$ 189.4 million). In 2019/20, total COVID-19 expenditure accounted for 5.2% of the total health expenditure. Of the infectious and parasitic diseases total expenditure, the COVID-19 expenditure share is 11.3%.

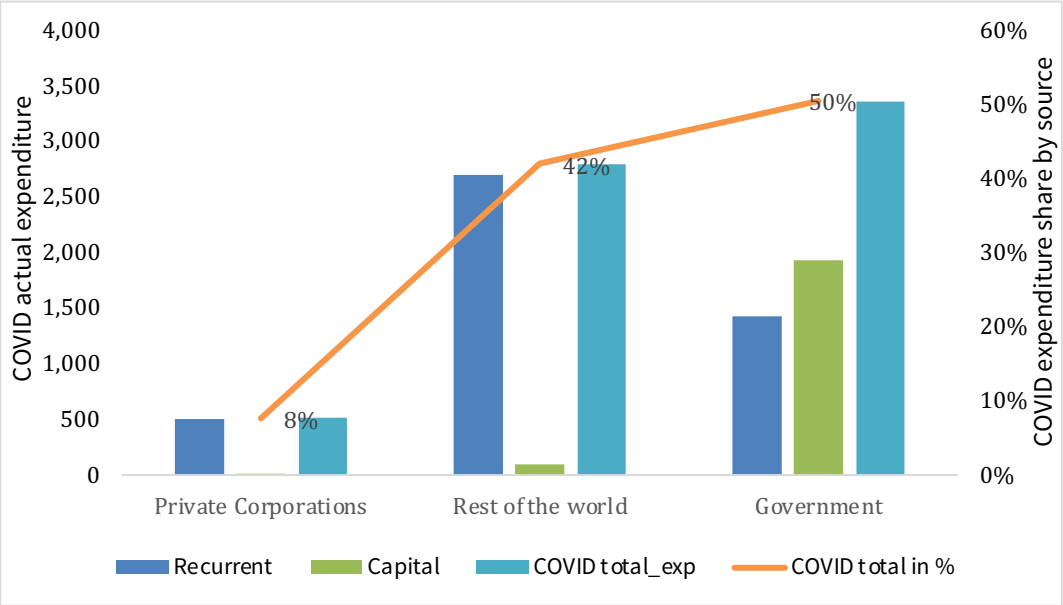

Figure 1: Financing source of COVID-19 prevention and management

The source of COVID-19 expenditure in 209/20 was primarily Government with 50% followed by development partners with 42% and the remaining 8 % was from private corporations and others that include but are not limited to manufacturers, importers, service providers, and new entrepreneurs. The resource types were financial, in-kind (material, equipment, and infrastructure), and HR and technology. The share of COVID-19 recurrent spending in 2019/20 was 70%, while 95% of the capital expenditure was financed by the Government of Ethiopia.

The per capita total health expenditure including COVID-19 expenses was USD 36.3 in 2019/20 but excluding COVID-19 it stood at USD 34.4 with about a USD 1.18 increase from the 2016/17 per capita expenditure. This justifies that the major health expenditure increases in 201920 were due to the COVID-19 pandemic. Though more additional resources were expected to finance the COVID-19 recovery and management, in contrast, the majority of resources were availed by repurposing existing resources.

Nearly three-fourth of the COVID-19 emergency response expenditure was on preventive care. This is followed by curative care services, which accounted for 15.4% of COVID-19 emergency response recurrent health spending in 2019/20.

Governance and health system administration accounted for a little over 10% and the remaining less than 1% went to other health functions, including long-term care, medical goods not specified by the function, and other health care provisions (Figure 3).

In the 2019/20 national HA study, 56.4% of total COVID-19 emergency response expenditure was spent at hospitals

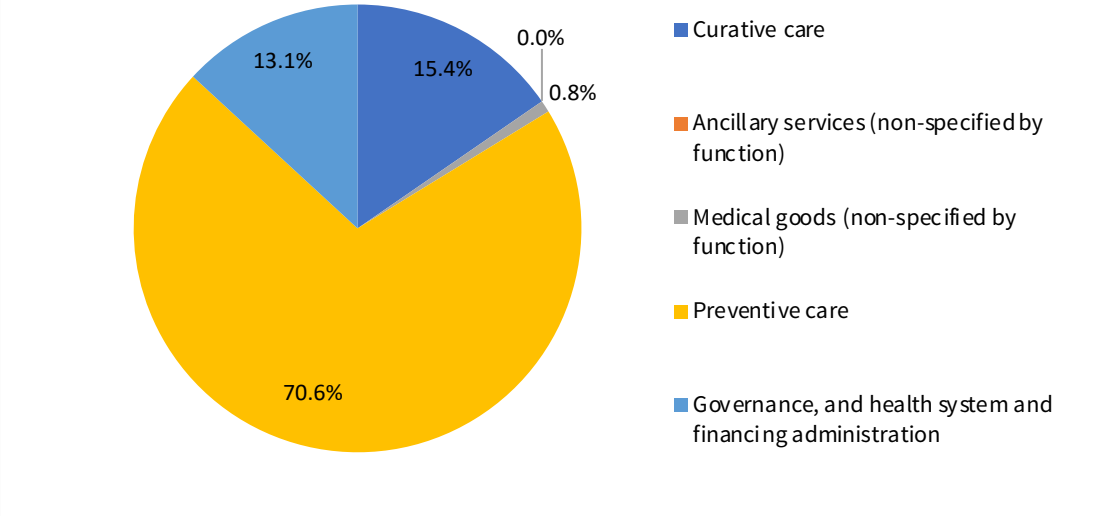

Figure 3 COVID-19 spending by care type in 2019/20

Providers of ambulatory care took the next largest share (24.8%) of the 2019/20 total COVID-19 response expenditure. Expenditure on providers of health care system administration and financing was 15.7% and providers of preventive care took 2.4% of the total COVID-19 expenditure in 2019/20.

Recommendations and Policy Implications

- Fund management is a key function regardless of who finances it as it determines where, for what purposes, and how expenditures are made.
- Improve the budget execution and fund release to frontlines. Implement an expedited budget allocation, distribution, and utilization system.
- In 2019–20, although new funding was anticipated to support the COVID–19 recovery and management, most resources were instead obtained by reallocating existing funding. This has a major impact on the already underfunded system of routine healthcare.
- Accurately record and report and monitor the efficient use of the private sector and community contributions for COVID-19 prevention and management.

Tuberculosis Financing in Ethiopia: Results from the 2019/20 National Health Account Study

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Introduction

Tuberculosis (TB) is a contagious disease that is a major cause of illness in the World, and TB was the biggest cause of death from a single infectious agent until the coronavirus (COVID-19) pandemic, ranking above HIV/AIDS (GBD, 2020). The TB death rate per 100,000 population has decreased from 20.34 in 2017 to 19.12 in 2020 in the global population. In Africa, it has decreased from 59 in 2017 to 49 in 2020, as shown in table 1.

Table 1: Basic TB Indicators

Year		2017	2018	2019	2020
Ethiopia	TB death rate per 100,000 population	28.20	24.72	21.41	19.14
	TB - disability-adjusted life-years (DALYs) per 100,000 population	1,336	1,261	1,189	1,121
	People newly diagnosed and reported (notified)	116,725	110,675	110,961	102,876
	TB incidence rate per 100,000 population	164	151	140	132
Africa	TB death rate per 100,000 population	59.49	54.16	49.95	49.11
	TB - disability-adjusted life-years (DALYs) per 100,000 population	1,802	1,708	1,627	1,547
	People newly diagnosed and reported (notified)	1.55 million	1.69 million	1.71 million	1.4 million
	TB incidence rate per 100,000 population	243	234	226	220
Global	TB death rate per 100,000 population	20.34	19.17	19.02	19.12
	TB - disability-adjusted life-years (DALYs) per 100,000 population	654	630	608	586
	People newly diagnosed and reported (notified)	6.4 million	7 million	7.1 million	5.8 million
	TB incidence rate per 100,000 population	135	133	130	127

Source: Compiled from MoH-health and health-related indicators (MOH, 2021), Global tuberculosis reports, and GBD Compare (GBD, 2020)

Ethiopia has made remarkable progress over the last decade to reduce the burden of TB and is on track to achieve one of the three targets of the global End TB Strategy (WHO, 2015), but it remains a major public health problem, claiming the lives of thousands of Ethiopians every year. Although Ethiopia has transitioned out of the list of the 30 high MDR/RR-TB burden countries, it is still among the 30 high TB and TB/HIV burden countries in the world. According to MoH health and health-related reports, 116,725 in 2017 and 102,876 in 2020 TB cases were people newly diagnosed and reported in the country. Furthermore, the TB death rate per 100,000 population has decreased from 28.2 in 2017 to 19.14 in 2020 in Ethiopia.

The Government of Ethiopia has given due attention to the control of TB and included the prevention and control of TB among the priority health programs in the country's health sector transformation plan (HSTP), aligning with the globally recommended End TB Strategy. Even though the COVID-19 pandemic and other political unrest are expected to cause new problems, the government has continued to build on the successes it has already had and find ways to deal with the problems that slow progress. The health system is changing in this way, and the population's health is improving. The national health account (NHA) has regularly tracked the flow and size of health spending in the health systems based on the system of health accounts 2011 (SHA 2011) framework. This is because the structure of financial flows is one of the most important parts of developing and implementing policies for specific programs (HIV, TB, malaria, RH, nutrition, NTD, NCD, etc.) as well as the general health system.

To understand the flows of funds throughout the health system, the Government of Ethiopia has conducted eight rounds of National Health Account (NHA) studies since 2000. These different studies found that the Ethiopian health system's financing sources come from public, private, and donor funding. As shown in Figure 1, Ethiopia's per capita health expenditure has grown steadily over the past two decades, from USD 4.50 in 1995/96 to USD 36.40 (including COVID-19 spending) in 2019/2021. Though this growth is encouraging, the amount is still very low compared to the USD 43 average per capita health expenditure among low-income African countries (WHO, 2022), and it is far less than the $86 per capita spending recommended by the World Health Organization (WHO) for delivery of essential health services (Matthew Jowett).

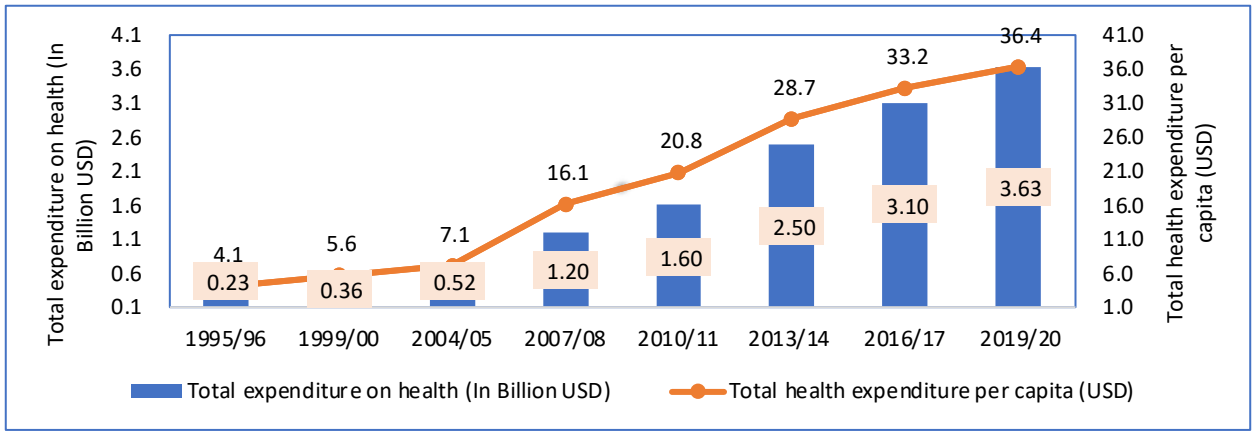

Figure 1: The Total and per capita health expenditure trend (In USD from 1999/00-2016/17)

With all this, it is also important to break down aggregate health expenditure information by specific health issues to provide more precise evidence to policymakers. Therefore, this policy brief presents the overall picture of health expenditure on TB programs and answers the following questions, such as: Who finances the TB program? How much is spent, and where do the funds go? Are funds reaching their intended target populations? What is the burden of TB financing on households?

Overview of TB Expenditure in Ethiopia

The total TB expenditure has increased from USD 57.2 million in 2013/14 to USD 65.5 million in 2016/17 to USD 66 million in 2019/20, but the share of total health expenditure spent on TB has decreased from 2.4 percent in 2013/14 to 2.1% in 2016/17 to 1.8% in 2019/20. Furthermore, the expenditure per diagnosed and reported case of TB has increased from USD 490 in 2013/14 to USD 642 in 2019/20, but it is still less than one dollar per capita (USD 0.7) (CSA, 2019).

Table 2: TB Expenditure in Ethiopia

Key indicator	2007/08	2010/11	2013/14	2016/17	2019/20
Total expenditure on health (In Billion ETB)	11.1	26.50	49.57	72.05	127.47
Total expenditure on health (In Billion USD)	1.2	1.60	2.50	3.10	3.63
Total expenditure on TB (ETB million)	439	848	1,186	1,521	2,319
Total expenditure on TB (Million USD)	47.5	51.20	59.81	65.5	66.00
Total Expenditure on TB as % Total Health Expenditure (THE)	4.0%	3.2%	2.4%	2.1%	1.8%
People newly diagnosed and reported (notified)	126,106	151,866	116,633	116,725	102,876
TB expenditure per case (diagnosed and reported) in USD	377	337	513	561	642
TB expenditure per Capita in USD	0.64	0.66	0.69	0.70	0.66

Source of TB health financing

As shown in figure 2, the major source of financing for TB care services was donors, followed by households and the government, respectively. The share of donors in TB spending has varied between 22% and 51% since 2007/08, which is a maximum share of 51% in 2010/11, whereas the minimum share is 22% in 2007/08. As expected, considering the relatively low TB government expenditure (which varies between 10%-14% of the last decade), Out-of-pocket (OOP) payments continue to play a significant role in TB financing, which is on average 45% of the total TB financing since 2007/08. This OOP's share of the total spending (either specific program or the overall health system) is higher than the 15% and 20% thresholds suggested by the WHO to minimize financial catastrophe and impoverishment due to accessing health care services (WHO, Health System Financing, 2010). In general, the fund is the main source of international donor funding in many countries, especially in low-income countries and several high-burden, lower-middle-income countries.

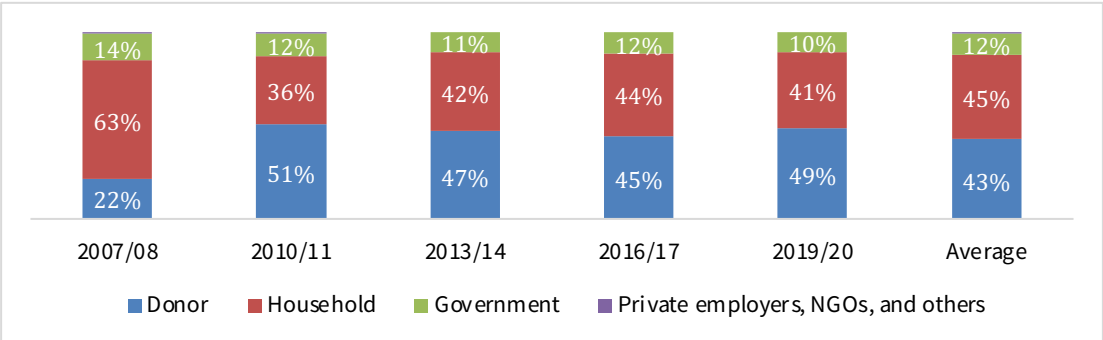

Figure 2: TB Expenditure by Source of Financing

Management of the TB resources

Government and households were the major entities managing resources for TB in 2019/20. Government and Household had managerial responsibility for 32 percent and 41 percent of the total spending respectively. The rest of the world managed about 27 percent of the TB resources.

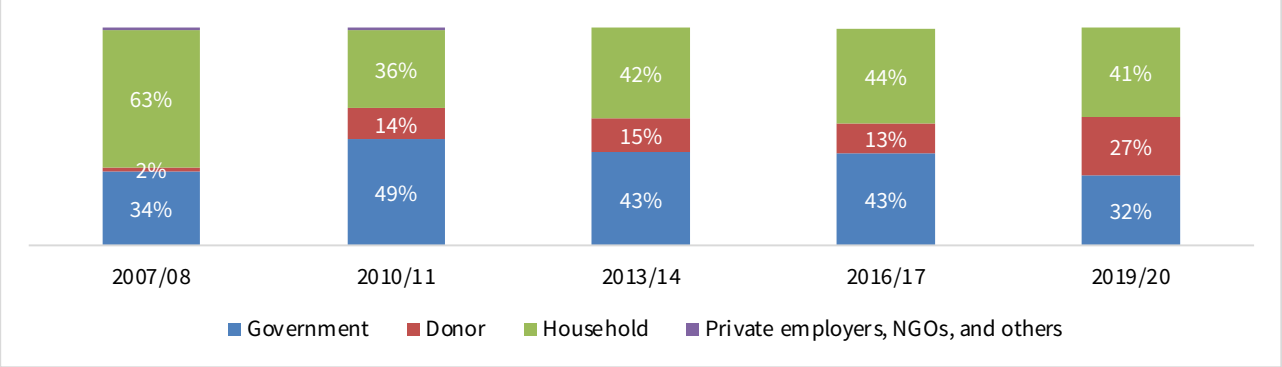

Figure 3: TB Expenditure by Financing Agent

Providers of Tuberculosis Care

Public hospitals were the major recipients of TB resources in the last decade: On average, over the last decade, public hospitals (primary, secondary, and tertiary) were the primary recipients of TB resources, accounting for approximately 31 percent of total TB spending. About 20.5 percent went to health centers and health posts. Ancillary service providers received 13 percent of total TB expenditure, followed by 10.4 percent of private and other hospitals, 9.6 percent of private and NGO clinics, 7.0 percent of health care system administration providers, 4.4 percent of independent pharmacies, and 3.7 percent of preventive care providers.

Table 3: TB expenditure by health care providers (%): 2007/08-2019/20

Provider	2007/08	2010/11	2013/14	2016/17	2019/20	Average (2007-2020)
Health center and health post	10%	14%	16%	15%	49%	20.5%
Primary hospital	17%	23%	26%	40%	20%	25.1%
Secondary hospital	5%	7%	8%	1%	4%	4.9%
Tertiary hospital	0%	1%	1%	1%	3%	1.1%
Private and NGO clinics	5%	6%	16%	16%	5%	9.6%
Government health administration	22%	2%	3%	3%	5%	7.0%
Providers of ancillary services	3%	25%	21%	3%	13%	13.2%
Private and other hospital	36%	15%	0%	0%	1%	10.4%
Providers of preventive care	1%	6%	7%	4%	1%	3.7%
Independent pharmacies	1%	2%	3%	16%	0%	4.4%

Total TB expenditure by healthcare function The bulk of TB spending has been used for outpatient curative care in the last decade. On average, in the last decade, about 62 percent of TB funds were used for TB outpatient care, followed by preventive care, which accounted for 23 percent, inpatient care for 7 percent, and others, including governance, health system financing, and others, for 8 percent.

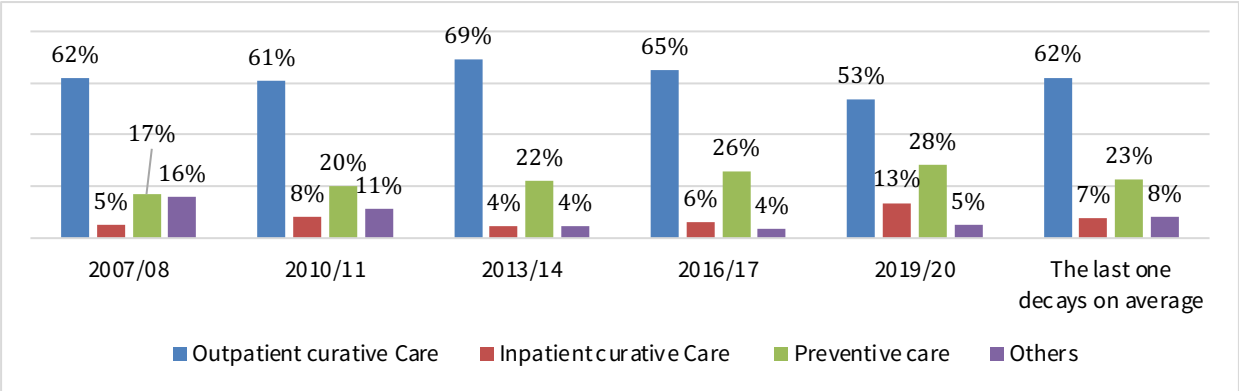

Figure 4. Share of total TB expenditure by healthcare function

3. Policy Implications

Though TB health spending is steadily growing both in overall volume and per capita terms, the government makes a little contribution. The contribution of domestic funding of the TB program by the government of Ethiopia needs to increase to keep up with the increasing expenses required for TB to give all of its citizens the essential health services they need and achieve the goal of universal health coverage sustainably.

Dependency on external funding, especially for TB care, should be reduced to ensure more predictable and sustainable funding for health. Ethiopia needs more domestic resources for health in the longer term, and this will require adopting innovative financing strategies in addition to a significant increase in government budget allocation to health.

Although TB services are exempted services in the health system, the second majority of sources of financing for TB programs, as shown from households and studies done to date on health financing in Ethiopia, had limitations in assessing the implications of health care costs on catastrophic and impoverished areas due to TB in depth. Hence, assessing the role of TB out-of-pocket health expenditure should be taken into consideration for informing policy on the need to incorporate health financing designs into poverty reduction programs and for highlighting the urgent need to ensure that the end TB strategy's goals and health financing systems offer financial protection specifically to achieve zero catastrophic costs due to TB.

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Digital Health System: Use of Simple App for Quality Improvement of Hypertension Care in Ethiopia

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Introduction

The Ministry of Health Ethiopia, in it is second health sector transformation plan (HSTP-II), has set a goal of improving the health status of the population by accelerating progress toward universal health coverage (UHC), protecting people from emergencies, transforming Woredas and enhancing the health system's responsiveness. Among the strategic directions toward the achievement of such objectives are 1). Improving evidence-based decision making and 2). Enhancing the use of digital health technologies. In this regard, the Ministry of Health (MOH) has given priority to improving the availability and use of quality health information for evidence-based decision-making using appropriate digital health technologies. Routine health care and patient-level data recording and documentation through a standard system are vital for the improvement of the health care system. Most importantly it's critical to have well-structured and standardized information capturing system for chronic disease to monitor the longitudinal outcome and quality of care for continuous quality improvement and guidance of the care systems. However, the traditional paper-based patient data handling is tedious, time-consuming, error-prone, and not easy for patient information retrieval and follow-up.

In many health facilities, staff spend hours each day recording and reporting data on resource-intensive paper-based systems that are inefficient for tracking chronic disease patients and monitoring outcomes. In this century digital data recording system at point of care is the most important innovative service that facilitates quality of care and ease the burden of the health care workers (HCWs). A well-designed digital information system for non-communicable disease (NCD) monitoring has immense potential to save lives.

Among various digital health systems, Simple App is one application that aim to enhance program performance monitoring by providing real-time data for HCWs and technical mangers which facilitate patient follow up and evidence-based monitoring and action for Hypertension and DM programs. Moreover, the application provide data on protocol-based treatment drug availability and stock management. Simple App is designed in considerations of the aforementioned challenges and into account mainly concentrating on fast and easy use, usability in resource-constrained environments, to get patients return for follow-up care, interoperability with other health systems and giving managers actionable and timely data.

In 2020, MOH in collaboration with Resolve to Save Lives (RTSL) launched the Ethiopia Hypertension Control Initiative (EHCI) program and introduced this mobile based application that can be used for Hypertension and DM patients' data collection at point of care and dashboard that provide indicator-based report which can be accessed throughout the health system for free. The implementation started in a phase-based and currently, Simple App is being implemented in 52 Health Centers and 10 Hospitals of four regions (Amhara, Oromia, Sidama and Somali) and two City Administrations (Addis Ababa, Dire Dawa). Even though the application can be used for both hypertension and DM, the RTSL EHCI program focused only on Hypertension care and this best practice and learning is based on the evidence captured under the hypertension control intervention.

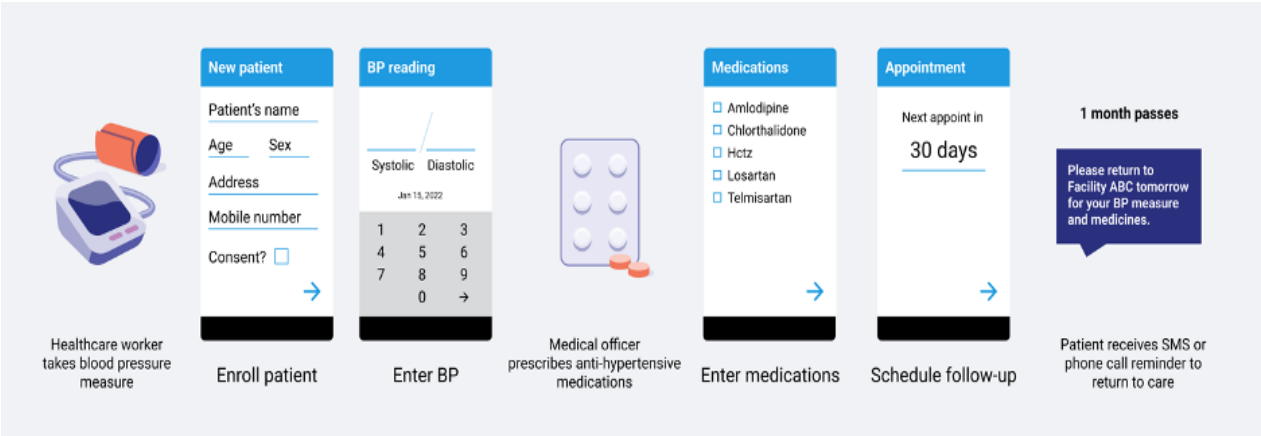

Figure-1 Shows Simple App data entry elements

Implementation Approach

Simple App is a free, open-source mobile application designed with a user-centered approach. It includes: 1) a mobile Android app for HCWs to record patient visits and review treatment history at the point of care which was adopted from World Health Organization (WHO) HEARTS technical package for cardiovascular disease management in primary health care and work offline (the average time taken for registering new patients is 77 seconds and entering follow-up visits is 14 seconds). 2) a web-based dashboard for health system managers to monitor program performance across facilities and regions based on the national and program level indicators ; 3) Blood Pressure (BP) passport, a mobile app for patients to record their own BP, fasting blood sugar and medicines, visualize their control rate periodically, set reminder for their medications, appointments, and 4) population management tools that generate lists of patients overdue for care and send automated messages to promote continuity of care.

The implementation started with equipping the HCWs and Web-based dashboard user of NCD technical managers with access to the application and the necessary knowledge and skill through training at all levels followed by on job mentoring and supportive supervision.

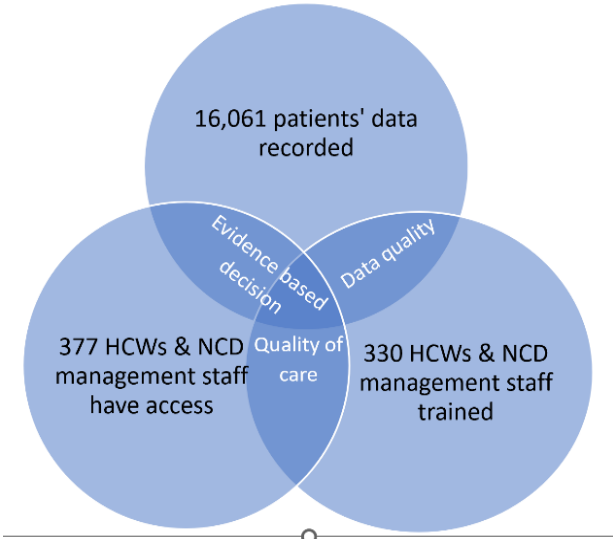

Figure-2: Shows the Simple App implementation

Moreover, to ensure sustainability, the intervention has been implemented in collaboration with and ownership of MOH. All the patient level data stored in the server of MOH.

Relevant Change

As of August 2022, HCWs recorded 16,098 patients' data across the 62 public health facilities in the Simple App. Overall, the Simple App intervention contribute significantly to the improvement of quality of care in the Hypertension program. This achieved by improving:

- Patient data record management including data quality at facility level. Simple App facilitates easy data entry and reduces human prone errors by placing restrictions and reminder in the data elements.
- Improve access to real-time data that strengthen program monitoring and action. Simple App Real-time data feature enables NCD technical mangers at all levels (MOH, Regional, Zonal and Woreda) to have the same data with the HCWs found at health facility level.
- Improved patent tracking system by enabling HCWs to identify overdue patients.

Facilitated evidence-based decision making at all levels by providing automated data on the main indicators of the program.
Having Simple App as a digital information monitoring tool, have significant role in improving quality of care. A comparison in the program after 1-year revealed that the six-month hypertension control rates more than doubled following implementation of the Simple App, from 21% before Simple App to 57% and missed visit reduced by 42% through overdue patient tracking feature after Simple App implementation although other program related interventions and improvements such as the use of hypertension protocol and guidelines and implemented approach might have also contributed to this increase.,

Lesson Learned

In our observation, Digital health technologies of Simple App demonstrated that fast, easy-to-use clinical software for hypertension control program have:

- High acceptance by the HCWs as it reduces the burden in data recording and management during reporting.
- Easy to implement and user friendly.
- Improved culture of data use by promoting data visualization.

While we learn the positive impact of the application, we also observed that the Simple App is not an electronic medical record and does not contain comprehensive information on each patient. Hence the application cannot substitute the whole paper-based documentation. The app has not been deployed to private sector health providers, which provide much of the outpatient care. This may inhibit the data transfer from one health facility to another. Even though the application work offline during data entry, the data have to be synchronized at some point to send it to the central server which require an internet. This created a challenge for health facilities which are found in a very remote area with limited internet access. The independent contribution of the Simple App to improved hypertension control has not been rigorously assessed and this could be an area for future evaluation.

To be effective, a digital health system to manage a hypertension control program must focus on simplicity, speed, and scale and be adaptable to on-the-ground challenges. A basic system should be implemented after careful pilot testing and assessment of actual use in the field, with complexity added only incrementally if speed and performance standards can be maintained and patient outcomes are improved.

Section Three: New Initiatives

Local Vaccine Manufacturing in Ethiopia

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Introduction: The need for building capacity in local manufacturing of vaccines has become more evident than before primarily due to the COVID-19 pandemic and the way vaccine distribution was managed globally (vaccine inequity). Other reasons include delays in the donation of vaccines, dependence on donors, the continuous threat from new and current pandemic diseases, and government interest in local manufacturing for import substitution and export. The pandemic has also taught countries that when there is scarcity, countries tend to act uncaringly as has been the case with the COVID-19 pandemic where rich countries stockpiled more than what they needed. Ethiopia, as one of the low-income countries, has been among the countries that received COVID-19 vaccines late. The big lesson learned from the pandemic is thus the need to be 'self-reliant' and that countries need to build 'their capacity for the local medical product (Vaccine, Pharmaceutical, and medical devices) manufacturing.

In Ethiopia, vaccine manufacturing for veterinary use began in the 1950s by the National Veterinary Institute (NVI). Currently, NVI has the capacity of manufacturing 22 different vaccines for both national consumption and export to many African countries. Vaccine manufacturing for human use also dates back to the 1960s whereby the then Pasture Institute, now called the Ethiopian Institute of Public Health (EPHI), used to produce Small Pox and Cholera vaccines. Besides, the institute has been producing Fermi-type anti-rabies vaccine over the past fifty years, which needs to be replaced by Vero- cell culture-based anti-rabies vaccines.

The experience of these two institutes demonstrates Ethiopia's engagement in the vaccine business since the 1950s and that there exists some degree of know-how already.

This again shows that the current initiative by the government of Ethiopia to manufacture locally human vaccines is not necessarily driven by the COVID-19 pandemic. It is the result of a strategic move that was well-thought as part of the Millennium Development Goal and the National Sustainable Development Plan of which local manufacturing of medical products including vaccines has been among the highly prioritized segments of the industries. This new initiative of local vaccine manufacturing is further justified by the fact that:

(1) Most morbidities and mortalities in Ethiopia, and Africa, are due to vaccine-preventable diseases that occur from endemic diseases and outbreaks

(2) There exists continuous threat from new pandemics/variants including COVID-19

(3) Vaccine inequity observed during the COVID-19 pandemic and the way vaccine distribution has been managed

(4) The risk of shortage in funding upon GAVI graduation when the country joins lower-middle-income countries by 2025

(5) To become self-reliant and be a hub for pharmaceuticals including vaccines to support its economy through import substitution and export

(6) Contribute to the Africa Centers for Disease Control and Prevention (Africa CDC)/Partnerships for African Vaccine Manufacturing (PAVM) goal of producing 60 percent of Africa's vaccine need within the continent by 2040.

Above all, building one's medical product industry expedites the government's endeavor to ensure the health security of the country.

General objective: Establish a fully integrated vaccine manufacturing capability in Ethiopia

Specific objectives:

1. Setting up a fill-finish vaccine manufacturing plant (phase I)
2. Train personnel with the required knowledge and skill
3. Transfer and adopt relevant technologies
4. Produce strategically selected vaccines
5. Strengthen and enable the regulatory capacity to reach Maturity Level 3

Methods: The project will be implemented in three phases i.e., Setting up a vaccine Fill-finish facility (Phase I), Full backward integration to vaccine manufacturing including bulk antigen preparation (Phase II), and Discovery of new vaccines and biological (Phase III). To drive this initiative, the Ministry of Health established a task force in 2021 comprising experts from the Ministry of Health (MoH), the Ethiopian Food and Drug Authority (EFDA), and the Armauer Hansen Research Institute (AHRI). To achieve the objectives, relevant investors from Ethiopia (Ethiopian Investment Holdings/private investors) as well as known vaccine manufacturers globally will be identified and invited to invest in Ethiopia in a joint venture or Foreign Direct Investment models.

Outputs: Since its establishment, the task force has been doing various ground works; which include the following activities: conducting a feasibility (market, technical and financial) study with financial support from WHO, identification of reliable and willing partners for vaccine technology transfer, and local and international partners for the joint venture.

So far, the market feasibility study is completed while the technical and financial feasibility studies are expected to be completed before the end of 2022. The potential list of vaccine manufacturers identified and some of them have been contacted, a couple of them showed interest to partner in a joint venture with contributions ranging from technical support to financial investment.

Conclusion and way forward: Vaccines are different from other pharmaceuticals because of their complex manufacturing process, stringent regulatory approval processes, and in their need for a controlled environment for storage and distribution; which is often owned by government public health institutions. The market for vaccines especially those used in the routine immunization program has also a peculiar nature as the government is the main/sole customer for the manufacturers; Thus, getting a market guarantee or commitment for procurement from the government is a pre-requisite by most interested investors.

Big pharmaceuticals have monopolized technological know-how as well as financial support and as a result, the capability and capacity are strategically limited within existing manufacturers. The initiative by Africa CDC is just to change the existing vaccine manufacturers' landscape so that African countries can also produce vaccines; with a target to produce 60% of the vaccines, the continent needs by 2040 from the current 1%. Different countries in Africa are therefore taking this opportunity and working hard to establish vaccine-manufacturing facilities. Africa CDC has named Egypt, Kenya, Nigeria, Senegal, South Africa, Ghana, Botswana, and Tunisia, in Africa as front runners countries of which Ethiopia is lately considered to be in that category. However, the political commitment should remain stronger and faster to move this initiative forward and meet its goal. One such commitment is addressing the issue of a buy-back guarantee by the government when vaccines are produced locally. This is critical particularly during the first few years until locally produced vaccines get access to the regional market through the continental free trade area or Global Alliance for Vaccines and Immunization (GAVI) and United Nations Children's Fund (UNICEF) pooled vaccine procurement system.

Building their capacity in vaccine manufacturing is not just addressing health issues but is also a matter of national health security, besides the potentially lucrative revenue countries can gain. Thus such initiatives shall be given special treatment by policymakers so that Ethiopia remains a front-runner country and the project can be materialized in a coming couple of years.

Altogether, the ecosystem for vaccine manufacturing shall be strengthened including access to finance, infrastructure, procurement and logistics, research and development capacity, regulatory capacity, supply chain, and access to the market. The Government of Ethiopia (GOE) recognized that creating such enabling ecosystem needs a multi-sectoral and multifaceted interventional approach to create conducive ecosystem for companies engaged in vaccine manufacturing.

SPECIAL BULLETIN

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