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MINISTRY OF HEALTH - ETHIOPIA

SPECIAL BULLETIN

25ኛው የጤና ሴክተር ዓመታዊ የግምገማ ጉባዔ

The 25th Annual Review Meeting of the Health Sector

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Strong Health Financing for Sustainable Health Development!

November 2023

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Contents

EDITORIAL BOARD MEMBERS AND REVIEWERS

Foreword

While extending my warmest welcome to this distinguished event of the Ethiopian health sector, the 25th Annual Review Meeting (ARM), I am delighted to present to you this issue of the special bulletin. On behalf of the editorial board and reviewers, I would like to express that this publication features salient program experiences, promising initiatives and strong scientific evidences from original research articles conducted during the recent fiscal years, particularly in the three years of the second Health Sector Transformation Plan (HSTP II).

To inform the health system performance with robust evidence 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 strategic affairs executive office (SAEO) of the Ministry of Health (MOH) has developed and has been implementing Health Information System (HIS) Strategic plan as one of a sub-strategies of HSTP-II. Based on the HIS strategic plan, the SAEO has been striving to enhance evidence generation and use to inform the designing of health programs, monitor progress and improve health system performance.

To this end, the SAEO has been producing and distributing scientific evidence with the special bulletin annually for the last 11 years with the aim of enhancing the generation, availability and accessibility of health data from different sources other than routine health data. As such, with this publication, SAEO aims to enhancing 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. The evidences will set the foundations for the implementation of the health sector development and investment plan (HSDIP) 2023-2026. The special bulletin has been primarily targeted to provide the opportunity to publish evidences generated by the executive offices of the ministry and the agencies. This year, a training on scientific writing and issue brief writing has been provided to staff at the ministry of health to increase their capacity to produce evidences.

This 12th issue of the Special Bulletin for this 25th ARM envisages to availing scientific evidence under three categories of articles; research articles, new initiatives, and best practices. The new initiatives section is essential to highlight the new policy and strategic issues of the health sector and policy issues 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 executive offices, regional health bureaus, agencies, researchers, programmers, and other health care workers for their efforts and contributions in publishing the articles. I am also grateful to the editorial board members, SAEO staff, contributors, and reviewers for their extraordinary efforts to realize the publication of this special bulletin.

Naod Wendrad

Executive Officer, Strategic Affairs Executive Office

Editorial

Strong health financing system for sustainable health development

Health financing is critical to building resilient health systems and ensuring optimal service coverage and financial protection for all citizens. The primary purposes of strong health financing are ensuring the generation of adequate resources, optimal risk-pooling, provider payment mechanisms, and strategic purchasing. Ethiopia has implemented various initiatives to strengthen the health financing system to drive sustainable health development and advance the country's progress towards universal health coverage.

Evidence from the mid-term review of the second health sector transformation plan (HSTP II) and other sources showed that despite impressive gains in recent years, health financing in Ethiopia has been experiencing challenges related to low health expenditure (around US$ 36 per capita, and totaling 6.3 % of GDP) that is highly dependent on out-of-pocket spending and external funds which faced contraction in recent years.

In Ethiopia, the total government health expenditure as a percentage of GDP (totaling 2% GDP) has remained quite low, even when compared to other low-income African nations, and has remained below the expected 5% for low-income countries and the global average of 9.2%. The share of government health expenditure from the total government spending has increased marginally in recent years and reached 8.7% in 2022/23 but still falls short of the Abuja target of 15% that many African nations committed to. Around 34% of the total health spending in Ethiopia comes from external sources through donations. This affects the long-term sustainability and stability of health programs. In addition, the contraction of donor funding has posed financial constraints in recent years and has been ascribed to limited absorption, liquidation, and coordination among financing components.

Ethiopia's health expenditure has been highly dependent on a high out-of-pocket expenditure that reached 30.5% in 2020, which implies limited protection of households from the financial burden of healthcare costs (catastrophic and impoverishment health expenditures). Consequently, the incidence of catastrophic health expenditure (CHE), i.e., the proportion of households that pay out of pocket payment exceeding a predefined share of its capacity to pay for health care, has been around 2.4% in Ethiopia. Households who experience CHE are highly likely to be impoverished (become poor after paying health payments) due to health care costs.

To ensure optimal risk pooling and protection for all households, the government of Ethiopia has been implementing a community-based health insurance (CBHI) scheme for the informal sector. Currently, the CBHI coverage among eligible households has reached around 81%. Social health insurance has not started and households in the formal sector are not covered with health insurance. As a result, a significant portion of households are limited in their use of basic health services without financial hardship. Moreover, the sustainability of CBHI is challenged by several factors including regressive and low CBHI premium rate that doesn't account for ability-to-pay, poor management of contracts between CBHI schemes and health facilities, limited disbursement capacity of health facilities, and delay in disbursement of subsidies for indigents.

To make substantive progress in strengthening its health financing system, Ethiopia needs to significantly increase domestic public spending on health to reduce dependence on out-of-pocket payments and unpredictable donor funds. Higher public investments in the health sector will provide the fiscal

space needed for long-term systems strengthening and expansion of access to quality services. The country also urgently needs to accelerate the expansion of health insurance, especially for the poor and vulnerable populations working in the formal sector. Growing prepayment and risk pooling through insurance will enable financial risk protection and access for all.

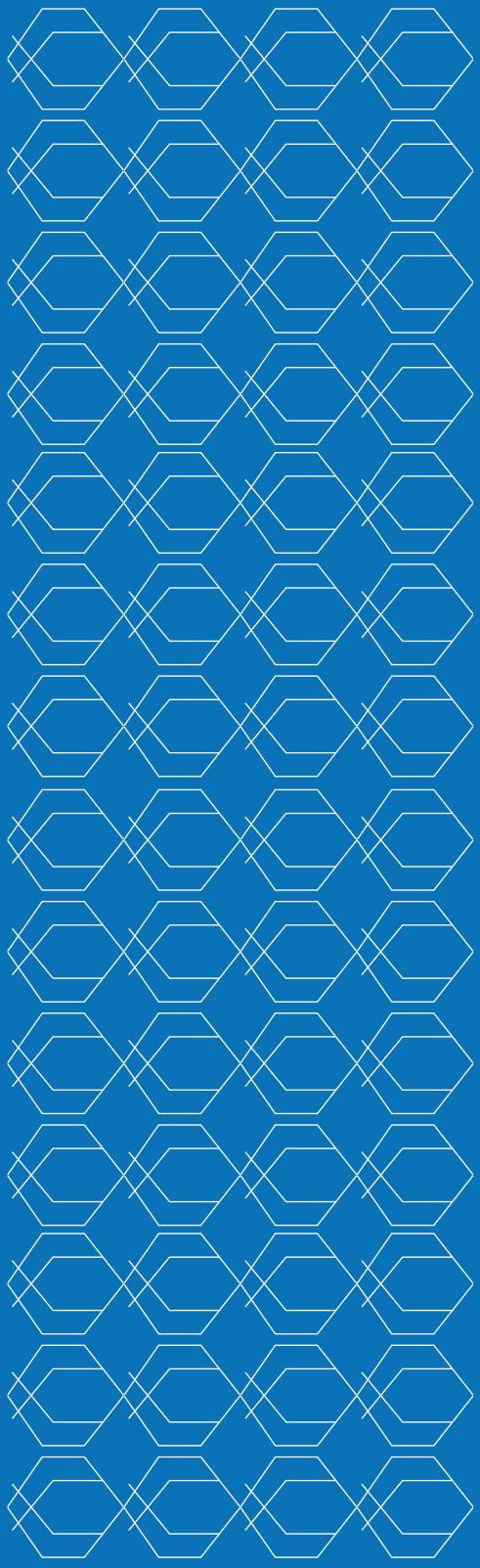
The health sector should also implement reforms including strategic purchasing mechanisms to promote efficiency and sustainability in healthcare delivery and spending. Decentralizing health financing decisions and empowering local governments can also facilitate decision-making that is better aligned with local community needs and priorities. Enhancing transparency, accountability and good governance will also be key to curbing corruption and inefficiencies that can undermine the health system. Ultimately, making steady progress towards universal health coverage will promote greater resilience, equity, and sustained improvements in health outcomes across the Ethiopian population.

In addition, introducing innovative financing resilient and equity funds, accelerating the shift to program-based budgeting especially at the lower levels, endorsing the revised exempted service financing mechanisms, mobilizing the required funds from domestic and external sources as per the national reconstruction and recovery plan, support user-fee revisions and implementation in the regions and the exempted service provision, revisiting the EHSP and developing an investment and implementation plan and providing strategic guidance for the sustainable and progressive implementation of CBHI, tailoring to emerging regions, accelerate coverage for the poor, digitization of the system, and feasibility of the SHI are recommendations drawn from the MTR.

In the sector's medium-term development and investment plan, the ministry plans to realize three strategic initiatives over the coming three years. Increasing health revenue by mobilizing capacity enhancement; improving resource allocation and efficiency and strengthening strategic purchasing. To advance universal insurance coverage, the ministry plans to strengthen the governance and expedite deployment of the health insurance. The government also plans to strengthen the private sector engagement in health service provision to increase its contribution and ensure transparency, accountability, and increase the responsiveness of the private sector. Strengthening good governance via transparency, accountability, and citizen engagement improves efficiency and reduces corruption, which undermines sustainability. There needs to be policy consistency, political commitment and reduced fragmentation to allow long-term health development strategies.

In summary, a health financing policy focused on raising domestic public spending, reducing dependence on out-of-pocket payments, expanding prepayment and risk pooling mechanisms, targeting resources to the poor, and aligning incentives with long-term development goals will put Ethiopia on a positive trajectory to build a strong health system capable of delivering quality, affordable healthcare to all its citizens. This will require enhanced political commitment and policy consistency in health financing reforms going forward.

Section One: Research Articles



Quality of examination gloves in health facilities in Addis Ababa, Ethiopia

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Abstract

Background: *Examination gloves are used in health facilities to protect health professionals and patients from the risk of infection and reduce opportunities for cross-transmission of infectious microorganisms. Poor-quality examination gloves expose health professionals to infectious diseases such as COVID-19, Hepatitis, HIV/AIDS, and other contagious diseases. Hence, this study assessed the quality of examination gloves in health facilities in Addis Ababa.*

Objective: *To identify the quality of examination gloves found in Addis Ababa health facilities Specific objectives were to determine the magnitude of holes and to describe the distribution holes in examination gloves and also to determine the dimensions (width, length, and thickness) of examination gloves.*

Methods: *A cross-sectional study design was employed. The examination gloves were collected from five randomly selected health facilities in Addis Ababa. The gloves were examined following standard procedure in the Ethiopian Food and Drug Authority. Holes in the examination gloves were detected using the watertight (leakage test) and geometrical dimensions such as thickness, width, and length were measured.*

Results: *A total of 2,500 selected examination gloves were collected and 500 gloves from each facility between Feb 10 and Feb 20, 2022. The gloves were sampled from health facilities in Addis Ababa. From the total samples collected, only 2280 examination gloves of five different brands were tested, which makes the response rate 91.2%. The proportion of gloves with holes detected ranged from 5.7% to 21.9%. Overall, two batches 0.4% for the width of gloves and three batches 0.7%, 4.2% 11.2% for the gloves length below standard. None of the gloves tested in this study had a thickness below the standard.*

Conclusions: *All five brands of examination gloves tested had a higher hole (leakage) rate than the 2.5% acceptable quality limit. This implies there is a substantial risk of infectious disease transmission to health professionals and patients in healthcare settings. Hence, regulatory enforcement needs to be strengthened across the life cycle of the product.*

Keywords: Examination glove, quality, health facility, Addis Ababa

Introduction

Hand gloves in healthcare are intended for single use to minimize cross-contamination. Single-use practices are recommended to avoid the burden of sterilization from health care contamination. However, even a single use may not guarantee the safety of users unless the gloves meet minimum quality standards.

Rubber gloves have been used in healthcare settings since 1890 to limit the transmission of infectious diseases(1). Gloves function as mechanical barriers to reduce the transmission of body fluids and pathogens from patients to health care providers and vice versa(2). The integrity of gloves, including lack of perforation, is crucial to reduce transmission of infectious pathogens effectively(2). Infectious pathogens can escape even via small defects in gloves that may not be visible to the naked eye(3).

There are many causes for the leakage of poor-quality examination gloves. The defect could happen during manufacturing, improper storage, and transportation. The defects during manufacturing could be due to poor latex chemistry, unclean forms that contain oil, or mechanical damage during packaging(4,5). Furthermore, studies on surgical glove perforation rates in developing countries such as Nigeria and Ethiopia revealed that low-cost and low-quality products were imported(6,7). Hence, manufacturing-related holes may be more common. In Ethiopia, it is observed that there is a more frequent failure of consignment samples of examination gloves tested for acceptance quality limit (AQL) by the Ethiopian Food and Drug Authority (EFDA). Although there were anecdotal reports of substandard products and enforcement gaps, there was limited empirical evidence to corroborate the reports. In addition, it was imperative that the vulnerability of the local market to illegal distribution of medical supplies needed to be considered. Therefore, this study aimed to assess the quality of examination gloves in the health facilities of Addis Ababa, Ethiopia.

Methods and Materials

A laboratory-based cross-sectional study was conducted in Addis Ababa from Feb 10-Mar 20, 2022, to assess the quality of examination gloves. This study area was selected because of the availability of many health institutions, including private and governmental health facilities (hospitals and health centers). At the time of the study, five brands of examination gloves were widely available in Addis Ababa. The health facilities were randomly selected from Addis Ababa Food, medicine and health Addis Ababa Food Medicine Healthcare And Control Authority annual reports of 2019. The data collectors collected using a simple random sampling method with one brand from each facility and 5 boxes that contain 100 pieces of gloves. five brands of unused latex examination gloves (four brands medium in size and one brand small in size) Though examination gloves are packed locally, a large portion of the gloves available in the market are imported from overseas. The EFDA regulates the country's manufacturing, importation, and distribution of pharmaceutical products. The EFDA has a medical device quality testing laboratory that tests the quality of examination gloves. Hence, EFDA sets AQL standards depending on ISO 2859(8). The standard for the batch is ASTM D3578.

Laboratory testing was done after visual inspection, and a watertight test was conducted to check the existence of holes. Each glove was tested by a standardized water-leak test. Gloves were filled with 1000 ml of water followed by a visual inspection of the glove for 2 min to check the availability of holes where leakage water indicates a hole(9). Dimensions of gloves were also measured. The length, as expressed in millimeters, was measured from the tip of the middle finger to the outside edge of the cuff. The width of the palm as expressed in millimeters was measured at a level between the base of the index finger and the base of the thumb. The thickness was also measured using a dial

micrometer, and cutting the glove was necessary to obtain a single thickness (10).

Ethical considerations

Ethical approval was obtained from the Addis Continental Public Health Institute (ACIPH) ethical clearance committee (ACIPH-MPH/035/13). In addition, a permission letter was sought from EFDA to collect and test the samples in EFDA medical device laboratory testing. To ensure confidentiality, each tested brand of examination gloves was coded.

Results and Discussion

All five brands of examination gloves were included in the study and were imported from overseas. Out of the 2500 samples collected, 2280 examination gloves were tested (456 gloves for each brand). Two of the five examination gloves (brand C and brand E) tested had the proper size for the length dimension. But glove brands A, B, and D are out of the standard specification. For the parameter width, Three of the five brands (brand A, brand B, and brand E) tested had the proper width size, but glove brands C and D were out of specification. Finally, the tested parameter for thickness dimension had the appropriate size for all brands.

The maximum leakage rate for examination gloves was 2.5% AQL. AQL is the worst quality level that is tolerable for a product. Products that might cause more health risks will have a lower AQL. All five brands of examination gloves tested for leakage rate included in the study exceeded the allowable quality limit (AQL) with a failure rate of 2.5% (9).

Table 1: Proportion of gloves tested for width, length, thickness, and holes

	Brands				
Parameters	A, n (%)	B, n (%)	C, n (%)	D, n (%)	E, n (%)
Gloves below Standard width (mm)	0	0	2 (0.4)	2 (0.4)	0
Gloves below Standard length (mm)	19 (4.2)	3 (0.7)	0	51 (11.2)	0
Gloves below Standard thickness (mm)	0	0	0	0	0
Gloves with Holes	67 (14.7)	26 (5.7)	100 (21.9)	76 (16.7)	66 (14.5)

Note: proportions are made out of 456 gloves for each brand.

Figure 1 indicated the numbers and location of holes on the gloves for each brand, and the result showed that most of the holes were found around the palm and fingers rather than the cuff area, indicating higher risk and the degree of contamination for health workers and patients.

Figure 1: Positions (distribution) of the holes of the gloves

The present study assessed the quality of examination gloves in health facilities in Addis Ababa. This study found that five brands of the collected examination gloves had leakage that exceeded acceptable quality. In some brands, the deviation is almost tenfold. In addition, the dimension measurements (width, length, and thickness) showed little deviation from the required standards. These findings were almost similar compared to the study conducted in Indonesia(11).

The study revealed that the leakage rate of the gloves ranged from 5.7% to 21.9% compared to the level of acceptable quality stipulated in EFDA and ASTM 3578(9). The leakage rate was obtained when testing the examination gloves straight out of the package. If tested after use, this could have been higher. This is critical because of the increased risk of infection for healthcare providers and patients. Professionals use double gloving because they do not believe it, and it causes economic loss or raises political concerns. This is also one of the big threats to infection control in health facilities. The availability of an unacceptable hole rate might be due to the importation of low-cost, low-quality products with manufacturing flaws, damage during packaging and temperature handling issues during transportation, poor storage conditions at warehouses and health facilities, and insect biting(4)(12). These findings were almost similar compared to studies conducted in Ethiopia, Saudi Arabia, and Nigeria(5,6,7).

Concerning dimensions, width, and thickness were not problems in our study. Both meet the necessary acceptable standards. However, there was a failure in the length of the gloves (4.2% for glove brand A and 11.2% for glove brand D), but for glove brand B, the result was negligible. If gloves do not fit the standards, breakage of gloves and convenience for use will be an issue. Furthermore, the location of the holes in the gloves was in the fingers and palm areas. A possible explanation might be that most holes occur due to poor quality and manufacturing size specification problems(4). This is a favorable condition for infection and contamination. Healthcare providers should not only be cautious about gloves; they should also be cautious about their vaccinations. Most of the health workers in Ethiopia are not fully vaccinated against hepatitis B(6). In addition, the regulatory body should ensure the safety and quality of gloves before distribution.

The testing was conducted using gold standards (ASTM) by EFDA and other international organizations. However, the study has limitations as well. The quality testing of the examination gloves only focused on two parameters: hole detection and dimension testing. Other parameters, such as tensile strength and powder content, mainly tensile strength that was probably caused by breakage during the usage, were not considered. In addition, we only consider one lot from one brand; this indicates that the manufacturer produces too many lots in every brand. Lot-to-lot variations within individual brands were not considered

Conclusion and Recommendation

The study found that all five brands of examination gloves tested had a higher leakage or hole rate than the allowable level of acceptable quality 2.5% with a slight variation between brands. This poses a substantial risk of infection transmission in healthcare settings. Therefore, the regulatory body needs to strengthen inspection activities considering the life cycle of medical devices, including Good Manufacturing Practice, Post-Marketing Surveillance, accreditation of the testing laboratory, and add-on testing parameters. We recommend more research to determine the cause of the examination gloves' high leakage rate, tensile strength, and user compatibility.

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Action-Worthy Strategic and Program Level Bottlenecks Around Health Emergency Management in Ethiopia: 7-1-7 Review Findings

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ABSTRACT

Background: *To improve the health emergency management system's detection, reporting, and response, 7-1-7 timeliness metrics are recommended to measure and generate evidence on detection (≤7 days from emergence), notification (≤1 day from detection), and implement early-response actions (≤7 days from notification).*

Objective: *To evaluate the national PHEM system's capacity to detect, notify, and initiate early-response actions, as well as identify bottlenecks using 7-1-7 timeliness metrics.*

Method: *Evidence from AARs, IARs, and field reports were used for a retrospective review of ten health emergencies occurring from 2018-2022 using 7-1-7 targets to measure system performance. We calculated timeliness intervals and identified bottlenecks. We mapped bottlenecks to JEE (3rd ed.) indicators. Results are described, tabulated, and graphed.*

Result: *Median time for detection was 13 days (1-75; IQR 2.5-23.5), notification 2 days (0-24; IQR 0-8.5), and completion of initial response 10 days (1-47; IQR 4-27). Of ten events, 6, 5, and 5 failed to meet detection, notification, and response targets. Sixty bottlenecks were identified, of which 36.7% were to detection, 26.7% notification, and 36.7% response. Low awareness or clinical suspicion by health workers was the most common detection bottleneck. Notification bottlenecks included the failure of early risk assessment or verification and human resources gaps. Response bottlenecks included weak coordination, incident management, rapid response team capacity, and limited countermeasures.*

Conclusion and recommendations: *7-1-7 metrics can assess health system performance in managing emergencies in real-time. PHEM system's capacity to detect, notify, and respond to health events is sub-optimal and requires strategic and program-level interventions. Gaps observed in preparedness and surveillance capacity to detect and report to stakeholders. Relevant policies and program decisions to facilitate the mobilization of supplies and equipment, financial funding, facilitate coordination and collaboration across sectors, and capacity buildings for preparatory, preventive, and response activities should be available.*

Key words: *7-1-7 timeliness metrics, public health emergencies, review*

Introduction: The routine monitoring of a health system's capacity to prevent, detect, and respond to emergencies enables understanding challenges and supports decision-makers in prioritizing corrective measures for implementation. The IHR Monitoring and Evaluation Framework (IHR-MEF) is used extensively by WHO member states, including Ethiopia, to evaluate core public health capacities under the IHR (2005). While timeliness metrics have been integrated into different approaches, including IHR-MEF's After Action Review[1] process, and region-specific guidance such as the IDSR strategy in Africa, there have not been clear global timeliness targets for detection and response.

7-1-7 is a newly introduced global timeliness metric whereby suspected public health events are expected to be identified within 7 days of emergence, notified within 1 day of detection, and seven early-response actions are completed within 7 days of notification[2]. Ethiopia has been piloting the 7-1-7 timeliness metric for performance improvement since 2022. In line with this, to better understand the baseline for timeliness of detection, notification, and response, a retrospective review of ten previous public health events was conducted along with a bottlenecks analysis to surface system-level challenges that require the immediate attention of decision-makers across all levels of the health system. Investment in resolving these bottlenecks will directly contribute to the HSTPII goal of containing all epidemics within acceptable mortality[3].

Objective: This study aims to determine the national PHEM system performance capacity to detect, notify, and complete initial response to health emergencies using targets of 7-1-7 timeliness metrics target as well as identify system-level bottlenecks that prevent achieving the identified target. Which are

- 7 days or less for detection (to be counted from the day of emergence)
- One day or less for notification (to be counted from the day of detection), and
- 7 days or less to implement early-response actions (to be counted from the day of notification)

Method

Study settings: A retrospective review of selected health events, which occurred from August 2018 to May 2022 and represented the country's risk landscape, was done using the 7-1-7 timeliness metric. (Table 1)

Data collection and management

A team of public health emergency management (PHEM) experts used a review guide and data abstraction tool to review AARs, IARs, and field reports for the selected public health events. The desk review focused on determining the timeliness of detection, notification, and response for public health emergencies, and identified and analyzed bottlenecks contributing to delays.

[1] Guidance for After Action Review (AAR), WHO, https://www.who.int/publications/i/item/WHO-WHE-CPI-2019.4

[2] 7-1-7: an organizing principle, target, and accountability metric to make the world safer from pandemics, Lancet, https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)01250-2/fulltext

[3] Health Sector Transformation Plan II (HSTP II) 2020/21 - 2024/25, Ethiopia, Ministry of Health, http://repository.iifphc.org/handle/123456789/1414

A grounded theory approach identified sixty bottlenecks related to delays in detection, reporting, and early-response across all selected public health emergencies and occurrences. The bottlenecks were classified into sixteen groups and coded by administrative levels of the Ethiopian health system level.

Relevant PHEM officers were also approached for verification, triangulation, and, where missing, to fill in information.

Data was consolidated and analyzed using online data entry and Excel spreadsheets. MS Excel functions were used to generate and synthesize median timeliness measures, as well as to calculate the proportion of events that met 7-1-7 timeliness metrics targets.

Table 1: Public Health emergencies and events considered for this study with geographic area and years of emergence.

Public Health Threat	Data source	Region	Year of Emergence
Cholera	AAR	Oromia	2019
Yellow Fever	AAR	SNNP	2018
Polio	AAR	Somali	2019
Unknown Camel Disease Outbreak	Field report	Somali	2021
Chemical Exposure	Field report	Somali	2019
Cholera	Field report	Oromia	2021
COVID-19	IAR	Addis A	2020
Yellow Fever	AAR	SNNPR	2020
Measles	AAR	Somali	2021
Anthrax	Field report	SNNPR	2021

Results: The median time for detection of public health emergencies and events was 13 days (range 1 to 75 days, IQR 2.5 – 23.5). The longest duration for detection was recorded during an Anthrax outbreak in Gamo Zone, SNNP region. The shortest detection time was registered during a chemical exposure incident in the Shebelle zone of the Somali region. Six of the ten emergencies considered for this review did not meet the detection target.

The median time for notification of public health emergencies and events to the next higher health system level for decision-making was 2 days (range 0 days to twenty-four; IQR 0 – 8.5 days). Multiple emergencies were notified within the 0 days (or within 24 hours). The longest time to notify was recorded for an unknown camel disease outbreak which occurred in the Afder zone of the Somali region, which took 24 days.

Half of the public health emergencies reviewed for this study did not meet the target for notification to the next level of decision-making.

This review also found that it took 10 days (range 1 to 47 days; IQR 4 – 27) of median time to complete the seven initial effective response components across all reviewed events. The shortest and longest time recorded was one day during the COVID-19 emergency in Addis Ababa and 47 days during the yellow fever outbreak in the Gurage zone of the SNNP region, respectively.

Only one event met all 7-1-7 timeliness metric targets for detection, notification, and completion of initial responses, which was the COVID-19 emergency in Addis Ababa. Half of the reviewed events did not meet the target for completing the initial effective response.

Identified bottlenecks at various levels of the health system.

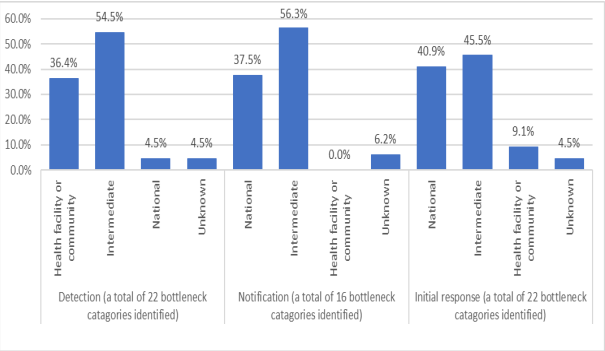
A total of sixty bottlenecks were identified in this study and of these 22 (36.7%) were related to detection, 16 (26.7%) to notification, and 22 (36.7%) to providing effective initial response.

The majority of bottlenecks identified related to detection (12 out of 22, 54.5%) were recorded at the intermediate level of the health system (district, and regional level), while 8 (36.4%) were at a health facility or community level. The most frequently observed bottlenecks for detection were low awareness or clinical suspicion by health workers and the event being an unfamiliar or unexpected pathogen. (Figure 2 and Table 2)

Of the total sixteen bottlenecks identified for notification, 9 (56.3%) of them were at the intermediate level of the health system followed by 6 (37.5%) at a national level. Failure to conduct early risk assessments and event verifications and lack of sufficient human resources for public health were among the most frequently mentioned bottlenecks.

Of the total twenty-two bottlenecks identified for initial effective response, 10 (45.5%) were identified at the intermediate and 9 (40.9%) were at the national level of the health system. The most frequently observed bottlenecks to initial effective response were weak response coordination (including incident management and rapid response team capacity) and limited availability of countermeasures or PPE. (Figure 2 and Annex Table 2)

Figure 2: Bottlenecks for detection, notification, and providing effective response for PH emergencies and events by level of the health system.



Conclusions:

This review finding shows that the national public health emergency management system's capability to detect, notify, and respond to public health events is sub-optimal and needs strategic and program-level interventions.

Furthermore, given that most of the bottlenecks were concentrated at the sub-national level, there is also a need to invest in improving health security capacities at the sub-national level. The review showed that bottlenecks at the health facility level, including low awareness or clinical suspicion, were contributing to delays in detection and subsequently affecting early containment of outbreaks.

The role of health facilities, in particular primary healthcare centers, when it comes to preventing the next pandemic should not be overlooked and significant investment is needed to build epidemic-ready primary healthcare[4].

[4] The road to achieving epidemic-ready primary health care, The Lancet Public Health, https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(23)00060-9/fulltext

In addition to the lessons learned from the review of past outbreaks, integrating the prospective implementation of the 7-1-7 timeliness metric with routine monitoring and evaluation framework at national and sub-national levels will help improve performance in real time. Furthermore, bottlenecks that have a direct link to specific JEE areas should be considered in mid-term and long-term strategic planning, including the upcoming National Action Plan for Health Security (NAPHS).

Special emphasis should be given to strategic and program-level interventions for improving JEE scores of the below indicators to strengthen national health security.

- **Indicator P2.2** Financial resources and public financial management:
- **Indicator D2.1**. Early warning surveillance function:
- **indicator P3.2.** Multisectoral coordination mechanisms:

Recommendations

The strategic and programmatic recommendations for the observed gaps in public health emergency management practice in Ethiopia are the followings:

1. Strengthen 7-1-7 timeliness metrics implementation at national and sub-national levels for routine performance measurement and evidence generation to support the decision-making process for system improvement.
2. Develop/customize and avail public health emergency preparedness logic model that quantifies required system capabilities and competencies to accomplish PH emergency preparatory activities with a strong monitoring and evaluation framework.
3. Avail required policy and legal protocols, SOPs, and guidances and/or improve the liability to enforce the existing laws to facilitate the public health emergency preparedness and communication for imminent Public Health Emergencies (PHEs).
4. Ensure availability of agreed up on national guidance which demarcates mandates of relevant sectors and institutions involved in PH emergency preparedness and response activities and official assignment of sector for leading and overseeing the health system preparedness at different contexts with legally approved mandate to ensure routine execution and accountability.
5. Ensure the availability of sustainable emergency funding and a functional financial system that considers PHEs during prevention and preparatory activities for identified imminent PHEs in the nation.
6. Ensure availability/enforcement of available SOPs, guidance, and legally binding documents for data and evidence sharing among relevant stakeholders to monitor, model/forecast, generate evidence, and notify relevant stakeholders including at-risk communities about health risks.
7. Establish standards for system-level capabilities and workforce competences for PHEM data collection, transmission, storage, management, and communication/ dissemination based on identified imminent public health hazards for relevant stakeholders at all administrative levels with relevant indicators for routine assessment and performance improvement.

Prioritizing and Addressing Zero-dose and Under-vaccinated Children: Lessons from the Ethiopia Immunization FPP 2023-25 Development

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Abstract

Background: Minimizing the burden of zero-dose children globally is a priority target of the Immunization Agenda (IA) 2030 and Gavi 5.0 strategy. The Ethiopia immunization comprehensive Multi-Year Plan 2023-25 (cMYP) also set an ambitious target of reaching all eligible children with Penta-1 by 2025. cMYP is the base for the three years strategic immunization plan; the Ethiopia Immunization Full Portfolio Planning (FPP) 2023-2025. Gavi is one of the key partners providing financial support to the immunization program. Since 2021, Gavi, the Vaccine Alliance, required countries to develop full portfolio planning (FPP) for immunization.

Objective: to share lessons from the Ethiopia FPP development process and to provide recommendations for the FPP implementation.

Methods: This study adopts a qualitative method.

Findings: FPP is a multi-year plan that avoids duplication of efforts and aims to identify and reach zero-dose and under-vaccinated children. Following the Gavi guidance, Ethiopia has developed the FPP 2023-25. FPP development was one of the top priorities for the country. The MoH's higher officials led the FPP development. The FPP developing team is organized by the MoH and EPI partners. A series of consultation meetings were conducted both nationally and sub-nationally. The budget allocated for the FPP is intended to be used for high-impact interventions in hard-to-reach areas with high unvaccinated children. Selection and prioritization of woredas with a high burden of zero-dose children took place using selected parameters. The GAVI team's engagement in the FPP development was essential. However, the development process was protracted because of a lack of prior orientation to the team and the complicated template. The lessons from the FPP development process in Ethiopia will be useful for countries.

Conclusion: The FPP was endorsed by the global Independent Review Committee (IRC) in April 2023. Implementation of the plan requires the MoH leadership and coordination; and engagement of all stakeholders to attain the FPP target; of a 50% reduction of zero-dose children in Ethiopia by 2025.

Key Words: *Ethiopia, Immunization, Full-Portfolio-Planning, Gavi*

Introduction

The Immunization Agenda 2030 (IA2030)[5] sets an ambitious overarching global vision for vaccines and immunization for the decade 2021–2030. The IA2030 and Gavi 5.0 strategy for 2021-25 aim to reduce the number of zero-dose children in Gavi-eligible countries by 25% by 2025 and 50% by the year 2030. The Ethiopia immunization comprehensive Multi-Year Plan (cMYP) 2021-25 target is also to reach Pentavalent-1 coverage 100%[6]. According to WUENIC 2022, Ethiopia has about 1.13 million unvaccinated children (6% of the global total) and 1.26 million were under-vaccinated.[7]

GAVI is a major partner in improving the immunization program of Ethiopia. Since the year 2000, GAVI provided support for immunization programs based on different applications from GAVI-eligible countries. The previous years' applications for Gavi support were done yearly and separately for various activities. Starting from 2021, GAVI has launched a new application process called Full Portfolio Planning (FPP).

FPP is a multi-year comprehensive and holistic plan. The Ethiopia FPP 2023-25 consisted of all GAVI-supported EPI components including; Health Systems Strengthening, Equity Accelerated Fund, Targeted Country Assistance, and Cold Chain Equipment Optimization with a total budget of $187, 201, 515. FPP brings all activities together as one unified plan that can avoid duplication and solo planning for each thematic area. The contributions drawn from the Ethiopia FPP 2023-25 development process will provide lessons and facilitate the FPP implementation.

Methods

The empirical basis for this assessment is derived from the FPP 2023-2025 development process in Ethiopia. This assessment adopts a qualitative method. Our approach has focused on understanding the process, such as meetings and group discussions that require data gathering through various qualitative data collection procedures.

The learning and documentation process was conducted from April 2022 to July 2023. Given the authors' in-depth and continuous involvement in the FPP development process, we collected qualitative data through multiple mechanisms. More specifically, data collection methods used included key informant interviews with the FPP developing team members using semi-structured interview guides, focus group discussion (FGD) with Regional Health Bureaus (RHBs) staff, participant observation, sub-national consultations, and secondary data collection; reviewed documents. Participatory observations took place during events, such as group discussions and meetings. Multiple photographs of events have been taken that made the context vivid.

The use of different data collection methods helped to strengthen understanding of the situation in different contexts (urban, remote-rural, pastoral, conflict-affected, etc.). Notes were taken throughout and interviews and FGDs were audio-recorded. Interpretations of audio records and notes taken during the data collection were prepared and subsequently discussed and reviewed by all authors. The findings are presented in the next section.

[5] Immunization Agenda (IA), 2030. A Global Strategy to Leave No-one Behind.

[6] Ethiopia MoH, 2021 National EPI strategic plan; the comprehensive Multi Year Plan (cMYP) 2021-2025

[7] WHO and UNICEF Estimates of National Immunization Coverage (WUENIC), 2022.

Results and Discussion

The FPP Development Process

With the leadership of the MoH, the GAVI supported the FPP development process and followed a systems thinking approach. The FPP developing team was established from the MoH directorates and agencies, and EPI partners were divided into six groups to work on eight Gavi thematic areas. The plan aligned the Gavi requirements with the country's context. The planning process focused on priority areas and impactful interventions. As per the Gavi guideline, the FPP development process followed step by step approach starting with the situational analysis followed by the theory of change, detailed work plan, and budget. As Ethiopia was one of the leading countries that developed FPP 2023-25, the process was extended." We *had no enough information and the template was not friendly, which resulted in a lengthy process*" said a study participant.

Prioritizing implementation areas with high zero-dose and under-vaccinated children

The FPP focused on addressing zero-dose and under-vaccinated children in line with the IA 2030, Gavi 5.0 strategy, and cMYP 2021-2025. However, inadequate and poor data quality compromised the identification of the zero-dose children and focus areas of interventions. The admin data did not show the reality on the ground because of poor data quality and unrealistic denominator. The WUNIC data have no sub-national disaggregation.

The FPP team followed the Gavi program funding guideline, 2022[8] developed a parameter with six criteria, and selected 534 woredas from a total of 1073 woredas to implement high-impact interventions through the FPP budget. The criteria included a number of zero-dose children, poor data quality, woredas affected by conflict and/or drought, a recent history of vaccine-preventable disease outbreak, and being pastoralist. "*The parameter was a better option to identify and select priority Woredas,*" said a study participant.

Leadership, coordination, and engagement

The FPP development process brought all immunization stakeholders together. The MoH higher officials led the FPP development and the EPI team played a spearheading role in coordination and facilitation of the whole process. As to the Gavi support detail instructions, 2021[9], the FPP developing team jointly engaged in the identification of gaps, prioritizing key initiatives and activities, and preparation of work plan and costing. The GAVI country team coached and monitored the FPP developing team intensively. All study participants agreed that the FPP development process was well-guided, engaging, and a good learning opportunity.

FPP Endorsement and Implementation

FPP met all requirements by GAVI and has passed every step of the approval process by various actors (the MoH, Inter-agency Coordinating Committee, GAVI, and the global Independent Review Committee (IRC). All comments and feedback provided by the reviewers were addressed. Ethiopia set an ambitious plan to reduce the burden of zero-dose children by 50% by the end of 2025[10]. The FPP incorporated various strategies to achieve the goal set. Implementation of the FPP requires the MoH's continued leadership commitment, follow-up, monitoring, learning, and strengthened partnership to implement the FPP efficiently and improve immunization services.

[8] Gavi.org., 2021. Program Funding Guideline; Gavi, the Vaccine Alliance

[9] Gavi.org., 2021. the Gavi support detail instructions; Gavi, the Vaccine Alliance

[10] Ethiopia MoH, 2023. Ethiopia Immunization

Conclusion and Recommendations

Ethiopia has successfully developed the FPP 2023-2025 which was approved in April 2023. FPP is aligned with the country's strategic documents, and global initiatives, such as the HSTP II, cMYP, GAVI 5.0, and IA 2030. MoH leadership, coordination, and engagement of partners and sub-national implementers were commendable. The FPP developing team worked closely with the Gavi team and followed the Gavi roadmap. To address the immunization coverage and inequity gaps, the team identified priority woredas with a high burden of zero-dose children. These prioritized woredas will be the focus of high-impact interventions using the FPP budget.

The study participants recommended cascaded orientation of the FPP to lower levels to familiarize and guide quality implementation, frequent follow-up, mentoring, and feedback mechanisms to be in place. Preparations, such as prior orientation for the FPP developing team are required to avoid a protracted process. It is required to disburse the budget timely and strengthen the health system to improve the performance of PHCs and immunization services delivery.

This paper builds on a deeper understanding of the FPP development process in Ethiopia. While these contributions have been derived from the empirical materials and experiences of Ethiopia, arguably, these can be used by other Gavi-eligible countries that have similar contexts.

Empowering Change: A Co-Design Workshop at Woreda level for Enhancing Primary Healthcare Services in Ethiopia

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Abstract:

Introduction: In recent years, interventions in developing countries have faced formidable challenges and limited success, often attributed to a 'one-size-fits-all' and top-down approach. The absence of local ownership and insufficient consideration of cultural context have posed significant barriers to their effectiveness and long-term sustainability. To address these issues, this abstract presents an innovative approach—a co-design workshop—that prioritizes participatory methods, cultural sensitivity, and collaborative engagement among stakeholders in the context of interventions in developing countries.

Methods: As part of the Improve Primary Health Care Service Delivery (IPHCSD) project, a co-design workshop was conducted in seven pastoralist woredas in Ethiopia. The workshop included stakeholders from the government, health facilities, communities, health extension workers, and other sectors. Using tools such as the modified Tanahashi model, causality analysis, priority matrix, and driver diagram, the workshop identified bottlenecks and co-designed strategies to improve access, quality, and accountability in primary healthcare.

Results: Following a comprehensive joint rapid assessment of health systems and services in the seven woredas, co-design workshops were conducted at the woreda level. The rapid assessment meticulously examined service availability, readiness, and gaps in service uptake using the Tanahashi model. The three-day workshops effectively assessed health status and identified key bottlenecks in primary healthcare service delivery—including limited access to essential health commodities, insufficient human resources, suboptimal care quality, weak governance, and accountability mechanisms, and limited community participation. Importantly, the workshops facilitated a shared gap analysis and the collaborative design of interventions, enabling stakeholders to collectively address these bottlenecks and test innovative solutions. The insights gained from these workshops informed the development of context-specific strategies.

Conclusion: The co-design workshop approach promotes ownership and commitment by engaging stakeholders and incorporating their perspectives. The lessons learned from this model can inform future initiatives in other settings, fostering stakeholder engagement, addressing bottlenecks, and promoting sustainable improvements in primary healthcare delivery.

Keywords: primary healthcare, co-design workshop, stakeholder engagement, community participation, access, quality, accountability,

Introduction

In the sphere of global health interventions, challenges within developing countries have consistently highlighted the limitations of "one size fits all" and top-down approaches. The effectiveness and sustainability of such interventions are often compromised due to neglect of local ownership and cultural context(1,2). Co-design workshops offer an alternative paradigm that transcends conventional models by emphasizing collaboration among diverse stakeholders, including healthcare managers, providers, policymakers, and community members(3–5). This participatory approach engages stakeholders in decision-making, harnessing collective wisdom to develop context-specific solutions rooted in local realities(3). Co-design is believed to yield improved outcomes through participatory design and evidence-based implementation of context-specific interventions, thereby ensuring local ownership. Integration of evidence-based data guarantees that proposed solutions are grounded in a comprehensive understanding of prevailing issues(2–4,6).

The Woreda in Ethiopia is a critical level from which to effect change, as more effective management of service delivery requires local leadership, community engagement, and active participation of key stakeholders. Woreda-level co-design is critical but not a common practice in Ethiopia.

This article introduces an innovative co-design workshop approach, a collaborative effort of the Ministry of Health, regional health bureaus, and Woredas, within the Improve Primary Health Care Service Delivery (IPHCSD) project in Ethiopian pastoralist Woredas.

This article comprehensively outlines the methodology, results, lessons, and challenges of these co-design workshops.

Methods:

The Government of Ethiopia launched the Health Extension Program (HEP) optimization roadmap 2020-2025 to accelerate the realization of Universal Health Coverage. Recognizing the path ahead is difficult, the roadmap recommends the design and implementation of context-specific interventions.

The Improve Primary Health Care Service Delivery (IPHCSD) project, a five-year initiative of the Government of Ethiopia and the Bill and Melinda Gates Foundation, implemented by Amref Health Africa and JSI, is expected to play a catalytic role in this effort. The project seeks to catalyze a comprehensive reconfiguration of primary healthcare (PHC) delivery through a network of care approaches.

The project follows a four-step scale-up framework to maximize its impact. The first step is co-design, where diverse stakeholders collaborate to collect data, analyze it, and identify bottlenecks. The second step is pressure-testing, where crafted interventions are tested for their effectiveness. The third step is the test of scale, where successful interventions are implemented on a broader scale and evaluated for replicability. The fourth step is positioning and supporting scale-up, which focuses on efforts to expand the project's impact at subnational and national levels, particularly on PHC service delivery.

This article focuses on the IPHCSD project's co-design phase. It includes a Rapid Woreda Assessment conducted jointly by regional, Woreda, and project staff using tools like the SARA and ISS Checklist. Integrated Data Analysis involves analyzing collected data and health facility-owned data using the modified Tanahashi model. Maternal and Child health indicators were identified and gaps in coverage were graphed. The centerpiece is the participatory Co-Design Workshop, prepared with activity guides and involving regional health bureaus and the Woreda health office. Facilitators held a

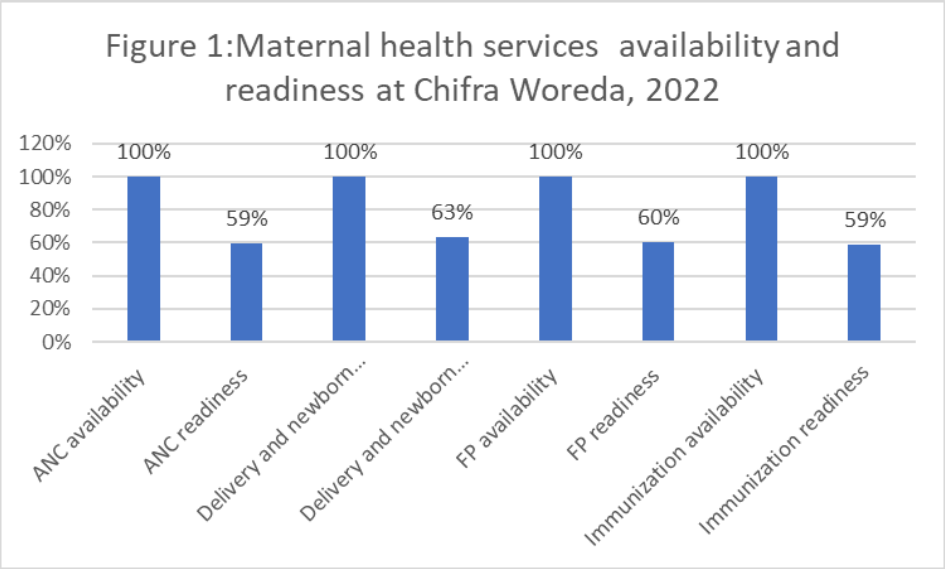
meeting beforehand to ensure participation and discuss facilitation methods.

As a component of the Improve Primary Health Care Service Delivery Project (IPHCSD), a co-design workshop was executed in seven pastoralist woredas during July-September 2022.

Results:

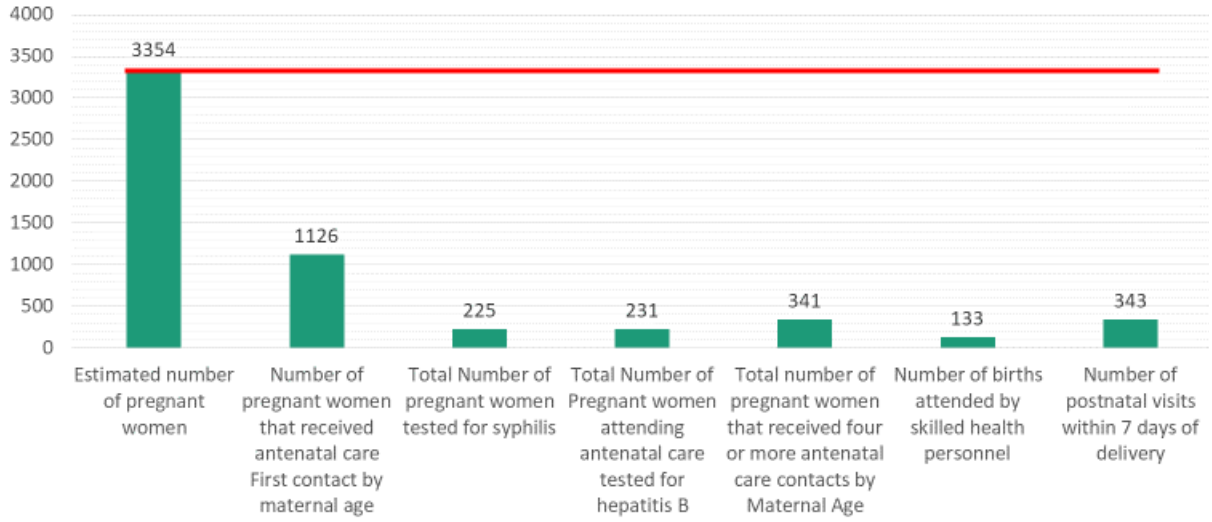
The culmination of seven intensive co-design workshops at the woreda level resulted from swift assessments of health services and system landscapes. A total of 302 participants attended the design workshops, with a majority (204) being female. Health extension workers and community representatives constituted 29% and 8% of the participants, respectively.

Over a dynamic three-day format, the following presentations of the rapid assessment consisted of woreda health status presented mainly in the form of tables, graphs, and maps. The health facility level RMNCH service availability and readiness were also computed and later aggregated at the Woreda level. The participants engaged in a series of discussions to identify key bottlenecks specific to essential RMNCH intervention (ANC, Skilled birth, Postnatal care, neonatal health, and nutrition) according to the 7-health system building blocks, conduct causality analysis using the 5 Whys approach and engage in a prioritization exercise. This was followed by the development of context-specific strategies by using a driver diagram.



The modified Tanahasi model where bars indicating the total number of pregnant women in the area, the number who attended ANC 1, tested for syphilis, tested for hepatitis, ANC4, SBA, and PNC was showing in bars sequentially revealing a cascade from the expected to the actual service delivery showing a continual change from one indicator to the other. The Modified Tanahasi graph used at one of the Woredas is shown in Figure 2.

Figure 2:Bottleneck analysis using Modified Tenahasi model to illustrates gaps in maternal health services at Chifra Woreda, 2022



The workshops facilitated the identification of critical bottlenecks, including limited access to essential health commodities, inadequate human resources, suboptimal service quality, governance challenges, and barriers to community engagement. The participants, using the '5 Whys' technique identified immediate, proximate, and distal causes of identified bottlenecks. Following a brief overview of prioritization, the participants completed the priority matrix by ranking actions based on the time to complete, cost, importance to quality, and availability of resources. On the last day, the team developed the driver diagram by developing a goal statement, setting an aim, identifying primary and secondary drivers, and changing ideas. The identified primary drivers were improving access to care, quality of services, and accountability and governance of the health system. The secondary drivers put down strategies to address the primary drivers. To improve the first driver, access to care, the identified strategies include community engagement, health literacy expanding mobile health services, and strengthening health extension programs through the operationalization of the HEP roadmap.

Finally, the participants shared responsibilities, approaching challenges from multiple angles with a shared goal in mind.

Discussion

The co-design workshops are crucial for stakeholders to systematically analyze obstacles to sustainable PHC service delivery and generate solutions. It helps address health system gaps, prioritize actions, and strengthen PHC. The workshop involves local government, community representatives, and stakeholders, ensuring context-specific investments and active participation. It fosters ownership and commitment, leading to sustainable outcomes. Key benefits of co-design include tailored interventions, resource synergy, empowerment of communities, and nurturing innovative partnerships. Valuable insights and lessons emerged from the workshops, such as the need to address gender-related issues and logistic challenges. Meticulous planning and coordination are vital for engaging stakeholders and overcoming hierarchical structures and distrust. The success of the co-design workshop relies on managing various factors effectively.

Conclusion:

The co-design workshop within the IPHCSD project serves as a remarkable testament to Ethiopia's commitment to participatory problem-solving and healthcare innovation. By embracing a co-design approach, tailoring interventions, and basing decisions on evidence, Ethiopia leads the charge in transforming its primary healthcare landscape. The workshop's outcomes underscore the potency of collaboration, context-specific solutions, and comprehensive health system strengthening. As Ethiopia advances toward universal health coverage, the co-design workshop stands as a beacon of inspiration and evidence of innovative approaches shaping healthcare delivery's future.

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Feasibility and acceptability of family-led postnatal care model, multi-site study in the Ada District, Ethiopia

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Abstract

Background: *Postnatal care (PNC) is a critical intervention to reduce newborn and maternal mortality. The 2016 Ethiopia Demographic and Health Survey found that only 17% of women and 13% of newborns received PNC within the first two days after birth, with 81% receiving no PNC at all. Given the lack of progress in quality and coverage, innovative PNC models may be useful to inform national and global investments. Family-led PNC is an innovative service delivery model that leverages self-care principles to address key barriers identified in Ethiopian. It utilizes an improved discharge process, with user-friendly monitoring devices made available as a home care kit kept with preferred community custodians*

Objective: *To assess the feasibility and acceptability of the family-led care model (FPNC) to increase coverage and quality of PNC in Ethiopia.*

Method: *Pre- and post-intervention mixed study design was used. Four health centers in the Adea District of Oromia were purposively selected. Postnatal women were included sequentially until the sample size was fulfilled. After data cleaning, descriptive analysis and chi-square test were done. P value < 0.05 was considered significant. Interviews with the husbands, families, custodians, and health providers were conducted. Thematic analysis was used for the qualitative study.*

Results: *A total of 218 eligible postnatal women were included in the study. 88 in-depth interviews were conducted. The proportion of mothers and neonates who have postnatal checks within 24 to7 days increased from less than 11% before the intervention to 95.5% (p< 0.0001) after the intervention. Most families managed to use the home care kit. FPNC is highly acceptable by postnatal women, families, home care kit custodians, community members, and health providers.*

Conclusion: *The FPNC model is a feasible and acceptable approach and significantly increases coverage of postnatal care. Testing the FPNC model in a different residential area and type of facility will help understand the scalability of the approach.*

Keywords: *Postnatal care, family-led care, self-care, Ethiopia*

Background:

Approximately 66% of maternal and 73% of neonatal deaths occur postdelivery. Postnatal care (PNC) is a critical intervention to reduce newborn and maternal mortality (1,2). In Ethiopia, the 2018 Ministry of Health guidelines recommended PNC postnatal Days 1, 3, 7, and 42 (3,4). Yet, the 2016 Ethiopia Demographic and Health Survey found that only 17% of women and 13% of newborns received PNC within the first two days after birth, with 81% receiving no PNC at all (5). Given these low rates of coverage, innovative PNC models are needed to improve coverage and quality of PNC, to inform national and global investments.

Family-led postnatal care (FPNC) is an innovative model for reaching postnatal women and newborns with key PNC services during the first week of life that leverages self-care principles. The design of the model reflects key insights from human-centered design activities (6).

Objectives

Assess the feasibility and acceptability of a family-led postnatal care model to increase coverage and quality of PNC in Ethiopia.

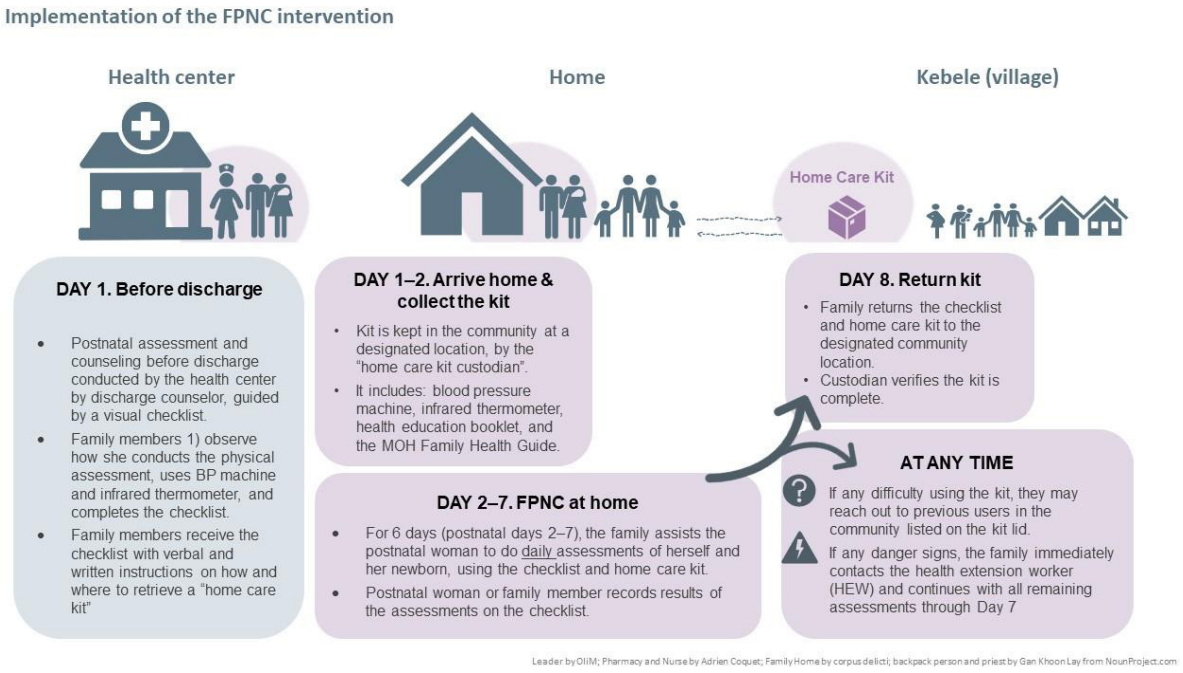

Figure SEQ Figure * ARABIC 1: Implementation of the FPNC Intervention

Methods

Study design: This study used quantitative pre- and post- intervention surveys, followed by a phenomenological qualitative study.

Study period and area: The study was conducted at four health centers (HCs) and their catchment kebeles in Adea district, Oromia, Ethiopia. The survey was conducted from November 2022 to April 2023.

Sample size: The sample size was calculated using the 2016 EDHS coverage of PNC within 24 hours of 17%. With a desired increase to 45% due to the intervention, 5% level of significance, 80% power, design effect of 2.0, and non-response rate of 10%, 109 postnatal women at both pre- and post-intervention, for a total of 218. Up to 20 key informant interviews (KIIs) and 88 in-depth interviews for qualitative interviews.

FPNC Intervention: Figure 1 describes the FPNC intervention. The postnatal checklist includes postnatal signs and symptoms in both the women and newborns that will be assessed by the mother and family for seven days at home. These include general well-being, severe headache, bleeding, breast examination, blood pressure, temperature, and swollen face and leg for the maternal checks. And for neonatal checks; neonates' well-being, breast feeding, burping, skin color, umbilical cord, breathing, temperature, and vaccination status were included.

Study population: The study population were: 1) eligible women who deliver at the study HCs; 2) eligible partners; 3) eligible family members; 4) discharge counselors; 5) HEWs; 6) HCK custodians; and 7) health managers.

Data collection procedure

For quantitative, postnatal women were interviewed using a structured questionnaire to collect information on basic socio-demographic data, assessment of signs and symptoms for both the neonate and women within 24 hours, 24 to 72 hours, and 73 hours to 7 days, feasibility, acceptability, decision making, and equity. For the qualitative component, IDI and KII were conducted using an interview guide.

Sampling procedure: For the quantitative component, postnatal women were included sequentially and were interviewed on the eighth postnatal day. For the qualitative component, purposive sampling was employed.

Ethical Consideration

Ethics approval was obtained by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB No. 21096) and the Addis Continental Institute of Public Health Institutional Ethical Review Board (IRB No. 0029)

Results

In the pre-intervention period 119, eligible women were included in the study. In the post-intervention period, of 115 women who delivered during the study period, 95.7% (n=110) accepted the checklist upon discharge from HCs. In both surveys, more than 88% of women were in the 18 to 35 age group. No formal education was reported in more than 23% of the women, while the majority (≥74%) reported at least primary and above educational status.

115/119 (96.6%) neonates and women in pre-intervention and 110 (100%) in post-intervention received postnatal care at HCs in the first 24 hours after delivery. Between 24 hours to the 7th day, less than 11% of neonates and women got PNC in the pre-intervention survey. In the post-intervention period, 95.5% of the women and neonates had received postnatal checks between the 24 hours and to 7th day.

Of the 110 mothers who accepted the checklist, 104 (94.5%) preferred the FPNC compared with the traditional PNC by health care providers. Moreover, 95% felt confident that they had received good care when doing assessments in the FPNC approach.

Above 80% of the women reported that they were able to use the checklist and device without difficult and were confident using it.

On the daily postnatal checks, 2.7% (3/110) of the neonates' family identified danger signs. All sought care at health facilities to address the danger signs. Danger signs were also reported in 18.2% (20/110) of the postnatal women, of which 80% sought care to address the danger sign.

Qualitative findings

The postnatal women appreciated the involvement of their husbands in their care and the care of the newborn. Husbands and family members were interested in being a part of the discharge counseling and helped with checks at home.

The following are the reasons they supported and preferred the FPNC approach:

- Counseling given upon discharge was comprehensive and informative,
- They liked performing care at home, using the HCK kit;
- They felt more confident knowing that everything was normal

All the discharge counselors agreed that almost all mothers and family members were happy to participate jointly in the discharge counseling. Most managers agreed that the approach has made it possible for many mothers to access PNC services— they most likely wouldn't have accessed them without FPNC. HEWs reported that the community was able to do the checks with no or minimal difficulty. They reported being contacted by families who identified danger signs.

Some of the limitations of the study are the absence of control areas in the study and part of the data was based on self-report which may introduce social desirability bias.

Conclusion and Recommendations

Family-led approach to postnatal care is highly acceptable by postnatal women, families, home care kit custodians, community members, and health providers. Family-led PNC approach has made it possible for many mothers to access PNC services at home, thereby significantly increasing coverage of postnatal care. Without this model, the majority of these women would not have received any PNC. Family-led assessments for postnatal care are feasible to be implemented by low-literacy women and family members in a rural setting.

Here are recommendations from the key findings of the study:

- Systematic and improved discharge counseling process for postnatal mother and family
- Involvement of the family members in the discharge counseling for better follow-up of the postnatal mother and newborn
- Usage of a checklist for the postnatal checks of the mother and newborn
- Testing the FPNC model in high birth volume health facilities, different residential areas and types of facilities will help understand more the scalability of the FPNC approach.

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Net repurposing and reasons for repurposing: Qualitative study

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ABSTRACT

Background: *Malaria nets are often repurposed for other uses, such as carrying crops, tying animals, or fixing things. This can reduce their effectiveness in preventing malaria. This qualitative study explored the reason for net repurposing in selected malarious areas of Ethiopia.*

Objective: *To explore the reason for net repurposing in selected malarious areas of Ethiopia.*

Methods: *a qualitative study was conducted in eight woredas of the country, four selected from moderate malaria transmission strata and four from high malaria transmission strata.*

Results: *net repurposing was found to be a common practice in the study area. Reasons identified for net repurposing included: Perceived nets worn, torn, or lost their chemical potency, the Availability of more nets in households, and the Strength, size, and shape of the nets.*

Conclusions: *Net repurposing is a common practice in all studied areas and is used for a variety of functions. Bed nets are preferred for repurposing because of their strength and bigger size, the availability of more nets in households and Perceived nets worn, torn, or lost their chemical potency. Provision of continuous community education whenever there is a public gathering for any reason (religious, social, etc.,) and refilling of nets based on the household need to prevent repurposing of extra nets. In addition, the enforcement of rules and regulations, especially in the reduction of net repurposing.*

Keywords: *net repurposing, LLINs, malaria, reason for repurposing, Ethiopia*

Background: Malaria remains a major public health problem in developing countries, like Ethiopia, although it is preventable and curable. There have been consistent efforts to fight the disease both globally and in Ethiopia(1).

Malaria is endemic in Ethiopia, with varying intensities of transmission. The disease is prevalent in areas below 2000 meters above sea level, an estimated 52% of the population is at risk of malaria infection. In addition to the prior high government commitment to stand-alone interventions to vector control interventions, the Ethiopian government scaled up antimalarial interventions since 2005. Following the scaling up of appropriate antimalarial measures under the scale-up for impact (SUFI) strategy, the country achieved reduction achieved a remarkable reduction in malaria cases and deaths.

Intending to sustain the gains made and the scale of interventions, the Government of Ethiopia, in collaboration with its partners, has developed a national malaria elimination strategic plan (2021 – 2025). The strategic plan incorporates focus areas in the fight against malaria and highlights the maintenance of proven antimalarial measures. Accordingly, the country has been implementing antimalarial interventions, including vector control, mainly through indoor residual spraying (IRS) and long-lasting insecticide-treated nets (LLINs)(2). LLINs are distributed to all malarious areas of the country. The World Health Organization (WHO) has identified the use of insecticide-treated nets (ITNs) as one of the main recommended interventions to reduce the burden of malaria(3).

To reduce net repurposing and enhance proper utilization of LLINs, the national malaria elimination program (NMEP), in collaboration with implementing partners, has implemented social and behavioral change communication (SBCC) activities using electronic media and training of media professionals and school teachers, who are expected to play a key role in educating the public and students(4).

Over the past decade, the country has carried out massive distribution of LLINs coupled with community-level social mobilization operational works. However, as seen by different national surveys (MIS), in 2011, 2015, and 2020, net utilization, assessed by the percentage of people sleeping under a net night before the survey, was found to be low. This low net utilization maybe due to the repurposing of nets for other purposes. This study aims to explore the (s), reasons for net repurposing in malarious areas of the country.

Objectives

To explore the reason for net repurposing in selected malarious areas of Ethiopia.

Methods

The study was conducted in eight woredas from four regions of Ethiopia from January to March 2021. Dera and Fogera from the Amhara region and Adama and Dugda from the Oromia region as malaria moderate transmission settings. Ada'ar and Awash Fentale Woreda from the Afar region and Ubadebre Tsehay and Zala Woreda from SNNP as High malaria transmission settings were selected. A total of 16 focus group discussions (FGDs), 16 in-depth interviews (IDIs), and 24 key informant interviews (KIIs) were conducted. Participants for FGD and IDI were adult community members of mixed gender. For the KIIs, the woreda malaria focal person at the woreda level and health extension workers were considered. Participants were selected based on their duration of residence in the area (at least 3 years) and their ability to express themselves about their daily activities. The FGDs and interviews were conducted by research assistants who were fluent in the local language of each woreda. The data was collected through audio recordings and transcribed verbatim. Daily debriefing sessions were conducted with the research assistants to capture any emerging issues. Participation in the study was voluntary and the confidentiality of the information was assured.

Focus group discussions (FGDs) were conducted with 16 groups of 8-10 participants each. The FGDs were guided by a discussion guide that covered a range of topics related to long-lasting insecticidal net (LLIN) utilization, such as the perceived benefits and barriers to LLIN use, the role of social and cultural factors, and the experiences of community members with LLINs. In-depth interviews (IDIs) were conducted with 16 individuals, including 8 men and 8 women. The IDIs were semi-structured and allowed for a more in-depth exploration of the issues raised in the FGDs. Key informant interviews (KIIs) were conducted with 4 health extension workers and 02 woreda malaria focal persons in each region, for a total of 24 KIIs. The KIIs were used to get the perspectives of these key stakeholders on the challenges and opportunities for improving LLIN utilization.

The data collected through the FGDs, IDIs, and KIIs was analyzed using thematic analysis. Thematic analysis is a qualitative data analysis method that involves identifying patterns and themes in the data. The themes that emerged from the analysis were used to develop the findings of the study. The analysis was assisted by qualitative analysis software Opencode version 4.02.

Ethical Consideration

Ethical clearance was obtained from the Addis Continental Institute of Public Health institutional review board (IRB) with version number ACIPH/IRB/004/2020.

Results and Discussion

The result is presented with the main themes of net repurposing and reasons for repurposing. The reasons for net repurposing are further presented with three subthemes: Perceived nets worn, torn, or lost their chemical potency, availability of more nets in households, and strength, size, and shape of the nets.

Nets Repurposing

Repurposing is a common practice in all the study areas. Some of the nets used when repurposed include: to carry crops and straw, as part of bedding (blanket, bed sheet, etc.) since it kills bedbugs and flees, as rope to tie animals and to fix things on carts and donkeys, as carpet (floor mat), as curtain, as head scarf for women, to cover the harvest when stored, to repel rats and weevils, as a sieve to filter crops from rubbish, to squeeze '*Kotcho'* (the root of false banana), which is a favorite food in south Ethiopia, to dry crops, as a toilet cover, and to build a chicken house. A community member said that" *the community uses bed nets for other purposes, such as coverage during harvesting time and covers on doors*". Another community member added, "*We use it as a rope to tie the goats. With torn bed nets, we stretch them and put them over the wall*"

Reason for repurposing

Perceived deterioration of net quality

The age of the net to repurpose varies from place to place. Most people reuse nets for other purposes when they are worn, torn, or have lost their chemical potency. The community believes that a net has lost its chemical potency when it fails to kill house flies, fleas, and other insects that come into contact with the net. A community member revealed that "*Most people in the community use a bed net for other purposes once it has a hole because they think it is useless once it has a hole."*

Availability of extra net in households

According to the study participants, there are incidences where bed nets are repurposed, regardless of their physical condition, even when the household receives a new one. Some community members also reported using new nets for other purposes. The availability of many nets in a household seems to encourage repurposing. For instance, if the household has

four new nets, they might use two for malaria prevention and the other two for other purposes. One community participant said: *"It depends on the purpose they are going to use. For example, the old one will be used to make rope, but the new one will be used to transport material"*.

The inherent physical attributes of bed nets

strength of the material and the large size and shape make nets preferable for other purposes than locally made materials. The bed nets can carry more than six times the weight of ordinary locally available materials. Their shape and size make them suitable for many customized purposes. The community used to cover trees to tie straws and their calves; however, this is no longer allowed because of the harm it causes to the trees. Therefore, they use bed nets for tying purposes because of their availability, size, and strength. another community participant said: *"Bed nets can carry a large amount (6 times more than a locally made sack can carry) of straw, crops, and other supplies".* Another participant from the same woreda said: *"Bed nets are very elastic and strong and can hold a very large volume of straw."*

Discussion

The findings presented in this manuscript provide insight into the widespread practice of net repurposing in various areas in Ethiopia. The practice is driven by reasons such as the perceived deterioration of net quality, the availability of extra nets in households, and the inherent physical attributes of bed nets. Other similar studies have shown communities repurpose bed nets for other purposes in Ethiopia(5), Guinea(6), Kenya(7) and Nigeria(8).

Repurposing bed nets for alternative uses may inadvertently compromise their primary function as a tool for malaria prevention(9). This study highlights the role of community perceptions in influencing net repurposing behaviors. The belief that a net has lost its chemical potency when it develops holes is a significant driver of repurposing. Which is also similar with other studies(10,11). Future research could investigate deeper into the accuracy of these community perceptions by examining the actual effectiveness of nets with minor damage.

The study also emphasizes the importance of the availability of extra nets in households as a factor influencing repurposing which is in line with other studies (5,12). Investigating the dynamics of net distribution programs and their impact on repurposing practices could be a matter of consideration. Examining the trade-offs between distributing larger numbers of nets to households and ensuring their proper use for malaria prevention could inform the approach of more effective distribution strategies.

The other reason explored in this study for repurposing was the preference for bed nets in repurposing due to their strength, size, and shape(13,14). This offers a valuable foundation for further research inquiry into the practice of net repurposing and its implications for malaria control. Future research should focus on assessing the impact of repurposing on malaria prevention, validating community perceptions regarding net efficacy, and studying the distribution dynamics of bed nets.

Conclusion and Recommendations

Net repurposing is a common practice in all studied areas. Nets are repurposed for a variety of functions, including; as a suck to carry crops, straw, etc., as a rope to tie animals and fix things on a cart, etc., as part of bedding (blanket, bed sheet), as a filter, as a mesh to cover windows, etc. According to the participants, bed nets are chosen for these different purposes because of their strength and bigger size. Net repurposing is a common practice in all studied areas and is used for a variety of functions. Bed nets are preferred for repurposing because of their strength and bigger size, the availability of more nets in households and Perceived nets worn, torn, or lost their chemical potency. Provision of continuous community education and refilling of

nets based on the household needs to prevent the repurposing of extra nets. In addition, the enforcement of rules and regulations, especially in the reduction of net repurposing.

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Effect of Educational Intervention on Lifestyle Modification of Patients with Hypertension at Bishoftu General Hospital

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ABSTRACT

Introduction: *Hypertension is the leading cause of cardiovascular disease (CVD) and is also a modifiable risk factor. Lowering and controlling blood pressure are crucial in reducing CVD-associated risks. The burden of hypertension is increasing in Ethiopia, however, evidence of educational and counseling interventions to lower the risk is limited.*

Objective: *This study aimed to investigate the effect of an educational intervention on clinical measurements among hypertensive patients attending the outpatient department at Bishoftu General Hospital in 2021.*

Method: *A pilot interventional quasi-experimental study without a comparison group was conducted. The effect of a 3-month educational intervention on the benefits of an improved diet (reducing salt intake, including more fruit and vegetables), quitting smoking, limiting alcohol intake, and increasing physical activity that was facilitated by nurses and physicians on clinical measurement changes among 50 patients with hypertension was evaluated at the Bishoftu General Hospital in Oromia region, Ethiopia. We measured blood pressure, weight, and total cholesterol at baseline and within a week of post-intervention. Data were expressed as mean (SD) and the paired t-test assessed overall changes in measured outcomes.*

Result: *We found significant decreases in systolic (−12.4 mm Hg; P < .001) and diastolic (−4.6 mm Hg; P < .001) blood pressure, total cholesterol (−34.8 mg/dl; P < .001), and weight (−2.6 kg; P < .001).*

Conclusion and recommendation: *the educational intervention was found to be effective in reducing risk factors for cardiovascular disease. Establishing an educational and counseling program for patients with hypertension in health facilities and communities would promote a healthy lifestyle and help reduce their risk for cardiovascular disease. Future interventions would benefit from including a comparison group or groups and a longer follow-up period with a larger sample size to examine whether positive changes would be sustained beyond the immediate educational intervention.*

Key words: *hypertension, educational intervention, lifestyle modification, Ethiopia*

Introduction

Hypertension is the leading cause of cardiovascular disease (CVD) and is also a modifiable risk factor (1). Lowering and controlling blood pressure are crucial in reducing CVD-associated risks (1). In Ethiopia in 2015, the prevalence of hypertension was estimated to be 20% to 30% (2,3). The burden of hypertension is increasing because of expanding urbanization, demographic transition, and shifting lifestyle behaviors (4). A recent study reported that 48% of people in Ethiopia with hypertension had uncontrolled hypertension (5). Despite a national strategic plan to implement policies to reduce uncontrolled hypertension and improve awareness of blood pressure control, the prevention and control of hypertension have not received due attention (6).

Education and counseling interventions have been proven effective in preventing and controlling hypertension (7,8). This type of behavioral intervention includes lifestyle modifications such as promoting physical activity, a healthy diet, smoking cessation, and medication adherence. However, the most successful interventions to date have been implemented in high-income and upper-middle-income countries (7). From the available literature, we found no results on the effect of educational interventions on lifestyle modification for patients with hypertension in Ethiopia. A better understanding of the effectiveness of interventions will provide evidence for strategic health system planning in Ethiopia. Therefore, this study aimed to investigate the effect of an educational intervention on clinical measurements among hypertensive patients attending the outpatient department at Bishoftu General Hospital.

Methods

A pilot interventional quasi-experimental study design without a comparison group was conducted at the outpatient department at Bishoftu Hospital in the Oromia Region of Ethiopia from January to September 2021.

We included a convenience sample of 50 patients with hypertension at the pre-intervention assessment, which corresponded with the minimum sample size required to achieve 80% power. However, only 41 participants completed the postintervention assessments and were included in the analysis. Eligibility criteria required that patients be aged 18 to 65 years, have either systolic blood pressure (SBP) of 140 mm Hg or more or diastolic blood pressure (DBP) of 90 mm Hg or more or be taking blood pressure medication. Pregnant women and patients with comorbidities (as determined by health professionals) were excluded.

The materials for the educational intervention sessions were adapted from the World Health Organization noncommunicable diseases model and modified according to the Ethiopian context (9). All participants attended 6 biweekly 3-hour sessions over 3 months that were facilitated by nurses and physicians and consisted of didactic lectures followed by interactive group activities and exercises. The objective was to develop skills to implement a healthy lifestyle by emphasizing the importance of medication adherence and reducing hypertension-related complications. The educational messages focused on the benefits of an improved diet (reducing salt intake, including more fruit and vegetables), quitting smoking, limiting alcohol intake, increasing physical activity like work-related activities, travel to and from place, recreational-related activities, and sedentary behaviors, and implementing behavioral change strategies for blood pressure control.

Baseline demographic characteristics were collected via an interviewer-administered questionnaire, physical measurements, and laboratory tests. physical measurements like weight, blood pressure (systolic and diastolic), and total cholesterol were taken both at baseline and within 1 week after the pilot intervention. Body weight was recorded to the nearest 0.1

kg. Blood pressure was measured 3 times with the patient sitting down and the cuff placed on the left arm. Measurements were taken within 5-minute intervals, and the average of the 3 was calculated. The fasting blood samples were analyzed at the hospital using the end point Jaffe method to measure total cholesterol.

Data normality for all continuous variables was checked and confirmed as normally distributed. Data were expressed as mean (SD) or as proportions. The paired t-test assessed overall changes in measured outcomes; the 2-sample t-test assessed outcomes by sex. The significance level was set at $P < .05$. Statistical analyses were performed using SPSS version 24 (IBM). Ethical clearance was obtained from the ethical review board of Oromia Regional Health Bureau and written consent was taken from all participants.

Results

Of the 50 participants, 41 completed both the pre- and post-intervention assessments for a response rate of 82.0%. The study sample was 63% female and patients had a mean age of 47.6 years. Approximately one-third (34%) of participants had no formal education, 61% were of Oromo ethnicity, 90% were Orthodox Christians, and 73% were currently married (Table 1).

From baseline to the postintervention follow-up, mean SBP decreased 9% (from 139.5 [SD, 12.9] mm Hg to 127.1 [SD, 9.5] mm Hg) and mean DBP decreased 5% (from 86.9 [SD, 7.7] mm Hg to 82.3 [SD, 5.9] mm Hg) ($P < .001$). The mean weight of participants decreased from 67.9 (SD, 12.6) kg to 65.3 (SD, 12.5) kg ($P < .001$). Total cholesterol was reduced by 17.0%, from 205.5 (SD, 26.7) mg/dl at baseline to 170.7 (SD, 27.6) mg/dl at the 3-month follow-up ($P < .001$) (Table 2).

When results were stratified by sex, there were significant reductions in mean SBP (9.6%, $P < .001$) and DBP (4.5%, $P = .004$), weight (3.2%, $P = .002$), and total cholesterol (15.4%; $P < .001$) at the postintervention follow-up among females. Similarly, males had significant reductions in the mean SBP (7.7%, $P < .001$) and DBP (6.9%, $P = .004$), weight (4.9%, $P < .001$), and total cholesterol (20.1%; $P < .001$). No significant differences between sexes were identified in any of these measures (Table 2).

Discussion

We found that a 3-month educational intervention promoting a healthy lifestyle among patients with hypertension resulted in significant reductions in SBP, DBP, weight, and total cholesterol. According to the Seventh Report of the Joint National Committee on Prevention, Dictation, Evaluation, and Treatment of High Blood Pressure, health-promoting lifestyle modifications are necessary to prevent the progressive rise in blood pressure and CVD (1). The lifestyle factors our intervention focused on were similar to those in the report, including reducing salt intake, increasing consumption of fruits and vegetables, increasing physical activity, avoiding alcohol, and medication adherence. Our results were consistent with findings from previous studies in high-income and upper-middle-income countries (8) and add to the evidence on the effectiveness of interventions using education and counseling strategies in CVD prevention and control in a particular context of low-income countries.

The strengths of this study included an acceptable follow-up of 82% of the study sample, and objective measures obtained via a standardized protocol and results from a hospital laboratory. We anticipated explaining observed reductions in blood pressure and cholesterol as a function of weight loss. However, no signification associations were found between weight loss and blood pressure or total cholesterol, which could be because of the small sample size. Other limitations included a lack of a comparison group, a purposefully selected sample, and a short intervention duration. Hence, we cannot rule out the possibility that the changes observed from pre-intervention to postintervention were

due solely to the intervention, as the improved outcomes could be attributed to one or more variables not measured.

In conclusion, our pilot study demonstrated the beneficial effect of educational intervention on changes in blood pressure, total cholesterol, and weight in a sample of patients with hypertension. We recommend that public health practitioners develop evidenced-based educational and counseling strategies appropriate for patients with hypertension in Ethiopia who seek treatment and control services at health facilities. However, supporting community-level educational interventions to reach a larger proportion of the high-risk population is equally important. Future interventions would benefit from including a comparison group or groups and a longer follow-up period with a larger sample size to examine whether positive changes would be sustained beyond the immediate educational intervention.

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Table 1. Sociodemographic Characteristics of Participants, Educational Intervention Among Patients with Hypertension, Bishoftu Hospital, Oromia Region, Ethiopia,2021[a]

Sociodemographic characteristic	Baseline (N = 50)	Postintervention (N = 41)
Sex		
Female	32 (64)	26 (63)
Male	18 (36)	15 (37)
Mean age, y	47.6	47.6
Age, y		
18–29	1 (2)	1 (2)
30–44	14 (28)	11 (27)
45–65	35 (70)	29 (71)
Ethnicity		
Oromo	29 (58)	25 (61)
Amhara	15 (30)	10 (24)
Tigray	4 (8)	4 (10)
Others	2 (4)	2 (5)
Religion		
Orthodox Christian	38 (76)	37 (90)
Protestant	11 (22)	4 (10)
Muslim	1 (2)	0
Educational status		
No formal education	15 (30)	14 (34)
Primary education	16 (32)	14 (34)
Secondary education	12 (24)	8 (19)
College/ University completed	7 (14)	5 (12)
Marital status		
Never married	2 (4)	2 (5)
Currently married	37 (74)	30 (73)
Divorced	4 (8)	3 (7)
Separated/Widowed	7 (14)	6 (15)
Employment status		
Government employee	9 (18)	9 (22)
Private/self-employee	9 (18)	4 (10)
Housewife	12 (24)	9 (22)
Merchant	5 (10)	5 (12)
Farmer	7 (14)	7 (17)
Unemployed	8 (16)	7 (17)

[a] Values are no. (%) unless otherwise indicated.

Table 2. Differences in Outcomes Measures Before and After Educational Intervention Among Patients with Hypertension, Bishoftu Hospital, Oromia, Ethiopia, 2021 (N = 41)

Outcome measure	Baseline, mean (SD)	3-Month postintervention, mean (SD)	Mean difference	P value[a]
Total				
Systolic blood pressure, mm Hg	139.5 (12.9)	127.1 (9.5)	-12.4	<.001
Diastolic blood pressure, mm Hg	86.9 (7.7)	82.3 (5.9)	-4.6	<.001
Weight, kg	67.9 (12.6)	65.3 (12.5)	-2.6	<.001
Total cholesterol, mg/dl	205.5 (26.7)	170.7 (27.6)	-34.8	<.001
Females (n = 26)				
Systolic blood pressure, mm Hg	138.5 (10.7)	124.5 (9.1)	-14.0	<.001
Diastolic blood pressure, mm Hg	86.4 (5.9)	82.3 (5.9)	-4.1	.004
Weight, kg	69.7 (14.4)	64.9 (13.8)	-4.8	.002
Total cholesterol, mg/dl	206.7 (24.7)	177.1 (25.3)	-29.6	<.001
Males (n = 15)				
Systolic blood pressure, mm Hg	141.4 (16.5)	131.5 (8.8)	-9.9	<.001
Diastolic blood pressure, mm Hg	87.4 (10.1)	82.4 (7.0)	-5.0	.01
Weight, kg	68.3 (9.1)	66.0 (10.1)	-2.3	<.001
Total cholesterol, mg/dl	203.3 (30.5)	160.8 (26.9)	-42.5	<.001

[a] *P* values determined from paired *t*-tests. No significant differences were found by sex using 2-sample *t*-tests.

Breaking Barriers, Building Equity: Engaging Communities and Stakeholders for Leveraging and Sustaining Mobile Health Teams in Ethiopia's Pastoralist Communities

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Abstract

Introduction: While Ethiopia has made substantial healthcare infrastructure and workforce progress, pastoralist communities still grapple with limited access to essential services. This article explores the potential of mobile health teams (MHTs) as a transformative strategy to bridge healthcare gaps in remote Ethiopian communities.

Methods: Following a rapid assessment of the situation of mobile health team services in the woreda, Worda-based MHT service was co-designed by engaging a diverse range of stakeholders, including community representatives, health workers, health extension workers, and managers. This workshop aimed to collaboratively address challenges, ensuring the alignment of the MHT service with community needs and improving healthcare delivery. The co-design was followed by the implementation of the mobile health services using the agreed principles and arrangements.

Results: The process began with a successful co-design workshop, following a rapid assessment of mobile health activities in Woreda and community mapping. Two rounds of integrated mobile health service outreaches reached 3284 and 2612 individuals across ten remote communities. Lessons from these initiatives highlighted the importance of collaboration, interdisciplinary teams, and resource allocation for effective healthcare in underserved regions. Successes and challenges emphasized community mobilization, standardized approaches, and partnerships in extending healthcare access to remote areas. The MHT program offered comprehensive healthcare, including maternal and child health, family planning, immunization, nutrition interventions, adult curative services, and health education.

Conclusion: MHTs present an opportunity to bridge healthcare disparities in remote areas, empowering communities, enhancing healthcare access, and proactively managing diseases. Collaborative efforts and innovative solutions play a pivotal role in achieving comprehensive healthcare for marginalized populations. The insights gained from MHT initiatives offer valuable perspectives for refining future implementations, ultimately contributing to a more equitable healthcare landscape.

Keywords: mobile health teams, decentralized, health equity, underserved communities, community engagement, interdisciplinary teams

Introduction

Ethiopia has made significant healthcare infrastructure strides in recent decades, yet pastoralist communities still grapple with inadequate access to essential services. The central tenet of health equity in Ethiopia's healthcare transformation agenda calls for equal access to healthcare for all segments of the population(1,2). However, this equity remains elusive for pastoralist populations, demanding innovative interventions(3).

Mobile health teams (MHTs) have shown promise in addressing these healthcare disparities in remote Ethiopian communities(4). They bring essential services closer to communities, resulting in improved health outcomes, reduced maternal and child mortality rates, and better overall well-being(5). However, past and most existing MHT initiatives were often donor-dependent and humanitarian-focused, limiting sustainability and Woreda involvement(6,7). This article explores how MHTs can empower communities and bridge healthcare gaps, providing timely care, early disease management, and promoting preventive healthcare in underserved regions. It underscores the need for decentralized MHTs to align with Ethiopia's commitment to 'leaving no one behind.'

Objectives of the Decentralized MHT

The objectives are to provide essential healthcare services to remote communities, empower primary health care units, and enhance health outcomes through timely promotive, preventive, and curative services in underserved areas.

Methods

A co-design workshop occurred in Chifra Woreda, preceded by a joint rapid assessment conducted by the Afar region Health Bureau and the IPHCSD project. The assessment employed questionnaires, interviews, and expert discussions to evaluate MHT service status and challenges.

The workshop brought together diverse participants, including the Woreda Health Office, healthcare facility managers, and professionals from various disciplines. Collaborative problem-solving during the workshop addressed common challenges, informed by a review of the rapid assessment and bottleneck analysis.

Subsequently, a jointly developed MHT implementation guide and activity plan guided two rounds of MHT services in remote areas. Interdisciplinary teams delivered comprehensive healthcare services, encompassing maternal and child health, family planning, immunization, nutrition interventions, and health education. The IPHCSD partnership played a pivotal role in addressing resource-related challenges.

Result

The results are presented in two sections: the Design Activity and Lessons Learned from MHT Outreach Programs.

Design Activity: Addressing Challenges through Collaborative Solutions

In a dynamic co-design workshop attended by 75 participants, including the Woreda Administration, Health Office representatives, partners, PHCU managers, health professionals, extension workers, community representatives, and experts, stakeholders collectively addressed challenges using the seven pillars of MHT based on WHO building blocks. Participants were divided into three groups, focusing on community engagement, health worker concerns, and management issues. This co-design workshop paved the way for a more inclusive, effective, and community-responsive MHT program, reflecting a proactive approach to healthcare delivery in the Afar region.

Lessons Learned from MHT Outreach Programs

Following the workshop, the Woreda Health Office and PHCUs developed an MHT implementation guide and activity plan. Two rounds of MHT services were conducted, addressing the healthcare needs of marginalized communities. A diverse team of 23 health professionals, including health officers, midwives, nurses, and health extension workers, provided comprehensive healthcare.

Each round spanned 10 days, focusing on 10 remote areas. Collaboration with the Improving Primary Health Care Service Delivery (IPHCSD) project enhanced reach and impact through financial and technical support. Community mobilization played a crucial role, in ensuring informed and engaged target populations.

The 10 outreach sites, their distance from the PHCU, and their respective catchment population are shown below.

Table 1. Outreach sites for the MHNT

Name of PHCU	Name of outreach village	Distance in KMs from PHCU	Total population
Merged	Bukli	70	2812
	Ferahti	60	1261
	Badsu	15	2122
	Tewele	20	438
	Asamay and Asriged	45	2138
Jara	Sidehadaba	25	3111
	Undajara	25	919
	Andale Harata	25	2118
Chifra	Rabo	25	628
	Dergera	50	1828
	Sisiblu	60	3216
	Derewayu	20	583
	Dedaba	15	611
Woama	Amaytole	50	2,118
	Wood	40	618
	Kille	40	3218
Total			**27,739**

Table 2 shows the services provided and the number of individuals reached in each round. The impact was significant, with 3,284 individuals reached in the first round and 2,612 in the second, despite challenging circumstances.

Table 2. Services provided during the two rounds of outreach

Service provided	First round	Second round
Adult Health Services	515	342
Care for pregnant women	213	863
Children under five years	574	320
Family planning	11	254
Health Education	588	12
Immunization Children	831	205
Immunization Women	260	11
Nutrition	274	139
Postnatal Care	18	466
Total	3284	2612

Despite hurdles, the program demonstrated promising impact and potential for improvement, shedding light on the importance of collaboration, leadership commitment, interdisciplinary teams, and resource provision for comprehensive healthcare delivery in hard-to-reach areas. While the initiative yielded promising results, several challenges were encountered. Notably, there were shortages of essential drugs and reporting formats, which hindered the seamless delivery of healthcare services. Additionally, the geographic terrain posed accessibility challenges, with certain areas proving difficult to reach even with dedicated field vehicles.

Conclusion

Decentralized multidisciplinary mobile health teams represent a promising model for enhancing healthcare access in remote and underserved communities. These initiatives, driven by improved outreach, capacity building, integration, data collection, and community engagement, address critical healthcare gaps, leading to improved health outcomes.

The co-design approach stands out as a key factor in ensuring stakeholder collaboration and commitment, essential for the success of such programs. The lessons gleaned from the two rounds of MHT implementation emphasize the significance of collaborative efforts, interdisciplinary teams, and resource provision, particularly in remote and underserved regions.

The commitment of all stakeholders, including health professionals, the Woreda health office, and the IPHCSD project was instrumental in the success of these rounds. The challenges encountered provide valuable insights for refining future implementations, with a focus on extending healthcare access to the most marginalized communities. This endeavor exemplifies the potential of integrated and collaborative approaches in bridging healthcare disparities and enhancing the health outcomes of underserved populations.

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Optimizing health extension workers' task-shifting to improve tuberculosis case detection and treatment in Ethiopia

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Abstract

Background: *Tuberculosis (TB) is one of the formidable health challenges in Ethiopia. Studies indicate that adding TB services to health extension workers (HEWs) tasks improved case detections and treatment outcomes in Ethiopia. Given the financial and operational difficulty of a national scale-up, only limited areas can be targeted by an expanded program of HEWs task-shifting.*

Objective: *This study aimed to map disparities of TB services across regions and districts and to project the equity and program benefits of HEWs task-shifting intervention.*

Methods: *We used data from the Health Management Information System, surveys, demography, geospatial, and implementation studies. We measured equity in terms of TB service coverage including: (i) health center adequacy (population-to-health center ratio); and (ii) spatial access (population with access within two-hours walking). Observed distributions were used as a comparative disparity measure. Districts with TB services access gaps were prioritized, and included in models that simulated equity benefits of HEWs' task-shifting and its impact on national TB program performance.*

Results: *Diagnosis coverage varied from 54% in Afar to 100% in Harari Region. Health center inadequacy ranged from 10% of districts in Benishnagul-Gumuz to 87% in the Sidama Region, and TB service inadequacy ranged from 32% in Amhara to 73% in Somali Region. Spatial access inadequacy ranged from 7% of districts in Sidama to 91% in Somali for health centers, and from 7% in Sidama to 97% in Afar for TB services. Task-shifting intervention in districts with inadequate coverage can improve national case detection and treatment success rates from 66% to 88% and 93% to 99%, respectively.*

Conclusion: *In Ethiopia, there are huge variations in access to TB services across regions attributable to the general health system and TB-specific deficiencies. Therefore, adding TB services into HEW tasks in poor coverage districts can address coverage gaps and improve program effectiveness.*

Keywords: *Tuberculosis, service equity, task-shifting, health extension program, Ethiopia.*

Introduction

The End-TB Strategy aims to use early detection and rapid linkage to treatment as key tools to reduce mortality due to TB and combat its transmission [1]. However, the routine passive case-finding strategy has left millions of TB cases out of the TB prevention and control program [2]. A third of TB cases in Ethiopia remain undetected and/or untreated [3], with higher reports in certain areas [4], attributable to variations in access to TB services [5].

The HEP has expanded primary care services to every rural village [6]. Despite HEWs being tasked with TB case identification, contact screening, and community care, their contributions to TB program are not adequate as expected [7]. Implementation studies show that Ethiopia could greatly improve TB program efficiency if diagnosis and treatment services are integrated into HEWs' duties through the provision of capacity building, logistics, and supervision packages to assist HEWs in identifying presumptive TB cases, collecting samples, and providing treatment [8]. This task-shifting package was reported to improve case detection and treatment success rates by 74% and from 75% to 95%, respectively. As a result, investigators recommended a national scale-up of the package. However, the cost and benefits will determine the eventual rollout of the package at the national level.

Cognizant of the variations in healthcare access, and operational and financial constraints in Ethiopia, prioritizing and targeting areas with poor service coverage is essential to optimize efficiency and equity, and ensure sustainability. Thus, assessing TB service disparities and pinpointing scale-up pathways will help to prioritize the most-in-need districts towards scale-up of the package.

Objectives

This study assessed the variations in access to TB services across regions and districts in Ethiopia and modeled how HEW task-shifting could address the disparities and improve TB program performance.

Methods

Data sources

We used multiple data sources. First, we extracted TB service availability and delivery data from the District Health Information Software 2 (DHIS2) for 2012 E.C. (July 2019 to June 2020). Second, data were supplemented with Service Provision Assessment, population from Central Statistical Agency and WorldPop, health facilities geocode, boundary shapefiles, and surface friction data from the Malaria Atlas project. Lastly, input parameters from an implementation study which was in Sidama and Hadiya zones to model the impact [8].

Analysis

Distributional variations in TB services were quantified in terms of coverage at region and district levels. Coverage was determined based on the availability of diagnosis services at health centers and primary hospitals. Coverage in the district was measured using: (i) health center adequacy (population to health center ratio) which is a proxy indicator of access to outpatient services [9]; and (ii) spatial access adequacy which is the proportion of population with access to health center within two-hours walking. Health center adequacy was calculated as the ratio of population to the number of health centers per district, and TB services adequacy as the ratio of population to health centers with TB diagnosis services. Whereas, spatial access adequacy considered variations in several health facilities, population and area sizes, and topographic conditions of districts. We used the observed distribution of health centers and spatial adequacies to measure coverage disparities: districts were categorized as "adequate" when the ratio was less or equal to the median ratios; "inadequate" otherwise (further subcategorized at 1st & 3rd quartiles).

Based on coverage disparities, we prioritized districts with inadequate coverage. Then, we developed a mathematical model that simulated the potential increase in the national case detection rate (CDR) and treatment success rate (TSR) when the intervention is implemented in prioritized districts. Using the national baseline CDR of 66%, we estimated improvements in CDR and TSR if task-shifting is implemented in severely and all inadequate districts.

Results and Discussion

Coverage

A total of 4,147 health centers and hospitals were included. Diagnosis coverage ranged from 54% in Afar to 100% in Harari regions. Using the median population-to-health center ratio of 27,000 cutoffs, health center inadequacy varied from 10% of districts in Benishnagul-Gumuz to 87% in Sidama, and TB services inadequacy from 32% of districts in Amhara to 73% in Sidama Region using the median 30,000 cutoffs. At the median proportion of the population with access to health centers (i.e., 0.34), spatial access inadequacy ranged from 7% of districts in Sidama to 91% in the Somali Region. Similarly, at 0.30 median proportion of the population with access to TB services, TB services inadequacy ranged from 7% of districts in Sidama to 97% in Afar Region. Over 90% of rural districts in pastoralist regions (Afar, Benishangul-Gumuz, Gambela, and Somali) did not have adequate access to TB services. Nationally, 28% of rural districts had severely inadequate or no access to TB diagnosis services in their territories.

Impact of task-shifting

A total of 453 rural districts with inadequate access (203 severe inadequate) were considered in estimating intervention impact. Implementing task-shifting in districts with severely inadequate coverage (203 districts) was projected to increase the national CDR from the baseline of 66% to 75%, and when all inadequate (453 districts) were added, CDR would rise to 88%. TSR would increase from 93% to 99% nationally when implemented in districts with severely or all inadequate districts.

Discussion

Universal access to TB medical services is essential to achieve the milestones of 90% detection, treatment, and cure by 2030 [10]. However, disparities in TB services coverage were enormous across urban vs. rural, and agrarian vs. pastoralist, districts- implying the progress to control TB could be gradual than required. Addressing access barriers to TB services is central to ensuring universal coverage [11]. However, it will be lengthy and unaffordable to build healthcare infrastructure across all communities, particularly in dispersedly populated rural settings. In settings with severe resource constraints and access disparities, targeted approaches in the lens of priority setting are instrumental [12]. Our modeling results reaffirmed that community-based TB diagnosis and treatment services by HEW in under-served districts would substantially improve TB program efficiency nationally, and the national TB program could achieve program milestones.

Conclusion and recommendation

Adding TB diagnosis and treatment services to HEW routine tasks in selected districts with poor primary care access could address service coverage gaps and enhance TB program performance.

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Readiness and performance assessment of comprehensive health posts and women's and healthcare providers' experiences receiving maternal and newborn healthcare services in Ethiopia

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Abstract

In May 2023, we did a rapid assessment of the readiness of comprehensive health posts to deliver maternal and child health care. We also explored the experiences of women and healthcare providers. Upgrading comprehensive health posts has improved maternal and child health service access to communities. Study participants appreciated the compassion and respect of the service providers and were satisfied by the services provided at the comprehensive health posts. The facility readiness assessment revealed that health posts were equipped. However, a significant number of health posts did not have either water or electric supplies, particularly in pastoral settings. Moreover, the shortage of human resources, lack of capacity-building training opportunities, and motivational schemes for health workers were major challenges needing improvement for continuous and sustained quality of care, as well as to respond to the growing community demand.

Keywords: *comprehensive health post, experiences of care, facility readiness, maternal health*

Background

The Health Extension Program (HEP) has been a major contributor to the remarkable achievements in access to and use of health services (1). Maintaining the quality of the HEP and PHC system to ensure access to good quality healthcare remains a challenge and threatens the gains in reducing the high levels of mortality and morbidity (2). To strategically respond to these challenges, the Ministry of Health (MOH) developed HEP optimization roadmap for the further expansion of the primary healthcare system for over 15 years (i.e., 2020-2035). This roadmap includes restructuring health service delivery by mapping health posts in relation to health centers, upgrading the farthest health posts into comprehensive ones to provide quality essential services, deploying new health cadres to improve the availability, distribution, and performance of health professionals, and strengthening community engagement strategies to achieve universal health coverage (2).

Since 2022, the "Improve Primary Health Care Service Delivery Project" implemented through a partnership between Amref Health Africa and JSI Research & Training Institute Inc. (JSI) and funded by the Bill & Melinda Gates Foundation, has been supporting the MOH to pressure-test operationalization of the targeted HEP roadmap at 14 woredas covering 64 primary care units.

In May 2023, the experiences of healthcare providers and mothers who delivered at the comprehensive health posts were explored to evaluate the quality of healthcare delivery and gather information on corrective measures needed.

Methods

A phenomenological study employing a rapid qualitative method—a team-based inquiry, iterative data analysis, and additional data collection to quickly develop a preliminary understanding of a situation from the insider's perspective (3)— and facility assessment were conducted. The assessment was conducted at eight comprehensive health posts (CHPs) providing childbirth care (Fig. 1).

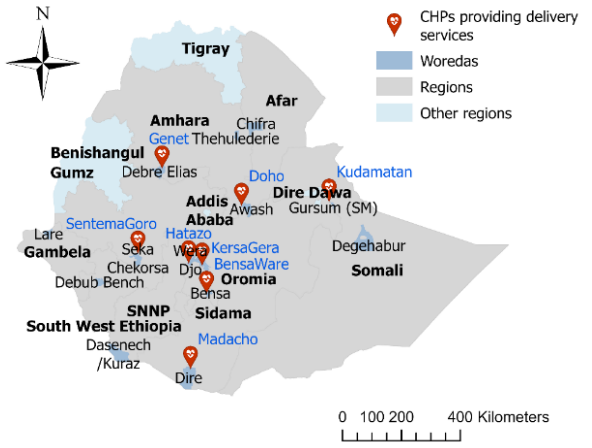

Figure 1: Comprehensive health posts providing delivery services, April 2023

The readiness of the comprehensive health posts to provide childbirth care was assessed using a structured facility assessment tool. The facility assessment documented the availability of trained providers, essential equipment, and commodities for maternal delivery services and the performance of basic and emergency obstetric and newborn care (BEmONC) signal functions, partograph use, active management of the third stage of labor (AMTSL), and immediate postpartum care (Table 1).

Table 1: Comprehensive health posts readiness measures

	Measures
ANC service readiness	**10 items** included: blood pressure machine, hemoglobin test, urine protein test, rapid syphilis test, iron/folic acid tablets, tetanus toxoid, injectable antibiotics for syphilis treatment, MgSO4, ANC guideline, and training on ANC
Childbirth care readiness	**20 items**: Delivery set, scissors/blade, manual vacuum extractor, vacuum aspirator or D&C kit, gloves, delivery bed, newborn bag and mask, suction apparatus, examination light, eye prophylaxis, injectable uterotonics, MgSO4, injectable antibiotics, chlorohexidine, IV fluids, BEmONC guideline, partograph, emergency transport, skilled birth attendant present, trained on BEmONC
Child care readiness	**13 items**: child scale, thermometer, growth charts, hemoglobin test, malaria blood test, ORS, Zinc, amoxicillin, cotrimoxazole, vitamin A, paracetamol, iCCM/IMNCI guideline, trained on iCCM/IMNCI

For the qualitative component, a qualitative study was employed to interview postpartum mothers in their respective communities about their experiences of obstetric care. Twenty-two postpartum women (10 in agrarian and 12 in pastoral settings) were interviewed. Sixteen health workers (midwives, nurses, health officers, and Health Extension Workers), eight in each agrarian and pastoral woredas were interviewed. A rapid qualitative analysis technique was employed to summarize interview transcripts (3).

Results

Readiness to deliver RMNCH services

All CHPs were providing antenatal care (ANC), childbirth care, and care for sick children. However, their readiness to provide care was found to be low. The mean service readiness for ANC, childbirth, and sick child care were 42%, 50%, and 62%, respectively (Fig. 2). ANC and childbirth care readiness scores were better at agrarian HPs, but childcare readiness score was better at pastoral health posts. Most CHPs

missed rapid urine tests, syphilis tests, national ANC guides, and training of health workers on ANC service readiness. Likewise, vacuum extractors for assisted delivery, vacuum aspirator or dilation and curettage (D&C) set for abortion care, light sources for examination, national basic emergency obstetric and newborn care (BEmONC) guide, and partograph are the commonly missed items for childbirth care. For sick childcare, hemoglobin tests and training of health workers on integrated community case management (iCCM) of common childhood illnesses were the commonly missed items.

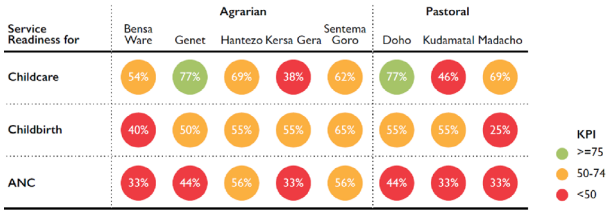

Figure 2: Readiness of CHPs to provide ANC, childbirth, and child care, May 2023

Delivery of RMNCH-N services

Three CHPs were providing all seven BEmONC functions in the last three months. Genet, Doho, and Bensa Ware were performing low. Parenteral administration of MgSO4/Diazepam for pre-eclampsia/eclampsia pre-referral treatment and removal of retained products of conception were commonly missed functions.

Since the eight health posts upgraded to CHPs and started providing delivery services over the last 15 months (from February 2022 to April 2023), care was provided to a total of 3,389 family panning clients, 1,146 ANC clients, 629 delivering mothers, and 1,273 penta 1 immunization. This translated into a mean coverage of 37% contraceptive acceptance rate, 73% ANC coverage, 38% facility birth rate, and 93% Penta 1 coverage from the expected eligible population. Likewise, 84% of women received oxytocin, and 59% of sick children received treatment for pneumonia. In almost all coverage indicators, the agrarian CHPs provided care to more clients than pastoral CHPs.

Women's and health workers' opinions and experiences

Access to care

Most interviewed women had previous home delivery experience because of the facility's inaccessibility. The proximity of the CHPs to their homes was a common reason cited by the women for seeking care there, which influenced their decision to choose the CHP as their preferred facility. One mother from Sentema Gora HP shared her perspective, saying, *"The CHP is walking distance from my house. I believe that delivering at the facility is better than delivering at home."*

Perceived quality of care

The participants expressed a positive perception of the quality of care they received from the CHP, emphasizing their appreciation for the timely and life-saving care provided by the health workers. They also highlighted the compassion and friendliness exhibited by the healthcare providers. One mother from Sentema Gora's health post shared her experience, stating, *"They are good for what they have. The provider at my delivery was kind; I felt like I was being taken care of by my mother. He cleaned me very well after the birth process. When he first met me, he said 'Abshir, Abshir,' and this was the most encouraging word I had ever heard during my previous deliveries. Hearing this word gave me encouragement and morale."*

Responsiveness of providers and respectfulness of the care

Respondents emphasized the compassionate, responsive, and caring practice of the providers. They praised the staff of the CHP for their care, respect, friendliness, and warm reception during health post visits. One woman persuasively expressed her feelings as follows, *"The service the health workers at the CHP provided is akin to a mother caring for her daughter. The provider who supported me during my delivery took care of everything for me and my baby."* Mothers also highlighted that the health workers promptly and respectfully responded to their inquiries, engaging them in open discussions and readily answering any questions.

Most respondents mentioned their involvement in clinical decisions as they were informed of each step of the activities during their care. The reason and benefit of each activity were explained appropriately and performed with their full consent. They reported their satisfaction with the interaction they had with the providers.

Community acceptance and trust

The care provided at the CHPs has been well accepted and trusted by the community and there is a strong preference for receiving services from the CHPs. The respondents perceive that community members, especially mothers, are extremely satisfied with the services they receive at the CHP. However, the health workers mentioned that the community's expectations for additional services and supplies were not fully met. It was noted that the community considers the CHP as a health center and anticipates it to offer a wide range of services, including laboratory services.

Conclusions

According to respondents and service statistics, the establishment of CHPs near communities has improved access to RMNCH services, including early care-seeking and delivery of basic and emergency obstetric and newborn care services, for a significant number of rural people.

The qualitative study revealed positive experiences of postpartum mothers who delivered at the new CHPs. Mothers appreciated the timely and life-saving care as well as the respectfulness, compassion, and friendliness of healthcare providers. Health providers affirmed that the community accepts and trusts the care provided at the CHPs. This study also identified there are unmet community needs and expectations for additional services such as basic lab tests and ultrasound services.

The findings provide valuable insights for program managers and service providers to address the challenges and enhance the maternal health services provided at these facilities for continuous and sustained quality of care at CHPs.

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Persistence of residual submicroscopic P. falciparum parasitemia following treatment of artemether-lumefantrine in Ethio-Sudan border, western Ethiopia

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Abstract

Background: In Ethiopia, artemether-lumefantrine (AL) has been the first-line drug for the treatment of uncomplicated falciparum malaria since 2004. This study is one of the earliest evaluations of the therapeutic efficacy of AL in western Ethiopia to assess PCR-corrected clinical and parasitological responses at 28 days.

Methods: Sixty uncomplicated falciparum malaria patients in two sites of Asossa Zone were enrolled, treated with standard doses of AL, and monitored for 28 days with clinical and parasitological assessments from September 15 to December 15, 2020. Microscopy was used for patient recruitment and molecular diagnosis of *P. falciparum* was performed by *varATS* real-time PCR on dried blood spots collected from each patient from day 0 and on follow-up days 1, 2, 3, 7, 14, 21, and 28. A p-value of less or equal to 0.05 was considered significant.

Results: From a total of sixty patients enrolled in this efficacy study, ten were lost to follow-up; and the results were analyzed for fifty patients. All the patients were fever-free on day 3. The asexual parasite positivity rate on day 3 was zero. However; 60% of the patients were PCR- positive on day 3. PCR positivity on day 3 was more common among patients < 15 years as compared with those ≥ 15 years (AOR= 6.44, P=0.027). Only two patients met the case definition of treatment failure. The PCR-corrected adequate clinical and parasitological response (ACPR) rate of AL among study participants was 96% (95%CI: 84.9-99). In seven patients, the residual submicroscopic parasitemia persists from day 0 to day 28 of the follow-up. In addition, 16% (8/50) patients were PCR- and then turned PCR+ after day 7 of the follow-up.

Conclusion: AL remains efficacious for the treatment of uncomplicated falciparum malaria in the study area. However, the persistence of PCR-detected residual submicroscopic parasitemia following AL might compromise this treatment and need careful monitoring.

Keywords: Artemether-Lumefantrine Therapeutic Efficacy/ Uncomplicated Falciparum Malaria/ Western Ethiopia

Introduction

Artemisinin-based combination therapies (ACTs) are currently used as a first-line treatment for uncomplicated falciparum malaria in endemic countries (1). Artemisinin resistance with a clinical phenotype manifested by slow parasite clearance was first reported in Western Cambodia and has now emerged or spread to other areas of Southeast Asia (2-4).

In Africa, it is predicted that the artemisinin-resistant malaria parasites might spread from Asia or originate *de novo*. The existence of artemisinin-resistant in Africa is concerning as more than 215 million malaria cases and 384000 deaths in 2019 were reported in Africa (5). Although ACT is still effective in Africa, there is increasing concern that antimalarial treatment with ACT would be seriously threatened by the emergence of drug-resistant parasites (6).

Some recent studies in Africa have shown reduced *P. falciparum* susceptibility to ACT and longer parasite clearance time (7-9). In addition, clinically artemisinin-resistant parasites have been reported from Rwanda and Uganda (10, 11).

Recent therapeutic efficacy studies (TES) that use quantitative polymerase chain reaction (qPCR) are reporting the persistence of residual submicroscopic parasites after ACT treatment (12-14). Substantial residual submicroscopic parasitemia after microscopically successful AL treatment was reported by qPCR (15).

Recrudescence after ACT treatment might not be the result of inherent parasite resistance (16-17). Host immunity and pharmacokinetic factors are also determinants of ACT treatment efficacy. Individuals lacking acquired immunity may have higher rates of AL treatment failure (18). In addition, recrudescence was associated with day 7 lumefantrine concentrations in blood (19), concomitant food intake (20), and type of diet taken (21).

Malaria is one of the major health problems in Ethiopia. In 2004, Ethiopia adopted the ACT, artemether-lumefantrine, as the first-line treatment of uncomplicated *P. falciparum* malaria (22). There are a few TES carried out in Ethiopia that reported greater than 98% PCR-corrected cure rate for AL (23-25). However; there is a paucity of reports on the efficacy of AL in western Ethiopia. Therefore, this study aimed to assess PCR-corrected clinical and parasitological response at 28 days following AL treatment and to give evidence of AL treatment outcomes in the treatment of uncomplicated falciparum malaria in the western part of the country that borders Sudan.

Materials and Methods

Study site and period: This study was conducted in Sherkole and Horazhab health centers close to the Ethio-Sudan Border. The two health centers are found in the Asossa zone in the Benishangul-Gumuz Region of Ethiopia. This study was conducted during the high malaria transmission season from September to December 2020. Study design: The study was a prospective study designed to assess the clinical and parasitological efficacy of AL for the treatment of uncomplicated falciparum malaria.

Study population: Patients with uncomplicated *P. falciparum* malaria attending the study health centers who consented to this study were enrolled if they were aged greater than 2 years, had a fever (axillary temperature ≥ 37.5 °C), and/or history of fever in the last 24 h, mono-infection with *P.falciparum*, and parasitemia of 2000 to 200,000 asexual parasites/µl by microscopy. Patients who had received antimalarial drugs six days before enrollment were excluded from the study.

Thirty-two and eighteen patients were recruited from Sherkole and Horazhab health centers, respectively. Once eligible patients were enrolled at the two study sites, they were treated with standard doses of AL and monitored for 28 days with clinical and parasitological assessments.

Patients' clinical and parasitological assessments were done on day 0 and followed on days 1, 2, 3, 7, 14, 21, and 28 based on the WHO template protocol for therapeutic Efficacy studies (26).

Treatment of patients: Artemether 20mg + Lumefantrine 120mg tablets (Ajanta Pharma Ltd, India) was administered twice daily for 3 days according to the weight of study participants: one tablet for ≥ 5 kg to < 15 kg, two tablets for 15kg to < 25 kg, three tablets for 25 Kg to < 35 kg and four tablets for ≥ 35kg. The first daily dose of the drug was directly observed at the study health centers.

Laboratory diagnosis of *P. falciparum*

Microscopy: Microscopy was done for parasite detection and quantification from finger-prick blood collected during days 0, 1, 2, 3, 7, 14, 21, and 28. In addition, dried blood spots (DBS) on filter paper were prepared for molecular diagnosis

Molecular diagnosis: The molecular diagnosis of the parasites was done at the Medical Research Council Unit The Gambia at the London School of Hygiene & Tropical Medicine. It was performed on DNA extracted from DBS collected from each patient from enrolment (day 0) to D1, D2, D3, D7, D14,

D21, and D28 using the Chelex DNA extraction protocol. Discrimination of recrudescent from new infections was determined by comparing merozoite surface protein 1 and 2 alleles (*msp1* and *msp2*) of samples collected at baseline with those collected on the day of recurrent infection observed after day 7.

Data analysis: Data entry and analysis were done by using the WHO-designed Excel spreadsheet and SPSS 20.0 statistical software package (SPSS, Inc, Chicago, USA). AL treatment outcomes were classified

based on parasitological and clinical outcomes assessments as recommended by WHO. A P-value of less or equal to 0.05 was considered significant.

Ethical consideration: Ethical clearance was obtained from the Ethiopian National Ethic Review Committee and Addis Ababa University, Aklilu Lemma Institute of Pathobiology, IRB.

Results and Discussions

Table 1: Clinical and parasitological outcomes of AL treatment (n=50)

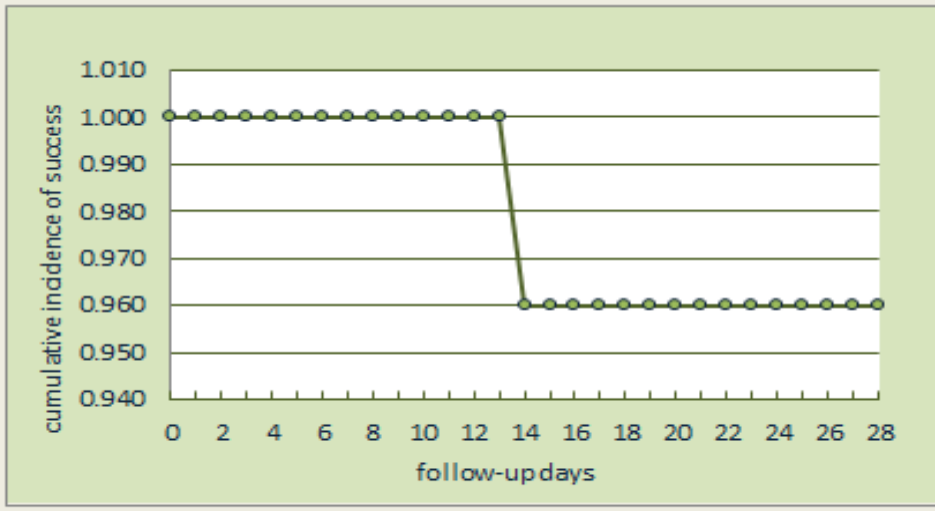
Follow-up days	Clinical efficacy of AL	Parasite Positivity		
		Microscopy*	PCR	Gametocytes detected
Day 1	16%(8/50)	38% (19/50)	92% (46/50)	8% (4/50)
Day 2	0	10% (5/50)	78% (39/50)	4% (2/50)
Day 3	0	0	60% (30/50)	2% (1/50)
Day 7	6%(3/50)	0	28% (14/50)	0
Day 14	4%(2/50)	4% (2/50)	18% (9/50)	0
Day 21	0	0	20% (10/50)	0
Day 28	0	0	20% (10/50)	2% (1/50)

*Asexual form of the parasite

In this study, all patients were fever-free on day 3. Nonetheless, three patients showed clinical features of malaria on day 7. In these patients, the presence of *P. falciparum* parasite was confirmed using PCR although this was not detected by microscopy. In addition, on day 14 of the follow-up, two patients showed symptoms of malaria (history of fever within 24 hours and chills, headache, and back pain). In these patients, the presence of the parasite was confirmed using both light microscopy and PCR. These findings indicated that AL treatment effectively resolved malaria symptoms on day 3. However, few patients developed clinical malaria during the follow-up period.

The parasite positivity rate on day 3 by light microscopy was zero. Thus, on day 3 all study patients cleared the parasites based on microscopy. However, 60% of patients were PCR-positive on day 3. This PCR-positivity after artemether-lumefantrine therapy might be due to residual DNA and/ or gametocytes in the absence of viable parasites, indicating that PCR might overestimate parasite prevalence on day 3 after treatment. This post-treatment residual submicroscopic parasite prevalence was comparable with the residual parasitemia on day 3(68.5%) reported from Faladje, Mail (27). The rate was also higher than the 17.7% reported in another study in Mali and Burkina Faso (28).

The persistence of PCR positivity following AL in this study was similar to those in Kenya which reported 37.1 % residual parasitemia on day 7 (15), Ugandan with 39·9% submicroscopic parasitemia persistence in children on day 17 (14), and Sumatra reported 39% (29). The finding was also similar to another study done in Uganda that reported more than 25% of patients had circulating ring-stage parasites by qRT-PCR at least 14 days post-initiation of ACT or ACT-primaquine (13).



Number of patients	
ACPR day 28	48
Censored (lost to follow-up, withdrawals, reinfections)	10
Treatment failures (PCR confirmed recrudescence)	2

		95% CI
Cumulative incidence of success, day 28	0.960	(0.849-0.99)
Cumulative incidence of failure, day 28	0.040	(0.01-0.151)

Figure 1: Kaplan-Meier survival analysis of PCR-corrected ACPR (n=60)

Efficacy data from the current study showed a high cure rate of AL. The PCR corrected adequate clinical and parasitological response on day 28 was 96 %. Two patients (4%) were classified as a late clinical failure as they showed symptoms of malaria and parasite positivity on day 14 was detected in microscopy. This study indicated that AL remains highly efficacious for the treatment of uncomplicated *P. falciparum* infection in the study site. This treatment success was comparable to previous studies done in Ethiopia (23, 30). In neighboring Sudan, a similar high treatment success rate of ACT was reported from a meta-analysis of twenty studies (31).

Although the treatment is effective in the study area, it is crucial to further assess factors that might relate to PCR positivity following AL treatment. The persistence of positive PCR after curative treatment of AL might be related to several weeks' persistence of the remaining parasite DNA and gametocytes after treatment without evidence of viable asexual parasites (32, 33). This finding highlights the need to distinguish active infections from dead pathogens or their debris (46) and sub-microscopic gametocytemia (34).

Some patients remain PCR positive during the entire study period and might be reservoir hosts After 28 days of the follow-up. In these patients, the residual submicroscopic parasitemia persists after AL treatment. This may contribute to the onward transmission of malaria among the surrounding human population. Residual *P. falciparum* parasitemia after ACT is associated with increased transmission to mosquitoes (35). 1.88% of mosquitoes became infected after feeding on blood from AL-treated children (36). Asymptomatic recrudescence may be important for the spread of drug-resistant malaria (37, 38).

Conclusion and Recommendation: Artemether-lumefantrine remains efficacious for the treatment of uncomplicated *P. falciparum* in the study area. However, in some patients, there was residual sub-microscopic parasitemia after AL treatment. The persistence of PCR positivity and re-appearance of PCR-detectable parasites following AL treatment has public health implications for continued malaria transmission and may be important for the spread of drug-resistant malaria. There is a need to assess factors that contribute to the PCR positivity of the parasite that might compromise the treatment.

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Reducing Road Traffic Accident: Rapid Evidence Synthesis

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Introduction

The number of road traffic deaths remains unacceptably high. The global estimate shows that about 1.35 million people die from preventable accidents and 50 million are injured by road traffic accidents every year. Road traffic accident is the 8th leading cause of death among people of all ages while it is the leading cause of death for the age group of 5-29 years. This disastrous problem is worsening with the increasing number of vehicles. It is estimated that road traffic accidents will be a cause of 13 million deaths and 500 million injuries in the coming ten years globally. The rate, scale, and other impact of the problem is even worse in low and middle-income countries which makes road safety development a priority in these countries. Even though there is a limited number of registered vehicles in developing countries, more than 90 percent of the world's road deaths happen in these countries. The rate of death in low-income countries is more than 3 times higher compared to the high-income countries. The rate of road traffic death is highest in Africa (26.6/100,000 people) followed by South-East Asia (20.7/100,000 people). It was also estimated that road traffic accident incurs a total cost of one to three percent of the total Gross National Product (GNP).

Reports indicated that the worsening trend of road traffic injury (RTI) was observed in two (Africa and Asia) of the six WHO regions. Financial losses in LMICs due to RTIs are also estimated to be US$100 billion/year. RTI victims are not able to participate in economic activities and RTI consequently puts households into poverty, for crash survivors and their families strive to cope with the event and the long-term effect of the event limits the activity of the victim. On the other hand, RTI affects the young age group which is usually the most productive part of society.

In response to the problem, the United Nations Decade of Action for Road Safety 2011-2020 sets an ambitious goal. The goal was to reduce the estimated level of traffic fatalities in low and middle-income countries by half in the year 2020. This was expected to prevent about 5 million lives, avert 50 million serious injuries, and provide an economic benefit of more than US$3 trillion. The Second Decade of Action for Road Safety 2021–2030 stressed the same plan as the previous plan of reducing deaths and injuries resulting from road traffic accidents by 50% in this decade.

Middle and high-income countries made more progress in reducing the number of road traffic deaths than low-income countries. Between the years 2013 and 2016, no decrement in the total number of road traffic deaths was observed in any low-income country. The problem remained unchanged globally in the past 20 years in both relative and absolute terms too.

Objective of the Review: The objective of this review is to summarize the best available evidence on interventions that can reduce road traffic injury.

Methods

A rapid evidence synthesis approach adapted from the SURE Rapid Response Service was applied to search, appraise, and summarize the best available evidence on effective intervention in reducing road traffic injury. To answer the question under review we searched for relevant studies from databases including PubMed, the Cochrane Library, TRANSPORT, Health system evidence, Epistemonikos, and SUPPORT summary. The following key terms were used for searching: Road traffic accident, RTA, Injury, Reduc*, Prevent*, Minimiz*, "Low and middle-income country", LMIC.

We found 18 articles through the search of different data bases mentioned above. After screening for the titles and abstracts of the articles, four of them that satisfy the inclusion criteria were included in the final review.

Inclusion and exclusion criteria

All systematic reviews conducted on road traffic accidents in low and middle-income countries were included in this review. The included studies were filtered for the English language. The last search was made on Dec 08, 2021, with no date restriction. Non-transparent reviews (e.g. news, letters, editorials, reports, communications, comments, and correspondence) were not included.

Results

Evidence on interventions to reduce road traffic accident (RTA)

We found four eligible sources of evidence that discuss reducing road traffic accidents (RTA) specifically from low- and middle-income countries. All the identified studies were systematic reviews. The identified interventions to reduce road traffic accidents were Legislation and enforcement, Public Awareness/Education, Speed Control/ rumble strips, Road Improvement, Mandatory motorcycle helmets, graduated driver's license (GDL), and Street lighting. The summary of the findings related to interventions to reduce road traffic accidents (RTA) is found in table 1.

1. Legislation and Enforcement

Legislation interventions reduced road traffic crashes, injuries, and deaths with the best results in the setting of good enforcement initiatives.

Legislation focusing on mandatory motorcycle helmet usage, banning cellular phone usage when driving, seat belt laws, and decreasing the legal blood alcohol content (BAC) level from 0.06 g/L to 0.02 g/L.

2. Public Awareness/Education

A significant reduction in fatalities appeared immediately following the enactment of public awareness campaigns with non-significant decreases over time.

Public awareness focusing on seat belt use, child restraint use, educational training in health centers and schools/universities, and public awareness with media through the distribution of videos, posters/souvenirs, and pamphlets are highlighted.

3. Speed Control

Public awareness and speed control interventions alone appeared to have no significant effects on reducing road traffic injuries or fatalities. But when these are combined with other approaches, they were shown to be more effective at significantly reducing road traffic fatalities and injuries over time. Means of speed control includes traffic calming bumps, speed bumps, and rumbled strip.

4. Road Improvement

Because speed control is crucial to crash and injury prevention, road improvement interventions should consider how the impact of improved roads will affect speeds and traffic

flow. In LMICs where enforcement and resources are limited, rumble strips could be effective at reducing road traffic crashes and fatalities through speed control.

5. Street Lighting

Street lighting is a low-cost intervention that may reduce road traffic accidents. Street lighting improves a driver's visual capabilities and ability to detect roadway hazards. It is also argued that street lighting may hurt road safety where drivers may 'feel' safer because lighting gives them improved visibility which could result in increasing speed and reducing concentration. This is important in low and middle-income countries where the installation of suitable lighting systems is less common than in high-income countries.

6. Graduate Driver License (GDL)

A graduate driver's license (GDL) reduces road traffic injury by 19%. GDL included two licensing levels of restrictions on teens' driving before they are eligible to drive without restrictions. The first level is a learner license that allows teens to gain driving experience under the supervision of a fully licensed driver (i.e., a parent or parent-designated adult). The second level is an intermediate license that allows teens who have gained experience driving with a learner license to drive independently but with restrictions that limit their exposure to the highest-risk driving conditions (i.e., at night and with young passengers).

Mandatory Motorcycle Helmet Use

Enactment of helmet legislation for motorcycle users is associated with a 29% reduction in fatalities

Table 1: Summary of findings interventions to reduce road traffic accident (RTA), Dec. 2021.

Studies	Findings	Type of document	Quality of evidence
Road Traffic Injury Prevention Initiatives: A Systematic Review and Meta summary of Effectiveness in Low and Middle Income Countries (Staton C., et al, 2016)	• Legislation interventions reduced road traffic crashes, injuries, and deaths with the best results in the setting of good enforcement initiatives. • Legislation as well as education and public awareness campaigns, a significant reduction in fatalities appeared immediately following enactment with non-significant decreases over time. • Public awareness and speed control interventions alone appeared to have no significant effects on reducing road traffic injuries or fatalities. But when these are combined with another approach, they were shown to be more effective at significantly reducing road traffic fatalities and injuries over time. • Road improvement interventions should consider how the impact of improved roads will affect speeds and traffic flow. In LMICs where enforcement and resources are limited, rumble strips could be effective at reducing road traffic crashes and fatalities through speed control.	A Systematic Review and Meta-summary	Low Quality
Differences in outcomes of mandatory motorcycle helmet legislation by country income level (Lepard JR. et al, 2020)	Mandatory motorcycle helmet laws reduce mortality Enactment of helmet legislation for motorcycle users is associated with a 29% reduction in fatalities	A systematic review and meta-analysis	Low quality
Interventions to Prevent Unintentional Injuries Among Adolescents: (Salam RA. Et al, 2016)	possession of a graduated driver's license (GDL) for new young drivers significantly reduced road accidents by 19%	A Systematic Review and Meta-Analysis	Low quality
Street lighting for preventing road traffic injuries (Beyer and Ker, 2009)	Street lighting may prevent road traffic crashes, injuries, and fatalities.	(A systematic Review)	Medium Quality

Efficiency analysis of the Ethiopian pharmaceuticals Supply Chain

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ABSTRACT

Pharmaceutical supply chain (PSC) management is the backbone of healthcare delivery. This study explored inefficiencies in different stages of Ethiopia's PSC to identify possible cost-savings and efficiency improvements. The study indicates that, on average, framework agreements (FAs) can offer better value for money (VFM) pharmaceutical procurement. However, given the variation, more investigation is needed into the specific conditions which maximize FA VFM. The study found that levels of preventable pharmaceutical wastage at EPSS warehouses were relatively low, but some savings could be made. The main causes of the expiry of pharmaceutical products include weak data, planning, and forecasting, with 84% of drugs expiring over 30 days after arriving at EPSS facilities. The average stockout rate across regular drugs in 2018/19 was 27%, and it takes 11.3 days for a customer to access the pharmaceutical commodity once an order is made from EPSS. The average price markup was also higher in Ethiopia than in Kenya and Uganda. To reduce inefficiencies, the study recommends investment in IT infrastructure to strengthen the coverage of e-LMIS across the health system. This would improve and promote end-to-end visibility and accountability in the PSC, enable wider use of efficiency metrics, and better support for informed decision-making in the PSC.

Introduction: In low-income countries, pharmaceutical expenditure constituted around 30% of total health expenditure (7.7% - 62.9%)[1]. This high proportion of health budgets for drugs limits the remaining funds available for other essential health services. PSC management is thus the backbone of healthcare delivery as healthcare depends on the availability of pharmaceuticals and other medical supplies at the right time and in the right quantities to manage patients. Lack of pharmaceutical products at the point of need often leads to an unnecessary loss of lives that could have been prevented. Therefore, efficient public health supply chain performance is essential for assuring access to medicines, medical supplies, and medical equipment, minimizing wastage, and, thus, for positive health outcomes. It is essential in most countries of sub-Saharan Africa, where the public and private health sectors serve a large proportion of the population[2]. Evidence shows that while financing of the health system has improved in Ethiopia, it remains critically low, and fiscal space needs to be enhanced to fill funding gaps[3]. Under current projections of the HSTP II, there is expected to be a funding gap between available resources and the required ones to meet the targets, 50% of which are for medicines and supplies)[4]. Increasing the efficiency of the PSC has the potential to unlock additional resources that could allow more access to medicines[5]. The study attempted to understand the levels and sources of inefficiencies in the PSC, examining the procurement, warehousing, distribution, and utilization.

Methodology: The study used a mixed-method approach involving quantitative and qualitative data collection and analysis. Sampling techniques were used to select tracer medicines, vital commodities, Ethiopian Pharmaceutical Supply Services (EPSS) branches, and health facilities. Tracer commodities were selected based on disease burden and being among the list of approved essential medicines. Quantitative data collection tools were designed per the study's objectives and supplemented with qualitative interview guides.

Results

Comparison of purchases of pharmaceuticals with and without framework agreement

The purchasing price ratio of the framework agreement (FA) over non-FA ranges from as low as 10% to 350%. Among the 135 pharmaceutical medicines, approximately 28% were purchased using FA at less than 75% of the non-FA prices. About 36% of the 135 medicines were also purchased using FA at a price between 75% to 95% of the non-FA prices (Figure 1). However, approximately 26% of medicines purchased under FAs were purchased at prices more than 5% higher than non-FA prices.

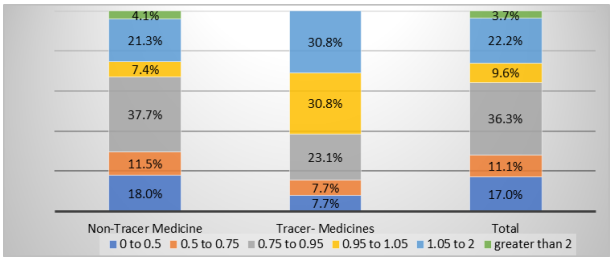

Figure 1: Price ratio between FA and non-FA

Regarding individual tracer medicines, there was significant variation in the purchase prices across FA and non-FA, ranging from 130% to 19%. On average, drugs purchased under FAs were cheaper than those purchased at non-FA prices. However, there was wide variation in the expensiveness of FAs relative to non-FAs, with non-FAs prices being lower in just over a quarter of cases.

Price comparison among EPSS and comparable medical stores in other countries

Generally, pharmaceutical purchasing prices paid by EPSS were lower than NMS but higher than those paid by KEMSA. For approximately 65% of the tracer medicines, purchasing prices paid by EPSS were less than those paid by NMS. On the other hand, among the 15-tracer medicines, the EPSS's purchasing prices were higher than KEMSA's (for 67% of the medicines). Overall, the comparison of public procurement prices comparison among the three countries reveals that the procurement price of Ethiopia is higher than KEMSA by 15% and 25% lower relative to NMS (after excluding three outlier medicines: Carbamazepine, Adrenaline (Epinephrine) and Folic Acid. The average markup (from the central warehouse to final delivery prices) in the case of EPSS varies widely across medicine, with an average markup price of around 22%, whereas, in the case of KEMSA, it is about 15% and NMS, around 8%.

Price and Cost comparison among local and international purchases

The local and international price comparison results showed that the purchase price for locally procured Carbamazepine, Furosemide, and Sodium Valproate was lower than the purchase price on global markets. Conversely, the international market's purchase price was lower than that in local procurement for Folic acid, Dextrose, and Albendazole. These findings suggest that the cost of locally procured products was generally lower than that of internationally procured products, except for Folic Acid. This can likely be attributed to the high purchase prices and costs of arriving at the Central Warehouse for internationally procured products. However, caution should be adopted when extrapolating this finding more widely to drugs not currently produced domestically.

Assessment of wastage of medicines - Tracer Commodities

From the analysis of total wastage at the warehouse level, 99.8% was due to expiry, while only an insignificant share (0.02%) was due to damage. Most medicines expiry occurred beyond 30 days after receiving (84%), while 11% and 5% expired within 30 days after receiving and on receiving, respectively. Considering the subset of tracer medicines with wastage rates above the EPSS's policy for wastage rates (2%), a total of US$1,226,308 would be saved across the five hubs included in the study. The main causes of the expiry of pharmaceutical products include weak planning and forecasting, oversupply of commodities from suppliers, and low quality of data at the facility level. In addition, donations were said to contribute to expiry due to the short shelf-life. Based on the study conducted by the PMED, in 2018/19, 81.1% of all hospitals in Ethiopia reported having unfit-for-use medicines, while the % of hospitals that disposed of unfit-for-use medicines at least in the past 12 months is 34%. The estimated wastage rate was found to be about 3.9% in 2018/19 which amounts to a loss of about US$ 1.98 million. Capping the acceptable wastage rate at 2%, the total value of excess wastage nationally was estimated at US$2.30 million[5].

Analysis of Order Fulfilment Cycle Time (OFCT)

In the case of EPSS, once an order is received from different health facilities to the central office, it takes about 5.8 days to process a given order and an average of 5.5 days to deliver a commodity to the requesting health facility. In other words, all things being equal, it takes 11.3 days for a customer to access the pharmaceutical commodity once an order is made. The OFCT varies across different health facilities based on the distance from the warehouse of EPSS to the hubs. Based on responses by key informants across warehousing and distribution, delays sometimes occur during order requests, order delivery, and order processing. Otherwise, the respondents indicated delivery times were within an acceptable range and did not contribute significantly to distribution-related delays.

Comparison of Generic and Non-Generic Medicines Purchase Rate, Usage Rate

For Low-Income Countries (LICs) such as Ethiopia, the use of generic medicines has the potential to reduce the cost substantially. Additionally, promoting generic medicine use has the potential to reduce out-of-pocket expenditure and the likelihood of catastrophic payments. As per the survey results, the purchase rate for generic medicines was very high, with non-generic medicines representing only 1.5% of the total. During KI interviews, however, all respondents indicated that 100% of their medicines budget was on generic medicines procurement per the guidelines. During follow-up on the discrepancy, it was noted that the winning suppliers, while bidding as generic, ended up supplying branded medicines at the same quoted prices. On the other hand, most health facilities had a generic medicine prescription rate above 90%, except Wereta HC (44%) and Debretabor Hospital (63%).

Assessment of Medicines Stock-outs

In the FY 2018/19 study period, the annual average stock-out rate for regular drugs was about 27%, and for health programs, the stock-out rate was 7%. The KII results revealed that all health facilities experienced stock-outs of medicines frequently. Main causes of stock-out cited were: shortage of funds to procure medicines, stock-outs of medicines at EPSS branches, shortage of cash due to credit service to health insurance members delays in processing reimbursements, the government procurement policy on single sourcing from EPSS, one-year procurement policy instead of plurilingual procurement schemes, long procurement process, unavailability of some essential medicines in the market, lack of credit facility at private pharmaceutical suppliers, weak procurement practices, and supplier related inefficiencies.

Conclusions and Recommendations: The study investigated inefficiencies in quantifying and procuring medical goods, warehousing and distributing pharmaceuticals, and medicine utilization. The results showed strong performance in some key measures while revealing gaps that should be addressed. On average, FAs offer better value for money in procurement, although there was wide variation in their expensiveness relative to non-FA. Stronger contract negotiation and management capacity could improve FA outcomes, especially with a strong market-shaping system, price monitoring, and international benchmarking system. Comparatively, the study has shown that EPSS' purchasing prices are lower than Uganda's NMS but higher than Kenya's KEMSA, suggesting that there is still room for further improvements. Regarding the wastage rates, there is little opportunity for further efficiency. To improve the efficiency of the PSC system, the following general recommendations are given:

Further study of FAs is needed to identify the circumstances in which they are most likely to offer VFM. Train procurement staff in contract negotiation and management, incorporating best practices and exchanges between EPSS and KEMSA.

Encourage multi-annual procurement plans beyond a year budget and encourage shorter procurement cycles and tendering processes.

Investigate determinants of higher markups for commodity prices offered by EPSS and develop a plan for addressing the actionable sources of inefficiencies.

Increase the end-to-end visibility of the supply chain by digitalizing the system, especially the facility level, making it interoperable with the existing system like DHIS2.

Review and strengthen the implementation of stock transfer policy across health facilities of the same levels without compromising the quality.

Strengthen policy on the donation of medicines by enforcing minimum shelf-life rules to reduce wastage and adherence to existing standards.

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Equity in the finance of health services in Ethiopia: A financing incidence analysis

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ABSTRACT

Ethiopia is directing its health policies toward the UHC goal and pursuing broadening the revenue base from domestic and external sources by expanding pooling arrangements such as community-based health insurance (CBHI) schemes. This paper examines the current fairness of health financing by subjecting the sources of financing, including direct and indirect taxes, CBHI contributions, and OOPs. It aims to contribute to the discussion and, more specifically, to draw attention to possible trade-offs of the current direction of the country's health policy. It specifically aims to show the extent to which they place different burdens on different socioeconomic groups. The methodological approach corresponds to that of a financing incidence analysis. To analyze the progressivity of the different sources of finance, diverse datasets are used: Ability-to-pay, OOPs, and CBHI contributions are determined using the 2019-20 CBHI Survey; direct tax burden using the 2018-19 Ethiopia Socioeconomic Survey; and indirect tax burden using 2015-16 social accounting matrices (SAM). The study shows that the tax portion of healthcare financing, which accounts for about one-third, tends to place relatively less burden on lower socioeconomic groups than on the better off. Direct taxes account for about 40% and have a Kakwani index (KI) of 0.21, while indirect taxes are just progressive with a KI of 0.03. OOPs, which account for approx. 30% are regressive (KI -0.09). The study has provided new insights into the effects of the current health system financing at the household level. It highlights the relevance of looking at the funding sources together and taking a systemic view. It shows that fair taxation can potentially provide public goods sustainably and equitably. In addition, the financing incidence ought to be carefully monitored, particularly if contribution-based insurance will be expanded.

Introduction: Ethiopia has made significant progress in improving the health status of its population in recent years, but the country still faces significant challenges in providing access to quality healthcare for all. One of the key barriers to achieving universal health coverage (UHC) is healthcare financing. This policy brief is based on a financing incidence analysis of healthcare in Ethiopia, which investigated who pays for healthcare and established the relationship between payments for healthcare and ability to pay (ATP). This brief provides recommendations to health policymakers in Ethiopia on achieving financing fairness and equity in the country's healthcare system.

Methodology: The study used household consumption expenditure to measure people's ability to pay. Among all the considerations, this seems to be the most sensible approach to the actual ability to pay Ethiopian citizens as closely as possible, and the corresponding data has been available in quality household surveys. An equivalence scale allocated consumption expenditure to household size and structure. The study drew on a range of data sets, including two household surveys, the 2019/20 national cross-sectional study 'Surveying households for evidence-based insurance system in Ethiopia' and the Ethiopia Socioeconomic Survey 2018/19, as well as the 2015/16 Social Accounting Matrix and data from the Ministry of Finance on the sources of government revenue. The quantitative analysis followed a state-of-the-art approach (O'Donnell et al., 2008) established in studies from numerous countries, including sub-Saharan Africa (e.g., Ataguba & McIntyre, 2018). In this approach, the progressivity of the individual funding sources is analyzed individually. Subsequently, an overall analysis can be carried out, in which the progression measures are weighted according to the share of the respective source in the total financing.

Results: In FY 2019/20, tax revenue accounted for 78.9% of total government revenue. Tax revenue, in turn, was divided 42.4% into revenue from direct taxes (income and profit taxes, rural land use fees, urban land use fees) and 57.6% from indirect taxes (National Bank of Ethiopia, 2020). Looking at the overall health financing landscape according to the 2019/20 NHA study, CBHI has so far played a subordinate role, accounting for only 1.4% of total domestic expenditure, as shown in the figure below, while the bulk of the domestic resources are from the government (48.9%) and OOP (46.3%) – the remaining 3.8% are from private employers and other contributions.

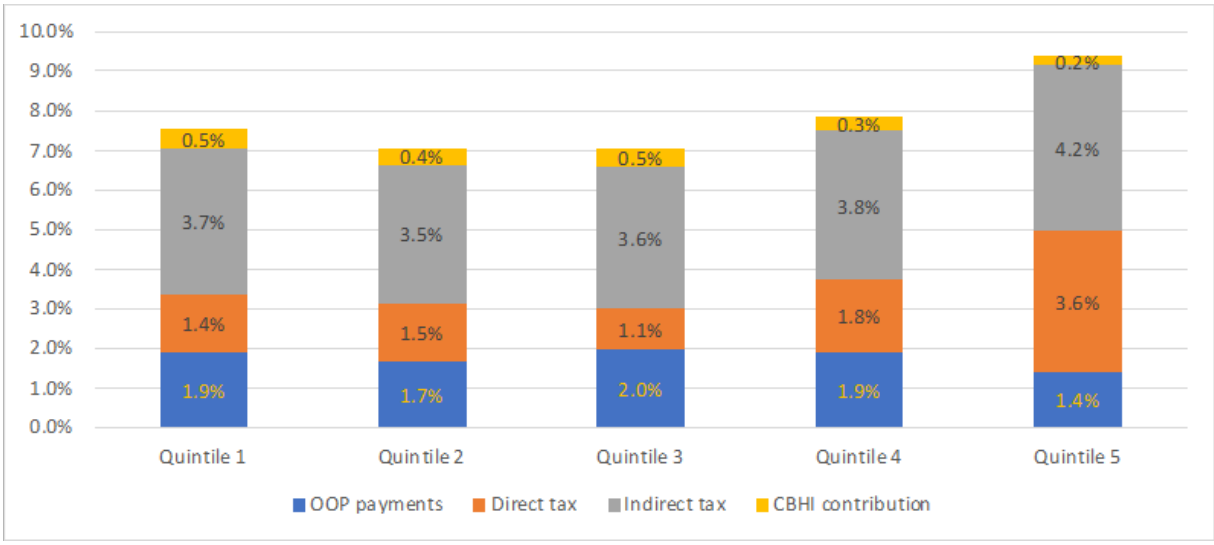

Figure 1: Payments towards healthcare as a percentage of total household expenditure – average by expenditure quintile

Figure 1 shows no clear gradient regarding the distribution of total household expenditure on health can be seen. The average highest share of healthcare spending in total consumer spending is in the top quintile – 9.4%, the second highest in the next well-off quintile at 7.8%, followed by the poorest quintile at an average of 7.5%. However, it must be made clear that the differences in the respective absolute ability to pay are significant. The relative share of direct taxes is highest in the top quintile at approximately 38% of spending towards healthcare. In this representation, OOPs are responsible for a good quarter of health payments in the bottom quintile and around 15% in the top quintile.

The study found that the taxes relevant to households regarding public expenditure on health, such as personal income taxes and consumption taxes, tend to burden economically better-off households relatively more than worse-off households. Community-based health insurance (CBHI) contributions and out-of-pocket (OOP) payments substantially burden poorer households. Direct personal taxes turn out to be progressive, as expected, while indirect taxes also have a weakly progressive effect in Ethiopia. CBHI contributions and OOP payments are both regressive. This is reflected in the so-called Kakwani indexes, which indicate progressivity: The more negative, the more regressive; the more positive, the more progressive the respective funding source.

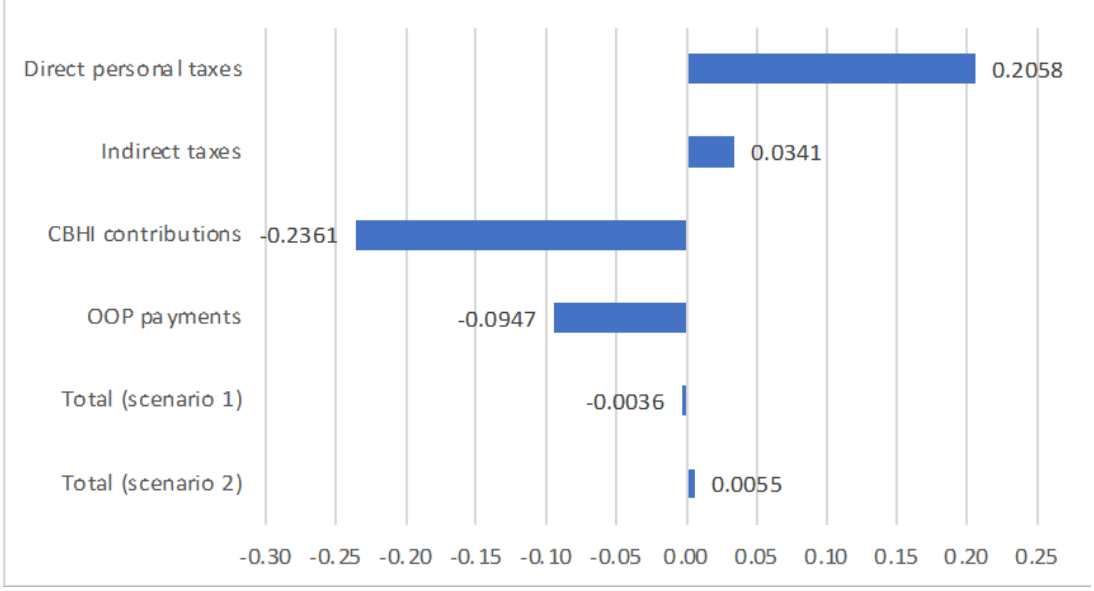

Figure 2: Overview of progressivity by financing source and total health finance

The overall system is either slightly progressive or regressive, depending on the weighting approach. The study reinforces the importance of health financing from government revenue to ensure financing fairness in the longer term. The Ethiopian health strategy relies on the expansion of the CBHI model. Considering the findings of this study, the importance of a coherent approach towards premium waivers for the population with very low incomes and for the vulnerable becomes obvious. Suppose CBHI will be used successfully to pursue the country's UHC goal. In that case, it seems urgently necessary, for reasons of financing fairness, to implement a counterpart for the formal sector in the form of social health insurance (SHI).

Conclusion and recommendations: The financing incidence analysis of healthcare in Ethiopia shows that financing fairness and equity remain a significant challenge in the country's healthcare system. The study recommends increasing government spending on healthcare, implementing premium waivers for the vulnerable, implementing social health insurance, exploring innovative financing mechanisms, and monitoring and mitigating poverty incidence. These recommendations can help policymakers in Ethiopia achieve financing fairness and equity in the country's healthcare system and move towards the goal of universal health coverage. Achieving UHC will require sustained efforts from all stakeholders, and it is crucial to ensure that healthcare is affordable and accessible to all Ethiopians. Therefore, policymakers must take a comprehensive approach to health financing that prioritizes equity, affordability, and sustainability. With these efforts, Ethiopia can realize the benefits of UHC, including improved health outcomes and greater economic productivity, which will benefit the entire society. The study proposes the following policy recommendations.

Increase government spending on healthcare: The study shows that government spending on healthcare is the most progressive form of healthcare financing in Ethiopia. Therefore, policymakers should increase government spending on healthcare, especially for vulnerable populations, to ensure financing fairness and equity.

Implement premium waivers for the vulnerable: The study shows that CBHI contributions substantially burden poorer households. Therefore, policymakers should continue to pursue premium waivers for the population with very low incomes and the vulnerable.

Implement social health insurance (SHI): The desirability of contributory health insurance should be assessed. If this path is pursued, it will be necessary to implement a contribution-based counterpart to CBHI for the formal sector. This will ensure financing fairness and equity across different sectors of the economy.

Explore innovative financing mechanisms: Policymakers should explore innovative financing mechanisms to increase the funding available for healthcare. These could include private-sector investments, public-private partnerships, and social impact bonds.

Monitor and mitigate poverty incidence: With the further expansion of the health financing system, keeping an eye on poverty incidence will become more important. Policymakers should monitor poverty incidence and compensate for it in a sensible and balanced way through social transfers.

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Infodemic, Digital Health Literacy and Information Seeking Behavior During Covid-19 Pandemic: A Systematic Review

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ABSTRACT

Background: *Health information-seeking behavior drastically increases during pandemics and other public health emergencies. However, void of relevant, sufficient, and actionable health information creates a fast spread of infodemic, misleading public perception of the risk of infection and undermining compliance to preventive public health measures. Though separate research articles have been published on the subject matter, there are limited systematic review articles that aggregate the existing body of evidence.*

Objective: *This systematic review aims to provide a global picture of the level of infodemic, digital health literacy, information-seeking behavior, and their associated factors during the COVID-19 pandemic.*

Methods: *This systematic review followed the Preferred Reporting Items for Systematic Review and meta-analysis steps. Databases such as PubMed, Web of Science, Scopus, World Health Organization libraries, and Google Scholar were used to search all published articles. Articles on COVID-19 and infodemic, digital health literacy, and information-seeking behavior published until May 2023 and published in the English language were included. Text analyses and narrative summaries have been used to aggregate results.*

Results: *Nineteen articles were included in the systematic review. High levels of infodemic and misinformation circulation were observed during the early phase of the COVID-19 pandemic. Digital literacy has played a key role in health information-seeking behavior; individuals with higher levels of digital health literacy were less susceptible to infodemic, while those younger in age, male, belonging to vulnerable groups and with low digital health literacy were susceptible to the dissemination of misinformation during COVID-19 pandemic.*

Conclusion: *Digital health literacy can improve prevention and adherence to public health measures. Thus, strengthening digital health literacy is an essential tool against misinformation during a pandemic. There is an urgent need to implement digital health literacy capacity-building training for various segments of the population to help solve the spread of the infodemic during COVID-19 and other public health emergencies.*

Keywords: *Infodemic, Digital health literacy, HISB, COVID-19, Systematic review*

Background: Over the past decade, a new form of 'digital media' has become an increasing source of health information specifically for the young generation with access to mobile devices (Alhodaib & Alanzi, 2021; Bao et al., 2020). However, health information obtained from digital media has reliability issues, as the source of information may not be an established authority on the subject matter or a legally proclaimed public health institution. Hence, a significant proportion of the population is exposed to not-so-accurate health information, misinformation, conspiracy theories, and misleading information, which paused the challenge to the population to adhere to public health measures released by officials(Bai & Guo, 2022).

Health misinformation has reached a new height during the global COVID-19 pandemic (Purnat et al., 2021). Right after the global news of the SARS-COV 2 outbreak in Wuhan, China, the volume, content, and velocity of information released by Chinese officials was limited, which has fueled misinformation campaign, creating a fertile scenario for conspiracy theorist to fill the information void with inaccurate information regarding nature of the pandemic, and critically undermining risk perception and behavior of individuals and communities, and poorer uptake of public health response hence endangering lives of thousands if not millions(Pickles et al., 2021).

This has led to the conception of the word "infodemic" by global health experts, which is defined as the dissemination of inaccurate health information through various sources to misrepresent facts and sway public perception towards non-cooperation, suspicion, and, at times, total rejection of public health measures (Tangcharoensathien et al., 2020).

Though various research articles have conducted studies to identify the magnitude of infodemics and factors associated with the spread of infodemics, they have yet to systematically review the level of digital media misuse and its impact on public health measures during the COVID-19 pandemic.

Research questions

1. What was the magnitude of the infodemic during the COVID-19 pandemic?
2. What were the factors associated with the infodemic during the COVID-19 pandemic?
3. What was the level of practices of health information-seeking behavior during the COVID-19 pandemic?
4. What was the role of digital health literacy during the COVID-19 pandemic?

Methodology

The preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline was used for this study. Studies published were extensively searched through Google Scholar, CINAHL, PubMed, EMBASE, and Cochrane Library. Searching was carried out using the following search terms: "Infodemics," "Digital Health," "Health Seeking behavior," "Digital misinformation," "digital literacy," "COVID-19", and "Pandemic." Searching words were used in combination and separately by using Boolean operators "OR," "AND," and "Not," or combined with these terms (Tawfik et al., 2019). Published studies reporting the prevalence of digital misinformation during the COVID-19 pandemic and published in English until May 2023 were incorporated into this study.

Descriptive statistics were used to summarize the study's features. Characteristics of studies were summarized in textual and tabular methods, including study population, study design, sample size, and data collection period. Study participants' health information-seeking behavior (HISB) and associated factors were clearly stated. The main outcome variable

Infodemics on COVID-19 have been explained textually.

Results and discussion

A total of 143 articles were retrieved from all sources after removing 81 duplicate articles, and 62 articles were assessed using titles/ abstracts, from which 22 were excluded due to not evaluating the outcome of interest. Forty articles underwent full-text review, and 21 articles were excluded due to various reasons, such as the language of the article, focusing on specific disease conditions, and focusing on the continuity of essential health services through digital health care during COVID-19. Finally, nineteen articles were included in this review.

This systematic review includes studies on infodemic, digital health literacy, and information-seeking behavior during the COVID-19 pandemic; studies published on May 31, 2023, were reviewed, and these articles are published in peer-reviewed journals. The study design of most of the articles was cross-sectional, 73.6% (n=14/19), and the study design of 26.3% (n=5/19) was a systematic review; the study design for the remaining 10.5%(n=2/19) was longitudinal.

The study population in this systematic review includes the general population, university students, policymakers, researchers, public health practitioners, clinical professionals, and vulnerable populations such as elderly and migrant workers.

The sample size in the articles reviewed for the systematic review ranges from an article that only interviewed 13 participants to an article that surveyed 14,916 respondents.

Infodemic was reported at a higher rate among those with limited digital health literacy, assessing health information from unofficial sources, including social media outlets. This review included studies that reported the following factors as the most contributing to a higher degree of exposure to infodemic: lower perceived risk, being a member of a vulnerable group, such as migrant workers and elderlies living in elderly centers, lower level of overall health literacy and digital literacy, internet access, self-reported low social status.

This systematic review focused on articles that have conducted studies on estimating the burden and factors associated with infodemic, digital health literacy, and information-seeking behavior during the COVID-19 pandemic across the globe. Risk communication and community engagement have been included as essential pillars of public health emergency response by WHO(Tangcharoensathien et al., 2020; Wilhelm et al., 2023). Reliable health information is scarce in the early phase of epidemics; this creates an information void, opening opportunities for disseminating inaccurate health information, resulting in misconceptions on the risk perception and undermining compliance with life-saving preventive public health measures (Mourali & Drake, 2022).

The majority of the articles reviewed reported that low-level of digital health literacy is contributing factor to infodemic, this might be because individuals with a lower level of digital health literacy face difficulties in identifying, processing, appraising, and using information obtained from various sources, specifically those information retrieved from usage of internet(Choukou et al., 2022; Gangireddy et al., 2022).

Health information-seeking behavior is affected significantly by risk perception, indulgence in risky behavior, and willingness to comply with preventive measures across different countries. This increased tendency to seek health information might be because individuals who have a better understanding of their risk level and identify risk behaviors that might increase their chance of falling for the circulating virus, triangulating health information gathered from various sources, and can avoid risky behaviors and get motivation to adhere to preventive measures.

Conclusion and recommendation

Infodemic was associated with low digital literacy, use of non-official sources as information sources, lower self-reported social status, and minimal risk perception. Whereas those reporting higher digital literacy and using official information sources and with higher risk perception had a lower risk of exposure to infodemic during the COVID-19 pandemic era. There is a need for an urgent and timely comprehensive health literacy, and specifically digital health literacy training among the general population and health professionals to equip them on surfing through the multitude of health information sources with critical appraisal skills to sieve through the information overload and identity relevant and reliable health information.

Investigation into Organizational Restructuring, Lessons Learned, and Recommendations at the Ministry of Health- Ethiopia

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ABSTRACT

Organizational restructuring entails challenges such as a lack of role clarity, communication chasms, and coordination problems. The importance of conducting a complete role analysis and definition, effective communication with stakeholders, and responding to employee concerns are some of the lessons learned. Employee engagement activities such as orientation, training, and capacity development initiatives are also recommended to ensure a smooth transition. Implementing these suggestions can help organizations handle restructuring skillfully and foster a productive workplace.

Key Words: *Organizational restructuring, Lessons learned, Recommendations, Workflow analysis*

Background

The Ministry of Health -Ethiopia oversees and manages healthcare services in Ethiopia. It plays a crucial role in developing and implementing health policies, programs, and strategies to improve the overall health and well-being of the Ethiopian population.

The Ministry's objectives include improving healthcare access and equity, enhancing the quality of healthcare services, strengthening the health system, and promoting disease prevention and control. MoH collaborates with national and international partners, non-governmental organizations, and other stakeholders to achieve these goals.

Over the years, Ethiopia has made significant progress in various health indicators, such as reducing child mortality rates, increasing immunization coverage, and expanding access to essential health services. However, several areas still require attention and improvement, including human resource management, infrastructure development, and health financing.

Importance of organizational restructuring

Recent developments in global and national disease conditions, such as pandemics, the political economy of healthcare, and increasing healthcare prices, imply that the Ministry needs to update its structure to respond to modern needs. Organizational restructuring is an important process that includes major adjustments to the size, relationships, functions, and processes to address current problems, increase productivity, improve quality and responsiveness, and expand operational efficiency. Streamlining processes, eliminating duplication, and improving inter-office collaboration enable different units to realign their structure and operations to meet current and future needs better. Restructuring is expected to enable health systems to perform better while optimizing resource use and improving service delivery. Organizational restructuring aims to provide flexibility, agility, and the ability to respond to emerging constraints and adapt to external shocks or changes in the healthcare environment.

Overview of the Restructuring Process

The restructuring process at the Ministry involved a systematic approach to bring about significant changes to the organization's structure, roles, and processes. It began with a comprehensive assessment of the organization's current state, including an analysis of its structure, roles, and functions. Once the assessment was complete, the next step was to develop a detailed plan that outlined the objectives, timelines, and resources required for the restructuring process.

With the current organizational restructuring of the Ethiopian Ministry of Health, it is very important to set clear goals and identify desired outcomes during the restructuring process. This ensures that processes remain focused and aligned with the department's strategic goals. Role analysis and design play an important role in the restructuring process. This requires a thorough analysis of existing roles and responsibilities within the organization. The ministry has worked to develop clear job descriptions and define role expectations for each position to ensure alignment with the Ministry's strategic goals and priorities.

Evaluation and adjustment are an integral part of the restructuring process. Feedback from employees and stakeholders was gathered to understand the implications of the restructuring and identify areas that require further adjustment or improvement. Based on the evaluation findings, necessary adjustments were made to the organizational structure or roles and responsibilities to ensure continuous improvement.

Overall, the organizational restructuring of the Ministry of Health in Ethiopia has been a dynamic and iterative process that has undergone careful planning, stakeholder engagement, communication, efficiency, and continuous evaluation. However, it still leads to confusion about roles within different units.

Methods Used

The method used by the Ministry of Health to assess the current roles and responsibilities of different units was a combination of task and work process analysis. Job analysis involved gathering detailed information about each role's duties, obligations, responsibilities, and requirements through interviews or employee surveys. Workflow analysis focused on examining how tasks were performed within the organization and evaluated the efficiency and effectiveness of the processes involved. These methods proved useful in assessing existing roles and responsibilities within the organization. Task analysis provided an in-depth understanding of each role's duties, functions, and requirements. In contrast, workflow analysis helped identify areas where the role needed clarification or adjustment to optimize performance and efficiency.

Challenges

Roles and responsibilities may not be clearly defined during organizational reorganization, and communication and coordination problems may occur. These difficulties could greatly impact how well the reorganization process goes and how well the organization runs. The difficulty in clearly defining roles and responsibilities is one of the major problems. Another frequent issue during organizational restructuring is communication barriers. Employees may experience confusion and worry when there is a lack of efficient communication because they may not get timely and accurate information regarding the restructuring process. Misunderstandings, reluctance to change, and declining employee morale can all result from poor communication. Organizational reforms can fail because of coordination problems. Coordinating the activities of many teams or departments is difficult if roles and responsibilities are not clearly defined. This can lead to task inefficiencies, decision-making delays, and work duplication.

The clarity in roles, efficient communication, and cooperation must be prioritized by businesses to meet these issues. Establishing regular communication channels and feedback is important to guarantee that staff members know their responsibilities and the restructuring status and can voice any issues or suggestions. To successfully traverse the intricacies of organizational restructuring and lay a strong basis for future success, businesses must address these issues.

Lessons Learned from the Organizational Restructuring

To avoid misunderstandings, overlapping activities, and duplication of effort, roles, and responsibilities must be thoroughly assessed. The following are some of the lessons learned during restructuring, and role overlaps found post-implementation that were noted in the Ministry of Health-Ethiopia reform.

There may be circumstances where the Human Resources Administration Office and the Human Resources Development Office`s roles overlap and are unclear inside the organization. Without defined boundaries, there might be misunderstanding and effort duplication when both offices handle comparable activities.

Similar roles overlap, and misunderstandings between the Strategic Affairs Office and the Digital Health Office could exist. While the Digital Health Office may utilize technology for healthcare delivery and implementing digital health solutions, the Strategic Affairs Office may be responsible for strategic planning, resource mobilization, project formulation, stakeholder engagement, monitoring, and evaluations. The duties of these offices may occasionally overlap, particularly when it comes to developing digital health strategies or engaging stakeholders in digital health efforts.

The Health System Innovation and Improvement Office and the Health Human Resource Development Office may also have roles that overlap or are unclear to one another. Planning and carrying out projects about managing the healthcare workforce and developing leadership styles may fall under the purview of the Health Human Resource Development Office.

However, these roles' duties could overlap in certain situations, such as workforce planning projects that call for innovation and improvement tactics. Clear communication routes and collaboration mechanisms must be established between these offices to maintain coordination and avoid duplication of work.

Regular review and feedback processes can assist in identifying and addressing any ongoing difficulties linked to role overlapping and confusion, supporting more efficient and effective organizational functioning.

Roles should be clearly defined to ensure staff understand their responsibilities and tasks, increasing productivity and efficiency. The successful reorganization of an organization depends on effective communication and stakeholder participation.

Another significant learning from organizational restructuring is responding to employee concerns. Organizations may establish trust and commitment by responding to employee concerns, increasing engagement, and facilitating a smooth transition.

Recommendations

Organizations should define roles and duties precisely to address role overlap and confusion. It is easier for employees to understand their positions, and there is less likelihood of confusion or duplication when each role's responsibilities, tasks, and reporting lines are clearly defined. The accuracy and alignment of job descriptions with the organization's changing needs can be ensured via routine evaluations and changes.

Improved channels for communication and coordination are necessary during organizational reorganization. Organizations should set up effective communication channels, such as regular team meetings, email updates, and intranet portals to inform staff members of the reorganization's progress and changes. Collaboration platforms or project management systems can help teams communicate and cooperate more efficiently.

The restructuring process needs to be regularly monitored and evaluated to spot any problems or potential areas for improvement. Organizations can address new problems, make appropriate adjustments, and make sure that the restructuring initiatives are on track by receiving input and feedback. Continuous evaluation aids in measuring the success of the restructuring activities and enables appropriate course changes.

Service Quality Standards and Client Experiences among Married Adolescent Girls Receiving Contraceptive Services in the Roadmap for Integrating Smart Start in Ethiopia project

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Abstract

Background: Smart Start is a proven model created and implemented by Population Services International and the Ministry of Health to improve the quality of contraceptive uptake among married adolescents aged 15-19. We conducted a client exit interview survey to understand married adolescent girls' experiences and HEWs' adherence to quality standards when delivering SS counseling within the Roadmap to Integrating Smart Start in Ethiopia (RISE) project sites.

Method: We used a cross-sectional quantitative client exit interview survey to collect data among selected 46 health posts in 12 woredas affiliated with the RISE project in Amhara, Oromia, SNNP, and Sidama regions. A total of 402 married adolescent girls who received Smart Start counseling and family planning services participated in the survey. We used Method Information Index (MII) scores to assess service quality delivered by Smart Start counseling.

Result: About 80% of the girls wanted to delay their pregnancy at least for three years. Among those who were using a method, the majority (80%) of them were using injectable contraceptives. Our result shows that 68% of girls responded 'yes' to all 4 method information index questions and only 6% responded 'yes' to none of the questions. Smart Start out performs national MII indicators when compared against all married women and all married women ages 15-19.

Conclusion and recommendation: As the majority of the girls wanted to delay their pregnancy for a long time, programs may need also to promote long-acting reversible contraception as an effective method without compromising clients' choices. We recommend improving service providers' knowledge of family planning methods counseling and including side effects management both in the RISE and non-RISE sites to improve the MII score.

Key words: Smart Start, MII, family planning, RISE

Background

Married adolescent girls require contraceptives but may not always be accessible due to the scarcity of quality services that are friendly and relevant to them. With funding from the Bill and Melinda Gates Foundation and the Children's Investment Fund Foundation, Population Services International (PSI) with the Ministry of Health (MOH) Ethiopia co-created Smart Start (SS), a proven model for improving the quality of contraceptive uptake among married adolescents aged 15-19. SS centers on the transformation of the client-provider interaction by supporting the Health Extension Workers (HEW) using the SS counseling tool, which links delaying first birth and spacing births with future financial security and achieving their goals and aspirations. In January 2020, a new project, Roadmap to Integrating Smart Start in Ethiopia (RISE) received funding, whereby PSI provides technical support to the MOH to integrate SS into the Health Extension Program (HEP) and take SS to scale in 465 woredas by December 2024. RISE implements SS targeting rural, married adolescent girls through existing public health systems. Through this journey, we conducted a client exit interview (CEI) survey to understand married adolescent girls' (15-19) experiences and HEWs' adherence to quality standards when delivering SS counseling within the RISE project sites.

Method

We used a cross-sectional quantitative client exit interview survey to collect data among 46 health posts in 12 woredas affiliated with the RISE project in Amhara, Oromia, SNNP, and Sidama regions. A total of 402 married adolescent girls (15-19) who received SS counseling and family planning services participated in the survey. Data was collected using questionnaires built on electronic devices through SurveyCTO. Data collection was conducted in November 2022. The study protocol has got approval from the Ethiopian Public Health Institute's Institutional Review Board and PSI's Review Ethical Board (REB).

Descriptive statistics were used to analyze client's experiences and HEWs' adherence to quality standards when delivering SS counseling using service quality Method Information Index (MII) scores. We have used the following four questions to measure MII: "Were you told by a health or family planning worker about other methods of family planning that you could use?", "Were you told by a health or family planning worker about side effects or problems you might have with the method?", "Were you given clear instructions on what to do if you experienced side effects after your services today?" and "Were you told you can switch to another method if you want to or need to?".

Results

Socio-demographic characteristics

The mean age of girls was 18 years, three-quarters of girls were aged 18-19 and about 8% of girls were aged 16 or younger. About four in five were out of school during the survey time. Among girls out of school, education levels were low. The majority did not complete any level of education (48%) and about 40% had completed only primary school. Among girls who were in school during the time of the survey, more than half (54%) were in primary school. Nearly all girls were in monogamous households. Just over half of girls had ever given birth (Table 1). Of those 6% had given birth twice and 2% of girls were pregnant (not indicated in the table).

Table 1. Socio-demographic characteristics of respondents (N=402), November 2022

Variable	Number	Percent
Age		
15	3	0.8
16	28	7.0
17	68	16.9
18	150	37.3
19	153	38.1
Currently in school		
Yes	70	17.4
No	332	82.6
Current grade level		
Primary	38	54.3
Secondary	27	38.6
Higher	5	7.1
Highest grade completed (currently out of school)		
None	161	48.5
Primary	131	39.5
Secondary	32	9.6
Higher	8	2.4
Marital status		
Married in a monogamous household	398	99.0
Married in a polygamous household	4	1.0
Ever give birth		
No	197	49.0
Yes	205	51.0
Current pregnancy status		
Pregnant	8	2.0
Not pregnant	394	98.0

Child-bearing intentions and Contraceptive use patterns before the event/visit

Under 2% of girls wished to have a child in the next 1 year during the time of the survey and the majority (43%) wish to wait 3-5 years. Overall, 15% of all girls were not using a method of contraception before the visit. Among method users, injectables make up 80%. Among method users, one quarter have been using their method for more than 2 years. Only 8% of girls have someone close to them who is against the use of contraceptives (Table 2).

Table 2. Child-bearing intentions and contraceptive use by respondents, November 2022.

Variable	Number	Percent
Intention to be pregnant		
In less than 1 year	7	1.78
In 1-2 years	64	16.2
In 3-5 years	169	42.8
In more than 5 years	138	35.0
Never	6	1.5
Don't Know	10	2.5
Using the method before the event		
Yes	336	85.3
No	58	14.7
The method used before the visit		
Implants	43	12.8
Injectables	270	80.4
Pills	21	6.2
Emergency Contraception	2	0.6
For how long using the method		
1-6 months	95	28.3
7-12 months	54	16.1
1-2 years	104	30.9
Above 2 years	83	24.7
Anyone against seeking contraception service		
Yes	32	8.0
No	370	92.0

Method uptake during the visit

One-fifth of girls received counseling only and 76% of girls received a method. Among girls who took a method, 81% received an injection. Among girls taking a method, 68% were already using their method. About 95% of girls using a method said their husbands knew about their method use. Among method users, 92% say contraception is their decision. The girl's top reason for visiting the provider was that she was nearby, followed by knowing the provider personally (Table 3).

Table 3. Method uptake by clients with Smart Start (N=402), November 2022.

Number	Percent	
Service received		
Counseling only	85	21.1
Contraceptive method	305	75.9
Method removal	12	3.0
Type of method received		
Injectable	246	80.7
Implant Insertion	31	10.2
Pill	27	8.8
Emergency contraception	1	0.3
Using this same method before the visit		
Yes	208	68.2
No	97	31.8
Husband/partner knows how to use a method		
Yes	366	95.1
No	19	4.9
Is using contraception mainly your decision?		
Yes	354	92.0
No	31	8.0
Reason for choosing the facility*		
Close location	291	72.39
Know HEW personally	121	30.10
Reputation of HEW/facility	107	26.62
Likely to have supplies in stock	68	16.92
Best quality of care	53	13.18
Cheap price / The service was free	51	12.6
Previous positive experience	39	9.70
Recommendation from a friend	24	5.97
Curiosity	18	4.48
Encouragement of partner	11	2.74
Referral from Women Development army	3	0.75

*Multiple response

Informed choice and service quality counseling

Our result shows that 68% of girls responded 'yes' to all 4 method information index questions. 8% of girls responded 'yes' to the 3; 12% of girls responded 'yes' to 2; and 6% responded 'yes' to none of the questions (Figure 1).

Figure 1. The proportion of clients' responses to the four method information index questions, November 2022.

Figure 2 shows the MII score of SS clients compared with the national (data from Performance Monitoring for Action). Smart Start out performs national MII indicators when compared against all married women and all married women ages 15-19. The difference is especially notable in the first two indicators, being informed of additional methods and information on specific side-effects.

Figure 2. Method information index score of Smart Start clients compared to the national survey, November 2022.

Conclusion and recommendations

Quality health care is a right, and counseling quality is an essential component of any family planning program [1]. Counseling necessitates two-way communication between service providers and clients, in which providers supply adequate information for each client to make an informed decision. Quality counseling ensures that every client receives the knowledge they need to achieve their reproductive health objectives [2, 3]. According to our findings, more than two-third of the girls reported obtaining information in all four indicators. This result is much higher compared with the national 2021 Performance Monitoring for Action (PMA) data (16.5% for a similar age group). The MII can have a greater impact on contraceptive prevalence and continuation [4–6]. Given the major barriers to facility-based services, smart start sessions have the potential to increase information quality. This study (self-reported communication quality score) recognizes the girls' positive attitudes about family planning use. Self-reported metrics are an important source of information for program managers looking to enhance efficiency and cut expenses.

The finding that the majority of the girls using injectable contraceptives is not a surprise as the method is highly preferred in sub-Saharan Africa countries including Ethiopia [7]. About 80% of the girls wanted to delay their pregnancy by at least three years. Programs may need also to promote long-acting reversible contraception as an effective method without compromising clients' choices. Client-reported experience measures of family planning services can be captured through MII, and communication quality indices during community service provision. While MII scores were moderately-high in this survey, service provider with the support of smart start demonstrated strong communication skills that build rapport and trust with their clients.

Health policymakers should strive to improve service providers' knowledge of family planning methods and side effects management. Reinforcing providers' counseling and communication skills, refresher training, and improved supervision, ultimately can strengthen positive relationships between HEW and clients. Improving the quality of family planning counseling can contribute to addressing the country's low contraceptive use rates. It is important to implement client-reported experience measurements (e.g., client-reported quality metrics) in routine implementation research for effective health service monitoring, program management, and policy reforms.

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Quality Improvement Project to Reduce Non-Leftover Medication Wastage in Haramaya University Hiwot Fana Comprehensive Specialized Hospital Pediatrics Ward, Harar, Ethiopia

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ABSTRACT

Background: *Non-leftover medication wastage refers to medications dispensed but not used by patients as they are not in the treatment regimen. This project aims to reduce non-leftover medication wastage in Haramaya University Hiwot-Fana Comprehensive Specialized Hospital (HrU-HFCSH) pediatric ward.*

Local Problem: *Baseline assessment showed that 23 % Of medications dispensed from a single dispensary were not administered to the patient as they were not in the treatment regimen. This implies that 29 % of the cost of medications dispensed from a single dispensary was wasted.*

Methods: *Before-and-after study was conducted. All data were converted into monetary value and presented as % wastage and % discrepancy. Medications dispensed but not used by the patient were considered wasted if they were not in the treatment regimen.*

Interventions: *Monitoring of discrepancies in medication supply and administration data.*

Results: *Overall, there was a 24.65 % reduction in % wastage (financial), an 18.65 % reduction in % wastage (product), and a 15 % reduction in % discrepancy from the baseline.*

Conclusion: *The findings of this project indicate the importance of monitoring discrepancies in medication supply and administration data in reducing non-leftover medication wastage.*

Keywords: *Medication wastage, non-leftover, Discrepancy, Harar, Eastern Ethiopia.*

Background: Medication wastage refers to any pharmaceutical product that remains unused or not fully consumed throughout the pharmaceutical supply and use chain. It's an act or instance of using or expending medications carelessly, extravagantly, inefficiently, ineffectively or to no purpose". It can be classified as Leftovers and non-leftover wastage. Leftover wastage refers to medicines dispensed to patients and remaining unused due to several patient, condition, or drug-related factors. In contrast, Non-leftovers Medication wastage is those dispensed out but not used by patients as they are not in the treatment regimen. Budget constraints in financing the health care system and huge amounts of wastage costs create a serious risk to the patient and health care system. In Ethiopia, none of the previous studies aimed to assess non-leftover wastage. This project aims to reduce non-leftover medication wastage in the pediatric ward of Haramaya University Hiwot-Fana Comprehensive Specialized Hospital (HrU-HFCSH), Starting from February 2023 to July 2023, Harar, Eastern Ethiopia.

Local Problem: The Hospital cannot accurately account for all medications. But at least there must be a way to identify discrepancies between medications supplied and medications administered to various patients. However, in our institution, there were no safeguards to fully account for drug losses and no way to identify discrepancies in the medication use process. Due to these and additional factors, Medication wastage, theft, and financial discrepancy are high. Baseline assessment of randomly selected prescriptions and their corresponding patient chart showed that 23 % Of medications dispensed from pediatrics pharmacy were not administered to the patient as they were not in the treatment regimen. This implies that, in terms of money, 29 % of the cost of medications dispensed from a single dispensary was wasted. In addition, baseline % discrepancy in the dispensary was conducted, and data from 1 month reference period were taken. Accordingly, there was a 19 % discrepancy between medication issued to the dispensary and medications supplied to various patients and units.

The facility estimates and purchases pharmaceuticals by calculating past consumption. Still, this estimation does not account for wasted and undocumented medications, compromising the estimation accuracy and leading to a stockout of essential medicines before the next purchase period is reached. Hence, the problem is not limited to the facility; patients are pressured to buy pharmaceuticals from private pharmacies at a high cost due to medication wastage and the associated stock of essential medicines. This project aimed to reduce non-leftover wastage and associated stock of essential medicines in the HFCSH pediatric ward.

Methods: A before-and-after study that utilized data collected through both prospective and retrospective methods was conducted. Brainstorming, System thinking, Technical expert opinion, and a Fishbone diagram were used to organize and analyze the root cause of the problem. A driver diagram was used to guide our intervention. 3 key areas that are vulnerable to wastage and theft were evaluated. All data were converted into monetary value and presented as % wastage and % discrepancy. Medications dispensed but not administered to the patient are considered wasted if they were not part of the treatment regimen.

Interventions: 3 main interventions evaluated in this project were:

1) **Implementation of New Prescribing and Dispensing Protocol**

The purpose of this protocol was to ensure that medications are reaching the right patients and those who need them the most, to avoid dispensing medications more than their daily requirement, and to provide an easy way to identify whether the required medications are already dispensed or not. In this prescribing and dispensing protocol**,** a List of all current medications that the patient is taking and the

maximum daily amount to be dispensed for each medication is calculated and documented by the HCP available at the ward. The pharmacy personnel at the dispensing unit check documentation of the patient's current medication on this chart, record the amount of medication dispensed with each encounter and make sure that the maximum daily amount to be dispensed is not exceeded. Medications not documented on this chart will not be dispensed to the patient at the dispensary.

2) Monthly Financial Audit of Discrepancy

The discrepancy between the stock available for sale during the specified one-month period and the documented cost of stocks dispensed to various patients, issued to other units, and expired/damaged stock in the dispensary was audited. The findings from the auditing process were informed to pharmacists working in the dispensary. They were given orientation to inform them of their poor documentation and associated high discrepancies. Roles and responsibilities were assigned to the dispensing staff. They were encouraged to work responsibly and informed of their negligence's direct and indirect consequences on the institution and the patient/community. The discrepancy between the cost of stock from the calculated ending balance and the Cost of stock from physical inventory was calculated as a total discrepancy in monitory value and presented as a % discrepancy after adjusting for inventory accuracy rate.

3) Control Of Stocks Flow in The Dispensary

This intervention aimed to create accountability and transparency of stock flow in the dispensary. A list of all medications stocked in the dispensary was provided alphabetically. Pharmacists at the dispensing unit were assigned responsibility. Some of them record the amount of medication dispensed after each transaction, and others provide dispensing and counseling services. The one who dispenses products is not involved in the documentation of transactions. Weekly consumptions of medications supplied from the dispensary were calculated and documented. The information obtained from this register will be used to compare the weekly consumption of each medication with the amount at hand when updating the bin card every week.

Results: 8 data points were taken in 4 PDSA cycles. In the final (4th) PDSA cycle significant improvement has been shown in all of the outcome measures. Overall, from the baseline, there was a 24.65 % reduction in % wastage in terms of finances, an 18.65 % reduction in % wastage in terms of product, and a 15 % reduction in % discrepancy from financial auditing of the dispensary.

Conclusion: Our finding indicates that monitoring and control of discrepancies in medication supply and admiration data is effective in the reduction of non-leftover medication wastage:

Recommendation: based on the findings from the project, it is recommended that HrU-HFCSH conduct regular and random audits of discrepancies in the medication use process and apply this concept in all other wards. It is also recommended for Harari RHB and FMOH to test the concept of this project in other public health facilities found in the region and the country.

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Workload Indicator for Staffing Need (WISN) Method to Improve Human Resources for Health Planning in Ethiopia

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Background: One of the greatest challenges in the healthcare field is planning the health workforce under limited financial resources while being fully capable of responding to an affordable, fair, and efficient healthcare system. The Ministry of Health (MoH) Ethiopia, with support from the World Health Organization (WHO) and Jhpiego, conducted a pilot study using the Workload Indicator of Staffing Need (WISN) with the objectives of determining the staffing level at selected health facilities, identifying gaps using the WISN methodology and forecast the required staffing numbers at these health facilities towards the attainment of universal health coverage.

Methodology: The Ministry of Health (MoH) has undertaken comprehensive preparatory work and executed the implementation of this study with predetermined terms of reference and meticulously planned action plans, commencing this initiative in November 2020. The study rigorously adhered to all established standard Workforce Planning for Health (WISN) procedures, from the initial determination of health cadres and healthcare facilities to the meticulous interpretation of WISN-derived outcomes and subsequent reporting thereof.

The research endeavor encompassed a multifaceted approach, thoroughly examining pertinent literature and relevant documents. Additionally, the study encompassed a series of key informant interviews, complemented by the careful analysis of annual service statistics extracted from the hospitals' comprehensive records. In terms of the sampling methodology, the study adopted a purposive approach, selecting a representative set of health facilities from all regions, excluding Tigray and Gambella. These chosen health facilities encompassed diverse care levels, providing a holistic representation of the healthcare landscape.

The original plan was to include a total of 72 health facilities in the study, which were categorized as follows: 14 health posts, 25 health centers, 12 primary hospitals, 16 general hospitals, including two privately owned facilities, four teaching and referral hospitals, and one highly specialized college and hospital. However, during the subsequent analysis phase, it was determined that substantive data suitable for comprehensive analysis was available for only 54 health facilities. This selection was predicated on the inclusion of the seven core cadres identified for the initial phase of the study.

Results: The analysis encompassed seven pivotal healthcare cadres: Medical Doctors, Health Officers, Nurses, Midwives, Anesthesia Specialists, Laboratory Professionals, and Pharmacy Specialists. The Workforce Planning for Health (WISN) analysis results were conveyed through essential indicators, notably the difference and ratio indicators generated using the WISN software. These indicators were meticulously expounded to elucidate the WISN ratios, instrumental in interpreting factors such as workload pressure, staffing gaps, personnel imbalances, and surpluses.

The outcomes were further stratified and interpreted within the specific contextual framework, reinforcing the analysis with empirical observations. These dual analytical approaches comprehensively examined various facets of the staffing dynamics within the healthcare facilities. Notably, the results yielded a spectrum of outcomes, exhibiting variance across different healthcare cadres and among individual healthcare facilities.

At the core of the findings were discernible disparities, with some facilities exhibiting a surplus of health personnel while others faced evident shortages. Workload pressures were similarly disparate, ranging from exceptionally high to notably low, contingent on the specific health facilities and professional categories in focus.

One of the paramount conclusions drawn from the WISN study was the inadequacy of the existing fixed facility staffing norms. Based on these findings and in alignment with the specified health services outlined in the Essential Health Services Package (EHSP) at the Health Post level, it is recommended that an additional Health Officer, two Midwives, and one Nurse be considered in addition to the existing complement of two Health Extension Workers (HEWs) as stipulated by the current staffing norm.

For Health Centers, an average of 15 additional healthcare professionals from various categories featured in the study are deemed essential. Furthermore, Primary Hospitals and General Hospitals necessitate an average addition of 14 and 25 diverse cadres, respectively, except nurses and laboratory professionals who were accounted for in the study.

Similarly, Referral/Teaching Hospitals, except for nursing professionals, require an average of 63 additional professionals from various categories that were assessed. This comprehensive staffing adjustment considers the diverse healthcare needs and complexities at each tier of the healthcare system.

Furthermore, the study delved into the budgetary implications of these augmented staffing requirements across the hierarchical healthcare system. A substantial additional budget of approximately 12.6 billion Birr (equivalent to USD 378,586,100) is deemed necessary for 2021 to cover the expenses associated with the employment of the recommended healthcare workforce. (The exchange rate is USD 1 = 33.25 Birr.)

Recommendation: The study proposes short-term, mid-term, and long-term recommendations. Key recommendations include:

Redeployment of Staff: Immediate action should involve redistributing healthcare personnel from facilities facing surpluses and low workload pressures to those grappling with critical shortages and high workload pressures.

Revision of Staffing Standards: The findings should be integral to the ongoing revision of staffing standards, ensuring alignment with the actual healthcare workforce requirements.

Standardization of Health Services: Standardizing healthcare service delivery across health centers at the same level of care will enhance consistency and quality.

Scope of Work and Job Descriptions: A thorough review of scopes of work, practices, and job descriptions for staff subcategories with overlapping roles is recommended to optimize efficiency.

Facility Classification: A reclassification of health facilities based on their workloads and service packages should be considered to ensure equitable distribution of healthcare resources.

Capacity Building: Strengthening the healthcare workforce's production capacity is vital to address the identified gaps effectively.

HRH Practices Review: A comprehensive review of human resources for health (HRH) practices and service delivery models should be conducted to align with the evolving healthcare landscape and demands.

Decentralizing oxygen availability and use at primary care level for children under-five with severe pneumonia, at 12 Health Centers in Ethiopia: a pre-post non-experimental study

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Abstract

Background: *Pneumonia is the leading infectious cause of death in children worldwide, accounting for 15% of all deaths in children under the age of five. Hypoxemia is a major cause of death in patients suffering from pneumonia. There is strong evidence that using pulse oximetry and having reliable oxygen sources in healthcare facilities can reduce deaths due to pneumonia by one-third. Despite its importance, hypoxemia is frequently overlooked in resource-constrained settings. As a result, this study aimed to assess the availability of medical oxygen devices, operating manuals, guidelines, and healthcare workers' knowledge, and skills in the practice of hypoxemia diagnosis and oxygen therapy in piloted health centers of Ethiopia.*

Methods: *A pre-post non-experimental study design was employed. An interviewer-administered questionnaire was used to collect primary data and review medical record charts. A chi-square test with a statistical significance level of $P<0.05$ was used as a cut-off point for claiming statistical significance.*

Results: *Eighty-one percent of healthcare workers received oxygen therapy training, up from 6% at baseline. As a result of the interventions, knowledge of pulse oximetry use and oxygen therapy provision, skills such as oxygen saturation and practices of oxygen therapy have significantly improved among healthcare workers in the piloted Health Centers. In terms of the availability of oxygen devices in the facilities, seven (58%) facilities did not have any at baseline, but due to the interventions, all facilities were equipped with oxygen devices.*

Conclusions: *Given the prevalence of pneumonia and hypoxemia, a lack of access to oxygen delivery devices, as well as a lack of knowledge and skills among healthcare workers in the administration of oxygen therapy, may represent an important and reversible barrier to improving child survival. Therefore, scaling up clinician training, technical support, availability of oxygen devices, guidelines, manuals, strengthening maintenance schemes, and close monitoring of healthcare workers and health facilities is strongly advised.*

Keywords: *severe pneumonia, medical oxygen, oxygen availability, health center*

Background: Pneumonia is the single most common infectious cause of death in children, accounting for 15% of all deaths in children under the age of five [1]. Hypoxemia, or a low level of oxygen in the blood, is a major fatal complication of pneumonia, and the risk of death increases as the severity of hypoxemia increases [2–5]. According to a systematic review, 13.3% of children with pneumonia have hypoxemia [6]. Many children with hypoxemia are missed if pulse oximetry is not used regularly [3, 7]. Countries are gaining experience in the clinical, bio-medical, and training aspects of establishing and maintaining effective oxygen delivery systems in hospitals and lower-level health facilities [4, 9]. There is evidence that the use of pulse oximetry and the availability of reliable oxygen sources in district hospitals can reduce pneumonia death rates by about one-third [4, 8].

Despite its importance in almost all types of severe illness, hypoxemia is frequently under-recognized and under-managed in resource-constrained settings.

Objective

Assess the availability of medical oxygen devices, investigate the knowledge and skills of healthcare workers in diagnosing hypoxemia, and provide medical oxygen therapy in 12 pilot health centers in Ethiopia.

Methods

To assess the availability of medical oxygen devices and assess the knowledge, skills, and practices of HCWs in the application and use of oxygen therapy, a baseline assessment was conducted in 12 HCs in four agrarian regions of Ethiopia from February to September 2019. Based on the assessment, baseline values were set and interventions such as procurement of oxygen concentrators, and pulse oximeters, development of oxygen therapy manuals and flowchart algorithms for children and adults, and oxygen therapy training and supportive supervision were conducted. The study employed a pre-post non-experimental survey design. The baseline data were collected in February 2019, followed by consecutive months of technical support and mentorship. The study setting consisted of 12 high-volume HCs that were purposefully chosen to meet geographical equity.

Additionally, HCWs working in the piloted HCs were the study populations. Furthermore, medical record reviews of children aged 0 to 59 months with severe pneumonia cases were reviewed to monitor the clinical practices of HCWs, including routine use of pulse oximetry and administration of oxygen. An interviewer-administered questionnaire was used to collect primary data and review medical record charts. A chi-square test with a statistical significance level of $P<0.05$ was used as a cut-off point for claiming statistical significance.

Ethical Clearance

The research protocol was reviewed, and ethical approval was obtained from the Ethiopian Public Health Institute (EPHI) under protocol number EPHI-IRB-175-2019, with a letter of approval dated 19 June 2019 and referencing EPHI13.6/136.

Results and Discussions

During the study period, 516,266 people visited the outpatient department (OPD). Out of the total OPD visitors, 64,398 (12.5%) were children under the age of five; among these under-five visitors, 3,893 (6%) and 267 (0.41%) had pneumonia and severe pneumonia cases, respectively. In terms of the availability of oxygen devices (cylinders, concentrators, and pulse oximeters) in the facilities, seven (58%) facilities did not have any at baseline, but due to the interventions, all facilities were equipped with oxygen devices. A total of 2,960 medical records were reviewed. Of the total medical records, 58% and 42% were male and female, respectively. The majority (94%) of professionals in the pilot health facilities did not have oxygen therapy training at baseline,

and as part of our designed interventions, 29 (81%) HCWs received oxygen therapy training.

Based on HCWs' knowledge assessment of whether clinical signs are reliable predictors of hypoxemia or not, our study revealed that only 14% of HCWs correctly answered at baseline. However, after training and technical assistance, the majority 30(83%) of them responded that clinical signs are not a reliable predictor of hypoxemia.

In terms of HCWs' knowledge of the cut-off point of oxygen saturation to initiate oxygen therapy (i.e., SPO2 <93%), 9(25%), 34(94.4%), and 35(97%) correctly stated the cut-off point at baseline (February 2019), May 2019, and end-line (September 2019), respectively. Because of ongoing capacity building, the majority of HCWs were aware of the recommended cut-off point for initiating oxygen therapy (Fig. 2).

The study revealed that oxygen therapy services increased dramatically after the intervention measures were implemented and were available in all 12 HCs. However, only 4 (33%) of the HCs were able to provide oxygen therapy services at the outset. Similarly, the majority (97%) of HCWs across all regions used pulse oximetry to measure oxygen saturation, compared to only 17% at baseline(Fig. 3).

According to the skill assessments of HCWs, all HCWs were able to properly place the pulse oximetry probe on the finger after training and subsequent technical support, but only 5(14%) were able to do so at baseline. Similarly, based on the skill assessment for the application of pulse oximetry, all HCWs knew to wait until the waveform became stable, but only 38% did so at baseline. Additionally, findings revealed that all HCWs were able to correctly read the oxygen saturation after mentorship was provided. However, only 5(14%) of HCWs were able to correctly read the oxygen saturation at baseline.

Discussion

The study findings revealed a lack of oxygen devices in more than half of the facilities and limited capacity of HCWs for oxygen therapy across all 12HCs. In line with this, researchers discovered that low knowledge and skills among HCWs were almost universally reported and many HCWs had misconceptions and fears about oxygen therapy, which hampered their motivation. Moreover, a study that looked at the barriers to using oxygen and POx in children with pneumonia found that lack of training and guidelines were the most frequently cited barriers [7]. Furthermore, studies reported that projects provided initial training and demonstrated that HCWs' knowledge and skills had improved [9-13]. Similarly, researchers documented that a lack of guidelines, equipment, and technical difficulties affect HCWs' motivation and that these challenges can be addressed through on-site training and regular on-site support [9,10, 14–16].

Conclusion and recommendations

Due to the effects of the multi-faceted interventions, the availability of medical oxygen devices, oxygen therapy manuals for children and adults, and oxygen flowchart algorithms have significantly changed from the baseline values. Similarly, the knowledge and skill of healthcare workers in the proper use and practice of medical oxygen therapy have significantly improved in the pilot HCs. In general, our findings can help practitioners and policymakers understand how to improve oxygen therapy in HCs, as well as lower level and key components of primary care units that are expected to provide comprehensive child health services like IMNCI. Given the prevalence of pneumonia and hypoxemia, a lack of access to oxygen delivery devices, as well as a lack of knowledge and skill among HCWs in the administration of oxygen therapy, may represent an important and reversible barrier to improved child survival. Scaling up training, technical

support, and close monitoring of HCWs and health facilities is therefore strongly advised.

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Is women's engagement in Women's Development Groups associated with enhanced utilization of MNH services?

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Abstract

Background: In Ethiopia, the Women Development Group program is a community mobilization initiative aimed at enhancing Universal Health Coverage by supporting primary healthcare services for mothers and newborns. This study aimed to assess the association between engagement in women's groups and the utilization of maternal and neonatal health services.

Method: A cluster-sampled community-based survey was done in Oromia, Amhara, Southern Nations, Nationalities and Peoples, and Tigray regions of Ethiopia from mid-December 2018 to mid-February 2019. Descriptive and logistic regression analyses were performed, considering the cluster character of the sample.

Results: A total of 6,296 women (13 to 49 years) from 181 clusters were interviewed. Of these, 896 women delivered in the 12 months before the survey. Only 79 (9%) of these women including Women Development Group leaders reported contact with Women Development Groups in the last 12 months preceding the survey. Women who had education and greater economic status had more frequent contact with Women Development Group leaders. Women who had contact with Women Development Groups had better knowledge of pregnancy danger signs. Women Development Group leaders or women who had contact with Women Development Groups in the last 12 months were associated with antenatal care utilization (AOR 2.82, 95%CI (1.23, 6.45) but not with the use of facility delivery and utilization of postnatal care services.

Conclusion: The Women Development Group program requires improved organization and management of the Women Development Group program. It is needed to strengthen the Women Development Group leaders' engagement in group activities promoting the utilization of maternal and neonatal health services.

Keywords: Engagement, Knowledge, Maternal, Neonatal, Women Development Group

1. Introduction

In 2003, the Government of Ethiopia introduced the Health Extension Program [1]. In 2011, the government established the volunteer Women's Development Group (WDG) initiative [2], which is similar to the concept of community health volunteers in other countries [3,4]. Each 1-to-30 WDG is further divided into a sub-structure of one-to-five networks; one network includes six women of which one is the network leader [4,5].

The WDG is regarded as a key vehicle to support and promote community ownership of the Health Extension Program to achieve Ethiopia's Health Sector Transformation Plan as well as universal health coverage [4]. This plan is aligned with the maternal and neonatal health targets set by the Sustainable Development Goals [1,6].

Despite some improvements in antenatal/perinatal care and facility delivery, postnatal care utilization coverage remains low [7]. Women with low or no education, living far from health facilities, and without available transport have difficulties in using health services. WDG leaders are expected to identify pregnant women, organize pregnant women's forums, visit newborns, refer sick children to the health posts, and counsel families to follow-up on referrals [6,8,9]. Some studies have shown that women exposed to WDGs were more likely to utilize maternal, neonatal, and child health services, potentially contributing to the realization of universal health coverage by 2030 [10,7,11] and ultimately to a reduction in maternal and child mortality [12,13].

Studies have shown WDG leaders' knowledge and performance to be insufficient for such purposes [2,5,14]. These issues have affected the frequency and quality of the WDG leaders' contact with their members [5,15]. As a result, the WDG leaders' performance has been reported to be low [3,16].

To improve the utilization of maternal and child health services, the Ethiopian Government introduced the Optimizing Health Extension Program (OHEP) intervention in four regions that aimed to increase the utilization of primary maternal, neonatal, and child health services. This study is a secondary analysis of data from the end-line survey which aimed to assess whether women's engagement in women's group activities was associated with the utilization of maternal and neonatal health services.

2. Methods

2.1. Study Design and Setting

The Optimizing Health Extension Program intervention was implemented in 26 districts. An end-line study was conducted for two years (mid-December 2018 to mid-February 2019). The study design was a cluster-sampled cross-sectional survey and was carried out in Oromia, Amhara, Southern Nations, Nationalities and Peoples, and Tigray regions of Ethiopia.

2.2. Data Source

A two-staged stratified cluster sampling method was used to select the study subjects. The 2007 Ethiopian Housing and Population Census data were used to identify and list enumeration areas in the 52 study districts. By the end-line survey, 52 districts and 181 enumeration areas were finally considered for the study. A questionnaire was prepared in English and translated into the local languages Amharic, Oromiffa, and Tigrigna. We decided to consider women who had a last birth history for children born in the past 12 months preceding the survey to minimize recall bias.

2.3. Data Analysis

A descriptive analysis, including frequencies and percentages, was performed. Binary and multivariate analyses were thereafter conducted to assess whether there was an association between having a WDG contact or being a WDG leader and antenatal care service utilization, use of facility delivery, and utilization of postnatal

care services. The STATA statistical software version 14.0 was used for all analyses.

Ethical review: Ethical approval was obtained from the Ethiopian Public Health Institute (protocol number SERO-012-8-2016), London School of Hygiene and Tropical Medicine (protocol number 11,235), and the Institutional Review Board (IRB) of Mekelle University, College of Health Sciences (protocol number 1433/2018). Support letters were also obtained from the Regional Health Bureaus in Amhara, Oromia, Southern Nations and Nationalities Peoples, and Tigray. Informed consent was obtained from all study participants.

3. Results

3.1. Background Characteristics of Study Participants

A total of 6296 women from 181 clusters were interviewed in the end-line survey. Of these, 896 women had delivered in the 12 months preceding the survey. The mean age was 28 years, and 460 (51%) of the women had no formal education. Only 20 (2%) of the women had had contact with WDG leaders in the last 12 months and 59 (7%) were leaders of a WDG (Table 1).

Table 1. Characteristics of women who delivered in the 12 months before the study in Ethiopia, 2018/2019.

Characteristics	N = 896 (%)
Education level of women	
No formal education	460 (51.3)
Educated	436 (48.7)
Religion	
Orthodox Christians	450 (50.2)
Protestant Christians	138 (15.4)
Muslim	299 (33.4)
Other	9 (1.0)
Marital status (*n* = 891) [a]	
Non-married	13 (1.5)
Married/In a union	845 (94.8)
Divorced/Widowed	33 (3.7)
Birth order (*n* = 892) [b]	
One child	129 (14.5)
Two or three children	306 (34.3)
Four or more children	457 (51.2)
Received antenatal care	685 (76.5)
Had a facility delivery	464 (51.8)
Received postnatal care in the first month after delivery	155 (17.3)
WDG contact (one year before the survey)	
Neither the WDG leader nor had contact	817 (91.2)
Had WDG contact but not a WDG leader or was a WDG leader	79 (8.8)

[a] Missing data on 5 women; [b] missing data on 4 women.

A greater proportion of women who had educations and greater economic status had contact with WDG leaders.

3.2. Knowledge of Pregnancy Danger Signs

Women who had had contact with WDG leaders or were the WDG leaders themselves had better knowledge of nearly all pregnancy danger signs (Figure 1).

Figure 1 Knowledge of mothers who had delivered last year on pregnancy danger signs by the level of exposure to the WDG, Ethiopia, 2018/19 *WDG= Women's development group*

3.3. Factors Associated with Antenatal Care, Facility Delivery, and Postnatal Care

Women who were either visited by a WDG leader in the last 12 months or were WDG leaders themselves had, to a larger extent, utilized antenatal care, compared to those with no WDG contact. This engagement with WDGs was also significantly associated with the use of facility delivery, compared to those not exposed to WDGs. Engagement in WDGs was not significantly associated with the utilization of postnatal care in the first month after delivery.

Education, economic status, and religion were significantly associated with antenatal care utilization and use of facility delivery. Birth order was also significantly associated with the use of facility delivery. Education and economic status were also significantly associated with the utilization of postnatal care.

Factors associated with antenatal care utilization, use of facility delivery, and utilization of postnatal care were included in multivariable logistic regression. The WDG leaders or those who had been in contact with a WDG leader in the last 12 months were more likely to have utilized an antenatal care service (AOR 2.82, 95% CI (1.23, 6.45), *p*-value = 0.01) (Table 2).

Table 2. Association of WDG contact with utilization of maternal and neonatal health services in Ethiopia, 2018/19.

WDG [a] Contact	Utilization of Maternal and Neonatal Health Services								
	Antenatal Care Service Utilization			Use of Facility Delivery			Utilization of Postnatal Care		
	OR (95% CI)	AOR (95% CI) [b]	p-Value	OR (95% CI)	AOR (95% CI) [c]	p-Value	OR (95% CI)	AOR (95% CI) [d]	p-Value
Neither WDG was [a] leader nor had contact	1.00	1.00		1.00	1.00		1.00	1.00	
WDG [a] leader or had WDG contact but not WDG leader	3.34 (1.56, 7.51)	2.82 (1.23, 6.45)	0.014	1.78 (1.12, 2.82)	1.34 (0.77, 2.32)	0.301	1.37 (0.75, 2.44)	1.24 (0.64, 2.39)	0.510

[a] WDG = Women's development group; [b] adjusted for clustering, education level, religion, and economic status; [c] adjusted for clustering, education level, religion, economic status, and birth order; [d] adjusted for clustering, education level, economic status, and birth order.

4. Discussion

Overall, very few women had contact with WDG leaders. Women who had educations or were from wealthier households had more contact with WDG leaders or were leaders themselves. Women who had contact with WDG leaders or were leaders had better knowledge of pregnancy danger signs. WDG engagement (contact or being the leader) was significantly associated with antenatal care service utilization, but not with the use of facility delivery or utilization of postnatal care services.

Before 2016, WDG leaders played a pivotal role in the health status of women due to close and continuous contact with the community, in particular with women [2,12,17]. The WDG network leaders were expected to meet with their members every other day [5]. The present study revealed that very few (2%) women had contact with WDG leaders during the last 12 months preceding the survey. The potential reason for the low contact could be that WDG leaders have a high workload. They could also be fatigued due to their other duties and their many years of service. These issues are believed to have contributed to a poorly functioning WDG program.

At the community level, the implementation of the WDG program has been unclear with large variations [3,18]. Women who had some education or better wealth had better contact with WDGs. Education and wealth are important enabling factors for the use of all primary healthcare services [18,19]. Hence, the level of education of women can be used as a core criterion for the selection of health cadres in the study communities.

Despite their knowledge was still sub-optimal; women who had contact with WDG leaders or were WDG leaders themselves had more knowledge on nearly all pregnancy danger signs. Studies have shown that knowledge of pregnancy danger signs is of great importance to improve women's awareness and use of services and ultimately improve their own and their neonates' health [3,5,20,21]. This could be due to a lack of support from the HEWs in the primary healthcare system. Improving the knowledge of WDG leaders could lead to better engagement with their members. This could enhance their health outcome performance [22].

More than three-quarters of the women had received at least one example of antenatal care and half had delivered in a facility, but only less than one-fifth had received postnatal care in the first month after delivery. Women who had contact with WDG leaders or were WDG leaders more frequently utilized at least one antenatal care service [11, 12,23].

5. Conclusions

We have shown that engagement in WDGs may potentially enhance women's attendance at antenatal care appointments. However, the study findings point to the poor functionality of WDGs. The WDG program needs to be revitalized in its organization and management. It could also benefit from task shifting for selected health services and improved criteria for the recruitment of leaders and support from the primary healthcare system.

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Effect of community-based health insurance on financial protection among chronic disease patients in Southeast Ethiopia

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Abstract

Background Chronic disease-related catastrophic health spending is frequent in Ethiopia affecting several households, particularly the poorest ones. A community-based health insurance (CBHI) scheme has been in place in Ethiopia to provide financial protection against health expenditure but there is little evidence of how well it protects chronic patients financially.

Objective The study aims to evaluate the effect of community-based health insurance in reducing the incidence of catastrophic health expenditure among patients attending chronic disease follow-up departments in Asella referral hospital, Southeast Ethiopia.

Method A health facility-based comparative cross-sectional study was conducted in Asella referral hospital from March to May 2022. Systematic random sampling was used to select 325 chronic patients. Data were collected using an open data kit application and then imported to STATA version 17 for analysis. Propensity score matching was used to evaluate the effect of community-based health insurance on catastrophic health expenditure.

Result The study enrolled a total of 325 chronic patients (157 insurance members and 168 nonmembers). More than 30% of the study participants incurred health spending that could be catastrophic based on the 15% nonfood threshold. Catastrophic health expenditure was found in 31% of insured and 47% of uninsured participants. Overshoot and mean positive overshoot were 10% and 33% for insured members, respectively and the corresponding figures were 18% and 39% for nonmembers. Community-based health insurance contributes to a 19% ((ATT -0.19, t-2.97)) reduction in the incidence of catastrophic health expenditure among chronic patients. This result is found to be consistent for alternative measurements of the outcome variable and the use of alternative matching algorithms.

Conclusion Chronic patients, particularly those in uninsured households, had a high incidence and intensity of catastrophic health expenditure. Hence, it is relevant to expand community-based health insurance to provide financial protection for people suffering from chronic conditions.

Keywords Chronic disease, Catastrophic health expenditure, Community-based health insurance, Ethiopia

Background

Chronic diseases are major global problems, with rising costs making it difficult for patients to afford medical care. Particularly when health systems are mainly financed through OOP(1,2). CHE due to chronic diseases occurs in 6–84% of households(3-5). OOP payments in Ethiopia were estimated to be 18.2 billion ETB in 2015/16, with chronic illness treatment accounting for 23% of OOP spending(4,5). Various studies in Ethiopia also indicated that CHE affects between 27% and 88.4% of households with chronic patients(6–9).

CBHI scheme was introduced as a sustainable way to overcome CHE and achieve universal health coverage (10,11). However, there is mixed evidence regarding the role of CBHI in reducing CHE in practice. According to studies conducted in India and Lao, it aids in lowering the CHE (12–14). On the other hand, other studies found that health insurance is ineffective in preventing CHE in families with chronic disease patients in China (18). Despite the high burden of catastrophic health expenditure, little is known about the effect of CBHI in mitigating CHE among chronic disease patients.

Objective: The study aims to assess the effect of community-based health insurance in providing financial protection for individuals with chronic diseases.

Method

Study setting and design: A health facility-based comparative cross-sectional study was conducted from March to May 2022 among chronic disease patients attending follow-up appointments at Asella Teaching and Referral Hospital.

Sample size and sampling procedure: The sample size was determined using double population proportion formulas. The proportion of CHE was taken from the CBHI evaluation(18). 80% power, 95% CI, and 5% degree of precision with a one-to-one ratio among insured and noninsured were taken. By using systematic random sampling, 336 chronic patients (168 CBHI members and 168 nonmembers) were recruited in the study after accounting for a 10% nonresponse rate.

Measuring CHE: The study measured catastrophic health expenditure using Wagstaff and Van Doorslaer's (2002) approach(19) and 15% of nonfood expenditure was used to evaluate the effect of CBHI on CHE.

Data collection and analysis: Data were collected using a structured questionnaire adapted from similar studies (6,7,18,20), which is translated into the local languages (*Amharic* and *Afan-Oromo*). Data were collected through face-to-face interviews using ODK Collect and transferred to STATA version 17 for analysis. Descriptive statistics were used to summarize the data. Propensity score matching was used to estimate the effect of community-based health insurance on catastrophic health expenditure.

Result

Socio-demographic and clinical characteristics

In this study, 325 study participants were involved, with a 96.7% response rate. Of these, 167 (51.38%) respondents were males. The mean age was 47.32 (SD+16.47) years. The majority of study participants were married Orthodox Christians and urban residents. The average household size of respondents was 4.73 (SD+2.03). In terms of educational attainment 71 (22%) had completed tertiary education (above 12) and farmers accounted for 25% of respondents. 143 (44%) were diagnosed with diabetes and 98 (30.15%) were hypertensive. The mean duration of living with chronic diseases was 3.9 (SD+4.22) years. The majority (99%) of patients had regular follow up.

Catastrophic Health Expenditure

Nearly one-third of the study participants (30%) had encountered CHE at a 15% nonfood threshold. The incidence and intensity of CHE was higher for noninsured patients. The incidence of catastrophic health spending among CBHI members was 31% compared to 47% for nonmembers. The overshoot was 10% for members and 18% for nonmembers. MPO for insured and uninsured households was 33% and 39%, respectively (Table 1).

Effect of participating in CBHI on CHE

The effect of community-based health insurance on catastrophic health expenditure has been estimated using the average treatment effect on treated. This was estimated at the most widely acceptable threshold, which is 15% of nonfood expenditure. A total of 155 CBHI members and 166 nonmembers with chronic diseases were compared based on the nearest neighbor matching algorithm. Table 2 shows enrollment in CBHI had a significant negative effect on catastrophic health expenditure. For instance, at a 15% threshold level, patients who are members of CBHI had a 19% lower incidence of catastrophic health expenditure compared to noninsured households. These results are found to be consistent for alternative dentition of CHE and for using alterative matching algorithms.

Discussion

This study aimed to evaluate the effect of community-based health insurance on catastrophic health expenditure among patients attending chronic disease follow-up in Asella Referral Hospital, Southeast Ethiopia. It was found that, at the 15% nonfood threshold level, more than 30% of study participants faced catastrophic expenditures. CBHI members had a lower incidence of catastrophic health spending than non-CBHI members, with 31 percent for CBHI members and 47 percent for nonmembers. This is higher than the earlier CBHI evaluation study, which found that the incidence was only 7% and 19%, respectively (18). The previous study focused on health expenditure in general, while the current study focused on chronic conditions, which require frequent visits to health facilities and additional costs. The existing report also supports that the prevalence of CHE is greater among families with chronic disease patients (21,22).

The propensity score matching model found that CBHI membership lowers the incidence of catastrophic health spending by 19 percent. This is because the CBHI scheme benefit package included medical expenses, particularly drug and diagnostic costs, which make up the majority of out-of-pocket health expenditures for the treatment of chronic diseases. As the Ethiopian CBHI does not provide coverage for nonmedical costs, the reduction in health expenditure for insured patients is because of a reduction in direct medical costs. This finding is similar to a study conducted in Northeast Ethiopia, which found that insured patients have lower catastrophic out-of-pocket expenses by 23%. Furthermore, several studies in Ghana, Nigeria, India, and China reported that health insurance schemes reduce the incidence of catastrophic health expenditure as well as out-of-pocket payments for health services (12–14,22–24).

Limitations of the study

The sample used in this study can only represent a portion of outpatient and the propensity score model used in this study ignores the effects of unobserved factors that could affect the study's outcomes. Hence, these issues need to be taken into account when interpreting the results of this study.

Conclusion

The overall evidence in this study implies the catastrophic nature of chronic health conditions on the welfare of households. Hence, it is important to focus on addressing the problem by designing an alternative resource mobilization strategy to meet medical spending for chronic illness. In this regard, expanding the coverage of community-based health insurance schemes could help to enhance financial protection against out-of-pocket health spending, particularly for the poorest households.

Table 1: Incidence and intensity of CHE based on CBHI status among chronic disease patients attending follow-up in Asella referral hospital based on CBHI status, 2022

OOP as share	CBHI enrollment Yes				CBHI enrollment No			
	10%	15%	25%	40%	10%	15%	25%	40%
Nonfood								
Head count (%)	44	30.6	21	10.2	63	47	27.7	13.9
Overshoot (%)	12	10.20	7.57	5.20	21	18.30	14.80	12.15
MPO (%)	27.23	33.22	36.02	50.83	33.87	39.39	54.06	88.74
Total expenditure								
Head count (%)	23	20			33.3	18		
Overshoot (%)	4.34	3.32			6.10	4.84		
MPO (%)	18.91	16.80			18.23	27.10		

Table 2: Effect of community-based health insurance on catastrophic health expenditure among chronic disease patients on follow-up in Asella referral hospital, 2022

Outcome Variable	Treated	Controls	Difference	S.E.	T-stat
CHE at;					
10% nonfood	.438709677	.651612903	-.212903226	.064271973	-3.31*
15% nonfood	.303225806	.494193548	-.190967742	.064271037	-2.97 *
40% nonfood	.096774194	.219354839	-.122580645	.044248702	-2.77*
10% Total expenditure	.225806452	.372903226	-.147096774	.060168301	-2.44*

* Significant at 1%

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Post-War Health System Recovery Strategies in Tigray: A Systematic Review

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Abstract

Background: Armed conflicts significantly impact the health status of communities, leadership, and administrative structures at various healthcare system levels.

Methods: A systematic review of the post-war health system recovery, and the WHO's six building blocks was conducted. Global Health, PubMed, CINHAL, and Science Direct were the databases used. Articles done in Post-war or conflict settings were included. In total, 75 articles were reviewed. MMAT is used as a quality assessment tool.

Findings: The government plays a crucial role in revitalizing the health sector through coordination mechanisms. Financial constraints and limited funds hinder access to health services in post-conflict countries. Pooling all funds in health systems has effectively addressed financial constraints and improved health system recovery. Capacity building and training for community health workers are essential for improving healthcare worker retention. The government health system must ensure health services and medical equipment are provided to the community in post-conflict situations. Innovative interventions, such as using locally sourced food items for nutrition therapy programs and vaccines, should be promoted to alleviate malnutrition.

Conclusions: The government should establish a coordination mechanism during the initial phase of the recovery. Strong human resources management capacity at all levels of the health system, including training, incentive packages, and autonomous drug and medical equipment services, should be established to improve the accessibility of essential medicines to the community. Establishing adequate community health workers, Effective implementation of global initiatives such as one health approach, and strengthening locally sourced food for nutrition therapy and vaccines are some of the strategies to be applied.

Key Words: Rebuilding, Reconstructing, Recovering, Health System, Post-war

Introduction

A health system is a comprehensive term comprised of all the organizations, institutions, resources, and people that are involved in improving the health of humans (WHO, 2010; Gesesew et al., 2021). Health systems' dynamic and multifaceted nature across multiple sectors poses challenges for monitoring performance. The WHO, in collaboration with other partners, developed six building blocks to monitor health system performance and sustainability (World Population Review, 2021). Before the war, significant progress had been made in health system coverage in Ethiopia and Tigray. However, after November 4, 2020, war erupted in the region, accompanied by a complete siege that resulted in various casualties. Since the war erupted, deliberate and systematic damage, vandalism, looting of health infrastructures and services, and killing of health professionals have been done by the allied invading forces. A United Nations Office for the Coordination of Humanitarian Affairs report and MSF revealed that about 70% of assessed hospitals and health centers in the region were either partially or fully damaged during the war (UN, OCHA, 2021, MSF, 2021).

However, to a certain extent, the Pretoria peace agreement made between the Ethiopian Federal Government and the Tigray regional government provides a unique window of opportunity to think about health system recovery in the region.

Objectives: This systematic review analyzed evidence and proposed strategies for the recovery of health systems in post-conflict settings in Tigray.

Methodology

Study design

A Systematic review was done based on the WHO's six building blocks. We adhered to the Statement of Preferred Reporting Items for Systematic Reviews (PRISMA, 2009).

Searching strategy

The search process involved searching peer-reviewed and grey literature published between 1990 and June 2023 in electronic databases like Global Health, PubMed/Medline, CINAHL, Science Direct, and Grey Literature

Inclusion criteria

Review of post-conflict/war settings since 1990, focusing on rebuilding, rehabilitating, reforming, reconstructing, strengthening, or recovering, focusing on health systems, healthcare systems, and sectors, using English literature.

Exclusion criteria

Literature that addressed pre- and intra-conflict settings did not mention a post-conflict setting in post-conflict contexts was excluded.

Screening process

We identified 4821 records, of which 3751 were duplicates and were removed from the review, 1070 unique records remained for screening. In title/abstract screening, 898 records were excluded. Through the full-text review, 172 articles were reviewed, and 97 were excluded due to insufficient information. Finally, 75 articles were included in the review.

Quality assessment

The Mixed Methods Appraisal Tool (MMAT) was used for quality appraisal, assessing methodological quality in various research studies (Hong et al., 2018).

Findings

In the review, 238 articles on governance and leadership, 119 Articles on healthcare financing, 16 articles on health information systems, 267 articles on the health workforce, 223 articles on medical equipment, drugs, and supplies, and 207 articles on healthcare delivery were screened for eligibility from the identified articles.

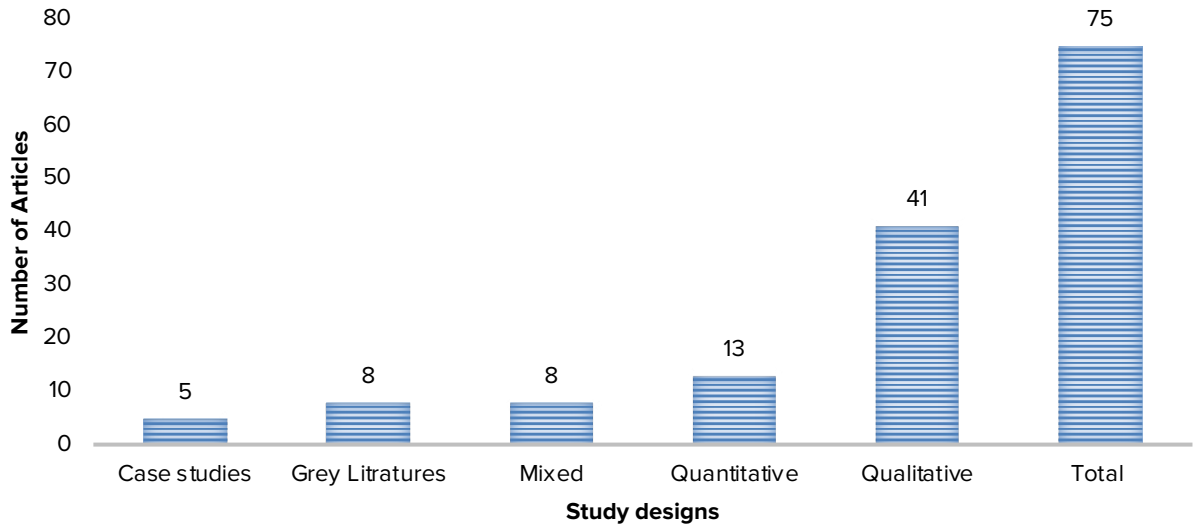

Figure 2. Study designs and several articles included on the Post-War Health System Recovery Strategies.

A study in South Sudan, examining the role of governance in the revitalization of the health sector, found that the state lacks a legitimate government or regulatory body, which would result in the health sector being led by multiple stakeholders. In this case, decentralizing the health system governance made the recovery process fast (C. CHOL et al, 2018).

The Kosovo health system was not prioritized along with other sectors during rebuilding, the health system of the country continued to deteriorate for years despite the strategy for recovery of the health system being available. This health sector pool fund was operated by the Ministries of Health and Welfare and directed to the country's national health policy priorities (Buwa D, Vuori H, 2006).

Innovation related to community health workers was the best strategy to solve the shortage of health workers in the five war-affected countries, such as Ethiopia, Eritrea, Angola, Mozambique, and Rwanda (C. CHOL et al.), 2018). This disparity was due to the participation of many health workers in largely unregulated private practice. This included a motivation and retention strategy, as well as a hard-to-reach policy to ensure the retention of health workers in hard-to-reach areas, particularly those affected by the conflict. As a result, overall health service delivery – measured by the number of people utilizing health services – increased from 51% in 2000 to 92% in 2011. (Chol C. et al. 2018).

The review process conducted looked at strategies to implement health information systems in post-conflict settings in five Sub-Saharan African countries. The availability of electricity, computers, skilled operators, and other forms of communication were barriers to achieving an equitable system (Mutale et al, Tesema et al, Mohamed Adan Damey Aimé Patrice et al, Kimaro HC et al). The establishment of global initiatives was also another strategy that could be integrated into the health system to prevent emerging and re-emerging public health problems in post-war settings (TRHB, 2023).

As observed from Somalia, capacity building for staff in underserved regions should target inequity in human resources and service delivery. There is an initial need for collaboration between development partners with capacity building which will eventually transfer to a locally run system in the regions (Omar, M. 2021).

Conclusions and Recommendations

Conclusions

The government has to establish a coordination mechanism during the initial phase of the recovery phase to avoid fragmentation of the health system. Additionally, integration of donor funding systems into national health system priorities. Strong human resources management capacity like in-service training, and incentive packages, are the main mechanisms for health workforce retention. On the other hand, establishing a strong distribution system with fully stocked central drug stores, autonomous drug and medical equipment service and procurement processes, and a functional regulatory framework in healthcare facilities could be a priority. Besides, clear roles and responsibilities for donors and government in implementing health information systems need to be run under a homogenous system, avoiding different incompatible donor funding systems.

Recommendations

- Governments need to establish coordination mechanisms at the beginning of the recovery phase to avoid fragmentation of the health system.
- Health care pool fund empowered by the Ministry of Health and social welfare
- Direct financial incentives such as pay and bonuses and various other types of indirect financial and non-financial incentives
- Effective strategies to provide the population with access to important medications include establishing public-private partnerships and coordination, medical supply wholesalers in the area, and the construction of revolving fund pharmacies in the hospitals.
- Avoid lengthy procurement processes, and cumbersome funding mechanisms that lead to inefficient stocking mechanisms and delays in service delivery
- The Basic Package of Health Services should have to be implemented later in the phase of post-conflict health system rehabilitation and reconstruction, resources and policy should be geared towards a comprehensive PHC-oriented health system strengthening.
- Use of locally sourced food/ items for nutrition therapy programs and vaccines, pharmaceuticals, and medical products
- Establish global initiatives like one health approach
- Strengthening community health workers
- Personal digital assistant, ICT, and harmonization of HIS are needed as recovery strategies in post-conflict settings.

Magnitude, disparity, and predictors of quality Antenatal care service: a systematic review and meta-analysis

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Introduction

Maternal and neonatal health remains a global priority, with high maternal and neonatal mortality rates. 98% of the burden comes from low-middle-income countries (LMICs). Effective intervention exists at reasonable costs, and optimum antenatal care can alleviate two-thirds of the burden. ANC works directly, through detection and treatment, and indirectly, through risk identification and referral. It is an entry point for communicable, non-communicable, and family health care.

Quality antenatal care has been stipulated as a means to achieve the targets of SDGs 3.1 and 1.2.

Poor quality antenatal care is linked to significant mothers and neonatal mortality. There is evidence that quality antenatal care can avert 2/3 of maternal and neonatal health burdens. Inconsistent with the evidence showing the quality of antenatal care (ANC) varies across countries, and there is no global evidence showing the current pooled quality of ANC is concerning findings. This study estimated the global, regional, and National pooled prevalence of poor-quality Antenatal Care services among pregnant women. This study aims to fill the evidence gap on ANC quality, enabling programmers and policymakers to rely on the evidence for their businesses. Researchers will gain insight into other research questions to further study the quality of antenatal care.

Methods and Materials

We conducted a comprehensive literature search for published and unpublished sources from 2002 to September 08 /2022, which reported the prevalence of Quality of Antenatal Care, or "prenatal care, or "focused Antenatal Care Service delivery".

We sought electronic databases such as; PubMed, CINAHL (EBSCOhost), Global Health (CABI), Medline, Hinari, Scopus, and other sources (Google Scholar and Google).

Statistical heterogeneity was assessed using Cochran's Q test. Sensitivity and sub-group analyses were conducted and presented in a forest plot in the presence of heterogeneity.

The pooled proportions of poor-quality Antenatal Care service delivery were estimated using a random effect model. All statistical analyses in this study were performed on stata16.0.

Result and Policy Implication

Results: 76 studies with a sample size of 940,164 pregnant women reported that highly diverse poor quality of ANC utilization ranging from 2.5% to 97.47% globally. The global pooled poor quality of ANC was 64.28% (95%CI: 59.58% – 68.98%) (I2= 99.97%, p =0.001). The subgroup analysis conducted by continental revealed that the pooled poor-quality ANC were:

- ✓ 70.07% (95% CI: 58.784% 81.364%) with (I2= 99.99%, p = 0.001) in Asia,
- ✓ 66.26% (95%CI: 61.81% – 70.71%) with (I2= 99.95%, p = 0.001) in LMICs
- ✓ 66.87% (95%CI: 61.908% – 71.84%) with (I2= 99.86%, p = 0.001) in Africa
- ✓ 57.577% (42.65- 72.50 with (I2= 99.94%, p= 0.0001) in South America
- ✓ 38.65% (95%CI: 18.42% – 58.88%) in developed countries (North America and Europe)
- ✓ 70.52% (95%CI: 64.55% – 76.48%) (I2= 98.37%, p =0.001) in Ethiopia, per 100 pregnant women attended ANC.

The identified pooled predictors of good quality antenatal care service were: number of ANC visits (fourth and above ANC visit) (AOR = 2.6 and 95% CI: 1.37- 3.84), family wealth index (AOR = 2.72 and 95% CI: 1.89- 3.55), maternal education attainment (AOR = 3.03 and 95% CI: 2.24- 3.82), residence (urban dwellers) (AOR = 4.06 and 95% CI: 0.95- 7.17), and maintained confidentiality during ANC follow-up (AOR = 2.23 (-0.36-4.82), respectively).

Policy implications: - The study found regional and country-level disparities in the quality of antenatal care services for pregnant women in Ethiopia, Asia, Africa, and South America, where poor-quality ANC services were provided for more than two-thirds to three-routh of ANC attendants. Therefore, policymakers and health planners should put a great deal of emphasis on addressing the quality of Antenatal care services.

Recommendation 1: Policymakers and global funders need to invest resources to monitor and improve the quality of antenatal care to meet the global maternal mortality target as per the SDGS plan by shifting health systems from coverage of ANC services to quality of ANC services based on World Health Organization (WHO) quality ANC contents.

Recommendation 2: Health care systems in LMICs should provide high-quality ANC based on WHO recommendations for pregnant women in need of quality services at all levels.

Recommendation 3: The Ministry of Health should maintain high-quality antenatal care services per nationally accepted WHO recommendations at all levels.

Recommendation 4: Policymakers and health planners should prioritize the quality of ANC service as current international and national public health agendas to reduce maternal and neonatal mortality and morbidities as per SDGs plan 2030.

Contextualization of Community Engagement Approach in pastoralist settings of Afar and Somali regions

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Abstracts: The purpose of this study was to adapt the Village Health Leader's community engagement approach to the pastoral context of the Afar and Somali region and to improve the engagement of the pastoral community in health service delivery and implementation.

Introduction: Community engagement is a process of developing relationships that enable stakeholders to work together to address health-related issues and promote well-being to achieve positive health impact and outcomes. Community engagement is a core component in primary health care and is part of the planning, design, implementation, and evaluation of primary health care services. It enables changes in behavior, environments, policies, programs, and practices within communities.

Methods: An exploratory qualitative assessment was employed to understand the socio-cultural features of the pastoral communities of Afar and Somali regions.

Result: The study discovered that in the Afar community, the structure below the Kebele level is known as 'Makafta' in the majority of the Woredas in the region. A single Makafta usually comprises around 110 households. Similarly, in the Somali region, there is a 'REER' which is a group of neighbors who have common interests, predominantly guided by their livelihood pattern. A single REER usually comprises a community of 10-100 households. These structures have been considered for the contextualization of the Village Health Leaders' approach to the pastoralist communities of the regions.

Conclusion & Way forward: The Village Health Leader approach was contextualized to the REER and Makafta health leaders in line with other clan structures of the Somali and Afar communities' respectively.

Introduction:

Community engagement has a long history in Ethiopia's health-related activities through different forms of voluntary community health workers and scopes of practice including the Community Health Agents (CHA), trained traditional birth attendants, community-based reproductive health agents, Community Health Promoters (CHPs), malaria agents and more. Starting from 2011 the Women Development Group (WDGs) approach which was launched to sustain the gains of the Health Extension Program (HEP), Ethiopia has made a concerted effort to expand coverage and increase participation of communities in health (Feleke Fanta, 2021).

Studies have found that the community engagement strategy using WDGs lacked representation from different segments of community groups including males, youth, and some indigenous social structures (Alula M.Teklu et al, 2020). To address these gaps, the Ministry of Health (MOH) designed an alternative community engagement strategy involving the recruitment and deployment of what are known as Village Health Leaders (VHLs). Accordingly, the VHL approach was piloted in four woredas and expanded to an additional 32 woredas of agrarian regions. A context-specific community engagement strategy needs to be designed for the pastoralist communities taking into consideration their culture, societal network, and mobility patterns to ensure the representation and participation of each segment of the community.

Objective:

To adapt the Village Health Leader community engagement approach to the pastoral context of Afar and Somali region and to improve the engagement of the pastoral community in health service delivery and implementation.

Methods

An exploratory qualitative assessment was employed to understand the socio-cultural features of the pastoral communities of Afar and Somali regions. In-depth interviews and focus group discussions were conducted in Chifra and Fiq woredas of Afar and Somali regions respectively in addition to a review of both published and gray literature to have a clear picture of the socio-cultural features within the pastoral context. Moreover, the implementation status and challenges of existing community engagement approaches were reviewed from administrative reports of MOH and the RHBs.

Results

The findings from in-depth interviews and focus group discussions were triangulated with the evidence of the desk review and consultative workshop findings. The community structure, social network, and cultural setups were identified through the process. The findings are as follows:

The Afar community is organized according to extended families, the structure below the Kebele level is known as 'Makafta' in the majority of the Woredas in the region. A single Makafta usually comprises around 110 households under locally established cultural structures of the community which is known as Da'ala. Similarly, in the Somali region, the pastoral livelihood system has social networks that are structured through clan and religious lines. A 'REER' is a group of neighbors who have common interests, predominantly guided by their livelihood pattern. A single REER usually comprises a community of 10-100 households. These findings of the qualitative assessment were supported by the attendants of the regional and Woreda-level consultative workshops. These structures have been prioritized for the contextualization of the Village Health Leaders' approach to the pastoralist communities of the regions.

Therefore; an implementation manual and the training materials have been developed for each of the Makafta and REER health leaders. The implementation manual points out the selection criteria, the number required, the scope of work, the implementation process, the support system, and reporting mechanisms that have been developed for the Makafta and REER health leaders. These strategies are under pilot tested in two Woredas from each region for further adaptation of key features of the strategy. After a one-year pilot testing and evaluating the implementation process, a full-scale implementation will be continued in the mobile communities of the two regions.

Conclusion and Way Forward

Community engagement has a long history in Ethiopia's health-related activities through different forms of voluntary community health workers and scopes of practice. The community engagement approach should consider the context, culture, beliefs, and values of the community. Therefore this context-specific community engagement approach has been developed for the pastoralist communities of Afar and Somali region.

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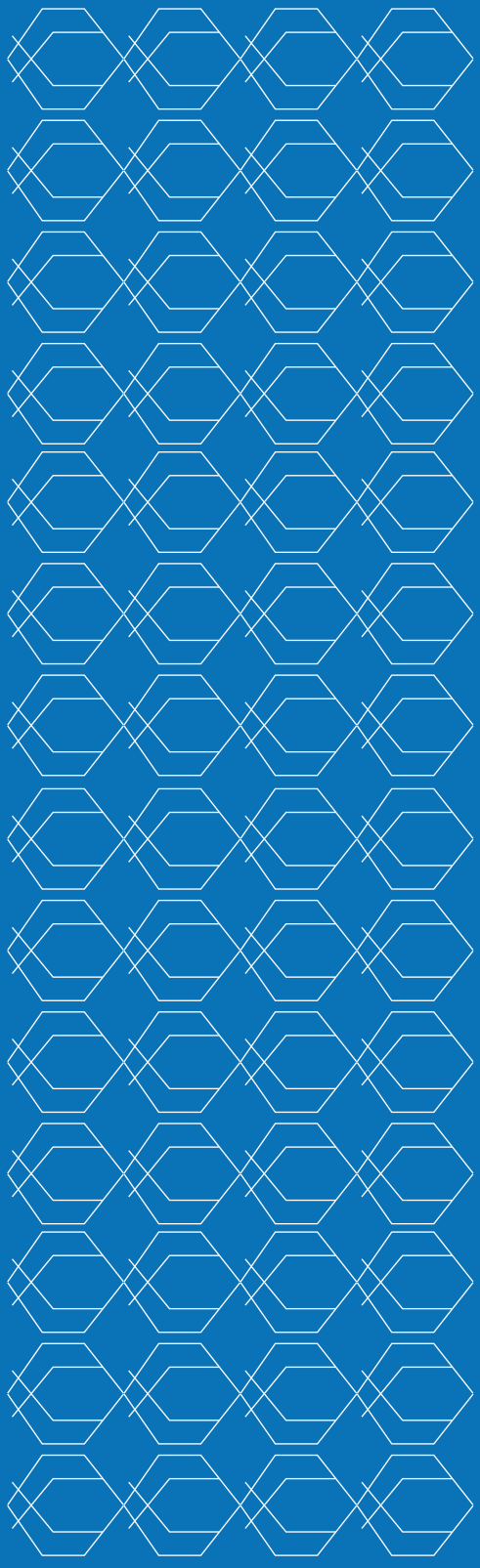
Section two:
Best Experiences



Ethiopian Hypertension Control Initiatives (EHCI) strengthened Primary Care Facilities, from July 2020 to July 2023, Ethiopia

Ethiopian Hypertension Control Initiatives (EHCI) group, Resolve to Save Lives (RTSL), Addis Ababa, Ethiopia.

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Introduction

Cardiovascular diseases (CVDs) are the leading cause of death globally[1]. In 2021, 20.5 million people died from a cardiovascular condition, a figure that accounted for around one-third of all global deaths and was a significant increase from the 12.1 million CVD deaths recorded in 1990[2].

Over three-quarters of CVD deaths take place in low- and middle-income countries (LMIC). As a result of delays in the detection and control of hypertension, premature death from CVD in LMIC is disproportionately high[1].

Hypertension is a major cause of CVD and deaths worldwide especially in LMICs. An estimated 1.28 billion adults aged 30-79 years worldwide have hypertension. Low proportions are aware (46%) and treated (42%). Despite the availability of safe, well-tolerated, and cost-effective blood pressure (BP)-lowering therapies, <14% of adults with hypertension have controlled BP.[3]. Improved population blood pressure control has the additional benefit of reducing demand for CVD care, which is particularly important in countries where referral and specialized care systems are less developed[4].

NCDs are estimated to account for 46% of all deaths in Ethiopia[5]. According to the 2015 STEPS survey report, Ethiopia has a raised blood pressure prevalence of 16% among adults which estimates 9.6 million adults. Only 3 million are aware, and 213,000 enrolled in care and treatment with only 1.5%[6] of those with hypertension controlling their BP which is way lower than the global control rate.[7]

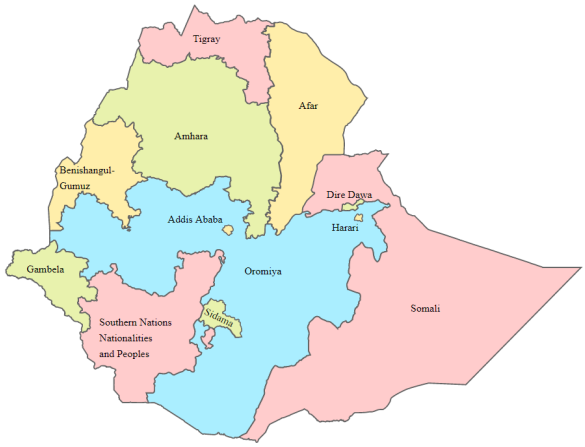
Partnership: To reduce the burden of CVD, the World Health Organization (WHO) and partners developed the HEARTS[11] technical package to guide the management of hypertension and other CVD risk factors in resource-limited settings. Since 2019, Resolve to Save Lives (RTSL), collaborated with the Ministry of Health of Ethiopia and other partners to implement the Ethiopian Hypertension Control Initiatives (EHCI), a HEARTS-based hypertension program.

[11] HEARTS - H: Health Lifestyle E: Evidence Based Protocol A: Access to Medicine and Technologies R: Risk Based Management T: Team Based Care S: Information for Monitoring

Project Scope, Interventions & Approaches

The project has been implemented in six regions of Ethiopia in 10 hospitals (One Tertiary, Four General, and Five Primary Hospitals) 52 health centers, and about 262 health posts (Annex 1, Table 1).

Picture 1: EHCI implementation Regions



The EHCI was aimed to provide services for all adults in the catchment areas of the selected health facilities. The total catchment population for the project sites is about 1.85 million with an estimated target of 103,182 raised blood pressure.

The program adapted five thematic areas from the WHO's HEARTS, i.e., use of an evidence-based treatment protocol; ensuring continuity of care through consistent medication and diagnostics equipment supply; community-based care and task sharing; patient-centered care and information system.

A comparative cross-sectional study conducted in April 2022 among selected eight health facilities for RTSL and non-RTSL supported to evaluate the compliance of the national protocol by reviewing 361 patient records. The findings of the study and program implementation approaches used to promote the national scale-up.

Result

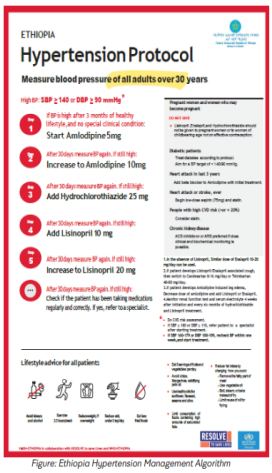
Following the launch of the EHCI in 2019, a baseline assessment was conducted focusing on the basic service provision capacity and availability of diagnostics equipment and essential hypertension medications at the PHC facilities. The major findings were:

- Only an estimated 2,500 patients were in care at the 62 health facilities. OPD abstract was used to collect hypertension cases in care which could have resulted in duplicate cases in the care due to the absence of standard longitudinal registration.
- Less than half (28 out of 62) of the health facilities have a BP apparatus for screening and diagnosis purposes for hypertension.
- Essential medication for hypertension treatment was available in all hospitals and only 19 HCs located in towns. Six out of ten hospitals and none of the HCs among 52 have separate Non-Communicable Disease (NCDs) management clinics in the facilities.
- No routine screening services for hypertension at the HCs except BP checkups with vital signs and integrated with triage. Those who do irregular screening refer raised BP cases for diagnosis and management to a nearby hospital.
- There is no proper documentation of the hypertension treatment outcome including control rate and retention in care.

Key achievements of EHCI from 2019 to July 2023

Protocol: The treatment protocol was developed by engaging local professional associations to adapt the WHO protocol to the local context. The types of drugs, doses, and algorithms are selected based on costs, treatment effectiveness, and side effects. The protocol included specific doses of three drugs: the calcium channel blocker amlodipine, the diuretic hydrochlorothiazide, and angiotensin

Converting Enzyme Inhibitors lisinopril with five steps of titration and combination therapy for BP control. it was piloted and validated at the RTSL-supported PHC facilities.


ETHIOPIA

Hypertension Protocol

Measure blood pressure of all adults over 30 years

High BP: SBP ≥ 140 or DBP ≥ 90 mmHg*

1 If BP is high after 2 months of healthy lifestyle, and no special clinical condition: Start Amlodipine 5mg

2 After 30 days measure BP again. If still high: Increase to Amlodipine 10mg

3 After 30 days measure BP again. If still high: Add Hydrochlorothiazide 25 mg

4 After 30 days measure BP again. If still high: Add Lisinopril 10 mg

5 After 30 days measure BP again. If still high: Increase to Lisinopril 20 mg

6 After 30 days measure BP again. If still high: Check if the patient has been taking medications regularly and correctly. If yes, refer to a specialist.

Lifestyle advice for all patients:

Figure: Ethiopia Hypertension Management Algorithm

According to the protocol compliance comparative cross-sectional study conducted, hypertension treatment protocol compliance was 60.44% in RTSL and 48.11% in non-RTSL facilities. Appropriate treatment choice at initiation was provided (64.54% vs. 42.94%, P<0.001), titrations were correctly provided (85.32% vs. 68.94%, p <0.001 and BP control were higher (46.81% vs. 27.98%, P<0.001) at last visits of hypertensive patients on follow-up[7]. The treatment protocol, as a result, was endorsed for national use at PHC and general hospitals.

Medication and BP measurement device Access: Resolve provided a startup medication to gap-fill the shortage of essential drugs and BP measurement devices and ensure medication adherence and continuity of care. Collaborated with facility leadership and pharmacists to incorporate the list of protocol-based drugs in the essential drugs list for procurement. The startup medication creates efforts to ensure accurate supply forecasting and timely procurement of drugs in all facilities. Through the provision of high-quality BP apparatus, patient screening and enrollment to care have been improved, and capacitated health centers providing treatment while community health workers started case identification, screening, and linkage.

Team-based care and Task shifting: Basic training on protocol-based hypertension management coupled with regular mentoring by experienced regional staff has improved the capacity of middle and lower-level HCWs and the capacity of the PHCUs on standard and quality service provisions including screening, diagnosis, and treatment of hypertension. Hypertension management has been well demonstrated by nurses and health officers. Facilities' service provision standards and procedures such as establishing screening corner, NCD clinic, and assignment of Focal person performed**.**

The collective efforts of the team-based care and task-shifting roles ensure better treatment outcomes particularly in the decentralization of care, reduction of care cost, and improved services accessibility.

Patient-centered Care: A differentiated services delivery (DSD) model with multi-month refilling started in 30 health facilities in January 2022. A total of 1,500 (10%) stable patients enrolled until the end of July 2022 which has impacted treatment outcomes. One of the health centers, Mojo Health center, enrolled 30% of the patients in care to DSD and this has benefited the facility by improving the treatment outcome: control rate (from 48% to 82%) and retention rate (from 72% to 88%) from February to July 2023.

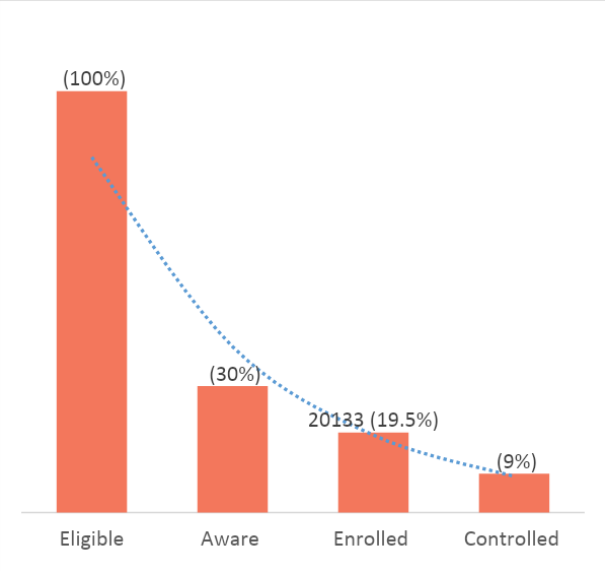
Information System: EHCI promoted standardized national recording tools such as intake forms, and follow and longitudinal registration for hypertension and Diabetes. Hand in hand, training on quality data capturing, information used for patient care, and program performance has been improved by continuous mentoring and follow-up.

A digital data recording called Simple App was introduced in February 2021. This android-based mobile App has changed the landscape of patient care and decision-making by making real-time data available at HFs and national level for evidence-based decision-making, Based on

the data recorded in the Simple app, a total of 20,178 (eight-fold from baseline) patients were put on care with 60.5% control their last BP at the 6th-month outcome and 80% retained in care by end of July 2023.

Simple App dashboard enabled decision-makers to monitor program performance and it has improved data quality. The digital system has also helped to track patients who have overdue follow-ups and monitor drug consumption as well as stock status.

Program treatment outcome: According to the 2015 STEPS survey result, the hypertension community cascade was estimated 7.6 million eligible raised BP, 40% aware (3 million), only 2.8% enrolled to care and less than 1.5% (114,000) controlled their BP. With RTSL deployment of the national protocol based managed coupled with other HEARTS strategy the treatment outcome was improved with nearly 20% enrollment and 10% control from community (graph 1). Moreover, the comparative cross-sectional study finding indicates a better compliance to the national standards with better outcome of care at RTSL supported facilities.



Graph 1: EHCI continuum of care by treatment outcome of 6th month at the end of July 2023

Conclusions and Recommendations

EHCI enrolled to care 20% and BP controlled 9% from the catchment eligible target of hypertension while 60% controlled BP from enrolled to care in the 6th month. One in five patients enrolled in DSD. Digital use has changed the outcome of the program by improving data quality, program monitoring, and data use for decision-making.

- Protocol-based management enabled to decentralize care system at PHC.
- Strong mentoring, provision of high-quality supplies, reforming and redesign of services provision enhanced capacity of PHC facilities.
- Innovative approaches like the DSD model create a good opportunity for patient-centered care and improved treatment outcomes.
- Digital data recording and dashboard system has impacted the quality of hypertension. Simple App also improved patient tracking for retention and drug stock management.
- Primary Health care Facilities will benefit from using standard protocol, Simple App, and scale-up of DSD which helps to improve patient care quality and standard as well as program outcome.

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Collaborative Effort is an Untapped Potential to Secure a Significant Amount of Resources

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Background

Ethiopia is facing several serious health challenges, including those caused by conflicts and drought, entailing the most pressing health concerns related to one health and the risk of zoonotic disease transmission. The government of Ethiopia is working to address some of these health challenges but also needs support, particularly in resources and technical advancement. This chronicle provides the highlights of the Ministry of Health (MOH) efforts in using the opportunity of the global call for proposals for funding by the Pandemic Fund Secretariat.

The Pandemic Fund is the first multilateral financing mechanism dedicated to providing multiyear grants to help low- and middle-income countries become better prepared for future pandemics (https://fiftrustee.worldbank.org/en/about/unit/dfi/fiftrustee/fund-detail/pppr). The Pandemic Fund Governing Board determined an approximately $300 million funding envelope for its first expression of interest through Call for Proposals. The funding envelope aimed to provide a dedicated stream for long-term financing to strengthen pandemic prevention, preparedness, and response (PPR) capabilities in low- and middle-income countries and address critical gaps through investments and technical support at the national, regional, and global levels. The funding opportunity was an open call for proposals globally and was expected to be country-led in partnership with implementing entities and civil societies. In addition, the proposals were expected to incorporate plans for co-financing and co-investment (financial and policy commitments from the beneficiaries, known as co-investors) and/or co-financing (financial and technical resources from implementing entities).

Proposal development approach and submission

In response to the expression of interest from the pandemic fund and call for proposals, the Ministry of Health (MOH) Strategic Affairs Executive Office (SAEO) in collaboration with the Minister's office and implementing partners led the application for expression of interest and full proposal development process.

The SAEO set up a multi-disciplinary technical team and undertook numerous activities in parallel and sequentially. National multispectral consultative meetings were held with representatives from relevant ministries - including the MOH, the Ministry of Agriculture, the Ministry of Finance (MOF), the Ethiopian Public Health Institute (EPHI), Armaur Hansen Research Institute (AHRI), and development partners - to identify pressing issues in multispectral pandemic preparedness and prevention. Furthermore, consultative meetings were conducted, involving a series of tiered focus group discussions with beneficiaries, stakeholders, partners, civil society, vulnerable groups, and marginalized populations which helped prioritize the pressing pandemic prevention and preparedness issues.

In addition, prioritized pressing issues were validated against available reports such as Joint External Evaluation (JEE), Performance of Veterinary Services (PVS), States Parties' Annual Report (SPAR), and strategic directions of the country using desk review. The reviewed strategic documents include the Health Sector Transformation Plan (HSTP-II), Ethiopia Public Health Institute Strategic Planning and Management (EPHI-SPM), Livestock Research Strategy (AHRS), Ethiopia United Nations Sustainable Development Framework 2020 - 2025 and linkage with the PPRF proposal, Antimicrobial Resistance Prevention & Containment Strategy (AMRS).

The consultations and reviewed documents highlighted a strong need to strengthen Ethiopia's capacity and capabilities to prevent, detect, and respond to public health emergencies, particularly in laboratories, surveillance, and the workforce. They also revealed the need to improve coordination between the ministries and other development partners responsible for public health, building the capacities of local health systems to effectively respond to public health emergencies with more engagement of stakeholders, partners, civil society, and vulnerable groups in the planning and implementation of public health programs.

Based on these findings, the Ethio-Pandemic Multi-Sectoral Preparedness, Prevention, and Response (EPPR) project proposal was drafted. The draft EPPR proposal was reviewed and substantiated by more than seventeen organizations from UN offices, government offices, non-government organizations, universities, and private sector stakeholders. Moreover, the proposal was presented to individuals and institutions that applied for the expression of interest to the pandemic fund but were advised to merge their applications with the government proposal. They affirmed that their views were included in one or another way and provided input. Accordingly, the final proposal was shaped. The developed proposal, in combination with the commitment letters of the World Health Organization (WHO), Food & Agriculture Organization of the UN (FAO), United Nations Children's Fund (UNICEF), and Ministry of Finance, was submitted to the Pandemic Fund secretariat on May 19, 2023.

Developed Proposal Contents

The EPPR project proposal comprises 39 major interventions on surveillance, laboratory, and workforce components for three years with their coordination and managing approach. The EPPR interventions epicenters a one-health approach at regional and sub-regional levels throughout the country and are considered the global priority agenda on creating resilience in pandemic preparedness, prevention, and response.

The surveillance and early warning detection component include establishing an intersectoral, interoperable and integrated electronic reporting alert system; carrying out International Health Regulations (IHR) capacity assessments (including simulation exercises, SPAR, and JEE) and joint-multisectoral risk assessments for Chemical, Biological, Radiological, and Nuclear (CBRN) agents; reinforcing surveillance and early warning systems in humanitarian settings (e.g. refugee sites); investing in the capacity of five point of entries; and adopting mobile technology and population mobility mapping tools.

The Laboratory capacity building component includes developing One Health guidelines to strengthen laboratory systems; procuring critical equipment and supplies for laboratory expansion, biosafety and biosecurity, Anti-microbial resistance (AMR), pathogen genomics, and other laboratory diagnostics, as well as support the mapping of 2500 labs and 218 veterinary laboratories (referral capacity) for strategic sample collection, transport, and storage of pathogens.

The Workforce strengthening component includes training and capacity building for various levels and sectors of the workforce, including surge capacity; emergency supply chain management; database management; emergency and critical care management; community-based surveillance; zoonotic disease prevention; food safety; CBRN surveillance and response; and environmental health.

The EPPR proposal also includes measures that enhance context-specific pandemic response strategies, improve coordination between national and regional health and veterinary stakeholders, and foster cross-border collaboration with neighboring countries and a clear result framework. The framework stipulates the interventions' impact, outcome, and output. The proposed interventions are linked with a continuous monitoring approach integrated with a routine health information management system, disease occurrence and vaccination report, and operational research.

Submitted Proposal Outcome

The Pandemic Fund's Governing Board reviewed 179 eligible submitted proposals using an independent technical advisory panel and accepted 19 proposals for first-round funding. Among the selected 19 proposals, the Ethiopian EPPR project proposal was approved to be granted

(https://www.worldbank.org/en/news/press-release on July 20,230). The US$50 million grant from the Pandemic Fund and an additional US$63 million in co-financing from implementing entities, WHO, FAO, and UNICEF. The EPER project proposal interventions will be implemented by the government, universities, UN agencies, and both local and international non-government organizations and are expected to be started soon.

Conclusions and recommendations

Proactively searching calls for proposals and funding fortes, and responding to the calls through a collaborative effort and multi-sectorial engagement - in line with current global and national priority agendas and sound integration of essential interventions - have paramount importance to augment the funding gap of the government. In an era of declining external resources, proactive and continuous explorations of calls for funding and responding to them need to be one of the routine activities of the resource mobilization team of the Ministry and Regional Health Bureaus.

Best practices on Professional Development (CPD) Telegram Bot that need attention Political Considerations

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Introduction

This paper introduces a groundbreaking Telegram bot that has been providing valuable Continuing Professional Development (CPD) links and updates on healthcare service manuals to health workers, completely free of charge. My program has already made a significant impact, empowering countless healthcare professionals to access essential resources for their professional growth and development.

Continuing Professional Development is a critical aspect of healthcare practice, enabling professionals to stay updated with the latest research, guidelines, and best practices. However, I recognize that accessing high-quality CPD resources can be challenging, especially for those working in resource-constrained environments or facing financial constraints. My program aims to bridge this gap by offering a free and easily accessible platform for health workers.

I strongly advocate for unrestricted access to knowledge, regardless of economic or political constraints. My goal is to guarantee that every healthcare professional, regardless of their location or financial situation, can access the necessary tools and resources to enhance their professional growth. By providing CPD links and healthcare service manual updates free of charge, I am helping to level the playing field and promote equal opportunities for all health workers.

However, to expand the reach and impact of my program, I recognize the need for political considerations. Politics can have a huge impact on healthcare systems and resource access in many different parts of the world. I committed to navigating these challenges and working alongside policymakers and stakeholders to advocate for the importance of CPD and the provision of free educational resources for health workers.

Scaling up my program involves addressing political barriers that may hinder the dissemination of knowledge and access to CPD resources. I aim to engage with political leaders, healthcare authorities, and policymakers to highlight the benefits of supporting ongoing professional development for health workers. By fostering partnerships and collaborations, I can work towards creating an enabling environment that encourages the provision of free CPD resources and acknowledges the vital role of health workers in delivering quality care.

I am also committed to ensuring that my program remains unbiased and independent from political influences. My focus is solely on providing evidence-based, reliable, and up-to-date CPD links and healthcare service manual updates. I try to keep the legitimacy and integrity of the resources I provide and put the needs of medical professionals first.

In the process of expanding my program, I extend a heartfelt invitation to healthcare workers, professional organizations, and policymakers to join forces in pursuit of our shared mission. Together, we can champion the significance of Continuing Professional Development (CPD), dismantle political barriers, and cultivate a nurturing environment that fosters the professional growth and development of healthcare workers around us. By collaborating hand in hand, we can amplify our impact, promote equal opportunities, and shape a future where every healthcare professional has access to the tools and resources they need to thrive.

I am grateful for the support and contributions of all those who have benefited from my program thus far. Your success stories and feedback inspire us to continue my efforts and expand the reach of my program. Together, let us empower health workers, transcend political boundaries, and build a stronger healthcare community driven by knowledge, collaboration, and excellence.

To join or appreciate the telegram bot go to the telegram and write on search bar''@ CPDETHIOPIA_bot'' or CPD Links and courses and join the bot.

Thank you for being a part of my program, and let us work together to create a brighter future for healthcare professionals worldwide.

stand that finding and organizing CPD resources can be time-consuming and challenging amidst the busy schedules of healthcare professionals.

My Telegram bot seeks to simplify this process by acting as a centralized hub for CPD links and updates on healthcare service manuals. With just a few simple commands, you can access a wide range of valuable resources that can contribute to your professional growth and keep you well-informed about the latest guidelines and best practices.

The bot is designed with user convenience in mind. It offers a user-friendly interface, intuitive commands, and regular updates to ensure that you have easy access to the most relevant and up-to-date CPD materials. Whether you are a doctor, nurse, pharmacist, or any other healthcare professional, my bot aims to support health workers' continuous learning journey and help them deliver the highest quality of care to their patients.

I understand the importance of reliable and trusted information in the healthcare field. Therefore, I ensure that all the CPD links and healthcare service manuals provided through my bot are thoroughly vetted and sourced from reputable organizations and institutions. This way, you can have confidence in the quality and reliability of the resources you access.

I believe that investing in your professional development is a commitment to delivering excellence in healthcare. With my CPD Telegram bot, I strive to make the process of accessing relevant resources and staying updated easier and more convenient for you. I hope that this tool will become an invaluable companion in your professional journey, empowering you to grow, learn, and provide the best possible care to your patients.

To start benefiting from my CPD Telegram bot, simply join my channel and explore the wide range of resources and updates available. I look forward to supporting your professional development and contributing to the advancement of healthcare together.

Lessons learned

The objective of the telegram bot is to provide a convenient and accessible platform for healthcare workers to complete their Continuing Professional Development (CPD) requirements.

The bot was created on March 08, 2022, and has 972 healthcare workers subscribed

The bot has been efficient in reducing the time and money spent by healthcare workers on in-person training, and has received positive feedback from users many of them react to the suggestion baton of the bot by sending their certificate earned and by asking questions related to CPD courses.

One of the challenges I faced in implementing the bot was the lack of leaders' consideration I was also busy at work to advocate the bot when I was PHCU director.

Regulations, policies, and guidelines impacting implementation and content distribution were taken into consideration during development as the bot was used by WHO, Chabot on Rakuten Viber provides COVID-19 information in multiple languages https://vb.me/82e535.

Recommendation

I recommend scaling up and expanding the functionality of the Telegram bot I created to support the professional development of health workers. This can be achieved by involving various stakeholders such as the Ministry of Health (MOH), Regional Health Organizations (RHO), health professionals, professional associations, and policymakers. By doing this, we can broaden the bot's influence and impact and give users more value. I suggest reaching out to these stakeholders to showcase the benefits of the bot, gather feedback, and collaborate on scaling up and expanding its functionality.

Conclusion

In conclusion, the Telegram bot has demonstrated its potential to support health workers' professional development and bridge the gap in accessing CPD resources. By applying lessons learned and continuously improving offerings, the bot will continue to empower health workers with the knowledge and skills they need to deliver exceptional care. Thank you for being a part of my program and letting us work together to create a brighter future for healthcare professionals worldwide.

The magnitude of hypertension among employees is rising: Call for workplace health program

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BACKGROUND

Hypertension is the persistent elevation of blood pressure over normal ranges. It can be classified into primary hypertension, which is caused by genetics and environmental factors, and secondary hypertension, caused by underlying medical conditions and medications. Hypertension is described as a silent killer because it often has no sign or symptom, and therefore frequently many go undiagnosed[1].

STATEMENT OF THE PROBLEMS

Hypertension is a global public concern in which 1 in 4 adults suffer from it, 46% of these adults are unaware of their condition, and less than 42% of them are diagnosed and treated[1]. By the end of 2025, it is projected to increase by 60% globally[2]. More than 25% of Ethiopians are estimated to have hypertension and more than half of them are unaware of their status[3]. If undiagnosed and uncontrol, hypertension leads to stroke, heart attack, heart failure, kidney damage, and many other health problems[4]. Hypertension prevalence in West Africa is 68% among sedentary workers and 12% among active employees[5]. Hypertension prevalence ranges from 16% to 29.3% among public servants in Ethiopia[6-11].

The environment in which people live, work, and age affect their health[12]. A high prevalence of hypertension is observed among office workers due to increased risk factors of hypertension such as prolonged sitting, a sedentary lifestyle, and a modernizing workplace, which has shifted from active to sedentary[13-15]. Theoretically, there are multiple levels of factors that contribute to hypertension. The objective of this was to determine the magnitude and contextual factors including individual factors among employees of Oromia regional sectors' offices.

Methods

The study was conducted at Oromia national regional government sectors' offices in Addis Ababa, in 2023. An institutional-based cross-sectional design was employed, with a sample size of 980 office workers.

KEY FINDINGS

- The magnitude of hypertension among government employees was 31.2%,
- Nearly 2 in 3 office workers (68%) were newly diagnosed
- Occupational sedentary time, being of older age, and eating more meals away from home per week are independent risk factors.

PRIORITY ACTION

- **Employers need to**:

» encourage physical activity at work by providing sit-stand desks;

» change workplace rules to permit short breaks, and to encourage standing during meetings and breaks.

» Policies makers need to establish workplace health programs to deliver well-integrated health promotion.

- **MoH and RHB should undertake:**

» regular screening and set up a surveillance system at a workplace for continues action.

» create awareness about risky behavior and younger groups need to be targeted.

- **Individual level**

» Individuals need to sit less, move more, get frequent checkups, and consume a healthy diet.

Policy IMPLICATIONS

The magnitude of hypertension is high among office workers and is an alarming figure. Hypertension has a profound impact on both employees and employers. Undiagnosed and untreated hypertension can result in life-threatening complications like cardiovascular diseases, stroke, kidney disease, visual loss, and dementia. Additionally, it imposes burdens on employers by reducing productivity, economic losses, absenteeism, and rising presenteeism. It is necessary to promote a healthy lifestyle by boosting physical activity at work by providing sit-stand desks and by changing workplace policies to allow for short breaks and to encourage standing during meetings and breaks. Efforts are also being made to boost routine screening and set up a surveillance system at the workplace for ongoing action. Establish a workplace health program strategy to deliver well-integrated health promotion.

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Expanding Employment Options For Medical Graduates

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Introduction

Health care is one of the basic human rights and its workers are the backbones of the health system. Even though there is remarkable improvement in increasing the number of health workforce, Ethiopia remains one of the countries with a low number of health professionals. According to the 2020 national health labor market analysis physician accounts for only 2% of health professionals. Overall the current stock of physicians is 0.12 (n=13,015) per 1,000 population. This number is largely insufficient to reach international benchmarks. In Ethiopia recently near to 0.55 doctors per 1000 population are required to achieve 80 percent coverage of live births. On the contrary unemployment rate of medical doctors is high in Ethiopia. Out of the 20,936 health professionals who graduated in 2019 about 5,026 (~20%) were potentially unemployed within one year after graduation. Among these 542 general practitioners (29.4%) who qualified in 2019 were not employed in the public sector. This indicates that Ethiopia needs more additional health workers and improved absorption capacity to employ graduating health professionals including medical doctors into the public sector to address the low health workforce density of the country.

Purpose: to recruit and deploy medical graduates into public health facilities develop motivated, compassionate, and competent professionals, and generate evidence for decision-making

Intervention

The Ministry of Health, Regional Health Bureaus, other line ministers, and development partners were jointly working to reflect the shared vision and goal of the different government sector ministries, health professional bodies, private sector, and development partners towards achieving national and global HRH goals and objectives through conducting resource mobilization, fund distribution, signing MOU between MOH and RHBs and advocacy meetings.

Result

The capacity helped to establish a matching funding system at a national level. The system is financed by the Ministry of Health (matching fund), Ministry of Finance, Regional Health Bureaus, and development partners over three years. The funding approach: in the 1st year 50% from the Ministry of health (matching fund) and 50% from the Ministry of finance (GOV fund), 2nd year 50% Ministry of Finance (gov fund), 25% Ministry of Health (matching fund), and 25% Regional Health Bureaus, 3rd year 50% Regional Health Bureau, 25% Ministry of health (matching fund) and 25% Ministry of Finance (federal Gov fund). The Regional Health bureau will fully take over the overall cost of employment in year four. The project started in 2014 (2021/2022) and solicited $3.8 million and an equivalent amount from the government treasury. As a result, a total of 1,195 medical doctors were deployed in regions except Tigray (table 1).

Table 1. Medical doctors hired in regional health bureaus June 2022

Region	Regional Quota	Recruitment status		Accomplishment %
		Employed	Vacant Positions	
Addis Ababa	161	161	0	100%
Afar	56	5	51	9%
Amhara	631	386	245	61%
Benishangul Gumuz	33	0	33	0%
Dire-Dawa	15	15	0	100%
Gambella	14	6	8	43%
Harari	8	8	0	100%
Oromia	2,000	255	1745	13%
Sidama	126	100	26	79%
SNNPR	379	197	182	52%
Somali	179	0	179	0%
Southwest Ethiopia	99	62	37	63%
Tigray	158	0	158	0%
Country Total	3859	1195	2664	31%

Except for Addis Ababa, Dire-Dawa, and Harari, the majority of regions were not able to hire and deploy the expected number of medical doctors due to a lack of applicants. The challenge was a lack of willingness to go to rural and remote areas. The ministry plan was to hire 2898 medical doctors by using matching funds but Oromia, Addis Ababa, and Southwest Ethiopia regions were promised to Hire 898, 55, and 8 medical doctors respectively using their financial resources and increased annual plan to 3859 in three years period.

Besides, a new healthcare delivery model has been designed to improve the employment of medical doctors and health officers. The new health care delivery models are medical office practice and medical plaza which allow physicians to be self-employed with little investment, thereby contributing to the reduction of unemployment among physicians. Standard was developed and endorsed for those models. Moreover, staffing standards of basic and comprehensive health posts, health centers, and primary and general hospitals are revised to improve the employment of all health professionals and health workforce density. If the revised staffing standard is fully implemented the number of health professionals is expected to increase by 50% from 217,165 to 326,173 which is in line with the need-based scenario of national health labor market analysis conducted in 2020 (table 2). The number will be higher when the standard of comprehensive specialized hospitals is finalized and implemented.

Table 2. The number of health professionals required to meet Essential Health Service Package targets based on old and revised staffing standards, September 2022.

Staffing Norm	Basic Health Post	Comprehensive health post	Health Center	Primary Hospital	General Hospital	Total recommended
Existing staffing norm	31590	351	141,930	16,740	26554	217165
Revised staffing norm	47385	15795	212,895	19710	30388	326173

Recommendations: Conduct consecutive advocacy and awareness creation to Regional Health Bureaus and the Bureau of Finance and Economic Cooperation to solicit additional financial resources allocation and improve the willingness of medical doctors to work in remote and rural areas through advocacy and enhancing benefits for rural and remote areas.

Improved child health and immunization in Afar and Somali Regions by strengthening management systems and capacity Authors Information

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Introduction/Background

Despite significant achievements in reducing under-five mortality and morbidity and increasing vaccination rates in Ethiopia, there are continuing disparities in immunization performance between regions and districts. Afar and Somali regions continue to report low immunization coverage, especially when compared to other regions. The 2016 Demographic Health Survey (EDHS) data revealed that only 15.2% and 22.8% of children in Afar and Somali, respectively were fully immunized, and 28.9% and 19.6% of children had received no vaccinations at all.[1] Furthermore, an assessment by CHAI in May 2017 revealed critical gaps in planning and governance, monitoring and accountability, human resource availability and capacity, and service delivery[2].

To contribute to the efforts of Afar and Somali RHBs, CHAI designed the project entitled "Improving Child Health Equity in Afar and Somali regions of Ethiopia", with the support of BMGF. This project aims to address the inequity and gaps in the vaccination programs to reach all eligible children for immunization by strengthening the governance and leadership capacity of the regional health bureaus and selected project woredas (6 in Afar[3] and 10[4] in Somali) between 2017 and 2021. The project had five objectives: To strengthen leadership and governance of immunization and CHS through evidence-based annual planning; To strengthen accountability for the execution of CHS activities; To improve human resource availability, capacity, and management; To optimize the time, location, and frequency of health sessions and increase their execution; and Support the transition to PFSA-led vaccine distribution in the Somali Region.

The project was implemented amid different challenges including political instability and related security issues in the Somali region in 2017, high EPI staff turnover in both regions, recurring floods in the Afar region, COVID-19 pandemic disruptions, and the extension of the conflict in the northern part of Ethiopia to Afar. Despite the challenges, the following results were achieved.

Result or Relevant Change:

CHAI implemented the project and among the results, the following were few:

- Pastoralist Community mapping information used for Evidence-based immunization session planning
- To address challenges faced in delivering basic health services to mobile agro-pastoralist communities – such as identifying the real-time location of the community and the target population size - CHAI worked with woreda health offices and health facilities to design tailored strategies to address the immunization needs of pastoralist communities and convened community leaders to identify and map mobile community movements and hard-to-reach populations. CHAI strengthened microplanning through reinforced community mapping using a dedicated template during the annual PHCU-level REC microplanning exercises.
- Expansion of static immunization sessions by ensuring the functionality of available CCE:
- A CHAI assessment (2017) revealed that out of health posts with functional refrigerators during the survey only 56.6% from the Somali region and 30.0% from the Afar region provided daily static immunization services and among the many problems training gaps in HEWs, lack of sufficient human resources at the HP level, etc were major.
  - » In collaboration with the respective Woreda Health Offices and/or PHCU, CHAI supported the project woredas and PHCUs to identify health posts equipped with fridges but did not have static sessions, assessed their challenges to initiate static immunization service, and worked with their respective woreda/ PHCU to resolve the challenges and started fixed immunization services. The assessment identified 20 health posts and 3 health centers in Afar and 10 health posts in Somali CHAI project woredas that were not providing static immunization service despite the availability of functional refrigerators. CHAI capacitated these health posts through on-the-job training to the HEWs on how to use the equipment as well as conduct maintenance besides distributing immunization materials. Moreover, CHAI organized a maintenance campaign with on-the-job orientation on PPM.
  - » Most health posts that initiated static sites reported that providing immunization services through static sessions enabled them to provide more regular immunization services to their community. This improved coverage and utilization and decreased immunization session interruption, while improving resource management (minimized time, human resources, transportation, and budget required for HC staff to conduct multiple outreaches in different kebeles).
- Monitoring of the execution rate of the planned session
- CHAI-supported project woredas to develop, implement, and monitor evidence-based session plans. As a result, all health centers (48) in the project woredas have detailed immunization session plans alongside other immunization action plans (including supervision, review meeting, cold chain maintenance, etc.) in 2022, against 53% and 17% of surveyed health facilities in 2017 in Afar and Somali project woredas respectively.
- Evidence-based decision-making made on the required number of immunization session delivery sites. The decision on the type, frequency, and number of immunization sessions was determined by multiple criteria, like target population

numbers, distance from the community to health facilities, availability of equipment, etc. Considering this information, during REC micro plan meetings, some woredas and health facilities increased the number of immunization sessions while some closed down unnecessarily opened outreach sites. As a result, most of the woredas Increased the number of immunization sessions; redundant and unnecessary immunization outreach sessions closed in some woredas; and the execution rate of planned immunization sessions increased leading to increased vaccination coverage.

- Inclusive planning practices that engage key officials created important opportunities for resource mobilization leading to increased accountability and financial resources for the RI program; improved coordination of resources at woreda to support Immunization; and organized immunization partners' plan alignment at the woreda level.

- Utilization of the CHAI-developed performance monitoring tool (The RI Tool) to increase performance visibility and improve feedback systems:

- The RI tool increased visibility into program performance by improving feedback processes. Moreover, the data from the tool has been used to establish feedback systems.

Lessons Learned

- Developing and using tools that track the movement of the pastoralist community helps to improve immunization session planning and immunization service delivery for the pastoralist community. To address the existing challenges in validating community mapping information, the use of GIS technology for community mapping can help inform accurate mapping and timely decision-making. Regular communication with kebele leaders can also help validate community movements and plan services accordingly.

- Static sessions increase the efficiency of immunization services (minimize resources required for outreach/mobile session) and improve their effectiveness (increased # of children vaccinated). Woreda health offices and PHCUs can help health posts initiate static immunization services with minimal resource input, including technical training and the provision of the necessary tools and maintenance of refrigerators.

- The installation or maintenance of cold chain equipment ensures the expansion of immunization services to HPs and can improve access to vaccinations for local communities.

- Session execution monitoring helps to assess the immunization program performance and take timely actions whenever there are interruptions. Monitoring can help identify the interruptions' reasons and plan catch-up sessions mobilizing necessary resources. Ultimately, session monitoring fosters HCW accountability and helps to reduce immunization service interruption.

- The utilization of tools for session planning, monitoring, and reporting to a higher level is critical to ensure the performance of the immunization program.

- Bringing all immunization stakeholders to one forum creates a chance to coordinate resources for efficient use and alignment of plans.

- If proper advocacy and participation are conducted with all relevant stakeholders, the implementation of the immunization program will be successful.

- Consistent follow-up and support are needed to institutionalize the use of new tools/technologies.

- Integrating the analysis of different indicators into one tool minimizes the effort to do the analysis separately and provides a full picture of the program (s).

Conclusion

Through the Afar and Somali grant, CHAI has strengthened the management capacity of Afar and Somali RHBs and project woredas to deliver effective immunization and child health services. In the project woredas, evidence-based planning, session monitoring, and regular review of performances have been the culture. In addition, 100% of the health centers provide IMNCI services despite the COVID-19 pandemic, civil unrest, and natural disasters that have affected service provision during the grant period.

CHAI brought best practices such as strategic and annual planning, the use of a routine immunization (RI) dashboard, improved supportive supervision, and performance review mechanisms to the lower level of the health system which produced positive results. The Afar and Somali project proved that integrating the child health program with the immunization program is possible and cost-effective at the program management level. The above lessons and best practices can be used with other interventions (scale-up) or better results.

[1] Ethiopia Demographic and Health Survey 2016

[2] The assessment (2017) revealed that among sampled woredas with updated immunization plans, 78% in Afar and 82% in Somali did not have activity costs. In Afar and Somali, only 40% and 57% of woredas and 41% and 10% of health facilities, respectively, undertake monthly or quarterly regular program reviews. Among all health facilities surveyed, only 53% of Afar and 17% of Somalis had immunization session plans.

[3] CHAI Project woredas in Afar region: Amibara, Gele'allo, Gewane, Hadelella, Dalifage and Semurobi

[4] CHAI Project woredas in Somali Region: Awbare, Berano, Bokh, Denbel, Jigjgiga Town, Geladi, Gashamo, Gerbo, Godey Town, and Mersin

Exploring unseen risks of Hepatitis B Virus and its transmission to meet 2030 Targets

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Introduction

In Ethiopia, there is limited data on viral hepatitis infection. Our 50-year systematic review and meta-analysis revealed the presence of all types of viral hepatitis with a 7.4% overall prevalence of Hepatitis B Virus (HBV) [1]. A recent National serosurvey showed a higher prevalence of HBsAg [estimated to be 9.4% among the general population aged 15 years and above] though regional variations have been observed with the highest prevalence rate in urban regions (28.8%). Quite surprisingly a minimal prevalence of 8.3% was reported in rural areas [2]. A recent systematic review and meta-analysis also showed a 4.7% pooled prevalence of HBV during pregnancy with regional variation ranging from 2.3 in the Southern region to 8% in Gambella, with higher prevalence in women with a history of multiple sexual partners and blood transfusion. Accordingly, Ethiopia has recognized the clinical and public health burdens of viral hepatitis and is committed to the global targets aiming at significantly combating viral hepatitis by 2030. In working towards achieving this commitment, a National strategic plan was developed in 2016 and revised currently. The revised National strategic plan includes a comprehensive strategy, key interventions, program coordination, partnership, and monitoring and evaluation of the viral hepatitis program in the country. Strategic targets are set for 2025 in line with the World Health Organization (WHO) target of combating hepatitis B and C to reach elimination by 2030 [3]. However, global progress to reach the elimination goals has been slow, particularly in sub-Saharan Africa including Ethiopia where the burden of hepatitis B is high. Consecutively, we plan to explore unseen risks of HBV and its transmission to address unmet needs of the general population, liver disease patients, mothers and their neonates, blood recipients, and household contacts of viral hepatitis index cases and show what we have been learning from this ongoing project.

Objectives

1. To determine the magnitude of HBV and Hepatitis D virus (HDV) vertical transmission among pregnant mothers and to define risk factors for mother-to-child transmission (MTCT)
2. To estimate the magnitude of occult HBV infection and to define its role in transmission during pregnancy and blood transfusion.
3. To define the factors that influence disease susceptibility, disease severity, and development of immunity among household contacts of chronic HBV carriers and their sexual partners
4. To evaluate the clinical and immunological efficacy of HBV vaccine
5. To define circulating HBV and HDV genotypes and characterize vaccine escape and drug resistance mutation using Whole Genome Sequencing WGS approaches
6. To develop a low-cost in-house quantitative polymerase chain reaction (PCR) assays for use in future research, diagnostic and prognostic modalities

Methodological approaches

The Armauer Hansen Research Institute (AHRI) has an initiative called -the Clinical Research Network Initiative [CRNI] which has been implemented in 13 university hospitals since 2017. The program aims to build clinical laboratory diagnosis and research capacity in peripheral health facilities using research as a platform bridging across biomedical and clinical disciplines. It addresses clinical challenges to generate baseline knowledge from diverse socioeconomic and geographical settings and build human capital in the long-term training of staff. Thus, for this study, we have been using existing centers of different geographical regions and additional Institutions. This would help to understand the real burden of the diseases, and transmission, and to optimize diagnostics and subsequent therapy challenges and demands in the settings. To address the aforementioned objectives, we use classical epidemiological approaches [for sampling and sample size determination] and clinical, imaging, immunological, and molecular approaches for presumptive and confirmatory diagnosis. Accordingly, staff of the Institutions were enrolled in either MSc and/or PhD programs and researched the objectives under AHRI supervision. Below are some of the major findings on HBV infection over the last 4 years.

Results

Briefly, thus far important data is generated focusing on the burden of viral hepatitis among chronic liver diseases. We observed the epidemiological coexistence of HBV, HCV, HDV, and HIV infection among adult patients. Regardless of the stage of liver disease, the overall frequency of HIV was 4.3% (15/345), with a 2% (7/345) and 0.3% (1/345) HIV/HBV and HIV/HCV co-infection rate [4]. Genotypes of HBV, HCV, and HDV circulating in Ethiopia are identified and found to be diversified. Known vaccine, diagnostic, and immunotherapy escape mutations and potential drug-resistant variant mutations on HBV are found to be highly prevalent [Data not shown]. Accordingly, screening of all high-risk individuals for concurrent infection is recommended.]. Furthermore, the magnitude and circulating genotypes of hepatitis delta virus and HCV among chronic hepatitis B carriers with different disease conditions in Ethiopia are identified and characterized. Irrespective of the stage of liver disease, the overall magnitude of HDV was 7.7% (25/323) with a predominance of HDV genotype 1 [5].

The burden of HBV in different population groups is also studied. For example, the burden and magnitude of HBV seromarkers, HBsAg, anti-HCV, anti-HBc, and anti-HBs among the general community were found to be 9.5%, 1.4%, 31.1%, and 14.3%, respectively [5]. Furthermore, among a total of 417 blood donors, the overall prevalence of viral transfusion-transmissible infections (TTI) was 14.38% with 9.8%, 2.4%, and 4.3% prevalence rates of HBV, HCV, and HIV, respectively. [6]. Similarly, the burden of Hepatitis B virus infection in pregnant mothers, its mother-to-child transmission, and the effectiveness of the immune-prophylaxis vaccine in Addis Ababa is being studied enrolling more than 12, 000 pregnant mothers [Data is being analyzed]. Twelve thousand one hundred thirty-eight (12,138) pregnant women were screened for HBsAg as routine antenatal care in the selected public hospitals during the study period, and 369 (3.04%) were positive for HBsAg.

The analysis included 174 infants who had a follow-up evaluation at 9 months of age. Five of 139 (3.6%) infants who received birth-dose vaccine were HBsAg positive at 9 months of age, compared to 9 of 35 (25.7%) who did not receive birth-dose vaccine ($p<0.001$). Transmission of HBV occurred both in HBeAg positive and negative mothers, and in mothers with high (>200 000 IU/ml) and moderate/low (<200 000 IU/ml) viral load at birth. Administration of birth-dose vaccine significantly reduced the risk of MTCT of HBV indicating improved coverage of birth-dose vaccine is needed to control the HBV epidemic in Ethiopia. We have also defined

the magnitude of OBI in HIV-infected and HIV-negative liver disease suspected individuals. The study showed an overall OBI prevalence rate of 5.8% (5.6% in HIV negative and 6% in HIV positive) which pauses a significant public health problem due to the high burden of HBV infection in the country and may cause a substantial risk of HBV transmission from blood transfusion, organ transplantation as well as vertical transmission as screening is solely dependent on HBsAg testing [8].

To further investigate the magnitude of OBI among the general population, we conducted a community-based cross-sectional in southern Ethiopia enrolling 346 individuals of whom 312 (90.2%) tested negative for HBsAg and were further assayed for anti-HBV core antibody [anti-HBc]. And 115 (36.7%) were found positive implying previous exposure to HBV, and 21 (18.3%) out of 115 anti-HBc positives had HBV DNA signifying OBI. This high rate of OBI was observed among individuals who had multiple sexual contacts, a family history of hepatitis, and tattooing and highlighted the possibility of residual cryptic transmission of HBV through blood donation, organ transplantation, perinatal transmission, and other contacts [].

Again to augment existing findings and generate additional evidence on the magnitude of OBI in the country, we extended our work on chronic liver disease of unidentified cause [10] and blood donors [11, 12]. These studies highlighted the need for a revision of HBV screening guidelines in routine health care practices and blood transfusion services by including nucleic acid-based testing (NAT) assay in a sample min pool approach. Extrapolating the high rate of OBI from the above findings, we are also extending our work to define the magnitude of OBI during pregnancy and its role in MTCT [Occult hepatitis B infection among pregnant women and rate of vertical transmission].

Conclusion

HBV is still a major problem in different segments of the population and highlights a need for a strategy to discover the unseen risk of HBV and its transmission and to meet the unmet needs of the general population, liver disease patients, mothers, and their neonates, blood recipients and household contacts of chronic viral hepatitis patients. Accordingly, the WHO recommendations for HBV for developing countries shall be seen and implemented carefully. We recommend screening of household contacts of chronic liver disease patients, screening of chronic liver disease patients of unknown cases, HBsAg negative pregnant mothers, and blood donors for occult HBV infection although not recommended by WHO. We further recommend standardization of HBV screening tests and algorithms using the different serological markers in particular use of nucleic acid-based testing (NAT) assay in sample pooling approaches in the blood transfusion service.

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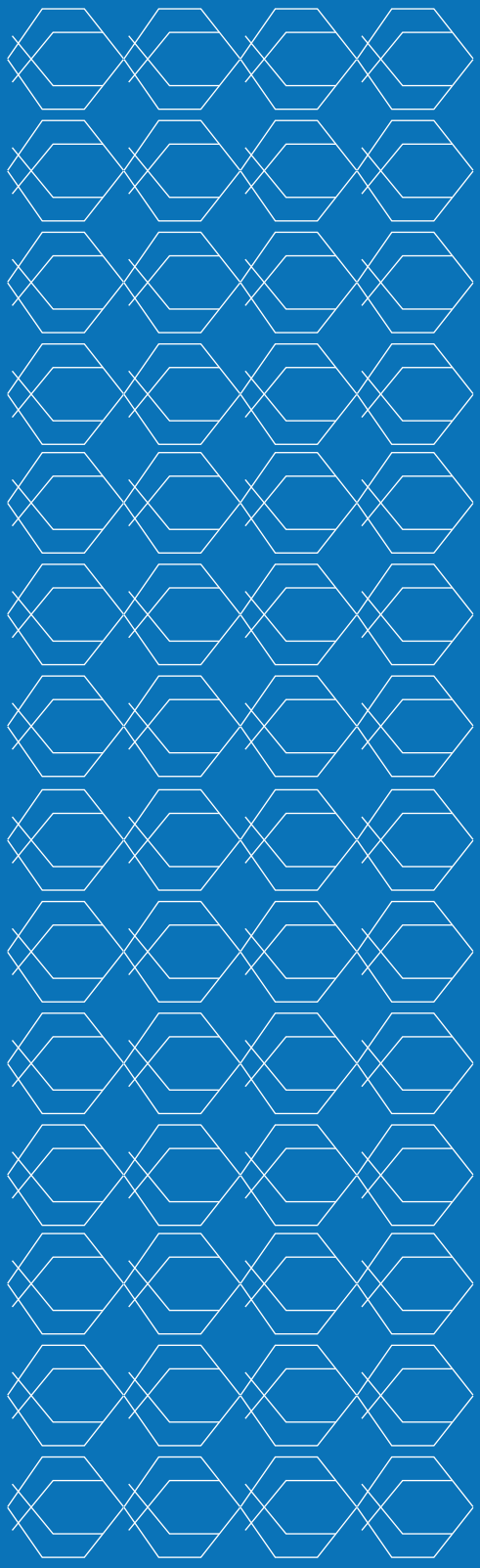
Section 3: New Initiatives



Subnational introduction of yellow fever vaccine into routine immunization is an appropriate strategy in the Ethiopian context

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Summary

Internationally, the subnational or national introduction of yellow fever vaccine (YFV) into routine immunization has been implemented in different settings. After reviewing evidence, this policy brief provisionally recommended a subnational approach to introducing YFV into Ethiopia's routine immunization. Senior experts' opinion is required to supplement the insufficient evidence and develop the final policy recommendation.

Key messages and recommendations

Problem: What is the best strategy to introduce the yellow fever vaccine in the routine immunization program of Ethiopia?

Recommendation 1: A subnational and phased approach is preferred to introduce the yellow fever vaccine into routine immunization in Ethiopia.

Recommendation 2: Further national risk and cost-effectiveness assessments including in non-endemic areas are required.

Introduction: Yellow fever (YF) is a viral hemorrhagic vaccine-preventable disease that is transmitted to humans mainly by the bites of infected Aedes mosquitoes. It is endemic in 47 South and Central America and African countries in the early 1990s, WHO estimated an annual 2,200,000 YF cases globally, with 30,000 deaths above 90% occurring in Africa. In Africa, there were an estimated 51,000-380,000 severe cases annually and 19,000-180,000 deaths in 2013 (1).

WHO categorizes Ethiopia as a high risk for YF (2,3). The western part of Ethiopia, which used to be affected by YF outbreaks, is considered YF endemic. However, a 2014 study by EPHI showed the burden of YF in Ethiopia to be low. According to the survey, 0.61% of participants had IgG against the YF virus, and three out of the five ecological zones (Zones 1, 3, and 5) showed low levels (< 2%) of IgG positivity against the YF virus. In contrast, Zones 2 and 4 showed no circulation of the virus (fig. 1) (4).

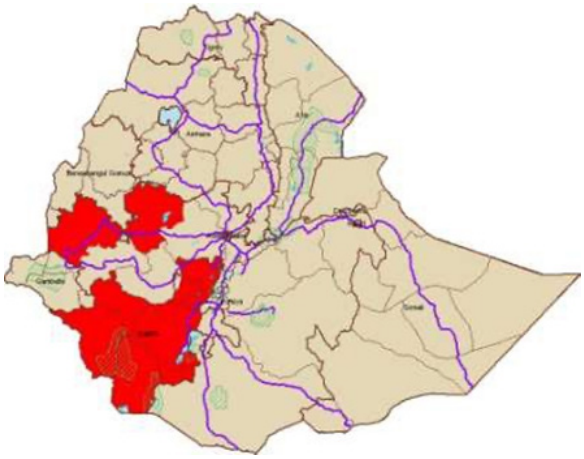

Figure 1: Map of Yellow Fever Cases Reported in Ethiopia, 1950-2013 (red shaded)

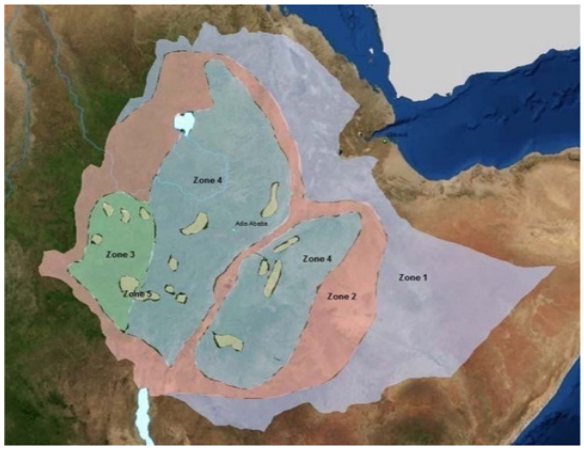

Figure 2: Map of Ethiopia Showing Demarcated Ecological Zones

The long-term strategies for eliminating outbreaks of YF include disease surveillance and laboratory testing, vector surveillance and control, and vaccination. According to the Global Strategy to Eliminate Yellow Fever Epidemic Strategy (EYE) 2017-2026, the inclusion of the YF vaccine into the routine immunization program is the most effective way of eliminating outbreaks globally. Following this guidance, Ethiopia has included this approach in the five-year comprehensive multi-year plan (cMYP, 2021-2025). However, the best way for this approach is not yet decided because of the lack of empirical evidence. The decision is more difficult due to the inadequate vaccine supply globally, the highly heterogeneous national distribution of YF, and a huge target child population with high operational costs to reach.

Aim: This policy brief aims to guide Ethiopian national immunization program managers on introducing the YF vaccine into routine immunization programs focusing on subnational concerning the national approach.

Methods: A scoping review was done using the population, concept, and context (PCC) eligibility criteria of the JBI Evidence Synthesis approach. The "population" encompassed those eligible for routine risk-based vaccination. The "concept" was a risk-based vaccine, particularly YF, introduction strategy /approach. There was no specific "context" required. All peer-reviewed and grey literature in English on policy and practice relevant to the review were included. Year of publication and geography were not eligibility criteria.

Results: A total of 35 records were reviewed: two on introducing any new vaccine, 11 on introducing risk-based vaccines, and 22 on introducing YF vaccines into routine immunization programs.

We found that strategies for introducing the YF vaccine should consider the heterogeneity of intra-country risk. The vaccination might be targeted at a sub-national level or to a specific population for documented localized YF risk. The following variables should additionally be considered for subnational strategy: disease burden, outbreak potential, treatment availability and costs, cost-effectiveness, availability of other preventive interventions., vaccine safety and effectiveness, the health system capacity, political commitment, and global recommendation. Compared with a national introduction, challenges include the granularity of disease-burden data and the political challenges of vaccinating only a portion of the population. The benefits of subnational introduction include targeted reduction of disease burden, higher cost-effectiveness, increased equity for marginalized people, higher acceptability of vaccines, and lower operational cost.

Conclusions: Within the limits of the scant evidence and the local context, the subnational strategy is likely more appropriate than the national strategy for introducing the YF vaccine into routine immunization programs in Ethiopia. More robust evidence is required to modify this strategy in the long term.

Limitations

Despite a thorough literature search, only articles and documents in the English language were considered. Since the review aimed at identifying evidence on risk-based vaccine introduction strategies/approaches, the risk of bias in the articles and documents (grading of evidence) was not conducted.

Acknowledgments

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Neonatal Intensive Care Unit (NICU) integrated clinical mentorship

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Background: Intensive Care Unit (ICU) is a specially staffed and equipped separate area of a hospital devoted to providing to managing and monitoring patients with life-threatening conditions. Neonatal Intensive Care Unit (NICU) is a health facility-based package of interventions to address critically ill or premature newborns that need advanced care in the first 28 days of life. The period within the first month of life is the most critical time for a child's survival as they face the highest risk of death. The emergence of the NICU was recognized as a means of delivering specialized care to newborns that need advanced treatment. Most newborn deaths can be prevented through improved identification of high-risk patients, timely provision of quality supportive care, and existing, proven, cost-effective interventions. Providing optimal supportive care in a hospital with Neonatal Intensive Care Units (NICUs) could avert 90% of neonatal deaths due to preterm birth complications.

Even though neonatal Intensive Care Units (NICU) play a critical role in the care and support of premature newborns, for those with complex health conditions, the NICU service is challenged with the quality of care due to inadequate clinical knowledge and skill of NICU staff and limitations in safe clinical use of NICU devices which leads to low NICU survival rates and calls for innovative interventions to improve competency in provision of comprehensive quality of care within NICUs.

To ensure optimal outcomes for these vulnerable newborns, mentorship programs have emerged as a valuable approach to enhance the skills and knowledge of healthcare professionals working in NICU, Labor & delivery, and biomedical staff. The Ministry of Health is working to reduce the high neonatal mortality and morbidity to reach the national HSTP II. Global SDG targets low-cost and high-impact interventions such as the expansion of essential newborn care (ENC), NICU services (INCLUDING Kangaroo-Mother-care) along with capacity building in the form of training, procurement, and distribution of life-saving devices/equipment, program monitoring in the form of supportive supervisions.

Intending to improve the holistic NICU care and services to impact favorable patient outcomes, the newborn and child health desk of the maternal, child, and adolescent health service lead executive office established a team of experts with mentorship experience (mentors) composed of a neonatologist/pediatrician, Obstetrician-gynecologist, neonatal nurse (NICU nurse), biomedical engineer, regional and national newborn and child health program experts. The composition of the mentors made possible the transfer of knowledge and skills in an integrated manner on the clinical, nursing, and device operation, corrective, and preventive maintenance aspects of the NICU service. The mentees were neonatal and clinical nurses at NICUs, midwives at labor & delivery (L&D) units, and biomedical technicians/engineers of respective hospitals. The 19 hospitals selected for the integrated mentorship were selected based on the high reported NICU mortality rate of respective hospitals extracted from DHIS-2.

Methods: The mentoring teams had a pre-mission orientation (face-to-face & virtual) before dispatch to create a shared understanding and guidance of the mission and of using the structured mentorship tool prepared for the clinical and biomedical mentorship. The key focus areas included the role and responsibility of each team member, mentorship approach and methodology, logistic arrangements, total duration of the mission, the importance of debriefing and feedback sessions with respective hospitals and RHBs, use of the reporting formats, documenting best practices and lessons learned and developing actions plans for individual health facilities. Follow-up meetings were also conducted virtually following the deployment of the teams in the field.

The mentorship commenced on February 14th, 2023, with seven days allotted for integrated clinical mentorship per hospital. The approach employed a one-day gap assessment to identify major gaps prevailing at NICUS and the root causes, assess the availability and functionality of NICU devices, identify areas of support as suggested by the mentees (NICU & biomedical staff) which made the mentorship need-based and making infection prevention aspects a cross-cutting area of the mentorship. Using a structured mentorship checklist, on-site observation, gap assessment, and theory & technical practice in NICU, L&D, and biomedical workshops was the center of the approach for mentorship. Quality and completeness of recording on client charts & use of formats were also a component of the mentorship. The practical sessions focused on how to use/operate medical equipment at the NICU, proper and safe use of NICU equipment, and conducting corrective and preventive maintenance.

Relevant Change: The integrated clinical NICU mentorship comprising clinical and biomedical aspects enabled the reach of NICU, L&D, and biomedical workshop units of 19 hospitals with high reported neonatal mortality. The unique and appropriate mix of mentors from different catchment tertiary-level facilities expedited successful knowledge and skill transfer to impact newborn survival in the NICUs. Moreover, the biomedical engineers/ technicians were also capacitated with knowledge and skills on preventative and curative maintenance of NICU devices. During the mentorship, many NICU devices were maintained and made functional.

A range of sessions on neonatal ICU were covered, including theoretical and practical demonstrations of infection prevention. Theoretical discussions and demonstrations were held with hands-on practice on vital NICU equipment, including CPAP, phototherapy, infant radiant warmer, incubator, mechanical ventilator, oxygen concentrator, infusion pump, hemoglobin meter, glucometer, bilirubin meter, phototherapy irradiance meter, blood gas analyzer, pulse oximeter, patient monitor, mobile digital x-ray, glucometer, Electrocardiogram, digital weight scale, Doppler ultrasound, and neonatal room thermometer. Installations of uninstalled equipment were made in some of the mentee hospitals.

Biomedical unit staff were capacitated with equipment capabilities, operating procedures, following protocol for equipment failure, emergency and safety procedures, and maintenance procedures of a variety of the mentioned NICU devices.

Lessons Learned or Conclusion: This Clinical integrated mentorship program is unique and the first type in Ethiopia. Mentorship programs should be specifically designed to address the needs of healthcare professionals in the NICU, L&D, and biomedical workshop settings. The need-based integrated clinical mentorship enabled a tailored mentorship to be rendered to NICU, L&D, and biomedical units, understanding the unique challenges and demands of working in a NICU. Mentoring teams comprised of a mix of mentors from multiple catchment facilities worked well and appeared to be the most feasible, sustainable, and scalable model. This

created matching mentors and mentees based on complementary skills, interests, and areas of growth. Maintaining and installing various NICU devices during the mentorship activity can be cost-effective enough, with clinical and biomedical knowledge and skill transfer occurring in one activity. Due to the team's combination with competency in biomedical, clinical, and programmatic areas, this activity can be considered exceptional and the best experience. Additionally, the feedback gathered from mentees demonstrated satisfaction and confidence on their part. Developing action plans at feedback meetings with the relevant hospital leadership completed the activity loop.

However, the task of conducting objective evaluation measures to assess the impact of the integrated clinical mentorship program on mentees' knowledge, self-confidence, and professional growth remains to be done. Another area for improvement was the need for more participation of midwives in the mentorship team.

The approach can be replicated and sustained because the mentoring teams are made from catchment health facilities. Integrated NICU and biomedical mentorship programs can provide an invaluable opportunity for healthcare professionals and biomedical technicians/ engineers to refine their skills, enhance knowledge, and improve device & patient care outcomes in a specialized healthcare setting. By tailoring programs to the unique needs of the L&D, NICU, and biomedical units, fostering effective mentor-mentee relationships, employing structured mentoring tools, creating a supportive environment, and implementing evaluation measures, stakeholders can establish successful integrated mentorship programs that empower healthcare and biomedical professionals and contribute to the overall improvement of NICU care. The overall experience also emphasizes the importance of considering integrated clinical mentoring program outcomes when running institutional quality improvement initiatives.

Health Technology Assessment Institutionalization Process in Ethiopia

Ministry of Health, Strategic Affairs Executive Office and Pharmaceutical and Medical Equipment Executive Office; Ethiopian Public Health Institute, Knowledge Translation Directorate**; Ethiopian Health Insurance Services; Ethiopian Food and Drug Authority; Ethiopian Pharmaceutical Supply Services; International Decision Support Initiative (iDSI); Management Science for Health (MSH); World Health Organization (WHO), Clinton Health Access Initiatives (CHAI), The World Bank (WB).**

**Lead the Initiatives

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Abstract

Background

Health Technology Assessment (HTA) is a systematic process that evaluates the safety, efficacy, quality, and cost-effectiveness of health technologies to inform decision-making in healthcare. Ethiopia, a country with a burgeoning healthcare system, recognizes the importance of Health Technology Assessment in ensuring the optimal allocation of limited resources and improving healthcare outcomes. The ultimate goal is to optimize the utilization of resources, improve health outcomes, and improve Ethiopia's healthcare system's overall efficiency and effectiveness.

Objective

The primary objective of the roadmap is to guide Ethiopia in establishing a comprehensive and sustainable HTA system. It aims to enhance local capacity for HTA implementation, elevate HTA practice and science, and optimize resource allocation and cost control. The ultimate goal is to strengthen Ethiopia's capacity to utilize HTA as a critical tool for informed healthcare decision-making, resulting in improved health outcomes and efficient healthcare resource utilization.

Process/Method

The development of an institutionalized HTA system in Ethiopia involves several key steps: a needs assessment, capacity building, policy development, robust data collection mechanisms, stakeholder engagement, a phased approach to implementation and monitoring, and case demonstration. The roadmap aims to identify healthcare system requirements for health technologies and interventions, enhance healthcare professionals' expertise, align HTA policies with existing policies, establish robust data collection mechanisms, foster collaboration among government agencies, healthcare providers, researchers, and the private sector, and ensure transparent communication of HTA findings.

Conclusion

The roadmap outlines the critical steps required to institutionalize HTA in Ethiopia, emphasizing its potential to revolutionize healthcare decision-making and improve health outcomes for all Ethiopians. Achieving these aspirations will require commitment, collaboration, and sustained effort from all stakeholders involved in the healthcare sector.

Keywords: HTA, institutionalization, decision-making, cost-effectiveness

Health Technology Assessment Institutionalization Process in Ethiopia

Introduction

Health Technology Assessment (HTA) is a systematic approach used to evaluate the safety, efficacy, quality, and cost-effectiveness of health technologies, including medical devices, pharmaceuticals, and healthcare procedures. In Ethiopia, the need for an HTA framework has become increasingly evident as the healthcare system continues to expand and evolve. This documentation serves as a comprehensive guide to the institutionalization process of HTA in Ethiopia, outlining the background, objectives, detailed steps, and aspirations.

Ethiopia's healthcare system has made significant progress in recent years, yet challenges persist, such as resource constraints and varying access to quality healthcare. The integration of HTA can play a pivotal role in addressing these issues by providing evidence-based decision-making support. Currently, Ethiopia lacks a formalized HTA system, hindering its ability to allocate resources efficiently and make informed decisions about healthcare technologies.

Objective

The primary objective of this institutionalization process is to establish a sustainable and comprehensive HTA system in Ethiopia. This system will serve as a foundation for evidence-based decision-making, streamlined resource allocation, and the efficient integration of health technologies into the healthcare system. Additionally, it aims to enhance transparency, accountability, and equity in healthcare resource allocation. This documentation provides a comprehensive roadmap for the institutionalization of HTA in Ethiopia, outlining the essential steps and desired outcomes. Successful implementation will require dedication, collaboration, and ongoing commitment from all stakeholders to strengthen the country's healthcare system and improve the health of its population.

Steps towards HTA institutionalization in Ethiopia

The journey towards institutionalizing Health Technology Assessment (HTA) involves a comprehensive process with several distinct stages, each crucial to the successful integration of HTA into a healthcare system. Here is a detailed note outlining the key steps in this complex journey:

1) Inception and Conception Stage

Recognizing the Need: The journey begins by acknowledging the critical need for evidence-based decision-making in healthcare. This stage involves identifying challenges and opportunities within the healthcare system, such as resource limitations, increasing healthcare costs, and the demand for effective healthcare technologies and interventions.

Stakeholder Engagement and Political Economy Analysis: In this phase, it is imperative to engage key stakeholders, including government health agencies, healthcare providers, researchers, development partners, and policy influencers. Conducting a political economy analysis helps understand the power dynamics and interests that might influence HTA institutionalization. This analysis informs strategies for garnering support and navigating potential obstacles.

2) Establishment of the HTA Technical Working Group

Expert Inclusion: Assembling a diverse group of experts with backgrounds in healthcare, economics, epidemiology, research, and policy to form the HTA technical working group.

Roles and Responsibilities: Clearly define the roles and responsibilities of the technical working group, including conducting HTA assessments, providing methodological guidance, and disseminating findings.

Capacity Building: Prioritizing the continuous development of the group's expertise through training and knowledge sharing to ensure robust HTA practices. Use international and local HTA experts to build the capacity of the technical working group on HTA institutionalization.

3) Conducting Assessments

Situational Analysis: Conducting an in-depth situational analysis of the healthcare system to identify its strengths, weaknesses, opportunities, and threats. It further reviews the current fragment of HTA practices in Ethiopia. This analysis informs the contextualization of HTA within the healthcare landscape.

HTA Capacity Needs Assessment: Evaluating the existing capacity for conducting HTA within the country, identifying gaps in knowledge and skills, and devising strategies for capacity development.

4) Developing the HTA Framework

Creating a comprehensive HTA framework that outlines the HTA scope and mandate, governance, and organizational structure, methodologies, and criteria for conducting HTA in the Ethiopian healthcare context. Ensuring that the HTA framework aligns with recognized international best practices and standards.

Scope: the scopes of HTA implementation in Ethiopia are listed below but is not limited to these aspects only and is adaptable to the evolving healthcare landscape in Ethiopia, ensuring that evidence-based decision-making remains a cornerstone of healthcare practice and policymaking

- Determination of essential health service package
- Health insurance benefits package design including clinical services and reimbursement.
- Determination of exempted health service packages and fee waiver for indigents
- Determination of pharmaceutical procurement list
- Determination of essential drug list
- Clinical practice guidelines and protocols for public health programs
    - » Selection of health technologies including medical devices, medicines, medical and surgical procedures, assistive devices, diagnostics, screening, vaccination, and public health interventions, producing and/or improving clinical guidelines and quality standards

Governance structure: to govern and coordinate the HTA process, the mandate for HTA must be vested in an Institution. Since the scope and mandate of the envisaged HTA are geared towards national policy, the HTA body will be within the Federal Ministry of Health.

HTA Unit: an HTA unit should be established in the short term – within the Strategic Affairs Executive Office at MoH and an independent HTA Agency in the long term.

HTA council: an independent HTA council should be formed to give guidance to the HTA unit till the time an HTA agency is established

Working groups: different working groups/ committees shall be formed to support the HTA unit and the HTA council. The working groups are 1) Health services working group, 2) Drugs or medicines/vaccines working group, 3) Medical devices working group 4) Health insurance working group, and 5) Health technology analysis working group.

5) Determining Strategic Directions, Initiatives, and Major Activities

Identifying the strategic directions of HTA institutionalization, including improving evidence-based decision-making, optimizing resource allocation, and enhancing healthcare outcomes. Developing a detailed plan with specific initiatives and major activities, outlining timelines, resource requirements, and performance indicators for each.

To institutionalize an HTA in Ethiopia, it is crucial to integrate HTA into the country's healthcare system and establish a well-defined structure that involves government arrangements. Accordingly, the HTA road map is structured in nine strategic directions and 18 initiatives, major activities are identified in each initiative that link to strategic objectives.

- Policy Formulation and Governance
- Capacity Building and Awareness
- Research and Data Infrastructure
- Standardized HTA Processes
- Collaboration and Partnerships
- Policy Integration
- Stakeholder Engagement
- Resource Allocation and Sustainability
- Reporting and Dissemination

Figure 1: HTA Institutionalization Result Chains

6) Conducting Workshops

Stakeholder Engagement Workshops: Organizing workshops to engage various stakeholders and solicit their input on the HTA framework, ensuring that it aligns with their needs and expectations.

Capacity Building Workshops: Providing training sessions and workshops to healthcare professionals, policymakers, and researchers on HTA methodologies, evidence interpretation, and the practical application of HTA in decision-making.

7) Developing the Road Map Document

Document Preparation: Compiling all the insights, assessments, and workshop outcomes into a structured and well-documented HTA road map document.

Alignment with Objectives: Ensuring that the road map aligns with the overarching strategic objectives and specific goals for HTA institutionalization.

Communication and Buy-In: Disseminating the road map document to relevant stakeholders, securing their buy-in, and fostering commitment to its implementation.

8) Case Demonstration

To execute a case demonstration within the Ethiopia HTA roadmap development course, the initial step involves the careful selection of a pertinent health technology currently in use or under consideration within the Ethiopian healthcare system. This technology should possess substantial relevance and potential impact on healthcare resource allocation, patient care, and overall health outcomes. The ultimate goal of this case demonstration is to generate evidence-based recommendations that can inform policy decisions and enhance health outcomes in Ethiopia, showcasing the practical application and value of HTA within the country's healthcare system.

Conclusion and the way forward

Ethiopia's effort to institutionalize Health Technology Assessment (HTA) is a key step towards developing evidence-based healthcare decision-making, optimizing resource allocation, and ultimately improving population health outcomes. The efforts made thus far have laid a firm foundation, emphasizing the significance of HTA. It is a continuous and iterative process that requires dedication, collaboration, and a long-term vision. By continuing the course, Ethiopia will be able to harness the power of

evidence-based decision-making to transform its healthcare system and, eventually, improve the health and well-being of its people.

Moving forward, the institutionalization of HTA in Ethiopia represents a pivotal step towards a healthcare system defined by efficiency, equity, and excellence. Although challenges may arise along this transformative journey, the unwavering dedication to upholding the highest standards in healthcare decision-making will serve as the driving force behind the realization of this vision in the years ahead.

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