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District Health Information System 2 (DHIS2) Data Utilization and its Determinants among Performance Monitoring Team in Public Health Facilities of Harari Region and Dire Dawa City Administration, Eastern Ethiopia

MPH Research Thesis

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ABBREVIATIONS AND ACRONYMS

AOR	Adjusted Odd Ratio
CBMP	Capacity Building and Mentorship Program
CI	Confidence Interval
COR	Crude Odd Ratio
DC	Data Collector
DHIS2	District Health Information System Version 2
ETB	Ethiopian Birr
FMOH	Federal Ministry of Health
HEW	Health Extension Workers
HIS	Health Information System
HMIS	Health Management Information System
HSTP	Health Sector Transformation Plan
HUIHREC	Haramaya University Institutional Health Research Ethics Committee
ICT	Information Communication technology
PHCU	Primary Health Care Unit
PI	Principal Investigator
PMT	Performance Monitoring Team
PRISM	Performance of Routine Health Information System
RHI	Routine Health Information
RHIS	Routine Health Information System
USAID	United State Agency for International Development
WHO	World Health Organization

ABSTRACT

Background: Data utilization is one of the key functions of the Health Information System. It enables performance monitoring team for evidence based decision making to improve quality of health service delivery. This can be supported by the use of District Health Information System 2 platform which is expected to increase the utilization of health data. However, little is known about the use of health data from District Health system 2 and its determinants especially among performance monitoring team working at facility level since its implementation.

Objective: The study aimed to assess data utilization from District Health Information System 2 and its determinants among performance monitoring team in public health facilities of Harari Region and Dire Dawa City Administration from July to August 2020 G.C.

Methodology: The study utilized an institutional-based cross-sectional study design. A stratified sampling technique was used to select a total of 220 participants. Data was entered using Epi-Data version 3.1 and exported to STATA version 14.2 for cleaning and analysis. The binary logistic regression model was applied to identify determinants of District Health Information System version 2 data utilization. Goodness of model fit was checked using Hosmer-Lemeshow statistics and statistical significance was declared at $P<0.05$.

Result: Overall utilization of data from District Health Information System 2 was about 45% (95%, CI= [39%, 50%]). Favorable attitude (AOR=3, 95% CI: 1.90 – 8.62), good perceived self-competence (AOR=2.9, 95% CI: 1.14 – 7.38), good perceived data quality (AOR=4.4, 95% CI: 1.76 – 10.9), and getting supportive supervision (AOR=4.3, 95% CI: 1.48-12.45) were determinants significantly associated with data utilization from District Health Information System 2.

Conclusion: The overall utilization of data was below national recommendation. Attitude, perceived self-competence and perceived data quality and supportive supervision were determinants of data utilization from District Health Information System 2 among performance monitoring team.

Key words: Data Utilization, District Health Information System version 2, Dire Dawa City Administration, Harari Region, Performance Monitoring Team, Public Health Facilities.

1. INTRODUCTION

1.1. Background

Data utilization is one of the key functions of the Health Information System (HIS). It is the analysis, synthesis, interpretation, and review of data as part of a decision-making process (Tara Nutley and Reynolds, 2013). Developing countries of all income levels have launched programs that now explicitly focus on encouraging the use of health data collected through the Routine Health Information System (RHIS) at public and private health facilities (Consulting, 2009). Thus, health data should be utilized for planning, decision making, monitoring and evaluation at each level of the health system(Wilfred Obwocha et al., 2016) .

Ethiopian Federal Ministry of Health (FMOH) explained the difficulty in ensuring the quality of health care without effective utilization of data at each level (FMOH, 2015). Thus, utilizing health data at the local level is essential in the process of transforming the health sector (FMOH, 2016). Through the transformation agenda of the Health Sector Transformation Plan (HSTP), the FMOH envisioned an increase in the utilization of health data at each level by Performance Monitoring Team (PMT). PMT is a team of the multidisciplinary health workforce that is primarily responsible to use health data to monitor performance at the facility level. This can be supported by the digitalization and scale-up of HIS as a result of the opportunity created by the ICT industry. In this regard, the use of the District Health Information System (DHIS2) represents one of the key instruments to enhance data utilization (FMOH, 2016) .

DHIS2 is a tool for the collection, analysis, and presentation of aggregate and individual-based statistical data, tailored to integrated health information management activities (Oslo, 2016). It is a platform and database independent open-source tool that the University of Oslo developed in 2006 to manage HIS. Ethiopia has adopted the software to national HIS (MEASURE, 2017) and customized it to fit with the Ethiopian health system based on a template of e-HMIS (Pandikumar et al., 2016). DHIS2 have many advantages over the previous Health Management Information System (HMIS) tools of which providing simple analysis to encourage local data use, increasing the accessibility of data and increase quality of data through validation rules are some (Josephine et al., 2014, Pandikumar et al., 2016).

1.2. Statement of problem

The success of a national HIS needs to be measured by evidence of the continued use of data at the local level to improve health system performance (Josephine et al., 2014). In Africa majority of health data generated at lower level of health system. However, data was inadequately used to inform decisions and planning (Edward Nicol et al., 2017). Studies shows that there is low use of health data at the local level (Geoffrey Somi et al., 2017). For instance, only 30% of data was used from DHIS2 for planning, monitoring and evaluation and reporting by case team leaders, Health Management Information System officers and facility heads in studies done in Nairobi, Kenya (Gathua, 2014).

In Ethiopia, the prevailing practices of data utilization at health facilities remain a problem (Kidist Teklegiorgis et al., 2014, Mulusew, 2017). In 2015, FMOH introduced an information revolution with the main objective to enhance the utilization of health data at all levels across the sector (FMOH, 2016). In this regard, DHIS2 is a primary tool expected to support the achievement of these objectives (FMOH, 2016).

Poor data utilization is attributed to different determinants (MEASURE, 2016). Technical, behavioral and organizational determinants were stated factors to lower utilization of health data in health facilities (Hiwot Belay and Lippeveld, 2013). Though countries and different stakeholders tried to strengthen data use through capacity building; investing in data sources; using the digital revolution and the like, data utilization remains a problem (WHO, 2017). This could affect management of communicable and non-communicable diseases, equity in the allocation of resources, planning for provision of essential healthcare services, management of essential drug stock out and led service delivery to face challenges (Richard Ole Kuyo et al., 2018).

In Ethiopia, different studies tried to examine data utilization at facility level and little is known about the use of data from DHIS2 among these particular PMT members. Besides, behavioral determinants were not well addressed in those studies. Therefore, this study aims at determining data utilization from DHIS2 and its determinants among PMT members in public health facilities of Harari Region and Dire Dawa City Administration.

1.3. Significance of the study

Effective use of health data across a range of activities is one of the major reasons that make the information revolution a transformation agenda. In this regard, knowing the status of data utilization from DHIS2 and its determinants among PMT members is of paramount importance. Thus, the finding of this study will help program implementers in the area, facility heads and researchers in different ways.

For program implementer in Harari Region and Dire Dawa City Administration:

The finding of this study will provide new insight into DHIS2 data utilization and its determinants among PMT members. It will also provide them with reliable information to improve local data use. The finding of the study will further contribute significantly toward evidence-based strategic and operational decisions on DHIS2 in both areas.

For facility heads: The finding will also help health facility heads to start their plan of strengthening DHIS2 data utilization at the source.

For Researchers: the finding of this study will provide researchers in a similar area as a source of information or as a baseline for further research.

1.4. Objective

1.4.1. General objective

- To determine data utilization from DHIS2 and its determinants among PMT members in public health facilities of Harari Region and Dire Dawa City Administration from July, 2020 G.C – August 2020 G.C.

1.4.2. Specific objective

1. To assess data utilization from DHIS2 among PTM members in public health facilities of Harari Region and Dire Dawa City Administration.

2. To determine determinants of data utilization from DHIS2 among PMT members in public health facilities of Harari Region and Dire Dawa City Administration.

2. LITERATURE REVIEW

2.1. Overview of data utilization

In Sub-Saharan Africa e-Health such as DHIS2 were designed to allow facilities to use data they generate and provide quality health care to their patients (Josephine et al., 2014, Muhammad Awwal Ladan et al., 2019). Although majority of health data generated at lower level of health system, information was inadequately used to inform decisions and planning and they often forward it to the next level (Edward Nicol et al., 2017). This perception is the major problem encountering HIS system in low income countries including Ethiopia (Josephine et al., 2014).

2.2. Level of DHIS2 data utilization

A study done in rural South Africa on evaluation of DHIS2 examined that there was little analysis, interpretation and utilization of data at local level (A Garrib et al., July 2008). This is supported by study done on utilization of DHIS2 for health service decision making in Brong Ahafo region in Ghana in which only 26% of the facilities used data from DHIS2 to inform annual action plan (Eliezer Ofori Odei-Lartey et al., 2020). Similarly 47% of health facilities used DHIS2 data for program improvement, accountability and sharing with partners in Kenya (Gathua, 2016).

Assessment of PRISM in Liberia and data use from DHIS2 in Nairobi shows that utilization of health data in health facilities was about 55% and 30%, respectively (Gathua, 2014, USAID, 2014). In Ethiopia a report of the cross-sectional studies done in governmental hospitals of Ethiopia and western Amhara examined that about 43.8% and 38.4% of data generated were utilized, respectively (Mulusew, 2017, Tesfamichael et al., July 10, 2019). In contrast to the above, there was comparatively good level of data utilization (71.2%) in study done on public health facilities of Mekele, Tigray. However, this study did not used PRISM framework for assessment of data utilization which might result in difference in result with the aforementioned studies (Welay Ataklti et al., 2017).

2.3. Factors associated with utilization of data

2.3.1. Socio-demographic determinants

The level of education played a significant role in the utilization of health data/information. Those who had tertiary level education had a higher utilization rate (Effah, 2019). Participants with masters' degree reported to use information always compared to under graduates. This indicates that education level is likely to be associated with information use. It appears those who are better-educated places more value on information and use it more often (Mboro, 2017).

In regards to type of profession, it was found to be associated with and influences the use of the DHIS2 data (Effah, 2019). In a study done at Coast General Hospital, Mombasa County, Kenya, nurses reported to use information more than any other professional category (Mboro, 2017). However, this can be opposed by the study done in Kenya by (Ojuok, 2015), which revealed that there was no significant association between the professional qualification of staff and level of health data utilization.

In addition, studies indicated that residing in rural areas significantly decrease utilization of information among health care workers (Mulusew, 2017). The study done in Western Amhara region, Ethiopia, shows that respondents from rural health facilities were less likely to use information than their counterpart in Urban (Mulusew, 2017). Disparities between urban and rural areas were observed with infrastructure in rural and remote areas poorly developed, with very limited access to ICT and electric supply (Mulusew, 2017, Onalenna Seitio-Kgokgwe et al., 2016).

2.3.2. Technical determinants

Technical determinants are explained as all the elements that are linked to the specific expertise and technology to create, maintain and enhance RHIS procedures and performance (Anwer Aqil et al., 2009). Data collection processes, systems, forms, and methods constitute the technical factors (USAID and MEASURE, 2019). If indicators are irrelevant, data collection forms are complex to fill, and if computer software is not user-friendly it directly affects data utilization or indirectly through behavioral factors (Anwer Aqil et al., 2009, Hiwot Belay and Lippeveld, 2013)

Lack of training on basic data collection, data analysis, data interpretation and data utilization is one of the technical factors which jeopardize data utilization (Kitaba, 2015, Welay Ataklti et al., 2017). Evidence of the studies done in western Amhara and east Wollega zone, Ethiopia shows that there is a huge gap of training in data analysis, computer software and data utilization among health care workers and those who are trained are more likely to utilize data compared to the counterpart (Mulusew, 2017, Yarinbab and Assefa, 2018). In Contrary to the above, institutional based cross-sectional study done in Dire Dawa by (Kidist Teklegiorgis et al., 2014) examined that being trained are not significantly associated with data utilization. Although,(Kidist Teklegiorgis et al., 2014) uses only heads of the department as study unit, (Mulusew, 2017, Yarinbab and Assefa, 2018) have included head of facility and technical staffs in their study.

2.3.3. Behavioral determinants

Health information users' Perception and attitude, self-competence or ability to perform RHIS task and level of motivation are behavioral factor affecting data utilization directly (Anwer Aqil et al., 2009, Hiwot Belay and Lippeveld, 2013, USAID and MEASURE, 2019).

The self-competence or ability to perform a task is an important promoter to health data use. Competencies include ability to perform data analysis, interpretation, synthesis, and presentation (Mboro, 2017). Competence level is limited in most countries (Hiwot Belay and Lippeveld, 2013) and become a challenge toward utilization of DHIS2 data (Josephine et al., 2014, Richard Ole Kuyo et al., 2018). Thus, users often struggle with an underdeveloped ability to understand analyses and interpret them (Mboro, 2017). According to a study done in South Africa, Uganda and Woliso town-Ethiopia, one of the main determinant factors that limit utilization of data was low self-competency of health workers, facility managers and health information management teams in calculating percentages and rates correctly (Asiimwe, 2015, Edward Nicol et al., 2017, Kitaba, 2015).

Success of data utilization is also dependent of user's level of motivation. A cross-sectional study done in Yekatit 12 Hospital, Addis Ababa examined limited utilization of data as a result of low level of staff motivation on HMIS related activities. This low level of motivation was analogous with poor data use practice observed at health facility (Bayisa,

2014). This can be supported by another facility based cross-sectional study done in Wollega, Ethiopia which indicated that data utilization was two times more likely (AOR= 2.07, 95% CI=1.12, 4.29) among motivated staffs as compared to those not motivated (Yarinbab and Assefa, 2018) .

In addition to the aforementioned factor, attitude of health professionals, managers and others are another challenge for data to be underutilized (Anwer Aqil et al., 2009, Hiwot Belay and Lippeveld, 2013). A study done in Kenya identified that there was increased utilization of data/information with positive attitude (Chorongo, 2016). Similarly, (Mboro, 2017) identified that attitude is the determining factors for data utilization and found that highest odds of data utilization were observed among those with favorable attitude. Although(Mboro, 2017) have used PRISM framework, the study measured attitude without any set of criteria, by simply asking whether the respondent are having favorable attitude on not.

Data quality affects demand and use of data in all level of health care delivery. For consistent data use to occur, data need to be of high quality so that data users are confident that the data they are consulting are accurate, complete, and timely (Chorongo, 2016). Lack of good quality data and poor perception toward data quality could influence use of health information (Edward Nicol et al., 2017). Thus, perception toward data quality has a determining influence on the utilization of data (Mboro, 2017).

Poor motivation, unfavorable attitude, low self-competence and poor perception toward data quality can be due to absence of rewarding good performance, low quality of supervision visits (Hiwot Belay and Lippeveld, 2013), lack of training, lack of feedback on performance, and an overburdening of work responsibilities (USAID and Evaluation, 2018). Thus, behavioral factors are affected by technical and organizational factors (Anwer Aqil et al., 2009)

2.3.4. Organizational determinants

Organizational rules, process and system have the ability to hinder or support individual ability to utilize data (Anwer Aqil et al., 2009, CourtneyCronley and A.Patterson, 2012). Staff members nested within organizations behaves differently based on their organization affiliations (CourtneyCronley and A.Patterson, 2012). Thus, promotion of culture of

information use within health facilities is one of organizational issue critical for improving health status more broadly (Abdoulaye Maïga et al., 2019). According to the study done to evaluate DHIS2 in South Africa, promotion of culture of information use is weak in health facilities. This leads to inadequate use of information and could influence the delivery of health care services negatively (A Garrib et al., July 2008, Edward Nicol et al., 2017). A cross-sectional study done in Uganda and Yekatit 12 Hospital, Ethiopia, shows that level of promotion of culture of information use of a health facility influence utilization of health information (Asiimwe, 2015, Bayisa, 2014). Thus, if organizations promote a culture of information use and avail resources, they will improve competence in performing RHIS tasks, and thus improving their self-confidence to carry out data utilization (Hiwot Belay and Lippeveld, 2013).

Promoting regular feedback mechanism is one indicator of information use in an organization and it is a strong predictor for data utilization (USAID and MEASURE, 2019). This might be due to the fact that if there is feedback mechanism, facilities and departments will identify their strength and weakness (Kidist Teklegiorgis et al., 2014). A cross-sectional study done in Kampala-Uganda and Woliso town, Oromia region examined that availability and access to timely feedback is the main determinant factor that limits use of health data in facilities (Asiimwe, 2015, Kitaba, 2015). Similarly, another study done in East Wollega zone public health facilities by (Yarinbab and Assefa, 2018) indicated that those who received regular feedback are more likely to utilize data than others.

Continued supportive supervision from the immediate supervisor are needed to enhance DHIS2 data utilization (Josephine et al., 2014). Diminished support from the superiors (Muhammad Awwal Ladan et al., 2019, Richard Ole Kuyo et al., 2018) and irregularity of supportive supervisions were the major bottlenecks for data use (Binyam Tilahun et al., 2018). This can be supported by a result of process evaluation of HMIS implementation status in public health facilities of Mekele Zone, Tigray that indicate lack of active supportive supervision affects the ability to use data (Welay Ataklti et al., 2017). In western Amhara public health facilities, respondents who got supportive supervision were 3 times more likely to be good practitioners of health information use than those who did not get it [95% CI=2.61(1.51, 4.92)] (Mulusew, 2017).

Availability of policies/guidelines and stationary materials (graph paper and markers) is another organizational factors affecting data utilization. A study conducted in Kenya, Iran and Ethiopia showed that availability of policies, guidelines and stationary materials are significantly associated with DHIS2 data utilization (Ahmad Reza Raeisi et al., 2013, Josephine et al., 2014, Tara Nutley and Reynolds, 2013). This can be supported by another study done in Kampala-Uganda that indicated the need of policies and guidelines as a crucial for boosting effective utilization of routine health information (Asiimwe, 2015).

Availability of functional computer in the unit were one of the cited challenges that hinders utilization of health data in Botswana (Onalenna Seitio-Kgokgwe et al., 2016). According to cross-sectional study done in western Amhara public health facilities, respondents who had computer access were 2.63 times (95% CI = [1.46, 4.77]) more likely to use data as compared to those who had no access (Mulusew, 2017). Apart from this, a study conducted in Kenya, Iran showed that availability of access to functional computer was also significantly associated with good DHIS2 data utilization (Ahmad Reza Raeisi et al., 2013, Josephine et al., 2014, Tara Nutley and Reynolds, 2013)

2.4. Conceptual framework

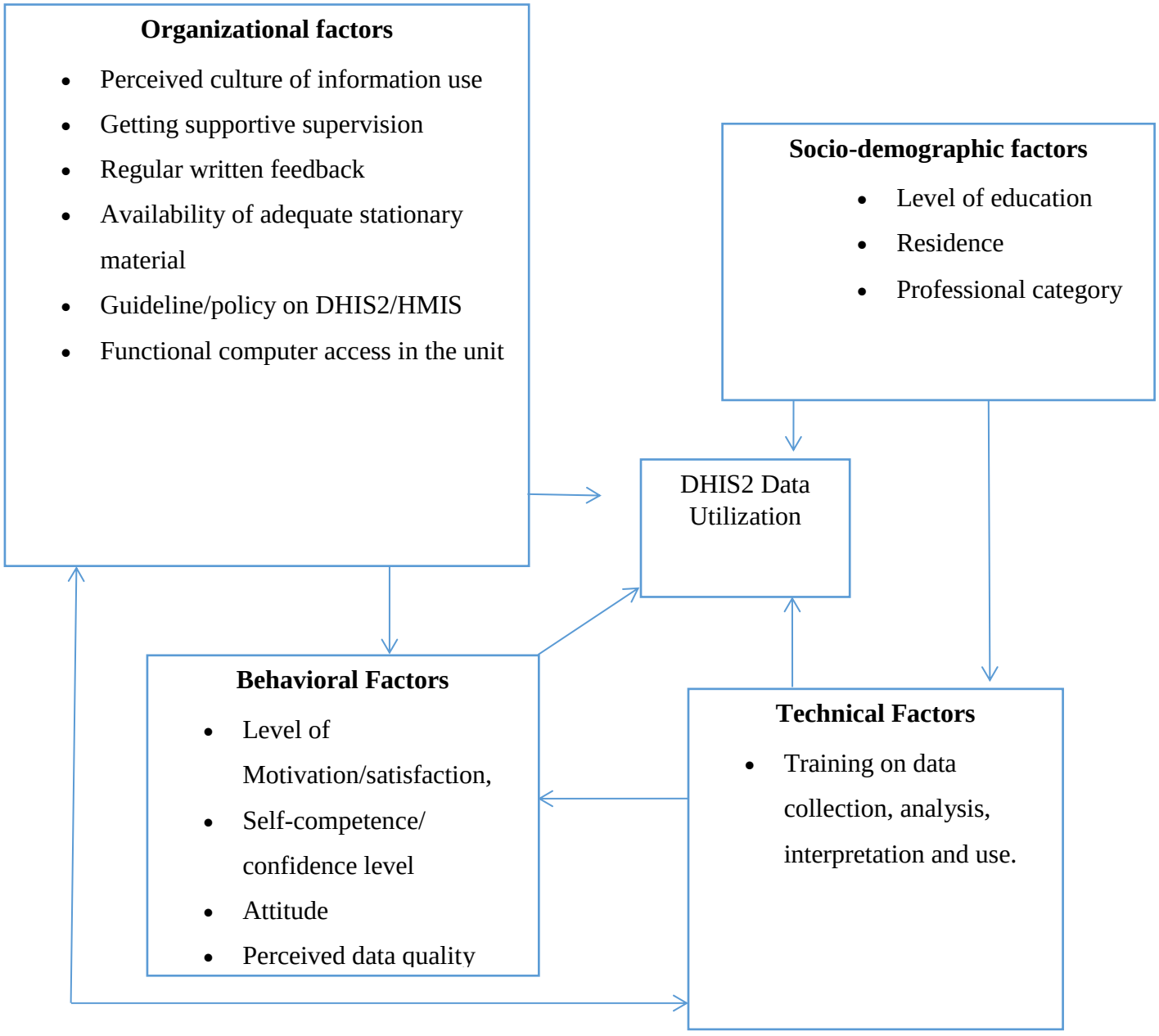


Fig.1 Conceptual framework for DHIS2 data utilization and determinants among PMT in public health facilities of Dire Dawa City Administration and Harari Region, Eastern Ethiopia, 2019/20 (source: reviewed literatures).

3. METHOD AND MATERIAL

3.1. Study area and period

The study was conducted both at Dire Dawa City Administration and Harari Region, eastern Ethiopia. Dire Dawa City administrative state is one of the two city administrations in Ethiopia located 515km from Addis Ababa. Based on the 2015 census report, a projected total population of Dire Dawa City Administration was 341,834 populations. There are a total of 17 public health facilities (Dilchora Referral Hospital, Sabian General Hospital, and 15 health centers) all of which are currently implementing DHIS2. At the end of 2020, expected number of PMT in Dire Dawa City Administration was 250.

Harari Region is one of the ten regional states found in Ethiopia located 526 km far from Addis Ababa. Based on the 2015 census report, a projected total population of Harari Region was 183,415. There are a total of 10 public health facilities (Hiwot Fana Specialized University Hospital, Jagol General Hospital, and 8 health centers) in the Harari Region all of which are currently implementing DHIS2. At the end of 2020, there are a total of 170 expected number of PMT in Harari region. The study was conducted from July- 2020 – August- 2020 G.C.

3.2. Study design

Institutional-based cross-sectional study design was performed at public health facilities of Harari Region and Dire Dawa City Administrations.

3.3. Source population

All PMT members in public health facilities of Harari Region and Dire Dawa City Administrations, eastern Ethiopia

3.4. Study population

All PMT members in randomly selected public health facilities of Harari Region and Dire Dawa City Administration**s**

3.5. Inclusion and exclusion criteria

3.5.1. Inclusion criteria

- All PMT members at public health facilities located in Harari Region and Dire Dawa City Administrations.

3.5.2. Exclusion criteria

- Those PMT members who were on annual leave or not willing to be interviewed.

3.6. Sample size determination

For Objective 1

The sample size is determined using single population proportion formula assuming 55% magnitude of data utilization in Liberia (USAID, 2014), 5% margin of error, 95% level of confidence, and 10% non –response rate.

$$n = \frac{(Z\alpha/2)^2 p(1-P)}{d^2}$$

n= Total sample size. N= source population (420). Zα/2= 1.96 d= margin of error. P=proportion of data utilization. Since the source population is less than 10,000, after using the correction formula, a minimum sample is 220.

For Objective 2

For each of the factors identified for data utilization, double population proportion is used and calculated using Epi info 7 as shown in the table below.

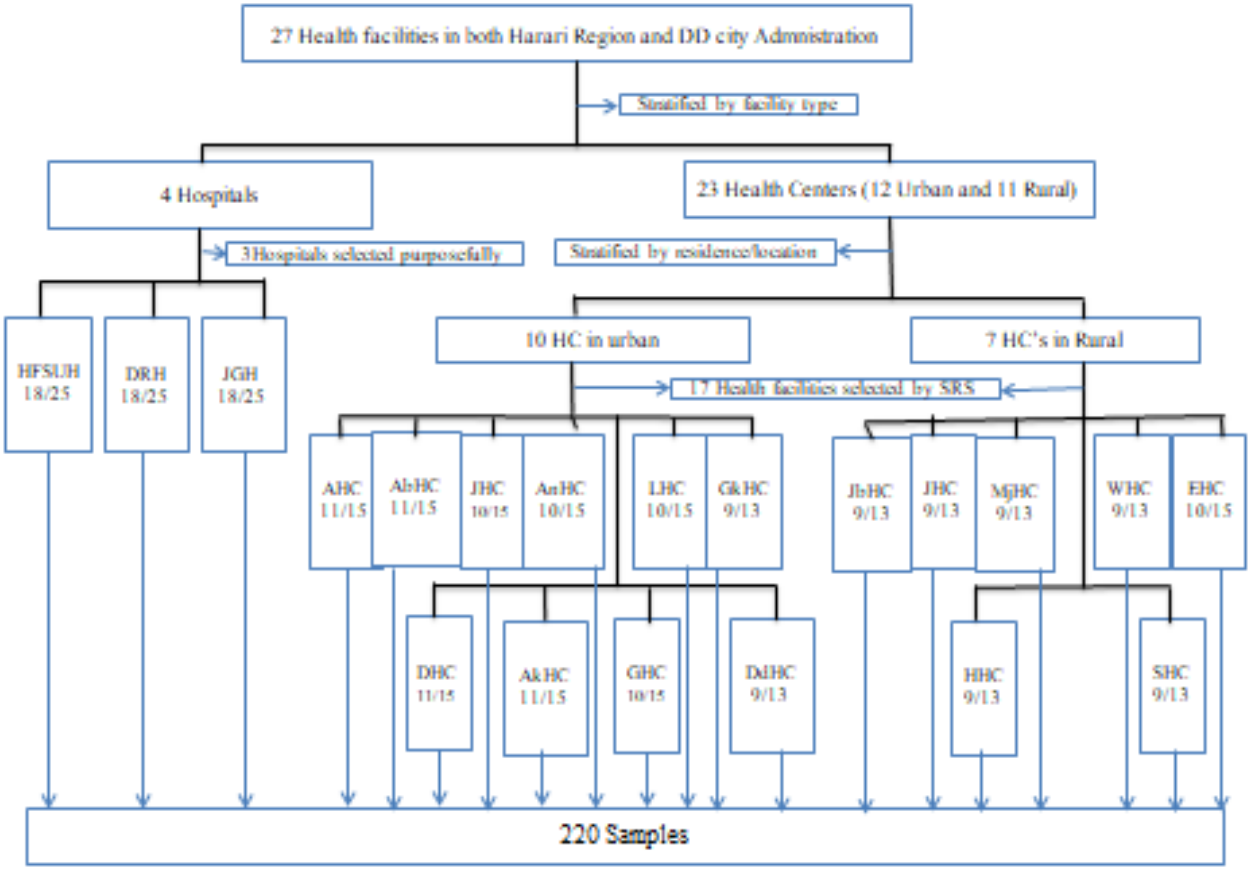
Table 1: Parameter from main determinants associated with data utilization for sample size calculation.

S/N	Variables		Proportion	Non-response rate	power	Sample size	Reference
1	Supportive Supervison	Present	60%	10%	80%	159	(Andualem, 2017)
		Absent	35.5%				
2	Level of Motivation	Yes	57.3%	10%	80%	110	(Yerinebeb, 2015)
		No	27.9%				
3	Training	Yes	60%	10%	80%	147	(Andualem, 2017)
		No	34.5%				
4	Computer access	Yes	54.6 %	10%	80%	92	(Andualem, 2017)
		No	34.1%				

The minimum sample size for objective 2 is 159 for the strongest factor supportive supervision (proportion of outcome among exposed=60%, the proportion of outcome among non-exposed= 35.5%). Finally, the minimum sample size for the study was 220 (objective 1).

3.7. Sampling technique

A stratified sampling technique was used. There are a total of 420 expected number of PMT in 27 public health facilities (4 hospitals and 23 health centers) in both the Harari Region and Dire Dawa City Administrations. The facilities were stratified based on facility type (hospitals and health centers) and residence (urban and rural). A total of 3 hospitals were selected purposefully. A total of 17 health centers were selected by lottery method from a total of 23 health centers. Then, samples were proportionally allocated for each facility, and finally a simple random sampling technique (lottery method) was used to select samples of PMT members from each selected facility as shown by figure below.



Keys:

HFSUH: Hiwot Fana specialized university Hospital, **DRH:** Dilchora Refferral Hospital, **JGH:** Jagol General Hospital, **AkHC:** Addis Ketema Health Center, **LHC:** Laga Hare Health Center, **JbHC:** Jelo Belina Health Center, **MjHC:** Melka Jebdu Health Center, **AHC:** Arategna Health center, **AbHC**: Aboker Health Center, **JHC**: Jinela Health Center, **AnHC**: Amirnur Health Center, **DHC**: Dechatu Health Center, **GHC**: Goro Health Center **GkHC:** Ganda Kore Health Center, **DdHC**: Dire Dawa Health Center, **JaHC:** Jaldesa Health Center, **WHC**: Wahil Health Center, **EHC**: Erer Health Center, **HHC**: Harawe Health Center and **SHC**: Sofi Health Center

Fig2. The sampling procedure used in the selection of study participants for studying DHIS 2 data utilization and determinants among PMT members in public health facilities of DD city administrations and Harari Region.

3.8. Data collection and method

3.8.1. Data collection method and instrument

A pre-tested, structured interview questionnaire adopted from the PRISM framework was used**.** The questionnaire collects data on technical factors, behavioral factors, organizational factors and data utilization from DHIS2. Besides, availability of functional computers in the unit, guidelines and stationery materials and written feedback from the supervisor were collected by observational checklist. The questionnaire was prepared and administered in English language.

3.8.2. Data collectors

Eight data collectors (BSc in Nursing, public health officers, and HIT) having training and experience on DHIS2 and working in similar setting were assigned to each health facility to collect data. Besides, four Mph students were assigned as supervisors to check daily data collection activities. Data collectors and supervisors were given two days' refreshment training on questionnaire contents and about the procedure of data collection.

3.8.3. The procedure of data collection

Participants were identified to be included in the study at the time of visit and were visited in their respective units/sections or offices and interviewed after being explained the purpose of the study and signing the consent form.

3.9. Variables

3.9.1. Dependent variable

- DHIS2 data utilization

3.9.2. Independent variable

- **Socio-demographic determinants:** Age, sex, education level, work experience, residence, position, monthly income.
- **Technical determinants:** Getting training, user-friendliness of tools, types of primary data collection tool.
- **Behavioral determinants:** Level of motivation, attitude, perceived self-competence, perceived data quality.

- **Organizational Level Variables:** The perceived culture of information use, getting supportive supervision, regular written feedback, guideline/policies on DHIS2 information display and use, availability of functional computer access in the unit, availability of adequate stationery material.

3.10. Operational definition

DHIS2 data utilization*:* It is defined as the use of data/information from DHIS2 for analytic report production, discussion, decision/actions, target setting, information dissemination, planning, and monitoring (USAID and MEASURE, 2019). There are a total of eleven question and all these components have a Yes or No answers each. Percent of data utilization was then calculated for each individual respondent. Finally, median score cut of point was used to classify as "good data utilization" if score is greater than or equal to median score and "poor data utilization" if a score is less than median score. Total level of DHIS2 data utilization was calculated as the average of all individual DHIS2 data utilization.

Perceived culture of information use: Intensity of participant's belief regarding information use in the facility by staffs, superiors or head of facility was measured through set of eleven items. All the components have a Likert scales ranging from strongly disagree to strongly agree. Finally, mean score cut of point was used to classify as good perceived culture of information use and poor perceived culture of information use (USAID and MEASURE, 2019)

Perceive self-competence: It is how participants perceive their competence in performing tasks related to information system. They rated their competence in accomplishing various activities on a scale from 0–5, where 0 is "no competence" and 5 is "very strong competence". Ability to check data quality, ability to calculate percentages/rates correctly, ability to plot trend on chart, ability to explain implication of results of data analysis, ability to use data for identifying performance gaps and ability to use data for making operational or management decision are components used to measure self-competence. Finally, mean score cut of point was used to classify as "good perceived self-competence" if score greater than or equal to the median and "poor perceived self-competence" if score is less than median score (USAID and MEASURE, 2019).

Attitude: Study participants were asked a serious of three questions on how they feel regarding health data. All components have a Likert scales ranging from strongly disagree to strongly agree. Finally, mean score cut off point was used to classify as "favorable attitude" if the score is less than or equals to mean score and "unfavorable attitude" if score is greater than mean score (USAID and MEASURE, 2019).

Level of motivation: Study participants were asked a serious of three questions. All components have a Likert scales ranging from strongly disagree to strongly agree. Finally, mean score cut off point was used to classify as "good motivation" if the score is greater than or equals to mean score and "poor motivation" if score is less than mean score(USAID and MEASURE, 2019).

Perception on data quality: It is how participants perceive quality of data in their facility/unit in terms of accuracy, timeliness and completeness. They were asked for their perception about quality of data in their facility as good or poor.

Performance Monitoring Team (PMT): A team that includes; head of facility, HMIS coordinators, case team leaders, finance and human resource representative (FMOH, 2015).

Functional computer access: if the available computer properly functioning and are used for data recording, processing and report writing.

Public Health Facilities: Are those facilities giving service to public and administered by government. In this case includes Health centers and Hospitals.

3.11. Data quality control

Data collection tool was pretested at two health facilities located in similar setting but not included in the study to validate the tools. Questionnaire was evaluated for clarity, adequacy of instrument and time required to fill the question and subsequent modification were made.

Data collectors and supervisors were recruited considering important criteria, like level relatedness of profession with subject area and experience. Degree (experienced diploma) and master's holders in similar area were required to select data collectors and supervisors, respectively. Similarly, possible experience with quantitative data collection was considered to ensure quality of the data.

Data daily collected by data collectors was cross checked by supervisors together with the investigator. Data was entered into Epi-data software on daily basis and any outliers or influential data were checked and corrected soon. Double data entry was performed by two data clerk and validation was performed at the end of data entry before the analysis.

3.12. Method of analysis

Completed questionnaires were coded and entered into Epi-data version 3.1 computer programs and exported to STATA version 20 for further cleaning and statistical analysis. Univariate analysis were made using mean (with standard deviation), media, frequency, percentage and the result was presented by narration, tables and graphs. Chi-square test was used to compare categorical variables between two groups. The binary logistic regression model was applied to identify determinants of DHIS2 data utilization and the multivariate model was fitted with enter method**.** A total of 13 variables that yield p-value of less than 0.25 in bivariate analysis were considered to be a candidate for multivariable logistic regression analysis. Presence of Multicollinearity among the independent variables was checked using Variance Inflation Factor (VIF). For a given covariate Multicollinearity was considered to be absent when it's VIF is below 10 indicating non-existence of Multicollinearity among the variable included in the model. The fitness of the model was assessed using the Hosmer-Lameshow statistic. The bivariate and multivariate outputs were presented in Crude Odds Ratio (COR) and Adjusted Odds Ratio (AOR), with their respective 95% CI and $p<0.05$ was used to declare statistical significance.

3.13. Ethical consideration

Haramaya University Collage of Health and Medical Science Institutional Health Research Ethics Review Committee (IHRERC) gave ethical clearance before the commencement. After telling the purpose of research as partial fulfillment of my master's degree, Informed consent was obtained from respective facility heads before data collection. During data collection, the study participants were asked for voluntary consent and signed written agreements on consent forms. The consent was secured after the purposes of the study, the rights of participants, potential benefits and harms of the study, etc. will thoroughly and

privately communicated. They were informed to interrupt the interview on desire. Confidentiality was ensured using codes instead of name.

3.14. Information dissemination

The result will be displayed to facility heads, respective regions and to Haramaya University School of graduate study as requirement for fulfillment of my study. Effort will also be made to publish on peer reviewed journal in the future that help as a source of information for other facility with similar setting and for those who are in need.

4. RESULT

4.1. Socio-Demographic Characteristics

A total of 216 (response rate=98.2%) individuals participated in the study. Non-respondents were from three health facilities. Of the total participants, 50% were males and with median (±SD) age of 28 ± 5.93 years. Of the majority of participants, 71% were degree holders and 74% were currently living in urban settings. Professionally, 41% were nurses and health information technicians (HIT) accounts for 7.4%. More than three-fourth of the participants, 77% was from health centers and 87% were case team leaders. The median monthly income of participants was found to be 7111ETB and the majority of which, 55% have 1-5years of experience.

Table2: Socio-demographic characteristics of PMT members working in public health facilities of Harari Region and Dire Dawa City Administration, 2020, n=216.

Variables	Category	Frequency	Percentage
Sex	Males	108	50%
	Females	108	50%
Age	≤30 year	142	66%
	>30 year	74	34%
Level of education	Diploma	49	23%
	Degree	153	71%
	Master and above	14	6%
Type of facility	Hospital	50	23%
	Health center	166	77%
Position	Case team leaders	188	87%
	HMIS focal persons	16	7%
	Facility heads	12	6%
Work experience	≤1 yr.	12	6%
	1-5yr	118	54%

	>5yr	86	40%
Monthly Income	≤5000 ETB	41	19%
	5000 – 10,000 ETB	133	62%
	>10,000 ETB	42	19%

Remark: Age and monthly income were categorized based on the finding of previous literature (Andualem, 2017)

4.2. Organizational determinants

More than half (53%) of participants perceive that the culture of information use was good in their facility. In terms of the level of support PMT members were getting from their supervisor, 46% have received at least one supportive supervision in the last three months on data utilization from the outside or inside supervisor and only 40% of participants received regular written feedback from their supervisors. Regarding resources, about 67.5%, 32.5% and 20% of respondents reported as having adequate stationery materials, functional computer access, and DHIS2/HMIS guideline in their unit, respectively.

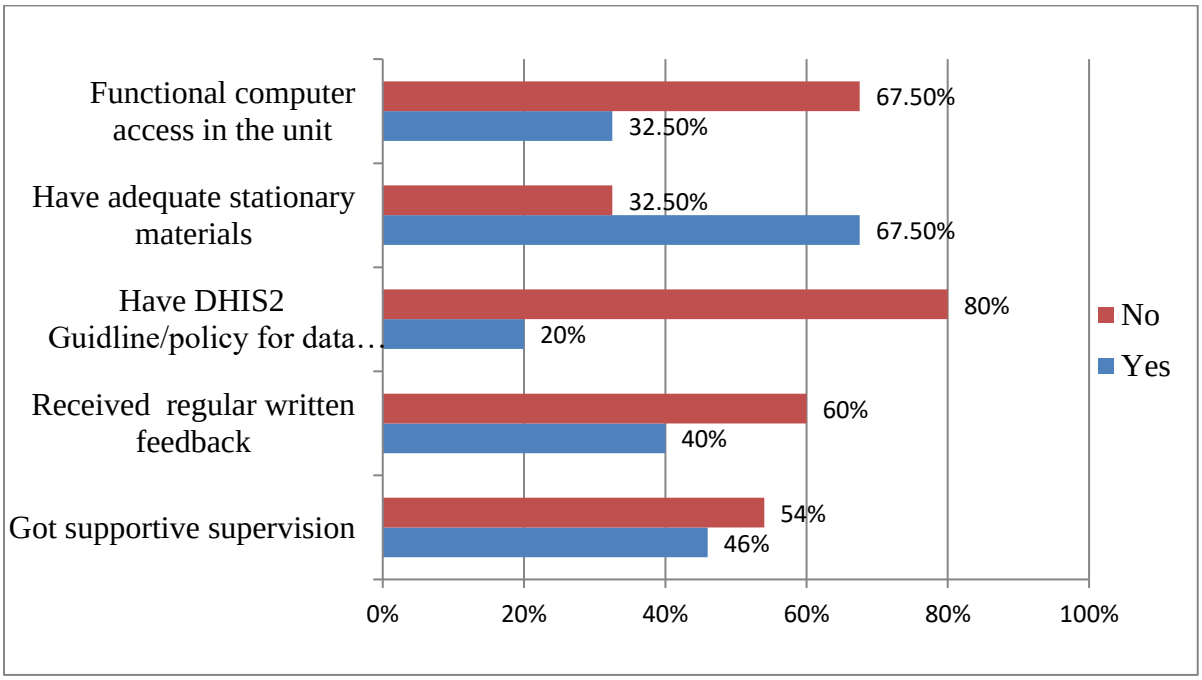


Fig3. Description of organizational determinants among PMT members working in Public health facilities of Harari Region and Dire Dawa City Administration, 2020 G.C

4.3. Technical determinants

In this study, it was revealed that one-fourth (26%) of PMT members had never had training about either the DHIS2 data recording and reporting, data analysis, or data utilization. In addition to training, about 79% of participants had reported data recording and reporting tool as user friendly, and more than three fourth (78%) of primary data collection tool in the unit were reported as paper-based (See figure 4 below).

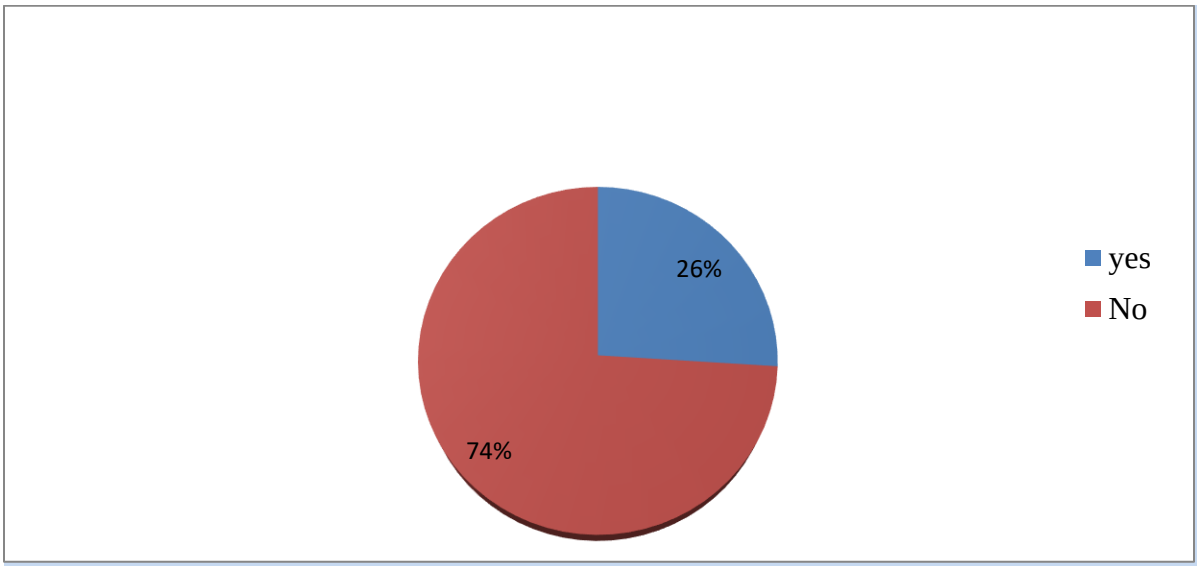


Fig 4: Training status of PMT members working in public health facilities of Harari Region and Dire Dawa City Admnistration, 2020.

4.4. Behavioral factors

Behaviors of PMT members determine their level of data use. Level of motivation, attitude, perceived self-competence, and perceived data quality were determinants of these behaviors. Among PMT members who were participated in the study, 47% and 43% of them described their level of motivation and perceived self-competence as good, respectively. The majority of respondents, 58% have a favorable level of attitude and less than half (41%) of PMT members perceived data quality as good (See figure 5).

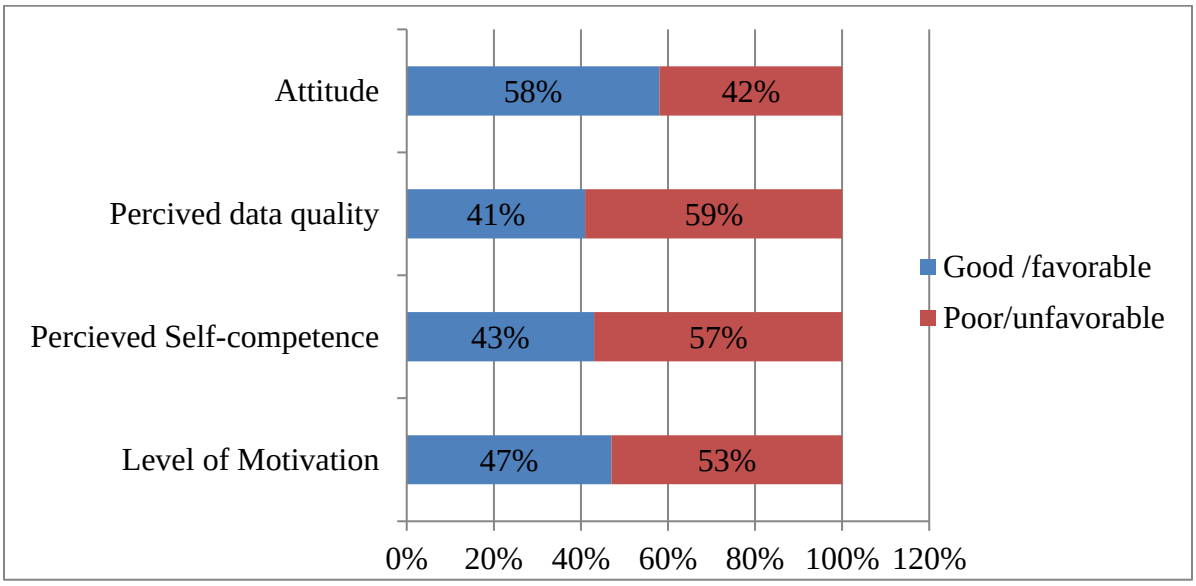


Fig 5: Description of behavioral determinants among PMT members working in public health facilities of Harari Region and Dire Dawa City Administrations, 2020G.C

4.5. Level of data utilization

In this study, utilization of data from DHIS2 was measured among PMT by computing a value of eleven dimension from July-August, 2020. Overall, utilization of data from DHIS2 by PMT member in study area was 45% (95%, CI= [39%, 50%]).

4.6. Determinants of data utilization

In the multivariate analysis performed by binary logistic regression adjusted for all variables, attitude, perceived self-competence, perceived data quality and getting supportive supervision were the only determinants significantly associated with DHIS2 data utilization. The Hosmer and Lemeshow test fit (*P value=0.3018*) for the total model and VIF indicated the non-existence of Multicollinearity among variables in this study.

The odds of DHIS2 data utilization among individuals with favorable attitude was threefold compared to individuals with unfavorable attitude (AOR=3, 95% CI: 1.90 – 8.62). Similarly, PMT members with good self-competence were more than two times likely to utilize data

from DHIS2 than their counterparts (AOR=2.9, 95% CI: 1.14 – 7.38) and individuals having good perception towards data quality are more than four-folds more likely to utilize data from DHIS2 (AOR=4.4, 95% CI: 1.76 – 10.9). Concerning organizational factor, the odds of data utilization from DHIS2 among those who got supportive supervision were four times more likely than those who did not get supervision (AOR=4.3, 95% CI: 1.48-12.45).

Although residence, the position of participants, monthly income, getting training, type of primary data collection tool, the perceived culture of information use, availability of computer in the unit and availability of guidelines were significantly associated with DHIS2 data utilization in bivariate analysis, they have lost significance in the multivariate analysis.

Table 4: Multivariate logistic regression analysis model for determinants contributing to DHIS2 data utilization among PMT members working in public health facilities of Harari Region and Dire Dawa City Admnistration, 2020 G.C

	Categories	**DHIS2 data utilization**		**COR (95%) CI**	**AOR (95%) CI**
		Yes	**No%**		
Position	Case team leader	63	125	1	1
	HMIS focal person	9	7	4.3 (1.45-13.10)	1.2 (0.09 – 15.8)
	Facility head	11	1	1.04(0.29-12.9)	1.7 (0.59 – 8.90)
Monthly income	≤5000ETB	16	25	1	1
	5000-10000ETB	39	94	0.6 (0.3-1.3)	0.62(0.16 – 2.4)
	>10000ETB	31	11	4.4 (1.7-11.1)	2.3 (0.37 – 13.8)
Motivation	Poor	28	87	1	1
	Good	58	43	4 (2.34-7.48)	1.6(0.62-4.00)
Attitude	Unfavorable	74	17	1	1
	Favorable	56	69	5.3 (2.84-10.11)	**3 (1.90 – 8.62)**
Perceived self-competence	Poor	26	97	1	1
	Good	60	33	6.7 (3.69-12.43)	**2.9 (1.14 – 7.38)**
Perceived data quality	Poor	37	90	1	1
	Good	49	40	3 (1.69-5.25)	**4.4 (1.76 – 10.9)**

Getting Training	No	43	116	1	1
	Yes	43	14	8 (4.12-16.63)	1.07 (0.27 – 4.2)
Getting supportive supervision	No	21	95	1	1
	Yes	65	35	6 (4.49-15.71)	**4.3 (1.48-12.45)**
Received written Feedback	No	22	105	1	1
	Yes	62	25	10(5.70-20.61)	2.5 (0.93-6.79)
Types of Primary data collection tool	Paper	54	114	1	1
	Electronics	11	12	2 (0.80-4.66)	0.2(0.03– 1.59)
	Both	19	3	13 (3.79-17.13)	6.3(0.27-31.62)
Availability of functional computer	No	38	108	1	1
	Yes	48	22	6 (3.31-11.59)	1.7 (0.53 – 5.28)
Availability of guideline	No	55	118	1	1
	Yes	32	12	5.5(2.64-11.60)	0.9 (0.19 – 4.20)
Perceived culture of information use	Poor	13	88	1	1
	Good	73	42	11(5.87-23.57)	5(0.69-13.47)

5. DISCUSSION

This study evaluated DHIS2 data utilization and determinants among PMT members working in public health facilities of Harar Region and Dire Dawa City administration. The overall level of utilization of data was found to be 45% (75% for facility heads, 62% HMIS focal persons and 41% case team leaders). Attitude, perceived self-competence, perceived data quality and getting supportive supervision were determinants significantly associated with DHIS2 data utilization.

Overall utilization of data from DHIS2 in Harari Region and Dire Dawa City Admnistration is 45% (95%, CI: 39%, 50%). The utilization of data in the study area was similar to a study done in a governmental hospital in Ethiopia (Mulusew, 2017, Tesfamichael et al., July 10, 2019) which is 43.8% but, higher than the study done in Nairobi county, Kenya in which DHIS2 data use was only 30% (Gathua, 2014). This difference may be due to the difference in the study period or tool. Unlike Gathua (2014), this study utilized the PRISMA framework for the measurement of the outcome variable. Though the PRISMA framework measures outcome variables concerning to data visualization, analytic report production, decision/actions, target setting, information dissemination, planning, monitoring and the like, Gathua (2014) measured outcome variables only in terms of reporting, program improvement, and information dissemination solely. Using a few set of criteria to measure outcome variables like that of Gathua underestimates the result. In contrast to the above, the result was lower than the result of an assessment of PRISMA in Liberia which is 55% overall data utilization (USAID, 2014, Welay Ataklti et al., 2017). This may be due to lower access to functional computers in the unit, poor supportive supervision and low access to DHIS2 functionalities for case team leaders in the study area.

According to this study perceived self-competence is another factor that has a significant association with DHIS2 data utilization. Those who have well perceived self-competence are more likely to utilize DHIS2 data. If people perceive they can analyze, interpret and understand data, they feel confident and competent in performing the task, and perceive that the task's complexity is challenging but not overwhelming, then they will complete the task diligently (Anwer Aqil et al., 2009, Mboro, 2017). The findings concede with the study done in South Africa, Uganda and Woliso which revealed that DHIS2 data utilization was

compromised by poor self-competence (Asiimwe, 2015, Kitaba, 2015, Richard Ole Kuyo et al., 2018).

The study also showed that good perception towards data quality improves the ability to use DHIS2 data for a different purpose. Individuals who had a good perception of data quality are more likely to utilize data. This might be because individuals having a positive perception toward data quality are confident that the data they are consulting are accurate, timely, and complete. The finding is consistent with the study done in Malinda sub-county, Kenya and South Africa (Chorongo, 2016, Edward Nicol et al., 2017, Mboro, 2017).

Furthermore, the attitude of the participants is one of the positively and significantly associated behavioral determinants with DHIS2 data utilization. In this study, individuals with favorable attitudes were more likely to utilize DHIS2 data. This is because if people think that data is useful activities or not a waste of time, they are likely to perform RHIS tasks (Anwer Aqil et al., 2009). This result matches with the study done in Kenya and Ghana (Chorongo, 2016, Mboro, 2017). Besides, the result is also consistent with reports of USAID and MEASURE Evaluation(USAID and Evaluation, 2018).

From the result, it is found that getting supportive supervision is an organizational determinant that which has significant association with DHIS2 data utilization. Individuals who got supportive supervision are more likely to utilize data. Getting supportive supervision promotes the skill, knowledge, and personal initiation to manage and use data. Besides, when regular supportive supervision exists, they tend to be focused on data quality, reporting, and data visualization to demonstrate compliance(USAID and Evaluation, 2018). This determinant is also mentioned as crucial for DHIS2 data utilization by various studies done in Kenya and Ethiopia (Josephine et al., 2014, Richard Ole Kuyo et al., 2018, Welay Ataklti et al., 2017).

6. LIMITATION AND STRENGTH OF THE STUDY

6.1. Limitation of the study

- Inability to include a qualitative method and private institutions are the major limitations of the study.
- Inability to measure actual skills.
- Finally, the cross-sectional nature of the design limits the study from showing the temporal relationship.

6.2. Strength of the study

- The is one of the few studies that explored the utilization of data from DHIS2 and used a set of criteria to measure a given variable like the perceived culture of information use, attitude, motivation, self-competence, unlike other studies. This would help to have a correct picture of a given variable.

7. CONCLUSION AND RECOMMENDATION

7.1. Conclusion

This study revealed 45% of DHIS2 data utilization by PMT members in public health facilities of Harari Region and Dire Dawa City Administration and it is below national recommendation. The result of this study revealed that favorable attitude, perceived good self-competence, perceived good data quality, and getting supportive supervision appeared to be the most important determinants of data utilization in Harari Region and Dire Dawa City Administration. This result also provides an insight into the level of DHIS2 data utilization and determinants in understudied areas.

7.2. Recommendation

Based on the result, it would be recommended that:

Harari Region and Dire Dawa City Administration health bureau

- Should provide or encourage supportive supervision regarding data quality and data utilization for PMT members.
- Should provide data analysis, interpretation and utilization training that helps to improve the skill of PMT members.

Health facilities

- Should facilitate regular discussions with members of the performance monitoring team to work on the attitude and the perception of members.
- Provide supportive supervision regularly.

Researcher

- Should focus further research by including qualitative method and consider multilevel models by including more facilities in examine variables operating at different level (facility level, regional level …etc).

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9. APPENDIX

APPENDIX 1: INFORMED VOLUNTARY CONSENT FORM FOR HEAD OF INSTITUTION

My name is----------. I am working as a data collector for the study being conducted in this facility by **Daniel Gudina** who is studying for his Master's degree at Haramaya University, the College of Health and Medical Sciences. I kindly request you to lend me your attention to explain you about the study and your institution being selected as the study setting.

1. The study/project title: Level of DHIS2 data utilization and determinants among PMT members in public health facilities of Dire Dawa City Administration and Harari Region from July, 2020 – August, 2020 G.C

2. Purpose/aim of the study: The findings of this study can be of a paramount importance for the facility to give new insight about level of DHIS2 data utilization and its determinants, thereby start their plan of strengthening data utilization. Moreover, the aim of this study is to write a thesis as a partial requirement for the fulfillment of a Master's Program in Mph in Epidemiology of principal investigator.

3. Procedure and duration: I will review and fill checklist and interview participants to provide me pertinent data that is helpful for the study. In order to achieve the above objective, this checklist and questionnaire are prepared for the collection of socio-demographic, technical, behavioral and organizational factors affecting DHIS2 data utilization that are useful for the study. There are a total of 26 set of interviewing question. The interview will take only 25 minutes.

4. Risks and benefits: The risk of interviewing this study is very minimal, but only takes few minutes of your workers. There would not be any direct payment for participating in this study. But, the finding of this study may reveal important information for local health planners.

5. Confidentiality: The information that we will be provided will be kept confidential. There will be no information that will identify the participants in particular. The findings of the study will be general for the study community and will not reflect anything particular of

individual persons. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

6. Right: participation for this study is fully voluntary. You have the right to declare to participate or not to participate in this study. If you decide to participate, you have the right to withdraw from the study at any time and this will not label you for any loss of benefits which you otherwise are entitled. You do not have to answer any question that you do not want to answer.

7. Contact address: If there are any questions or enquires any time about the study or the procedures, please contact:

Investigators phone no. = 0923450340

Investigators email= danielgudina40@gmail.com

Institutional Health Research Ethics Review Committee (IHRERC)

Office phone= 0254662011

P.O. Box= 235, Harar, Ethiopia**.**

Declaration of informed voluntary consent: I have read the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality and the contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I am informed that the Hospital/health center has the right to stop this study from being conducted if any misdeeds and unethical procedures are observed during the data collection process in the Hospital's premises. Therefore, I declare my voluntary consent on behalf of ---------- management to allow this study to be conducted in the Hospital/health center with my initials (signature).

Name and Signature of Head of the Hospital: _____Date _____

Name and Signature of Data Collector: _____Date _____

APPENDIX 2: INFORMED VOLUNTARY CONSENT FORM FOR HEALTH PROFESSIONALS

My name is----------. I am working as a data collector for the study being conducted in this facility by **Daniel Gudina** who is studying for his Master's degree at Haramaya University, the College of Health and Medical Sciences. I kindly request you to lend me your attention to explain you about the study and your institution being selected as the study setting.

1. The study/project title: Level of DHIS2 data utilization and determinants among PMT members in public health facilities of Dire Dawa City Administration and Harari Region from July, 2020 – August, 2020 G.C

2. Purpose/aim of the study: The findings of this study can be of a paramount importance for the facility to give new insight about level of DHIS2 data utilization and determinants, thereby start their plan of strengthening data utilization. Moreover, the aim of this study is to write a thesis as a partial requirement for the fulfillment of a Master's Program in Mph in Epidemiology of principal investigator.

3. Procedure and duration: I will review and fill checklist and interview health professionals and facility managers to provide me pertinent data that is helpful for the study. In order to achieve the above objective, this checklist and questionnaire are prepared for the collection of socio-demographic, technical, behavioral and organizational factors affecting DHIS2 data utilization that are useful for the study. There are a total of 26 set of interviewing question. The interview will take only 25 minutes.

4. Risks and benefits: The risk of interviewing this study is very minimal, but only takes few minutes of your working time. There would not be any direct payment for participating in this study. But, the finding of this study may reveal important information for local health planners.

5. Confidentiality: The information that we will be provided will be kept confidential. There will be no information that will identify the participants in particular. The findings of the study will be general for the study community and will not reflect anything particular of individual persons. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

6. Right: participation for this study is fully voluntary. You have the right to declare to participate or not to participate in this study. If you decide to participate, you have the right to withdraw from the study at any time and this will not label hem for any loss of benefits which you otherwise are entitled. You do not have to answer any question that they do not want to answer.

7. Contact address: If you have any questions or enquires any time about the study or the procedures, please contact:

Investigators phone no.= 0923450340

Investigators email= danielgudina40@gmail.com

Institutional Health Research Ethics Review Committee (IHRERC)

Office phone= 0254662011

P.O Box= 235, Harar, Ethiopia**.**

Declaration of informed voluntary consent: I have read the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality and the contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I am informed that the Hospital/health center has the right to stop this study from being conducted if any misdeeds and unethical procedures are observed during the data collection process in the Hospital's premises. Therefore, I declare my voluntary consent on behalf of ---------- management to allow this study to be conducted in the Hospital/health center with my initials (signature).

Name and Signature of Head of the Hospital: _____Date _____

Name and Signature of Data Collector: _____Date _____

APPENDIX 3: INTERVIEW QUESTIONNAIRE

Data: ------/-------/ 2020 G.C **Ser. No. ----------**

Title: Level of DHIS2 data utilization and determinants in public health facilities of Harari Region and Dire Dawa City Administration.

Introduction

The purpose of this questionnaire is to collect data to study DHIS2 data utilization and determinants in public health facilities of Harari Region and Dire Dawa City Administration. The findings will assist in informing strategies and opportunities for improvement. Please express your opinions honestly. Your responses will remain confidential and anonymous and will only be used for purposes of the research in aggregated forms. Your participation and assistance in this study is highly appreciated.

For any clarification contact Mr. Daniel Gudina 0923450340 (principal investigator)

Name of the Health Facility:	
Section one: Socio- demographic determinants	
1. Age (in complete year) _____	
2. Sex 1. Male 2. Female	
3. Level of education 1. Diploma 2. BSc 3. Master 4. PhD	
4. Facility type 1. General Hospital 2. Specialized Hospital 3. Health Center	
5. Residence 1. Urban 2. Rural	
6. Position : 1. CEO/Medical Director/PHCU Director 2. HMIS coordinator 3. Case Team Leader.	
7. Your current working unit: _____	
8. How long have you been in these facility (in years)?_____	
9. What is your monthly salary in Ethiopian birr?	_____ETB

10. What is your average duty payment per month in ETB? (Insert '00' if you were not paid duty).					_____ETB
11. What is your average monthly payment received from training, extra work, incentives, etc. in ETB? (Insert '00' if you were received nothing in the last 6 months)					____ETB
Section Two: Technical determinants					
12. Did you ever attend training on DHIS2? 1. Yes 2. No					
13. If your answer is yes for question 013, on which topic you train? (You can choose more than one answer) 1. Data recording and reporting procedure 2. Data quality 3. Data analysis and information use					
14. What is primary data collection tool in your unit? 1. Paper based 2.Electronic 3.Both					
15. How do you describe tools (e.g. recording, reporting tool or software (DHIS2)) in your facility? 1. Easy /user friendly 2. Complex/not-user friendly					
Section Three: Behavioral determinants					
We would like to know your opinion (how strongly you agree or disagree). Please indicate your level of agreement. 1- Strongly disagree, 2-disagree, 3- Neutral, 4-Agree, 5- Strongly agree					
16. Please indicate the extent of your attitude toward data use?					
I find collecting data is tedious (i.e., repetitive or duplicative)	1	2	3	4	5
I find that the data that I collect burdens my workload, making it difficult for me to complete my other duties	1	2	3	4	5
Data is meaningless /useless for me.	1	2	3	4	5
17. How would you describe your level of motivation to DHIS2 data utilization?					
I feel discouraged when data collected/reported are not used for monitoring or decision making.	1	2	3	4	5
I feel that the data collected are important for monitoring the performance of the health services provided at my facility/unit	1	2	3	4	5
My work of collecting data is appreciated and valued by supervisors	1	2	3	4	5
18. How you rate your Perception of self-Competence (confidence level)? Please rate your competence in accomplishing various RHIS activities on a scale from					

0–5, where 0 is “no competence” and 5 is “very strong competence”.						
I can check data accuracy	0	1	2	3	4	5
I can calculate percentages/rates correctly	0	1	2	3	4	5
I can plot a trend on a chart	0	1	2	3	4	5
I can explain the implication of the results of data analysis	0	1	2	3	4	5
I can use data for different purposes	0	1	2	3	4	5

19. How do you perceive quality of data in your facility in terms of timeliness, completeness and accuracy? 1. Good 2. Poor

Section Four: Organizational determinants

20. Is there availability of adequate stationery material like Graph paper and Markers (observation)? 1. Yes 2. No

21. Is there availabllity of functional computer in your unit (observation) ? 1. Yes 2. No

22. Are there written national/regional guidelines or policies on DHIS2/ HMIS information display and use in your unit (observation) ? 1. Yes 2. No

23. Perceived culture of information use (answer based on the below table) in the facility.

Please indicate based on a scale regarding promotion of culture of information use.

1- Strongly disagree, 2-disagree, 3- Neutral, 4- Agree, 5- Strongly agree

In the health department ,superiors (managers or supervisors):					
Seek input from relevant staff	1	2	3	4	5
Emphasize that data quality in the compilation and submission of periodic reports (e.g., monthly reports)	1	2	3	4	5
Promote multidirectional feedback mechanisms to share information within the team, and to lower and upper levels of the health system	1	2	3	4	5

Conduct routine data quality checks at points where data are captured, processed, or aggregated	1	2	3	4	5
Use DHIS2 data for service performance monitoring and target setting	1	2	3	4	5
Ensure that regular meetings are held where performance reports are presented, decisions are made, follow-up actions are identified	1	2	3	4	5
In the health department, staff:					
Complete tasks (reporting, processing/aggregation, and/or analysis) in a timely manner	1	2	3	4	5
Display commitment to generate and use good-quality data for evidence-based decision making	1	2	3	4	5
Feel "personal responsibility" for failing to reach performance targets	1	2	3	4	5
Prepare data visuals (e.g. graphs) showing progress toward target	1	2	3	4	5
Use Routine data to solve common problems in service delivery	1	2	3	4	5

24. Does your supervisor provide at least one supportive supervision in the last three month? 1. Yes 2. No

25. Did you receive regular written feedback from the head or other body regularly on your performance, data quality and information use? 1. Yes 2. No

Section Five: Level of DHIS2 data utilization

26. Do you use DHIS2 data to,	Yes	No
Prepare data visuals (graphs, tables, maps, etc.) showing achievements toward targets in the last 3 month? (observe)		
Compare performances across time (e.g. previous month) and space (e.g. across facilities) in the last 3 month (observe)		
To make decisions on Medicine supply and drug management based on the discussion of the health facility's performance in the last 6 month?		
To make decision on Human resource management (training,		

reallocation, etc.) based on the discussion of the health facility's performance in the last 12 month?		
To make decision on Budget preparation/reallocation based on the discussion of the health facility's performance in the last 12 month?		
For formulating plan in the last 12 month?		
Supervise staff on performances based on DHIS2 information and help take corrective action in the last 3 month? (observe checklist)		
Provide feedback reports on service performance and data quality based on DHIS2 information in the review 3 months? (observe)		
Produce any report (annual, quarterly, etc.) in the last 12 month containing key performance targets? (Excluding the monthly summary/aggregate reports submitted to the higher level).		
Submit/present performance reports to supervisors (or other entities) in the past 12 months by using data/information from DHIS2 to show progress?		
Share with general public via printed materials (e.g., brochures, newsletter etc.) in the past 6 months? (observe)		

APPENDIX 4: CURRICULUM VITAE (CV)

DANIEL GUDINA

Ethiopia, Addis Ababa

Phone: +251-923450340 or +251-982383716

Email: danielgudina40@gmail.com

Professional summary

I am highly motivated senior public health professional who never give up for the challenges facing me during my professional career. I have 5-year of experience in HIV/AIDS, TB/HIV, and PMTCT and Health information system. I am committed in discharging my effort to avert public health problem of our community through coordination skill in collaboration with NGO (CDC, ICAAP), community and government sector. I have strong experience regarding monitoring and evaluation, mentoring and leading program. I also have experience in conducting research in the areas of HIV and Health Information System. Currently, I am working as COVID-19 call agent supervisor under public health operation centre (PHEOC) at Ethiopian public health institute (EPHI).

Skills

- Adequate basic computer skills such as Microsoft office (word, excel, power point)
- Basic internet and web management
- Data entry and analysis software (Epi-Info, Epi-data, STATA, SPSS)
- Conducting health and health related research
- Good team work

Experience

Covid-19 call agent supervisor (September 2021-now)

Ethiopian Public Health Institute (EPHI), Ethiopia, Addis Ababa

- Capture covid-19 rumours, contacts and positive cases.

- Collect guinea worm notification.
- Handling and resolving customer inquiries.
- Recording information and identify and escalate issue to supervisors.

ART Coordinator (October 2014 – September 2019)

Moyale Hospital, Oromia, Moyale

- Coordinate the whole activities of HIV, TB AND PMTCT in the Hospital
- Plan, monitor and evaluate ART department activities.
- Clinical mentor for the catchment health centres.
- Participate in care and treatment of people living with HIV.
- Chair catchment area meeting and multidisciplinary team (MDT).
- Prepare performance report and present at different level representing Hospital (Hospital, woreda and zonal level)
- Work in collaboration with NGO, community and government sector on how to collaborate to tackle HIV.
- Supervise staffs on how to document, collect and report DHIS2 report.
- Worked closely with CEO, Medical Director and other stakeholders.
- Participate actively on decision making process as active member of senior management team and being delegated CEO multiple times.
- Worked as member of PMT, Quality, and IPPS, DTC and SMT committee.
- Participated in monitoring and evaluation of Hospital activities.
- Knowledge of different initiatives like HSTP, EHSTG and HSTQ.
- Worked as GBV focal person in the hospital.

Education

- MPH in Epidemiology, September 2018 – Now
  Haramaya University, Harar, Ethiopia
  CGPA = 3.98
- Bachelor of Science public health officer, graduated in 2013/14
  Haramaya University, Harar, Ethiopia
  CGPA= 3.57

Language

	Listening	Speaking	Reading	Writing
Amharic	Excellent	Excellent	Excellent	Excellent
Afan Oromo	Excellent	Excellent	Excellent	Excellent
English	Excellent	Very Good	Excellent	Excellent

Research (Thesis, proposals)

- Data use from District health Information system 2(DHIS2) and determinants among performance monitoring team(PMT) working in public health facilities of Harari Region and Dire Dawa City Admnistration, Eastern Ethiopia. (Funded by Doris Duke foundation)
- Effect of adolescent psychosocial support in suppressing viral load among adolescent with HIV attending public health facilities of Adama city: *retrospective cohort*.
- Routine health information utilization and determinants among health professionals working in Eat Hararghe Zone, Oromia region: *Multilevel-analysis of individual and organization factors.*

Awards

- Top performing employee of the year (certified)
- Professional licence (Senior public health professional)

Training Attended

s/n	Title of training	Organized by	Duration
1	Covid-19 infection prevention and control	FMOH	1 week
2	Reference management and citation	Haramaya University	1 week
3	Basic ART training	ORHB, ICAAP	2 weeks
4	TB/HIV Co-infection	ORHB	1week
5	HIV monitoring and evaluation	ORHB	1 week
6	Monitoring, evaluation and reporting 2(MER2)	ORHB, CDC	1 week
7	PMTCT monitoring and evaluation	ORHB, Mada Walabu	1 week

		University	
8	Gene x-pert and INH sensitization	FMOH	1 week
9	Appointment spacing and DSD	ORHB	1 week
10	Mental health	Arsi University, ORHB	1 week
11	Paediatric psychosocial support	ORHB, Mada Walabu University	1 week
12	Gender based violence (GBV)	Mada Walabu University, ORHB	1 week
13	HSTP	FMOH	1 week
14	Severe malaria and Artisunate injection	Malaria consortium	1 week
15	Nutritional assessment, counselling and support(NACS)	ORHB, FANTA	3 days
16	Refreshment training on Home based isolation centre (HBIC)	Ethiopian public health institute (EPHI)	3days

Reference

Dr.Ahmed Ibrahim Moyale Hospital, Medical Director

Phone: +251-932503572, Email: ahmedx20@gmail.com

Mr Behailu Hawulte (Assistant Professor) Haramaya University, Advisor

Phone: +251-912186283, Email: bhawulte@gmail.com

Mr Awol Dawud. Ethiopian Public Health Institute, call centre coordinator.

Phone: +251-922216425

Summary

S/n	**1.1 Educational Background**
1	University – Haramaya University Mph in Epidemiology (candidate) Haramaya University BSc in Public Health Officer
	1.2 Work Experience
2	• Covid-19 Call Agent Supervisor: Ethiopian Public Health Institute (EPHI) from September 2021-now • Mph in Epidemiology: Haramaya University from Sept 2019 – Now • ATR, TB and PMTCT Coordinator: Moyale Hospital from October 2014-

	September 2019 • Clinical Mentor and GBV focal person: Moyale Hospital from October 2015- September 2019
	1.3 Technical Skills
3	• Excellent team work • Basic computer skill on Microsoft Office(word, excel, power point) • Statistical software (Epi-Info, Epi-Data, STATA, SPSS, OpenEpi) • Conducting Health and Health related research. • Qualitative and quantitative data collection. • Facilitate and chair review meetings. • Driving licence.