Facilitators and Barriers Affecting the Implementation of Capacity Building and Mentorship Program (CBMP) in Improving Evidence-Based Decision-Making in Amhara Region, Northwest Ethiopia: An Exploratory Qualitative Study

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Abstract

Background: The Capacity Building and Mentorship Program (CBMP) has been implemented in Amhara Region to enhance data use for decisions. Though the intervention is effectively improving the routine health data use for decision-making, knowledge on the facilitators and barriers in implementing the CBMP is scarce. Therefore, this study sought to explore the facilitators and barriers that affect the implementation of the CBMP in improving evidence-based decision-making in the Amhara National Regional State of Ethiopia.

Methods: A hermeneutical phenomenology qualitative study was done in five districts of the Amhara region from 5th June to 30th July/ 2020. The study recruited 25 key informants working at different health system levels using a heterogeneous purposive sampling method. Codes were developed and assigned to the data, ideas of patterns were searched, and themes and subthemes were identified using abductive thematic analysis.

Results: The overarching thematic areas spanning were 1) The need for Capacity Building and Mentorship Program (CBMP), 2) the Effectiveness of CBMP in Routine Health Information System (RHIS) Performances, 3) Implementation Facilitators, and 4) Implementation Barriers. The implementation facilitators and barriers subthemes were human-related, technical, organizational, and socio-economic context-related. Human-related (a favorable attitude towards recommendations for mentors, staff motivation, and leaders' commitment), technical (skill in data management and use, and the capacity for conducting the performance monitoring team meeting), organizational (access to information, data availability, and resource supply), and contextual (policy support and government concern) were positive attributes. Human-related constraints include resistance to accepting the intervention at the early stage of the intervention period and lack of knowledge on the National Classification of Disease; technical barriers: lack of intra-facility information communication skills and inadequate training; organizational barriers: trained staff turnover, and lack of technology for intra-facility data sharing; and contextual barriers (the onset of the COVID19 and security issues.

Conclusion: Human, technical, organizational, and contextual attributes played massive roles in facilitating the implementation. However, strengthening the capacity of health workers, supporting health workers for good use of NCOD, installing intra-facility level data sharing mechanisms, and continuous re-assessment of the context in implementing the CBMP is required. [*Ethiop. J. Health Dev.* 2022;36 (SI-2)]

Key-words: Capacity Building Mentorship Program, Data use, Evidence-based decision, Routine Health Information System, Facilitators, Barriers

Background

The ultimate goal of a national health information system is to "collect, process, report, and use health information to influence policymaking, program action and research (1,2). Improved information use requires improved quality of data and of information products, which in turn requires improved health information systems (HIS) (3). Access to and capacity to use information more frequently and effectively will lead to decisions that improve health by improving the health system's ability to respond to health needs at all health system levels (4).

Applying the performance management information system has a positive effect on improving the performance of clinical departments (5). Thus, enhanced use of routine health data resulted in improved performance of health systems. Data not only enables us to identify problems accurately but also assists in prioritizing quality improvement initiatives and empowers an objective assessment of whether change and improvement have occurred. Collecting and analyzing data is, therefore, central to quality improvement in any health service. Data push quality improvement by helping to identify and analyze problems and pulls quality improvement by helping to identify and analyze opportunities (6). Good-quality data and analyses are important for decision-making during all stages of the program cycle (7).

Numerous enabling and constraining factors can potentially facilitate or impact routine data utilization in the healthcare system. Prior studies on facilitators and barriers to implementing HIS broadly fall under technical, organizational, behavioral/human, and financial factors (8,9). Strong leadership and clear policy direction coupled with the financial support to acquire essential technology and provide staff training,

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data availability, and responsiveness to stakeholders helped promote the implementation of the HIS interventions in LMICs (10–12). Moreover, the technical facilitators (user-friendly software; web-based and integrated reporting; and availability of resources), organizational facilitators (prioritizing data; supportive supervision; and quarterly performance review meetings), and behavioral facilitators (motivation and competence of staff) are responsible for improved data use (13,14).

On the contrary, the implementation of HIS intervention can also be negatively impacted by multiple factors. One piece of evidence from Australia identified several impediments, including poor adherence to minimum dataset requirements; challenges in standardizing processes or defining interventions; low rates of use of outcome tools; lack of value of the tools to the service provider; difficulties in defining or identifying the endpoint of an intervention; technical and ethical barriers to accessing data; a lack of standardized processes; and time lags for the collection of data (15). Several studies conducted in LMICs showed that lack of training and poor infrastructure, technical, motivational, economic, political, legal, and ethical factors were considered as the main challenges to a successful implementation of HIS interventions (10,16–20). Moreover, high staff attrition, inadequate data collection and use training, frequent stock-outs of paper-based forms, provider rotations, disruptions to care processes, and performance indicator lifespan were reported as implementation barriers (13,21).

Strengthening the health system has become a top priority of many global and national health agendas as a way to improve health outcomes (22,23). Ethiopia has identified the target in the Health Sector Transformation Plan (HSTP) to improve data use at different levels in the healthcare system (24). Thus, the CBMP is one strategy implemented to improve the performance of RHIS in different regions across the country (18,25). The Amhara National Region Health Bureau (ANRHB), in collaboration with the University of Gondar (UoG), has been implementing the CBMP since 2019 in five districts of the region (26). The intervention effectively improved the routine health data utilization for decision-making among department and health facility heads (27). Despite the multitude of evidence on facilitators and barriers to the HIS implementation in the national and LMICs context, information is scarce on the implementation facilitators and barriers of the intervention, particularly in enhancing the capacity of healthcare workers in evidence-based decision making in the study area. Therefore, we sought to describe common facilitators and barriers that affect the implementation of the CBMP improvement in evidence-based decision-making and identify transferable lessons to enhance implementation efforts in similar settings.

Methods
Study setting and design
A hermeneutical phenomenology study using key-informant interviews was conducted in public health facilities in five districts (Awobel, Gondar Town, Tach Armachiho, Tehulederie, and Wogera) of the Amhara region from 5th June to 30th July/ 2020. These study sites were selected based on the pre-defined criteria as an implementation site of the CBMP by the FMOH and ARHB. As indicated above, the study aimed to identify facilitators and barriers of the CBMP. Therefore, the study sites were included in this study to draw deep understanding from these sites.

The study's methodological approach was based on the social sciences, using an abductive strategy that aimed to uncover and then interpret knowledge about the social actors in question (28). This involved investigating how the health workers experienced, understood and created a context for using the CBMP to improve evidence-based decision-making. This perspective worked well with the hermeneutic-phenomenological approach we employed in our analysis; moreover, our choice of research strategy was integrated into the study's objective and the research questions under investigation. For this study, a hermeneutic-phenomenological perspective meant that the researchers sought an in-depth understanding of the participants' life-world experiences around the importance of CBMP in enhancing the performance of RHIS (improved data use) (29,30).

Study population, sample size and sampling procedure
The study population was department and health facility heads in Awobel, Gondar town, Tach Armachiho, Tehulederie, and Wogera districts. It included participants who received at least one round of mentorship and training, and stayed for at least three months after the intervention started. However, the study excluded participants from administrative departments (human resources, finance, and guardians) and newly hired staff with below three months of stay in the facility. For this reason, we determined the sample size to be 25 department and facility heads. Study participants who fulfilled the inclusion criteria were recruited purposively using maximum-variation sampling techniques.

Data collection tools and procedures
The data collection tool was adapted from the Measure Evaluation Tool Kit (31). It contained variables related to data use practices, the contribution of CBMP in improving the use of routine health data for decisions, the barriers, and facilitators for the implementation of the CBMP. The tool was administered using interviewers and had guiding inquiries with multiple probes. On average, it took one and half an hour to respond to all questions. Audio data were collected using an audio recorder, and field notes were taken during the interview. Three teams of data collectors comprised of one interviewer and one note-taker per team were involved in the data collection. The data collectors submitted the letter of representation to the organization and requested permission to access the

study participants before the interview. Then, they conducted the interview using the adapted tool.

Analysis methods
The audio data were transcribed to the Amharic language verbatim and back-translated into the English language. Non-verbal cues were included to communicate the embarrassment or emotional distress of respondents. Transcribed files were organized, labelled with non-unique identifiers, and narratives were numbered. We read the data again and again and developed memos. Then, codes were developed and assigned to the data. Salient patterns were searched, and themes or emergent concepts were identified from the data. We applied the thematic analysis technique following an abductive approach and developed major themes and subthemes. Data were coded and analyzed using the OpenCode software. To ensure the reliability of the findings and test our conclusions, we referred to the external evidence, including previous qualitative and quantitative studies. Moreover, the "negative" or deviant cases from the data were checked and presented the original data like quotations that indicated different views from different key informants (32,33).

Ethics approval and consent to participate
We received an ethical clearance letter from the ethical review board of the University of Gondar referenced to O/V/P/RCS/05/430/2018. The Amhara Public Health Institute also registered the study and provided us with a support letter dated 26/10/2012 EC to collect data in the health facilities. The research was done based on the declaration of Ethical Principles of Helsinki and informed written consent was obtained (34). Data were collected with no personal identifiers and used only for this study. Information on sex, age, experience, education, and department name was collected from participants referring to direct quotations.

Results
From the data, four themes and four subthemes emerged. The overarching thematic areas spanning were 1) The need for the CBMP, 2) The effectiveness of the CBMP in Routine Health Information System (RHIS) Performances: bridging the gap in data use, 3) Implementation Facilitators, and 4) Implementation Barriers. The implementation facilitators and barriers subthemes were also organized into human-related, technical, organizational, and socio-economic context-related attributes.

Participants' characteristics
A total of 25 key informants participated in the interviews, including Nurses (n=12), Physicians (n=2), Health Informatics Technicians (n=4), Health Officers (n=2), Public Health Professionals (n=3), and Midwiferies (n=2). The mean age of participants was 32.2 years old (ranging from 25 to 51 years old). The participants' highest and lowest years of experience were 29 and three years, respectively, and most participants, 18(72%), were male. Of the participants, 11 were diplomas, nine were bachelors, three were masters, and two were general practitioners by profession (Table 1).

Table 1. Characteristics of study participants in Amhara Region, Northwest Ethiopia, 2021

Participant ID	Sex	Age in years	Education	Work Experience	Current Position
P1	Male	35	Master in Public Health	12	Planning, Monitoring and Evaluation Directorate Director
P2	Male	51	Master in Public Health	29	Planning, Monitoring and Evaluation officer
P3	Male	37	BSc nurse	12	Facility head
P4	Female	41	BSc nurse	17	ART department head
P5	Female	30	Health Information Technician	6	HMIS department head
P6	Male	29	Clinical Nurse	8	MCH department head
P7	Male	35	Health Officer	7	Facility head
P8	Male	31	Health Information Technician	5	HMIS department head
P9	Female	28	Clinical Nurse	6	MCH department head
P10	Male	27	Health Information Technician	4	HMIS department head
P11	Female	29	BSc Midwifery	6	MCH department head
P12	Female	25	Clinical Nurse	5	OPD head
P13	Male	29	Health Information Technician	5	HMIS department head
P14	Male	47	Clinical Nurse	24	EPI department head
P15	Male	27	Clinical Nurse	4	Facility head
P16	Male	28	BSc nurse	5	Facility head
P17	Male	27	BSC pediatrics	2	OPD head
P18	Male	29	BSc nurse	6	ART department head
P19	Male	28	BSc nurse	3	M&E department head
P20	Male	29	General Physician	4	IPD head
P21	Female	30	General Physician	5	MCH department head
P22	Male	37	MSc Public Health	12	M&E department head

P23	Male	29	Health Officer	8	CEO
P24	Male	28	BSc midwifery	4	MCH department head
P25	Male	39	Clinical Nurse	5	OPD head

ART: Antiretroviral Therapy; CEO: Chief Executive Officer; EPI: Expanded Program on Immunization; HMIS: Health Management Information Systems; IPD: In-patient Department; MCH: Maternal and Child Health; M&E: Monitoring and Evaluation; OPD: Outpatient department.
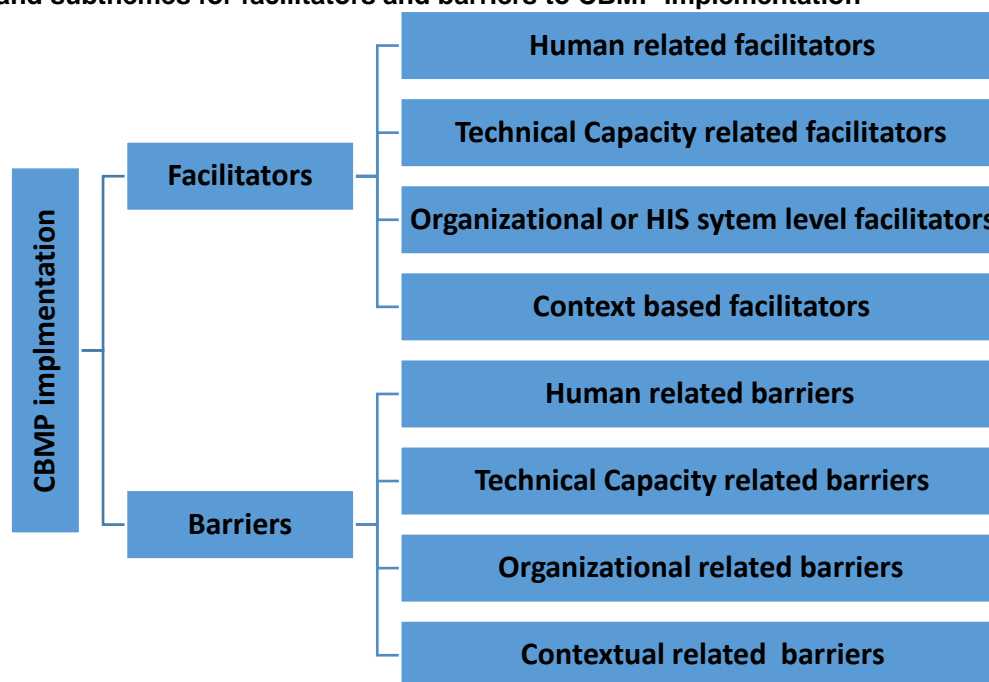
Themes and subthemes for facilitators and barriers to CBMP implementation

Figure 1. Pictorial Presentation of themes and subthemes for CBM study in Amhara, Northwest Ethiopia, 2021

The need for Capacity Building and Mentorship Program (CBMP)

Facilities in the different areas have not faced similar problems in RHIS activities. Thus, tailored interventions were needed to improve the RHIS performance gaps observed in each specific facility. In line with it, the CBMP was endorsed. As part of the capacity-building activity, health workers, departments, and facility heads received basic training on data quality and information use. Meanwhile, the inputs required for HIS were placed in the health facilities. After the work began, on-job training was also provided to fill knowledge and skill gaps at service delivery points. Following the capacity building training, mentoring, and supervision were some of a series of steps carried out every quarter in the targeted facilities to improve the use of information for decision-making. With all these efforts, most respondents have created positive attitudes toward the CBMP.

"The CBMP is being implemented in the selected districts of the region since 2019. It primarily targeted to make health information available at any time to make it accessible to the user and increase the capacity of decision-makers to make decisions based on quality information. We are in favor of the intervention since we did not have such kind of support in the previous times." [P2]

Participants also mentioned that both capacity-building training and mentoring contributed to improving the performance of the RHIS in health facilities. Both activities were very helpful in filling the gaps, improving the quality of data, use of information, and strengthening the capacity of the Performance Review Team (PMT) members. It has also added value in improving the perception of health workers and healthcare leaders towards generating good quality data and evidence-based decision-making at different levels. We also noted that most key informants mentioned that the CBMP had created a sense of data ownership among health workers.

"The Capacity Based Mentorship Program (CBMP) has played a key role in enhancing the health professional's experience and perception of information quality and decision-making. Therefore, instead of giving general feedback during the next mentoring program, special activities should be given to the relevant professional. It is also possible to achieve better results if we verify whether the planned activities are carried out before the next support visit is conducted." [P13]

Effectiveness of CBMP in Routine Health Information System (RHIS) Performances, bridging the gap

Respondents were asked about the effectiveness of the intervention in improving the performance of the RHIS (strengthening the PMT meeting, improving the quality of data, enhancing evidence-based decision-making, and conducting a continuous performance review meeting). Most key informants agreed that the CBMP had played a significant role in improving the RHIS performance than ever before the implementation started in their facility. They have generated quality data that would enhance the use of data for decisions. The PMTs were established in many facilities and regularly conducted meetings.

> *"The CBMP was instrumental in supporting health facilities to improve information quality and helped build the capacity of health professionals and leaders to enhance a culture of evidence-based decision-making. In addition, it assisted health facilities in implementing the DHIS2, EMR, and similar eHealth applications in the health system." [P1]*

The study participants mentioned that different program and administrative decisions were made at the department and organization levels. Hence, data were being utilized for target setting, comparing performances against targets, identifying the causes for the low achievements, and setting action points that would have improved the observed gaps. Department heads, case team leaders, and facility heads have participated mostly in the decision-making process. Participants explained that the District Health Information System (DHIS2) is the major source of evidence for decision-making. Besides, administrative data, like personnel and financial reports, were also used as additional sources of information.

We noted that participants had conducted weekly, bi-weekly, monthly, and quarterly performance meetings to evaluate the target achievements set for the fiscal year. Thus, targets with the low-performance were identified using these iterative meetings. Moreover, they have exerted efforts to bridge the gaps between the target and performance achievements. They stated that strengthening the data documentation, revising the organizational plan, assigning the responsible person for the tasks, providing feedback, and availing the required resource for HIS activities were some of the efforts made to improve low performances with the support provided by the CBMP. It was mentioned that all these efforts enhanced the use of routine health data in the health systems.

> *"An institutional support plan was developed to improve our performance. And resources were provided that enable us to do our job properly. We compared our targets with the quarterly and yearly performances in the PMT meeting. We also reviewed the utilization of guidelines by observing each of the service rooms." [P6]*

The practice of data used to inform decisions among the department and facility heads showed progress compared to the previous time. They documented the discussion points of the meetings in minutes or a logbook and distributed them to concerned parties to rectify them. Besides, they have highlighted that most discussion points were communicated to higher levels for additional support and resources required for the RHIS activities. We noted that the health workers practiced informed decision-making for leveraging effective resource utilization.

> *"Discussions made on the quality of information as well as the overall performance of the institution can be seen in the PMT Log Book. Moreover, we documented the issues we have addressed in the management meeting in minutes. For example, we have seen that having a large number of clients in maternal and child health services was not conducive to services, and we made decisions to improve the service." [P3]*

Facilitators of the CBPM implementation
Human related facilitators

For an intervention to be effective in attaining its targets, several human attributes may interact with each other in facilitating the overall accomplishment. Most key informants mentioned that individual willingness to execute recommendations forwarded by mentors created a conducive playground for implementing the intervention as per the guideline. Moreover, having a sense of teamwork among health workers and existing motivated staff in certain facilities had contributed to the good achievements made through the CBMP. It was also reported that leaders at different levels in the health system were committed to providing the required resources for HIS activities.

> *"I think the commitment of the manager of the institution has made a difference. He provided a list of jobs to case team managers and evaluated the achievements for the activities provided. Besides, close monitoring and evaluation of each department were done. All these initiatives resulted in improvement in the facility." [P16]*

Technical capacity as facilitator

Respondents mentioned that most health workers received technical capacity training through the CBMP that improved data management, analysis, and interpretation skills. Besides, they have developed skills in data quality assurance techniques. Lots Quality Assurance Sampling (LQAS), Routine Data Quality Assurance (RDQA), and Data Quality Audit (DQA) were the techniques applied in the health system at different levels for quality assurance. Most of the key informants mentioned that the LQAS was applied in health facilities as an internal data quality assurance technique using 12 randomly selected data elements every month, through which facilities had improved the data quality.

> *"When we look at the quality of information, we can say that it is better now. The size of the LQAs has never dropped below 90%. The quality of health data has become better.*

There is also no gap in delivering timely information to those who need it. Thus, data quality assurance was done on a monthly basis." [P7]

Most respondents stated that health facilities developed the technical capacity in conducting the PMT meeting regularly. The PMT members incorporated maternal and child health services, in-patient, out-patients, pharmacy, laboratory, health information, system, and facility heads. The PMT has discussed performance achievements every month. Participants have identified gaps by comparing the targets to the achievements made, developed action points, and designed interventions tailored to specific facilities. Then, they forwarded doable feedback to lower levels of the health system. They have also highlighted that most health facilities have acquired skills in developing a supervisory checklist and conducting internal supervision with their health workers collected from different departments.

"Our institution has been able to form a strong PMT committee. They hold regular monthly and quarterly meetings. We have been able to solve problems by regularly reviewing and evaluating so as not to create a shortage of resources in our institution. Accordingly, for example, regular childhood immunization performance has been improved." [P15]

Organizational or HIS system-level facilitators

Most respondents outlined the organizational attributes that facilitated the implementation of the CBMP. Providing access to information, availing information for decisions, and presenting the required resources for HIS activities were identified as organizational-related facilitators. As respondents mentioned, these attributes significantly contributed to the observed level of change in data use among health workers. We noted that facilities provided recording and reporting tools to the departments that strengthened the availability and quality of data at the service delivery points. Besides, they also discussed that leaders in the organization were supportive by allocating additional budgets and time for performance evaluation.

"Much effort has been made to bring about change in our organization. The fact that the Woreda Health Office has been able to assign professionals to support our institution regularly, provide a required resource for HIS supervision, and the support of the university has been a great help for us." [P14]

Respondents explained that organizational leaders were committed to executing the roles of managing and supervising health facilities to attain the targets of the CBMP, reaching the model or connected facilities. We identified that most leaders were responsive to address feedback provided by the mentors and supervisors. They mobilized finance for HIS activities, shift resources to areas where the budget was scarce, and created a conducive environment for healthcare providers. They assigned responsible persons for portering patient charts to improve the loss of information. Besides, they had strengthened the utilization of tracer cards, a checking mechanism when patients' or clients' cards were drawn from medical record units.

Context-related facilitators: socio-political support

The key informants were asked about the social and political context-related facilitators of the intervention. Most of them mentioned the multiple efforts exerted at health facilities through the national and regional health bureaus in realizing enhanced data use for decisions at different levels. They understood the government has a high interest in improving the use of information at a granular level through digitalizing the health systems and mentioned that the CBMP was one of the indications of the government's commitment. Moreover, they added that most health workers were receptive to mentors, keen to receive feedback from them, and initiated to improve the performance of RHIS activities.

"The CBMP is a government commitment being implemented in the selected districts of the region since 2019. It primarily targeted to make health information available at any time, accessible to the user, and increase the capacity of decision-makers to make decisions based on quality information." [P2]

Barriers to the CBMP implementation
Human-related barriers

Several barriers affected the implementation of the CBMP in reaching its intended outcome. Participants reported human-related constraints that they faced in the course of the intervention period. They mentioned that health workers showed less commitment at the early stage of the intervention period to go with the new way while working on the RHIS activities. They also took a long time to adapt and implement the new intervention and sought continuous supervisor or mentor support. Moreover, most health workers needed frequent training to fill gaps observed during the mentoring time. Likewise, some participants considered that the Health Information Technician and facility heads were only responsible for RHIS activities and left the activities to them.

"Yes. It was common to leave activities related to the information system as only for HIT and facility head. The case team leaders should have done this [data recording and use], but I went to the case teams on my own initiative to ensure data recording and reporting. Thus, we were able to ensure that the information was properly recorded and maintained in the facility. I think this is the biggest problem we have faced while implementing the CBMP at the early stage." [P4]

Some respondents also highlighted that there were health workers who did not consider the information generated in the departments relevant for the country-level information. They lacked knowledge about the importance of the data for predicting the incidence or prevalence of the disease nationally and forecasting supplies that would be required for effective treatment in the health care system. Besides, some health workers

did not give attention to activities that improve the data quality and enhance information use as much as they did for patient care and management. Likewise, the lack of professionalism on patient data recording and reporting among health workers affected the quality of data generated at the service delivery points. Respondents pronounced that individual-related constraints are still challenges for improving evidence-based decision-making.

Technical capacity-related barriers

Most respondents reported technical constraints that affected the implementation of the CBMP. Lack of adequate knowledge of the newly endorsed National Classification of Diseases (NCOD) made health workers record the data indifferently. Lack of data sharing and communication skills among health workers was also a technical constraint that hindered health workers in reaching the clients and stakeholders for scale-up use of health care services.

> "For example, under the new health information system, the NCOD has changed, but we have been provided only the guideline to do so. This strategy [only providing a guideline for health workers] will not be able to bring about the desired change in the information system. There was a gap in providing training for health workers on the use of this NCOD." [P3]

Weak intra-facility information communication skills among departments were also reported as individual-related barriers that made the intervention less effective than expected.

> "We have observed problems around the card room and lack of computers to strengthen the information exchange system in each department. There are also capacity limitations as card room staff have grown up from the guardian section. To address this issue, we have hired IT graduates in the card room." [P3]

Organizational or HIS system-level barriers

Key informants mentioned the constraints related to organizational structures that accounted for inadequate achievements of the CBMP targets among health facilities. They reported that trained staff left the organization frequently, which increased staff attrition. Besides, the training was not adequate to cover a large number of staff in the intervention sites, and supplies were in shortage for running the RHIS activities as required. Moreover, they stated that computer failure also happened many times due to intermittent power supply and fluctuation.

> "There are a number of reasons why it may not be possible to achieve the desired outcome of the intervention [improved quality data and enhanced use of information]. Transfer of trained professionals, input supply limitation, a lack of knowledge and skills, and a lack of HIS infrastructure were some of the barriers." [P2]

The lack of technology for intra-facility information communication among departments was reported as an organizational-related barrier. The current health information system is managed centrally by the Health Management Information System (HMIS) department, which processes and organizes data dispatched from different departments. As a result, health workers were not able to see the progress or failure among service delivery points in performing the RHIS activities within the facility. They have also mentioned that patient information was not shared between departments and individual care providers enhanced evidence-based medicine and quality of care. Lack of adequate HIT, shortage of rooms for medical records, and a limited budget for room expansion were also mentioned as organizational-related barriers to information use.

> "Shortage of room, limited budget (for example, additional rooms could not be built), and shortage of registers were the challenges that can lead to health workers' misuse of information." [P16]

Another key informant also supplemented that inadequate training for staff in the Medical Record Unit and lack of computers to run the Smart Care were an organizational challenge for good patient data management.

> "We have observed problems around the card room and lack of computers to strengthen the information exchange system in each department. There are also capacity limitations as card room staff have grown up from the guardian section. To address this issue, we have hired IT graduates in the card room." [P3]

Contextual: socio-political barriers

The respondents were also asked about the effect of contextual factors (the outer setting) on the implementation and sustainability of the CBMP. Most of them replied that the onset of COVID19 negatively affects implementing the quarter and annual Performance Review Meeting (PRM) and conducting routine monthly PMT meetings as per the intervention guideline. They added that there were times when meetings were halted completely, and mentors were restricted from movement to health facilities. Moreover, some respondents also highlighted that the security issues and unrest observed in some localities drove trained health workers to move to another area.

> "The occurrence of Covid-19 prevented us not to take training on new initiatives and made a delay in routine meetings. Besides, it prevented us from conducting health education and learning forums inside and outside the facility. It also restrained us from conducting review meetings timely. As a result, we have seen some work backward from the previous achievements." [P23]

Discussion

The CBMP was effective in enhancing evidence-based decision-making and strengthening the functionality of the PMT. The human-related, technical, organizational,

and context-related factors could affect the intervention's implementation either positively or negatively. Having a sense of teamwork, positive attitudes towards mentors' recommendations, leaders' commitment, access to information, and policy support facilitated the implementation of the CBMP. However, considering the intervention as an additional task posited among health workers at the early stage of the implementation period, lack of knowledge on NCOD, trained staff turnover, lack of technology for intra-facility data sharing, lack of computers and the onset of COVID-19 were identified as barriers for implementing the CBMP.

The study indicated that human factors, acceptance of the intervention, the presence of motivated staff, and the existence of a sense of teamwork among health workers facilitated the implementation of the CBMP. The presence of motivated staff and collaborative efforts among team members support adopting the intervention and maximize its effectiveness in addressing the desired outcomes. This finding was in line with implantation research conducted in Ireland, the EU and the USA that indicated having a local lead and supportive colleagues (35) and motivated staff (36), and a positive attitude towards the intervention (37) were implementation drivers, respectively. It was also consistent with the scoping review that most research findings reported that collaborative decision-making and building and maintaining trust are drivers of successful intervention implementation (38).

Training is a major contributor to enhancing the technical capacity of health workers to effectively carry out the targets for the CBMP in the intervention sites. Thus, technically competent staff in the healthcare system is highly relevant to operate the implementation of the CBMP in the health system for enhanced data use and evidence-based decision-making. The finding was consistent with the study done in Ethiopia, Spain, and Chania, which indicated training as a critical factor for implementing the guideline (39), and the standards in the health systems (40), improved data use (10), respectively. It might be because the previous studies were new projects like the CBMP, which were implemented for the first time that required more intensive training.

Local leaders' commitment and availability of resources were organizational-related factors that facilitated the implementation of the intervention. For a successful implementation of interventions, leaders' commitment and availability of required resources by time and place have played pivotal roles in attaining the targets of the intervention to reach the end-users properly. The finding was consistent with a scoping review done in LMICs, and implementation studies done in Argentina and the USA that reported facilitators as effective (38) and motivated local leaders (41), and personal commitment (42), respectively. However, the finding was inconsistent with the study done in Iran that reported available human material resources have limited effects on implementing the intervention (36). The difference could be because the latter was a small-scale intervention operated in resource-intensified facilities.

This finding also highlighted barriers that affected the implementation of the CBMP in the study sites. Lack of knowledge, trained staff turnover, resistance to change at the early stage of the intervention, and inadequate training were reported as common constraints. All these attributes were hindering the performance of the health system. Besides, they tackled the enhanced use of information for evidence-based decisions at different levels. The finding is consistent with studies done in Argentina and Norway that mentioned barriers to effective implementation of different interventions as lack of adequate funding, skilled personnel, equipment and material resources (41), and tension for change, respectively (43). It could be because the health interventions, by their nature, are dynamic that requires more iterative and resource-intensive training.

Likewise, the study showed that weak communication skills, shortage of budget for HIS activities, security issues, and the onset of COVID-19 were barriers to the implementation of the CBMP as intended. It is well-known that health workers sought to move to a better area if unrest has happened. Moreover, the weak communication skills prevented study participants from reaching the community at large to improve health literacy. The finding was in line with studies done in Norway that mentioned a lack of skilled personnel and adequate funding as barriers to implementing eHealth solutions (41). It might be the fact that the health care system requires more financial and material resources to reach all target groups and run the intervention effectively.

Implications of the study
The finding of this research disclosed the barriers to implementing the CBMP in the region that would help managers and policymakers redesign the intervention before large scale implementation start. It also gives insights into the drivers that fuel the intervention to be more effective in the study area. Moreover, it indicates the influence of the outer setting environment on healthcare providers and facility managers while executing similar interventions in the health system. Lastly, the finding of this research shall enhance evidence-based decisions in the health system that would, in turn, improve the quality of care provided for clients and patients.

Strategies applied to ensure trustworthiness
We applied different strategies to ensure the trustworthiness of the findings. The accurate and truthful depiction of a participant's lived experience was achieved in this study through prolonged engagement to learn the context of the phenomenon in which it is embedded. Besides, triangulation was achieved by cross-checking the data and interpretations within and across each category of participants by two qualitative researchers. Member checks were accomplished by constantly checking data and interpretations with the participants from which data were solicited. Transferability was enhanced by using

the purposive sampling method and providing a thick description and robust data with a wide possible range of information through the detailed and accurate descriptions of the study participants. For this reason, data collection was continued until the information was saturated, complete, and replicated. Dependability was achieved by having two expert qualitative researchers review the transcribed materials to validate themes and descriptions. Besides, confirmability was achieved through maintaining a reflexivity journal during the research process to keep notes and interpretations daily that would be beneficial and pertinent to the study.

Limitations

This study has some limitations. It included department and facility heads only, and the ideas or insights of health care providers that might potentially influence on the findings were not included. Respondents might provide positive answers about the intervention because they participated in the implementation phase. Besides, some recall bias might be introduced because participants were asked about their previous experiences.

Conclusion

The overarching thematic areas spanning the facilitators and barriers included human-related, technical, organizational, and socio-economic context-related attributes. Having a sense of teamwork, positive attitudes towards mentors' recommendations, presence of motivated staff, technical capacity in data management, analysis, and use, access to information, leaders' commitment, and policy support were facilitators for implementing the CBMP. However, considering the intervention as an additional task posited among health workers at the early stage, lack of knowledge on NCOD, trained staff turnover, lack of technology for intra-facility data sharing, lack of computers, powers supply interruption and the onset of COVID-19 were identified as barriers for implementing the CBMP. Therefore, strengthening the capacity of health workers on data sharing, supporting health workers for good use of NCOD, installing intra-facility level data sharing mechanisms, supplying backup generators, and continuous re-assessment of the context should be done to enhance the effectiveness of the intervention.

Abbreviations

ANRHB: Amhara National Region Health Bureau; ARPHI: Amhara Region Public Health Institute; DHIS: District Health Information System; EMR: Electronic Medical Record; EIDM: Evidence-Informed Decision Making; HIS: Health Information System; HIT: Health Informatics Technician; HMIS: Health Management Information System; ICT: Information Communication and Technology; IR: Information Revolution; LMIC: Low and Middle-Income Countries; LQAS: Lot quality Assurance Sampling; MOH: Ministry Of Health; PMED: Planning Monitoring and Evaluation Directorate; QIP: Quality Improvement Project: RDQA: Routine Data Quality Assurance; RHIS: Routine Health Information System; UoG: University of Gondar; WHO: World Health Organization

Declarations

Consent for publication

Not applicable

Availability of data

Data will be available up-on reasonable request from the corresponding author.

Competing Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Authors' Contribution

MA, MY, AA, SM, MG and BT conceptualized the design of the study. All authors provided a review of the methodology and analysis results. All authors contributed to the writing of this manuscript and all have read and approved the final manuscript.

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