ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
SCHOOL OF PUBLIC HEALTH

EVALUATING THE QUALITY OF MDSR DATA BASE MANAGEMENT SYSTEM IN, ETHIOPIA

By: Alem Begna

A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES IN ADDIS ABABA UNIVERSITY FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH

June 8, 2017

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Abstract

Back ground: one of the priority objectives of the Health sector Transformation Plan of Ethiopia is reducing maternal mortality. Knowing the right causes of maternal deaths through use of valid and reliable information is crucial to design appropriate policies, programs, and interventions to prevent avoidable deaths. Maternal Death Surveillance and Response system is a method of collecting information on the level and causes of maternal death in order to provide precise information to improve quality of maternal health. The quality of MDSR data base management system has not been adequately studied in our country.

Objective: To evaluate the quality and measure the coverage error of MDSR database management system in Ethiopia.

Methods: Institutional based cross-sectional study design with quantitative and qualitative method applied. The MDSR database with data from December 2006 through February 2009 E.C was analyzed using STATA version 14. Point and interval estimates were used to measure the coverage error of maternal death by relating reported death with estimated death for the country and regions. Besides, content errors of the data base were measured by using fundamental quality dimensions completeness, timeliness and consistency .Moreover, the challenges and limitations of the MDSR database system were assessed through thematic analysis of qualitative data collected from key informants who were heavily involved in the development and management of the MDSR database.

Result: The overall coverage rate of national MDSR database was 2.98 % with 95% CI (2.85, 3.11) which was below expected level. The incompleteness rate of variables on the database ranged from the minimum of 2.2% to the maximum of 97.2% which was far from acceptable range (80%). The timeliness of national MDRF report was 56.8% which was less than 80% and there were also inconsistent variables on the data base, high gravidity among teenagers and higher number of parity compared with gravidity for some mothers. Periodic changing of reporting tools and their shortage, addition of variables over time, inability of proxy respondents to report on every characteristics of the deceased mother while filling verbal autopsy forms were main causes for the content errors. The main limitation of the MDSR data base was capturing of very few maternal deaths and absence of user friendly software reporting system.

Conclusion and Recommendation: - The coverage rate of the MDSR database was too low. The data base had variables with incompleteness and inconsistent. The national timelines of MDRF report is less than acceptable range which is 80% System, organizational, monitoring and evaluation and individual related factors were found to be factors affecting the quality of MDSR database. Thus, the responsible bodies should play active role in supporting and facilitating the database management system.

Acronyms

ANC	Antenatal care
CRVS	Civil Registration and Vital Statistics
DQ	Data Quality
EPHI	Ethiopian Public Health Institute
FBA	Facility Based Abstraction
FMOH	Federal ministry of health
HSTP	Health Sector Transformation Plan
MCH	Maternal and Child Health
MDG	Millennium Development Goal
MDSR	Maternal Death Surveillance and Response
MDRF	Maternal Death Reporting Format
MMR	Maternal Mortality Ratio
PHEM	Public Health Emergency Management
SDG	Sustainable Development Plan
SNNP	Southern Nations, Nationalities and People's Region.
SPH	School of Public Health
TWG	Technical Working Group
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
VA	Verbal Autopsy
WHO	World Health Organization

1. Introduction

1.1. Back ground

Data quality (DQ) has been defined as “fitness for use” of the data also called Information Quality. A single aspect of data quality is defined as a “dimension” such as “consistency”, “accuracy”, “completeness”, or “timeliness” (1)

The concept of ‘fitness for use’ is a central principle: the quality of any particular data source or product can only be evaluated in light of its intended use. An overall assessment of the fitness for use of the data can only be performed once all quality dimensions and relevant indicators have been assessed(2). Data quality has serious consequences, of far reaching significance, for the efficiency of organizations. However, data quality analysis is complex, multidisciplinary area of Investigation that requires investment of resources(3).

Accurate, timely and accessible health care data play a vital role in the planning, development and maintenance of health care services. Quality improvement and the timely dissemination of quality data are essential if health authorities wish to maintain health care at an optimal level(4)

Maternal Death Surveillance and Response (MDSR) is a form of continuous surveillance system by which timely and real maternal death data is reported from local to national level. It includes the routine identification, notification, quantification, and determination of causes and avoids ability of all maternal deaths, as well as the use of this information to respond with actions that will prevent future deaths. Elimination of preventable maternal mortality is the goal of MDSR.(5). MDSR emphasizes the link between information and response. In addition, the notification of every maternal death permits the measurement of maternal mortality ratios and the real-time monitoring of trends that provide countries with evidence about the effectiveness of interventions.

Globally MDSR is acknowledged as a public health tool for reducing maternal mortality. WHO and Partners launched MDSR in 2012 by including surveillance of maternal death with timely warning and an action and response approach to the aggregated death review information (6).

In Ethiopia the MDSR system was launched in may 2013. It had been officially integrated into the Public Health Emergency Management (PHEM) system and introduced in 17 Zones as the 21st reportable condition by the end of 2014 covering around 40 million people out of an estimated total national population of 95 million (7).Then after it had been expanded to ten regions in the country ; Addis Ababa, Amhara, Afar ,BenishangulGumuz , Dire Dawa, Gambella ,Oromia , SNNP , Tigray Hareri.

Effective implementation of MDSR can directly impact the quality of care and improve maternal and prenatal health outcomes and provides real-time and nationally owned information on maternal mortality measurements and helps strengthen national civil registration and vital statistics (8, 9).

Underreporting and under-ascertainment can have a significant impact on data quality. Various degrees of underreporting and under-ascertainment can be observed during the data quality monitoring process. Underreporting can be detected at the healthcare and public health system levels, while assessment of under ascertainment would require additional studies at the population level. (10)

1.2. Statement of the problem

Most countries with high maternal mortality have weak civil registration systems. About 50% of maternal deaths were unreported due to misclassification even in countries with sufficient civil registration system (11). As a result, many maternal deaths and the causes behind these deaths were not recorded and reported, especially when women die at home. Preventing maternal deaths can be effective only if accurate information is available to support targeted responses. MDSR enables each maternal death a notifiable event, and ensures that communities and facilities report and respond to each death in their efforts to end preventable maternal deaths (12). In order to improve quality of maternal health care at all levels, establishing a functional and effective MDSR database management system is very important. (13).

Most of the studies in developing countries including our country were conducted on experiences of maternal death review, assessment of causes, trends of maternal mortality and factors affecting the implementation of the MDSR system. The national MDSR task force report on policy brief identified the presence of serious data quality problem based on 19 selected variables of MDRF reports in terms of completeness(14). Although the national MDRF data base was evaluated for completeness, the rest dimensions such as timeliness, consistency and accuracy were unknown. Thus this study aimed at evaluating the quality of MDSR database management system using quality dimensions.

1.3. Significance of the study

Counting the maternal mortality alone cannot be enough to prevent maternal deaths and to improve the quality of care (15, 16). It is important to have the right kind of information about level of maternal mortality and the contributory factors that led to the death (8, 16, 17).

In its Health Sector Transformation Plan (HSTP), Ethiopia targets to reduce Maternal Mortality Ratio from 420 to 199 per 100,000 live births by 2020 (18). Reliable and timely maternal causes of data are required to regulate the progress towards achieving the targets set in the HSTP. In this regard, the MDSR data base management system will play a key role .However, the quality of the MDSR database should be evaluated continuously. Thus this study would provide evidence on quality MDSR database that may help to inform the design of policies that improve quality of maternal health care. The study will also provide evidences that can be used to further researches in the future.

2. Literature Review

In this section we discussed on overview of the existing literature pertaining on concepts of MDSR, conceptual frame work for the evaluation of the MDSR database and factors attributed with poor data quality and challenges of MDSR system.

2.1 Maternal Death Surveillance and Response (MDSR)

There are five ways that has been used to review maternal mortality and morbidity. These are community based or verbal autopsies, survey of severe morbidity or near miss, confidential enquiries on maternal death, clinical audit and facility based maternal death review (19). WHO defines MDSR as a form of continuous surveillance that links the health information system and quality improvement processes from local to national level. The primary goal of MDSR is to eliminate preventable maternal mortality, with the overall objectives of providing information that effectively guide immediate as well as longer term actions to reduce maternal mortality. MDSR system allows counting of every maternal death, assessing the true magnitude of maternal mortality, calibrating the true cause of maternal death and the impact of actions to reduce it(20).

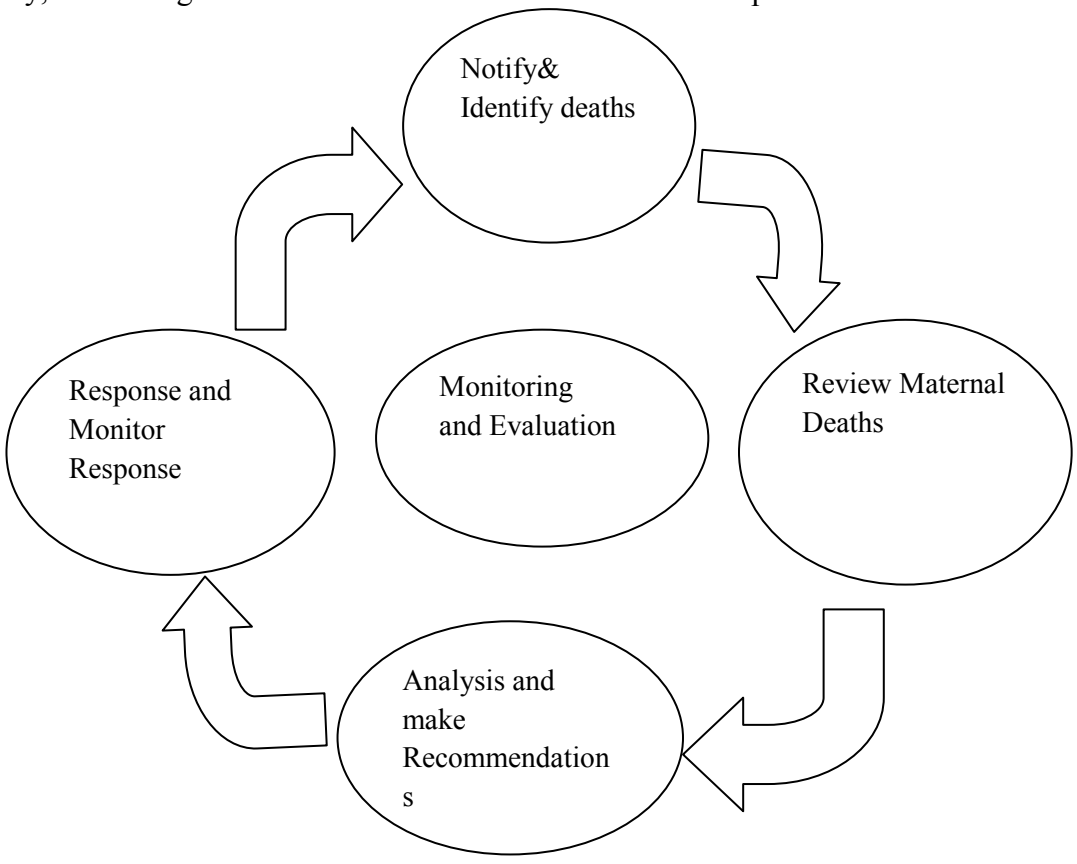

Figure 1.The continuous cycle of Maternal Death Surveillance and Response System

MDSR provides a template for a comprehensive system that notifies all suspected maternal deaths, reviews probable maternal deaths, analyze the findings and implements and monitors recommendations for change (21).

Worldwide the reported maternal mortality has been underestimating the true magnitude up to 30% and by 70% in some countries. An effective MDSR system will give more accurate and complete estimates of maternal mortality, providing robust and reliable data for a country where there is no reliable civil registration and vital statistics (CRVS**)** systems in about 60% of the world (22).

The study done on MDSR in East and Southern Africa states that Maternal death surveillance and response is considered as a one of several low cost, high impact strategies to decrease maternal mortality and needs ongoing monitoring and evaluation to make sure that it is functioning effectively and also it is an initiative strongly supported by the African Union Commission, UNFPA, and the WHO (23).

The two basic rationales of MDSR are providing information about preventive causes of maternal deaths and to set up the framework for accurate estimate of the magnitude of maternal mortalities and enables the evaluators in assessing the effectiveness of the interventions and finally helps in providing the accountability for the results and compels decision makers to give an attention to the problem. Zero reporting is the unique feature of MDSR which shows that an active process of notifying suspected maternal deaths, whether or not any have occurred (20).
The main principle of MDSR is that findings from maternal death reviews should generate an immediate response to prevent similar future deaths from occurring(22).

Moreover, study done in Ireland states that MDSR is a surveillance tool for providing timely information on where, when, and why maternal deaths occur, and for improving quality of care and preventing maternal deaths. Additionally, it enables that each maternal death is a notifiable event, and ensures that communities and facilities report and respond to each death in their efforts to end preventable maternal deaths (12). In addition to creating awareness to the

community about maternal mortality, MDSR has a great contribution for the health professionals in understanding when, where, and why mothers have died and helps in preventing future similar death by designing and taking appropriate intervention. And finally establishes enabling situation of collaboration rather than blaming to apply the findings for policy makers(16, 22).

2.2. MDSR implementation in Ethiopia

Before the implementation MDSR system, a national MDSR advisory group was established and national MDSR guidance and training materials for health workers were adapted from WHO guidelines and considering the country context other standard international guidelines were also taken. It was launched in may 2013 and initial implementation was started in a phased approach after provision of training of trainers and rollout trainings, availing tools in local language, and technical support in 5 regions and two city administrations (Oromia, Amhara, Tigray, SNNP, Hareri, Addis Ababa and Dire Dawa city administrations.) then after it had been officially integrated into the Public Health Emergency Management (PHEM) system and reported as 21st reportable conditions in 2014 (18, 24).

Trainings were also given to woreda and facility maternal and child health focal persons.
Regional, zonal/woreda and facility based MDSR review committees were established and technical assistance and mentorship were provided onsite to insure the initiative is implemented according to the guidelines. All case-based reports following local review of maternal deaths have been collected into the national MDSR databases managed by EPHI for regular analysis (24).

2.3. Challenges of MDSR system

MDSR has different challenges on different countries; limited resource, staff shortages and lack of trainings were commonly identified barriers in many of the countries that respond to MDSR baseline survey (22). According to the case study from Moldova" instilled fear" in the country's health professionals which finally lead to falsification of medical documents to mask the true circumstances of death was identified (25).

Similarly in Malawi health professionals were unwilling to report maternal death for fear of being blamed and consequently disciplined (26). Moreover, the case study of Cameron states there is the absence of appropriately trained health professionals to maintain the MDSR system (27). But it may not similar to the case study from Malaysia that achieved a significant improvements in the setting where lack of trained staffs and funding are scarce (28).

Similarly the study done in Nigeria found different Challenges on MDSR were fear of blame, shortage of staff, transfer of MDR team members, inadequate supportive supervision, and poor record keeping(29).

According to the time to respond survey report, only 46% of countries responding had a national maternal death review committees that meet twice annually (22) .Moreover, Burkina Faso case study notes that it is difficult to report maternal death from remote, hard to reach communities that had no telephone connection (30). Similarly the case studies from Bangladesh also have the same finding reporting maternal death in hard to reach areas can take them up to a month compared to one week specified by national guidelines (31).

Moreover, study done in East and Southern Africa documented limited resources (both financial and human), lack of a legal framework for MDSR, misconceptions about confidentiality and accountability, lack of adequate community engagement, absence of policies and guidelines, competing priorities in an already stressed health care system, inadequate leadership, and the inability to follow up on recommendations identified as challenges and weaknesses of MDSR (23).

According to the national report from EPHI on the challenges of MDSR system in Ethiopia, there are three categories of challenges. Tendency to hide any information about abortion, pregnancy outside marriage, low awareness of the community about what and when to report, fear of accusation by their supervisors among Health Extension workers, large catchment area to cover by HEWS were considered as community level challenges. On the other hand, at Health Facility (Health Centers and hospitals) level : absent/ poorly functioning review committees, low ownership and leadership among managers, delay in doing verbal autopsy and reviewing cases

and reporting, sending case based report without reviewing, tendency to hide cases because of fear of blame from higher authorities, poor coordination of activities, shortage of resources for implementing responses, poor recording and documentation of relevant histories, lab results and /missing of charts are categorized under this theme. At National and Regional program level, irregular meeting of TWG, shortage of budget for system scale up, low supportive supervision at all levels, absent or poorly functioning TWG at ZHOs, poor ownership of the program, low support and follow up for Health Centers, weak coordination of different activities at woreda level were mentioned (24).

2.4 Factors affecting the quality MDSR database management system

Accurate, timely and accessible health care data play a vital role in the planning, development and maintenance of health care services. Quality improvement and the timely dissemination of quality data are essential if health authorities wish to maintain health care at an optimal level. It is important to ensure that the original source data are accurate and timely, which in turn, will produce reliable and useful information(4).

In general terms, quality consists of the ability to achieve desirable objectives using legitimate means. Quality data represent what was intended or defined by their official source, are objective, unbiased and comply with known standards. Data quality includes: accuracy**,** validity**,** reliability, completeness, legibility, timeliness, accessibility, consistency and usefulness**.(32)**

Health care data are maintained for the present and future care of the patient regardless of the level at which the service is provided. Quality data is essential, not only for use in patient care, but also for monitoring the performance of the health service and employees. Data collected and presented should be accurate, complete, reliable, legible and accessible to authorized users.(32-34)

Various factors were identified in different literature on factors affecting the quality of database in different context. According to study done in Nigeria, factors such as management commitment and support, data quality policies and standards, training and communication, organizational structure, nature of information system, performance evaluation and rewards, change management, adequate funds to execute project and internal controls (systems and

processes) were identified (29). Similarly the study done in Netherland categorizes various factors at respondent, system, data supplier, statistical agency, regulations, agreements and cooperation level. Under the respondent motivation and capacity, the respondents capacity to supply correct and complete data timely, and concepts of the respondents were included. Under the system, availability, reliability, correctness of the system itself was seen. Continuity, reputation, commitment, motivation and capacity to supply correct and complete data timely were seen under data supplier. Involvement in the design and production of the data supplier, influence to policy makers were seen under statistical agency. Legal rules that govern/influence the process of the data supplier and regulations oriented towards the needs of the statistical agency were categorized under regulation.(35, 36).

Another study done using Health information record review defined a quality data problem as any difficulty encountered along one or more quality dimensions that turn data completely unfit for use. And also identified four major aspects known to affect information quality, these are: intrinsic data quality, data quality context, data quality representation and data quality accessibility (37).

Organizations are also identified as one of the factors contributing to the quality of data since they are becoming more and more dependent on data, almost everything the modern organization does both depends upon and creates enormous quantities of data. To meet the needs of the organization, a comprehensive data management program is essential (38)

Another study done in Namibia on TB database quality, clearly describe the flow of data from the facility level up to the district level and identified timeliness as major factor affecting quality of information reaching various management levels, the frequency of feedback to evaluate the achievements of the program (39). One of the attributes of reliable and valid data is its completeness. According to a study in the United Kingdom, complete data allow governments to be reassured concerning full disclosure of outcomes by the centre of origins, thus assisting in the process of validation, monitoring and feedback geared toward improving data quality (40)

2.5. Coverage and data quality problems of MDSR data base management system.

The main purpose of MDSR is to set an intervention for reducing maternal mortalities, to prevent future maternal deaths and improve the measurement of mortality and response to calls for ending preventable deaths requires better measurement and better information. Different MDSR implementing countries had better coverage on maternal death data through MDSR database system.

According to Malawi report 68% maternal deaths were captured by the MDSR data base from October 2014 and June 2015.Similarly in India forty two percent of maternal deaths were captured by the MDSR data base from estimated. Moreover the report on MDSR from Bangladesh states 38% of maternal deaths were captured from estimated by the MDSR data base (41)

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The study done in South and East Africa identified factors such as lack of information regarding community-related, Concerns about confidentiality and the laying of blame as affecting completeness of MDSR data. (42)

The national MDSR task force of Ethiopia report on MDSR data review from January 2014 to December 2015 covering 539 maternal deaths identifies the presence data quality problem in terms of completeness on case based MDSR data base report. The variables evaluated for incompleteness were date of MDRF reporting , deceased ID ,date of death , age at death , place of death ,marital status ,religion and ethnicity of the deceased ,level of education ,gravidity ,parity , attended ANC, cause of death ,preventability of deaths. The rate of incompleteness ranges from the minimum of 1.3% to 100%. The maternal death captured by the data base was only 2.5% from that of estimated during this period which was very low. (14)

2.6. Conceptual framework of factors affecting the MDSR data base management system

This is a conceptual frame work, indicating roles of various factors affecting the quality of MDSR database. This framework also helps us to document factors identified within different literatures and in relation to the quality of database management. Poor quality of MDSR database could be attributed to different factors. Some of the factors associated with poor data quality of MDSR database are related to organizational factors **(**Data quality policies and standards, performance based rewards**,** change management**,** conducive physical environment, continuous power supply**,** sufficient funds to execute project),system factor**: (**nature of the information system**,** supplies like format, database**,** software (up to date (current) and original)**,** periodic and frequent backups**,** functionality of database**,** internet access),monitoring and evaluation**: (**management support and commitment to DQ**,** training and communication**,** performance evaluation, capacity building**,** Internal controls),individual factors: (commitment, motivation, (employee responsibility to DQ) and understanding of the system and importance of DQ) (35, 43).

Organization can directly affect both system and monitoring and evaluation but can affect personal factor indirectly to cause the poor quality of MDSR databases. Additionally organizational, personal, and system can independently affect the quality of MDSR database management system. The detail description of the interaction of factors with quality of MDSR database is as shown in figure below.

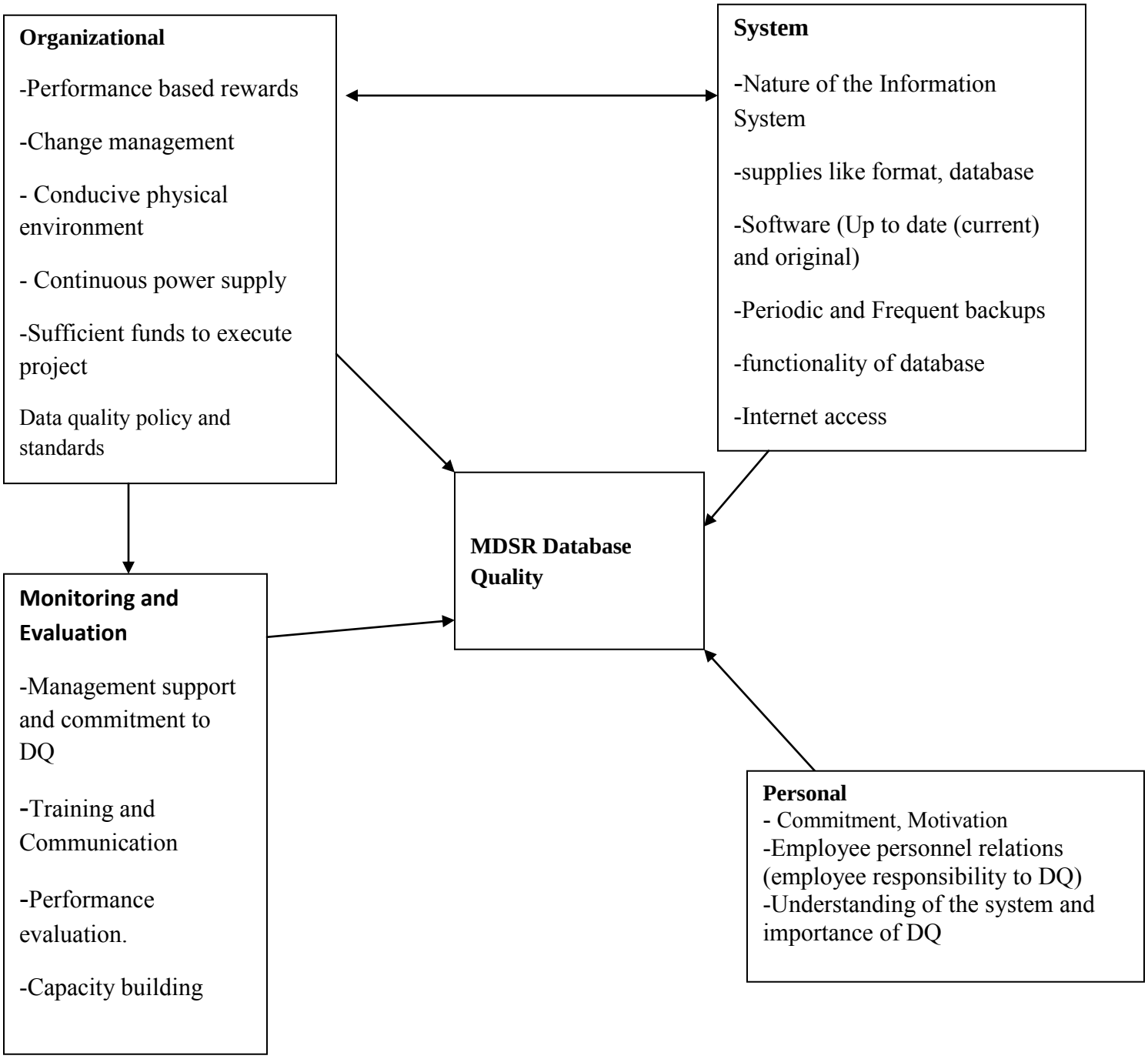

Figure 2 Conceptual Framework on factors affecting data quality of MDSR

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3. OBJECTIVES

3.1. General objective

To evaluate the quality and measure coverage error of the MDSR database management system in Ethiopia

3.2. Specific objectives

- To measure the coverage error of the MDSR data base
- To identify content errors in the MDSR database using quality dimensions (completeness, timeliness and consistency)
- To explore factors affecting the quality of the MDSR database management system

4. Methods

4.1 Study design

Institutional based a cross sectional study design with mixed method was used. The EPHI MDSR data base in the period of December 2006 to February 2009 EFY was used for the quantitative data quality assessment and secondary data analysis for this study. Moreover, the qualitative method was used to explore the process and quality of MDSR database management system starting from district to national level in improving quality of maternal health care system in Ethiopia. FMOH, EPHI, WHO and UNFPA were used as cases for the qualitative study. The qualitative method was also used to document the strengths and limitations of the MDSR database system.

4.2 Study area

Ethiopia, with total land area of 440,284 miles (1.1 million square kilometers),is the second most populous county in sub-Saharan Africa with a great geographical diversity.It borders six countries - Eritrea, Djibouti, Somalia, Kenya, South Sudan and the Sudan.The total population of the country is94,351,001,consisting of 47,364,009 males and 46,986,992 females in 2009 EFY.(44).

The health coverage in Ethiopia is about 94%. There are 3547, 311, 16440 health centers, public hospitals and health posts respectively in the country. However the number of health facilities currently reporting MDSR are only 404 and trained health professional on MDSR were 2084 until the end of 2007 EFY (18, 24) .

4.3 Study period

The study was completed from November 2016 through June 2017 by using MDSR database in EPHI during the period of December 2006 to February 2009 E.C.

The qualitative part was conducted immediately after the completion of the analysis of the quantitative part of the study.

4.4 Population

4.4 .1. The source population

The source populations for the study are all mothers who had been pregnant during the period of December 2006 to February 2009 E.C in all MDSR reporting places.

4.4.2. The study population

The study populations are all mothers who died during the period of December 2006 to February 2009 E.C.

4.5 Sample size

For the quantitative part of the study: all maternal deaths that were reported through the MDSR and registered on MDSR database from December 2006 to February 2009 E.C were included.

For the qualitative part of the study, the interviewed key informants were peoples who are heavily involved in the development and management of the MDSR database. MDSR focal persons from UNFPA and EPHI, MDSR data managers who are working in EPHI and WHO. In addition, MCH team leader working at the federal ministry of health and PHEM leader who is working in EPHI were interviewed until saturation of idea was reached

4.6 Study variable

This study does not have one variable used as dependent variable. We rather used the four fundamental data quality dimensions of acceptable range based on WHO recommendation for MDSR data quality.

Completeness:- has been measured for the following selected variables on the MDSR data base ; age ,region ,residence , marital status ,educational status ,gravidity ,parity ,ANC follow up, place of ANC, preventability of the death , Method of COD Abstraction ,cause of death ,place of death , timing of death ,contributing factors and date of reporting .

- The acceptable range of completeness rate for the variables was more than 80%.

Timeliness: -

- If ≥ 80% maternal deaths were reported through MDRF to the next level within a month we consider the report is timely. (45)

Consistency: - Timing of death during post partum deaths versus post partum post abortion deaths, ANC attendant and ANC place of the deceased mother, Number of pregnancy versus age at pregnancy, parity versus age at parity and pregnancy versus parity were the selected variables for consistency from the MDRF data base based on their logical relationships.

- If the above selected variable recorded number of cases was matched to each other the data was said to be consistent.

Accuracy

In this study it is difficult to measure accuracy because it needs the confirmation of each maternal death by cross checking at their home. So we dropped it.

4.7. Attributes of measurement

There are several themes of characteristics of deceased mother on the MDSF data base for which content error in terms of completeness, timeliness and consistency was evaluated.

Individual Characteristics: Age group, marital status, level of education, religion, ethnicity, gravidity/parity,

Timing: date of death, timing of death in relation to pregnancy

Location: place of death (home, health post, health center, hospital, on transit others), residency of the deceased

Direct causes of maternal deaths: - hemorrhage, unsafe abortion, obstructed labor, sepsis, hypertension and other direct causes.

In direct obstetric causes of maternal death: Anemia, malaria, Tuberculosis, HIV and other indirect are also included in the MDSR database.

Contributing factors

Delay one: - delayed referral from home, traditional practice, delay recognizing the problem, lack of decision to go to health facility and family poverty

Delay two: - lack of roads, lack of transportation, lack of money for transport, delayed arrival to referred facility, absence of facility with reasonable distance

Delay three: - miss management/ human error, delay for admission, and delayed or lacking supplies, delayed arrival to next facilities.

4.8 Operational Definitions

Timeliness**:** is defined as the delay from data notification and report to EPHI with case based MDRF

Consistency**:** - refers to whether the logical relationship between related variables is correct and complete(32, 46)

Completeness**:--** is defined as 'the number of completed values for a variable out of the total expected number of values '(unknown and missing items should be included in the denominator) (32, 46)

Accuracy: - The extent to which data is correct, reliable and certified (47)

Coverage error: - The gaps in capturing of maternal death between the actual and estimated.

Content error:-error of observation or recording which results in associating wrong value of the characteristic with a specified unit.

Verbal autopsy: a tool used to investigated and verify all suspected maternal deaths that are documented at the health post and notified to the respective health center(45)

Facility based abstraction form: a tool used to document all confirmed maternal deaths that are notified and documented at a health facility. (45)

4.9. Data collection procedure

The quantitative data was extracted from MDSR database. The MDSR collects data on maternal death using different MDSR tools (forms): Identification and Notification form, Verbal autopsy tool (maternal death review tool at community level), Facility based ward notification form and Maternal Death Reporting Format (VA summary form).

The identification and reporting of maternal deaths is done at different levels. At community level all identified probable maternal deaths are notified by health extension workers to their respective health center surveillance focal person. Informal information/rumor about probable maternal deaths are reported immediately (within 30 minutes) to the next level of the PHEM structure by any channel of communication. Formal notification of probable maternal deaths are reported within 24 hours (from the time of identification) by the HEW to the respective health center surveillance focal person using maternal death identification and notification format (two copies) (Annex-1) All completed notification formats at health post and health centers are documented and used as source of data for weekly PHEM reporting. In the same fashion reports from Woreda health to regional health Bureaus and from RHB to EPHI are submitted on weekly and monthly bases except the case based report which should be done within 48 hrs. The whole data collection process from community level up to EPHI database is explained detail in figure below.

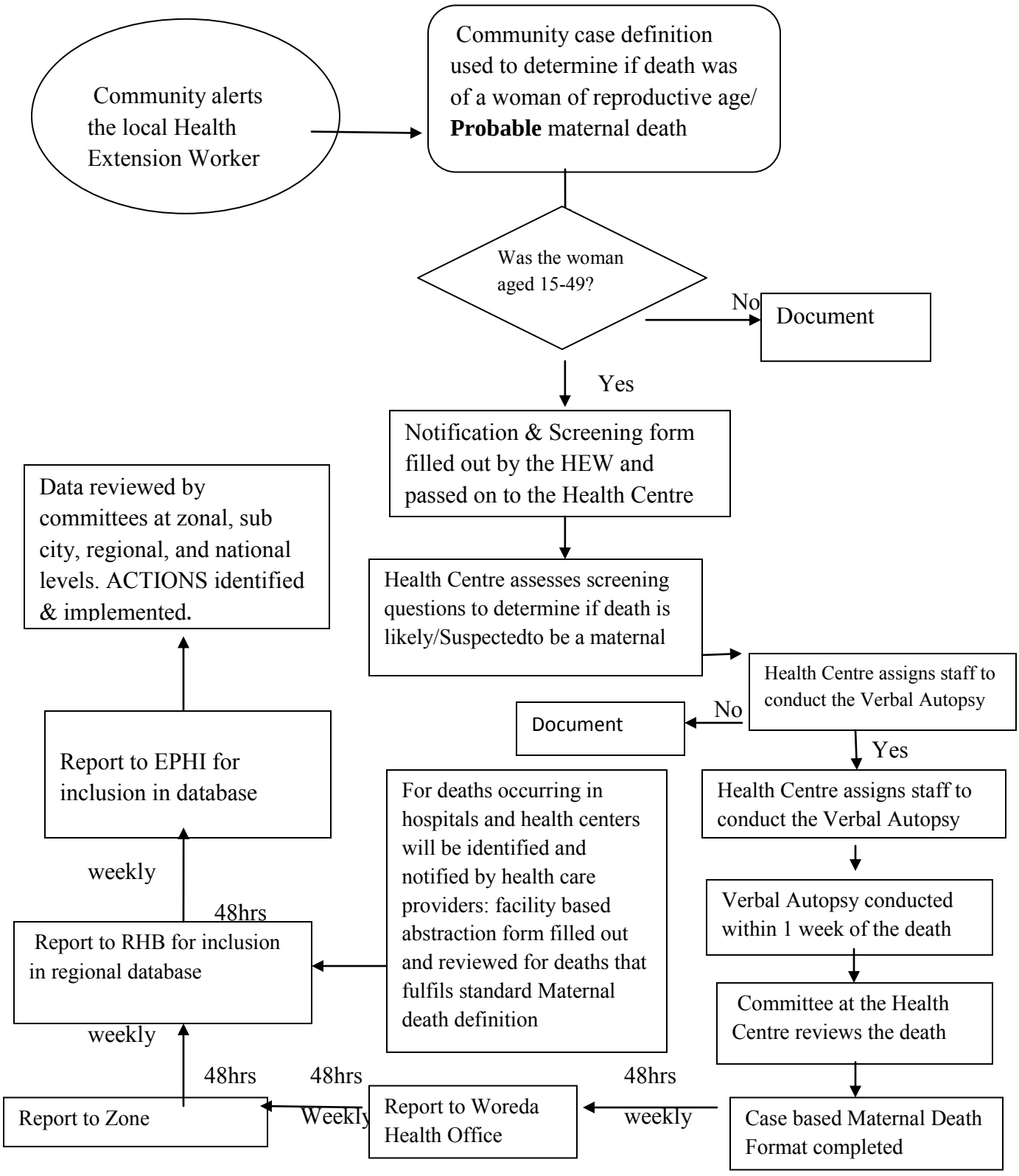

Figure 3. MDSR data collection process

The qualitative data was collected using key informant guide that was first prepared in English and then translated in to Amharic. After the respondents are selected using a combination of maximum variation and snowball sampling technique the interviews were conducted by the principal investigator. The purpose of the study was briefed, before the beginning of the interview. Respondents were assured about data confidentiality issues. Each interview took about the minimum of 30minutes to the maximum of one hour and twenty minutes. All of the interviews were tape recorded and transcribed in full text. The key informant interviews were conducted in natural settings, where the informants wanted to have the interview.

4.10. Data quality management

For quantitative part of the study we used the MDRF data base as it is for the secondary data analysis.

For qualitative part of the study data were collected from MDSR focal persons, MDSR data managers, PHEM and MCH leaders working at UNFPA, WHO, MOH and EPHI to check the trustworthiness of the information consent was obtained from key informant interview. The data was audio taped and note was also taken to double check its quality.

4.11. Data Analysis procedures

Quantitative study

Quantitative data was analyzed using STATA version 14 software, excel was used to develop graphs. Cross tabulation was used to identity incompleteness of the variables and inconsistencies. Frequency and percentage on individual characteristics, causes of maternal death, contributing factors, deaths reported by regions, place of death, reporting health facilities, timing in relation to pregnancy and the mean age was presented using frequency tables, graphs and descriptive summaries. .

The total annual estimated maternal death in Ethiopia was 58,036 from 2006 to 2009 and the total maternal death captured by database was 1448 in the defined period (from Dec. 2006 to Feb. 2009 E.C)**.** But by prorating the number of maternal deaths for the year 2006 and 2009 the total death captured by database became 1734 and this figure was used for coverage error analysis of this study. The coverage error of this data base was computed by using prorated

maternal deaths for entire period of 2006 to 2009 as numerator and the total estimated death of maternal death in the same period as denominator.

The content error for the database was measured for different characteristics of the deceased mother. Cross tabulation of the variables was done to identify the completeness rate of variables and inconsistent variables which have logical relationship on the data base.

Data quality dimensions used to evaluate the quality of MDSR data bases in content error **(35, 36).**

Completeness can be measured by

- Percentage of variables recorded in a database with no missing required information. (Percentage of missing information by required field) (48).
- Acceptable range of completeness for the variables is 80%

Timeliness was measured

- Proportion of maternal deaths that occurred at facility and community level and reported through MDRF within a month or total reported death that submitted to EPHI within the defined period of time
- Acceptable timeliness is more than or equal to 80%

Consistency was measured by *(48)*

- For the variables which have logical relationship the total number of recorded (filled) cases need to be equal to each other.

Qualitative study

Qualitative data was analyzed using thematic analysis. First, the audio record of the interviews were fully transcribed and translated into English. Then, translated material was entered in to open code 3.6 software and coded. Different codes in the text were merged to form categories which were combined in to thematic areas .Finally, the result was presented in narration by triangulating with quantitative findings.

4.12. Ethical consideration

Ethical clearance of this study was obtained from the research ethics committee of the School of Public Health, College of Health Sciences, Addis Ababa University. Letter was obtained from school of public health to facilitate access to organizations with key informants.

During the interviews the purpose of the study was explained to the interviewees and verbal informed consent was obtained from each interviewee before participation. Confidentiality was maintained for all interviewees and their specific identifiers such as names were not used on the study instrument and would not be mentioned on the study report. The MDSR data base was accessed from EPHI after signing an agreement on data sharing policy with them.

4.13 Dissemination of the results

This research report will be presented at the school of Public health in College of Health Science and a copy of it will be submitted to the SPH library. Another copy will be given to EPHI and EPHA and also to concerned governmental organizations FMOH and nongovernmental organizations. Another copy will also be submitted for the project funding the thesis research. The research will also be presented in different seminars and conferences. Publication in reputable journal will also be considered.

5. Results

Socio demographic characteristics of the deceased mothers captured by the MDSR database

A total of 1448maternal deaths (aged 15- 49 years) have been registered in the MDSR database during the period of December 2006 to February 2009 E.C. The majority of the deceased women were between the age of 25-29 (27.5%) years and married (90%).The mean age of the women at the time of death was 28.5 with the SD $\pm$ 6.2. In this study, out of 1,448 maternal deaths captured by the national database, eighty two (5.7%) of them were living in rural, 35 (2.4%) of them were living in urban and the living place of the rest 1,331 (91.9%) of them were not specified. The mean number of pregnancies was 3.9 with SD $\pm$ 2.7. Thirty three percent of the deceased had five or more pregnancies and twenty seven percent of them had five or more children.

Causes of deaths and their preventability were assessed. Among the maternal deaths captured by the MDSR database, the causes of death for 670 (46.3%) of them were identified using verbal autopsy procedure while for 456 (31.01%) they were identified by using facility based abstraction forms and the rest 322 (22.2%) of cases their method of abstraction were not. Regarding preventability of the deaths, 1,041 (71.9%) of deaths were preventable, 122 (8.43%) unavoidable and 117(8.08%) of them were not known whether it was possible to avert it or not. In the following table the missing values of the variables are excluded and explained under the section of data quality dimension completeness.

Table 1. Socio-demographic characteristics of the deceased mothers from the period of 2006 to 2009 E.C in Ethiopia

Variables		Frequency of death	%
Age 14-19		86	5.94
20-24		245	16.92
25-29		398	27.49
30-34		319	22.03
35-39		259	17.89
40-44		58	4.01
45-49		10	0.69
Residence:	Rural	82	5.66
	Urban	35	2.32
Religion :	Orthodox	603	41.64
	Muslim	495	34.19
	Protestant	99	6.84
	Catholic	3	0.21
	Traditional	11	0.76
	Others	10	0.69
Marital status			
Single		35	2.42
Married		1305	90.12
Divorced		19	1.31
Widowed		2	0.14
Educational status			
Illiterate		814	56.2
Can read and write		111	7.67
Elementary school		141	9.74
High school		65	4.5
College and above		48	3.3
I don't know		128	8.84
Gravidity	I	350	24.17
	II –IV	516	35.64
	≥ V	483	33.36
ANC follow up			
Yes		227	15.7
No		122	8.4
Parity			
I		283	19.5
II –IV		501	54.1
≥ V		390	26.9
Preventability of the deaths			
Preventable		1041	71.9
Un preventable		122	8.5
Unknown		117	8.1
Method of COD Abstraction			
Verbal Autopsy		670	46.3
Facility Based Abstraction		456	31.1

The Magnitude and Causes of maternal death

The national MDSR database has documented maternal causes of death identified by verbal autopsy procedure and facility reports. Overall, direct obstetric complications contributed to 71.2% of the reported maternal deaths. Hemorrhage was found to be the leading cause of death, accounting for 594 (41%) of direct causes and 33.4 % of all causes followed by HPD which accounts for 237 (16.4%) and 14.4 % of the direct and all causes of deaths. Sepsis contributes to (9.2%) and 7.4% from direct and all maternal causes respectively. Indirect obstetric complications contributed to 28% of the maternal deaths. From the indirect obstetric complications Anemia was the most frequent cause of maternal death contributing to 206 deaths which is 51.5% of indirect causes and 14.2% of all the causes.

Table 2. Distribution of maternal deaths by cause of deaths from December 2006 to February 2009 E.C in Ethiopia.

Direct causes	Percent from direct causes
Hemorrhage	41.02
HDP	16.37
Sepsis	9.19
Obstructed labor	7.25
Abortion	1.52
Direct others	8.98

Indirect causes	Percent from indirect causes
Anemia	51.5
Malaria	4.5
HIV	4
TB	0.25
Indirect others	39.75

Timing of maternal death in relation to pregnancy

Over half (60.7%) of maternal deaths occurred in the post partum period, 15.75% were ante partum, 16.99 % were intrapartum and 6.56% of them were unknown.

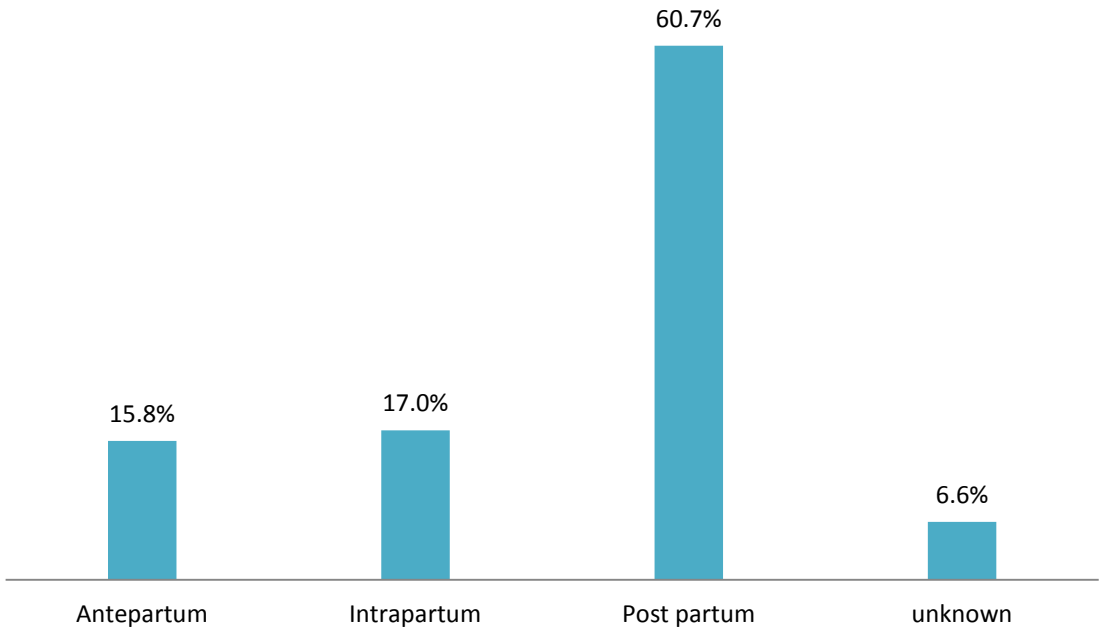

Figure 4.Timing in relation to pregnancy for reported maternal death from December 2006 to February 2009 EFY in Ethiopia.

Place of death

Initially even though Facility Based Abstraction (FBA) form was filled for deaths occurred at health facilities VA was used as a method of cause of death abstraction to count maternal deaths that was occurred in both health facilities and communities.

The majority of deaths occurred in hospital 59.67% and 6.91% in health centers. Home deaths accounted for 17.06% and 12.36% of deaths happened on their way to health facility. Deaths occurred during referral from health facility to higher level of health facility were less than one percent (0.83 %.)

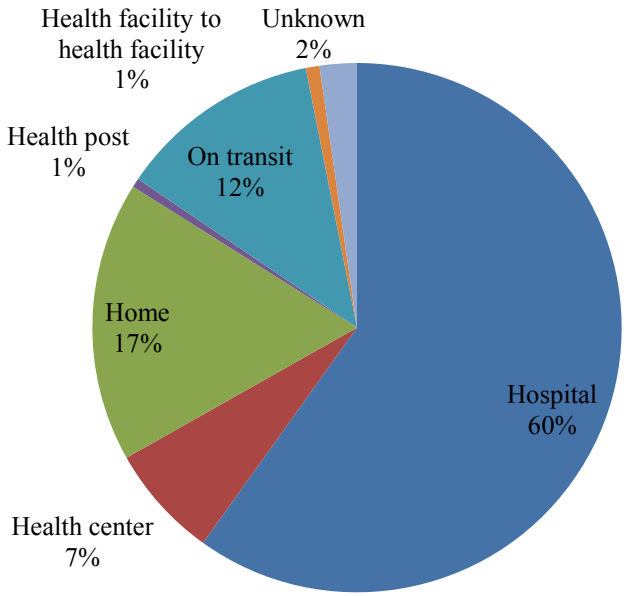

Figure 5.Place of death for reported maternal death from December 2006 to February 2009 EFY in Ethiopia.

Delay factors contributing to maternal deaths

Delays in seeking, accessing and receiving care during obstetric emergencies are usually classified into three categories. Delay 1 refers to the time from the start of a woman's illness to the time the problem is recognized as requiring care; Delay 2 refers to the time from acknowledging a problem to reaching an appropriate health facility; and Delay 3 refers to the time from arrival at a care facility to receiving the required treatment. Family poverty, traditional practice, delayed referral from home, failure of recognition of the problem and lack of decision to go to health facility are categorized under delay one. Under the theme of delay two ; lack of many for transport ,no facility within reasonable distance, lack of roads ,lack of transportation, delayed arrival to referred facility are categorized. Human error or mismanagement, delayed or lacking supplies, delayed management after admission and delayed arrival to next facility from referred facility are categorized under delay three.

The majority of maternal deaths happened due to delay in receiving care 559 (38.6%) and followed by delay in seeking care 440(30.4%) and accessing care 314 (21.7%) the contributing factor of rest 9.3% of deaths were unknown .

Delayed referral from home attributed for the majority of maternal deaths 461(46.4%) from Delay 1followed by delay to decide to seek care from health facility 287(28.9%) and failure of recognition of the problem 148(14.8%). From Delay 2delayed arrival to referred facility contributed for 51.3% of maternal deaths followed by lack of transport access 132(24.5%) and distance to health facility 69 (12.8%).Delayed arrival to next facility contributes for the majority(37.2%) of maternal deaths in Delay 3.

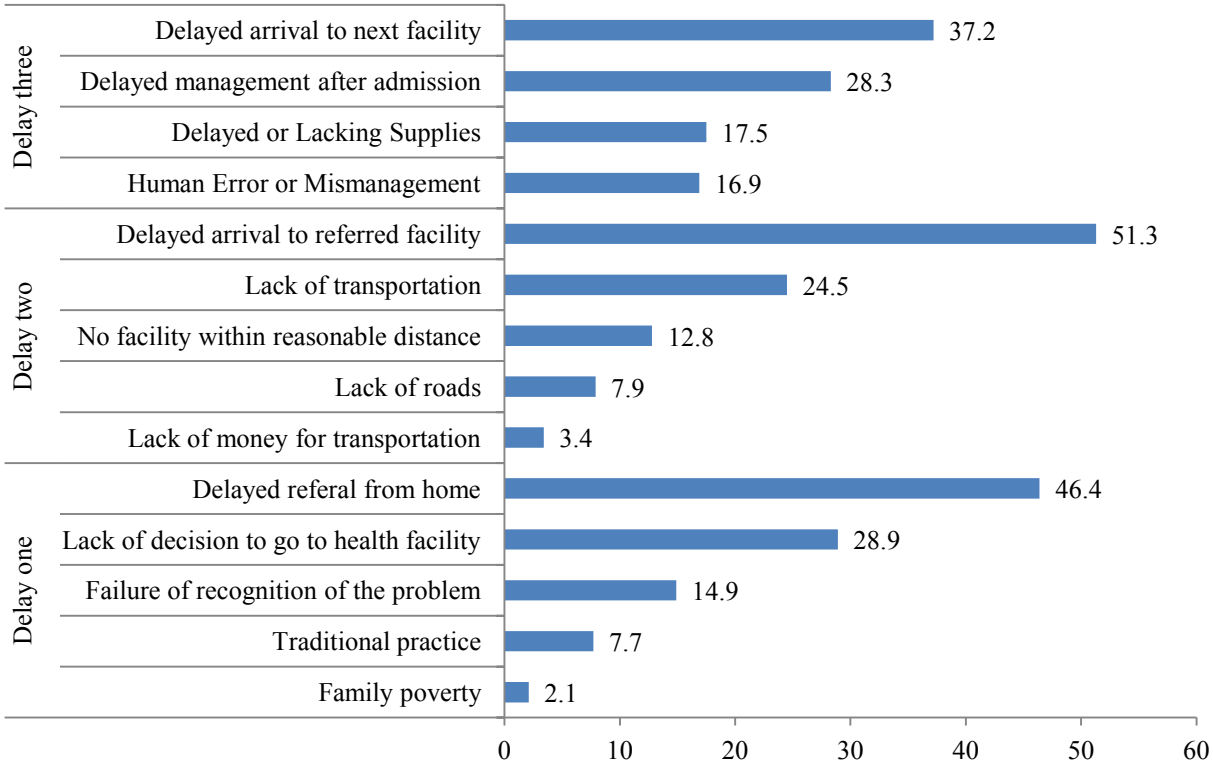

Figure 6. Percentage Distribution of the three delays by specific determinant from December 2006 to February 2009 E.C in Ethiopia.

5.1. The coverage errors of the MDSR data- base.

The total annual estimated maternal death in Ethiopia was 58,036 from 2006 to 2009 and the total maternal death captured by database was 1,448in the defined period (from Dec. 2006 to Feb. 2009 E.C)**.** Since the data for 2006 and 2009 E.C miss some months we prorated the number of maternal deaths for the two years which gave us a total of 1,734deaths. We used this figure to compute coverage errors for MDSR.

The analysis showed that the coverage rate of maternal death in Ethiopia was very low. The coverage rate has shown statistically significant increase over the years from 2006 to 2008E.Cbut declined in the year 2009 E.C. The overall coverage of the MDSR database in capturing maternal death in Ethiopia was 2.98% (95 %CI: 2.85, 3.11).

There had been an increase in the rate of capturing the maternal death over the years. Though the increase has been statistically significant for some years (2006 - 2008), decreased for the year of 2009E.C.

Table 3.The coverage error of the MDSR data base in Ethiopia 2006 to 2009 E.C

Year of death (EFY)	Annual Estimated Maternal Death	Observed Maternal death	Prorated maternal death from the MDSR data base	Coverage %	CI 95%
2006	13,000	194	388	2.98	(2.68,3.27)
2007	13,030	402	402	3.08	(2.90,3.20)
2008	13,536	669	669	4.90	(4.70,5.10)
2009	18,470	183	275	1.50	(1.38,1.60)
Entire period	58036	1448	1734	2.98	(2.85, 3.11)

The overall coverage error of the MDSR for all years was greater than 95%.The trend of the coverage error has shown decline from 2006 to 2008 E.C. and was increment for the year 2009 E.C. The coverage error for the entire period of (2006 to 2009) for the MDSR throughout the four-year period was 97.02%.

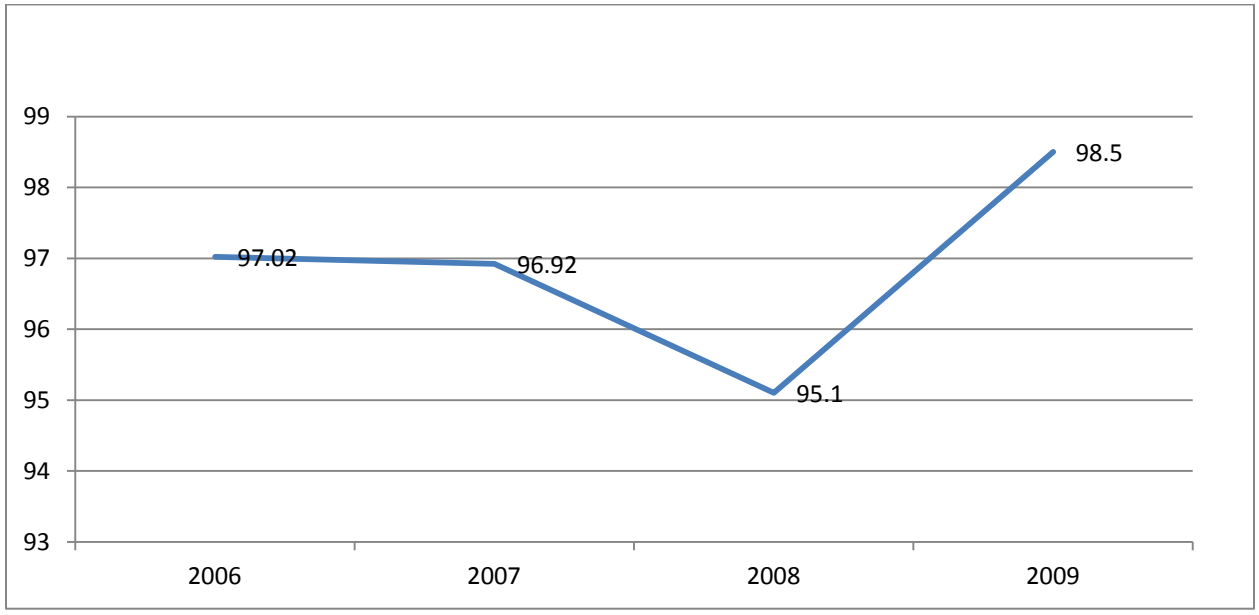

Figure 7.Trends of MDSR database coverage error in Ethiopia from 2006-2009E.C

5.1.1 Regions reporting maternal death

MDSR was launched in December 2006 EFY at national level. Initially the initiative was managed by FMOH by the wing of maternal health. Since 2007 EFY MDSR was formally integrated into EPHI disease surveillance system and all regions in the country, with the exception of Ethiopia Somali region started using this database for reporting of maternal death and related causes.

The regional coverage rate was computed by using the actual maternal death captured by the data base as a numerator and estimated number of maternal death as denominator for each region for the period of 2006 to 2009 E.C. Since the data for 2006 and 2009 E.C miss some months we prorated the number of maternal deaths.

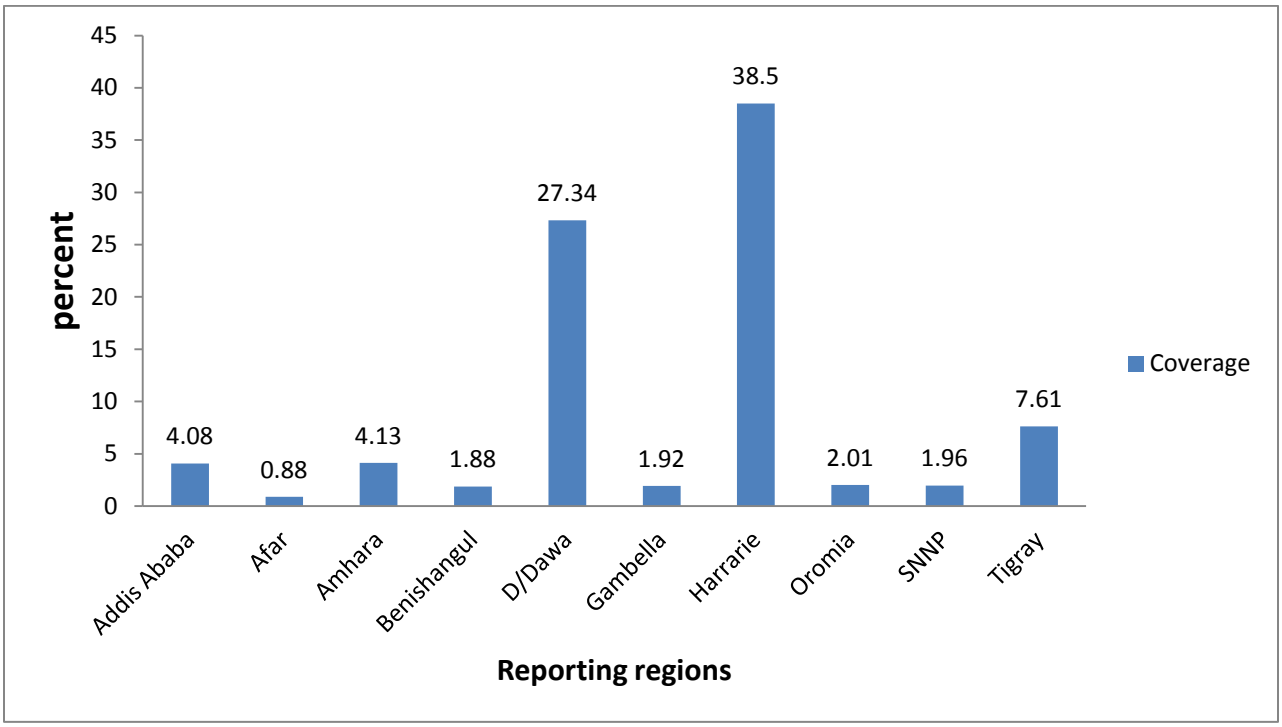

Figure 8.Maternal death reported by regions from the period of December 2006 to February 2009 E.C in Ethiopia.

The key informants agreed that the MDSR system captures a small proportion of maternal deaths due to different reasons. Maternal death is made sensitive political agenda at different levels. This has led to fear of accountability among Health Extension Workers in the community and Health Workers working at the health facility .In addition, creating community awareness on the program were not adequately implemented partly due to lack of resource and poor management system. Key informants have also mentioned that the motto "zero maternal death during labor and delivery" has been wrongly interpreted at all levels and thus resulted in fear of reporting maternal deaths. The respondent from MCH team of federal ministry of health stated the reason as follow

"*.....the captured report on maternal death is very low. It is less than 6% of the estimated deaths."The advocacy of "zero maternal death during labor and delivery" was misunderstood at all levels making maternal death politically sensitive, and resulted in fear of reporting maternal*

death on the side of health professionals. …when you go down to the woreda level the issue of maternal death is a big agenda. As a result the health professionals fear to report maternal death ehee……the community surveillance system is also not as such strong system…thus as I told you before fear of blame contribute for under reporting of maternal death …"

In addition the way the program initially started had a gap. The implementation of MDSR was initially started vertically by MCH department of the FMOH and after a while integrated into PHEM which resulted pushing of responsibility between the MCH and PHEM departments to report the maternal death. Due to this some reports has been lost between the two departments. In addition, absence of continuous monitoring and evaluation of MDSR with feedback on reports from higher levels were mentioned as reason for poor coverage rate of the MDSR. The informant from the PHEM team of EPHI stated

"*There are a lot of limitations. The first limitation is that initially MDSR was not integrated with PHEM. It was started by MCH department of the FMOH. This resulted in pushing of responsibility between MCH and PHEM departments in reporting maternal death and creates gap in reporting of maternal death. So there was under reporting of maternal deaths."*

5.2 Content errors of the MDSR database

The content errors of the database were assessed by running frequencies for all variables and cross tabulating the variables which have logical relationship to check for incompleteness and inconsistent variables.

5.2.1 Completeness of the variables on MDRF data-base

Almost all variables on the MDSR data have missing values. The incompleteness rate of the variables on the MDRF data base was not uniform and ranges from the minimum of 2.2% to the maximum of 97.2%. Death occurred during post partum was the variable with highest missing value and place of death was with minimum rate of missing value.

Table 4. The percentage of incompleteness of the variables on MDRF data base in Ethiopia: December 2006 to February 2009 E.C

Variables	Number of filled cases	Number of missed cases	Rate of missing %
Reporting regions	1434	14	0.97
Type of health facility	1223	225	17.6
MDRF Extracted from	1126	322	22.2
Age at death in years	1375	73	5.04
Residence of deceased	117	1331	91.9
Place of death	1411	37	2.6
Marital status	1361	87	6.01
Deceased Religion	1221	227	15.7
Level of Education	1320	128	8.8
Gravidity	1350	98	6.8
Parity	1360	88	6.1
Timing in relation to pregnancy	1353	95	6.6
Death occur in postpartum	41	1407	97.2
Attended ANC	349	1099	75.9
Place of ANC	215	1223	85.2
Number of ANC visit	145	1303	90
Place of delivery	51	1397	96.7
Mode of delivery	46	1402	96.8
Year of delivery	46	1402	96.6
cause of death	1396	52	3.6
Preventable Cause	1302	146	10.1
Delay	1313	135	9.3
Year of reporting	1407	41	2.8
Year of Death	1431	17	1.2
Delivery out come	314	1134	76.9
Date of reporting	1387	61	4.2

We learned from the key informant interviews that there are two main reasons for these missing values. The first reason was frequent change of the reporting tool coupled with delay in distribution of the updated reporting formats health facilities. Thus the professionals at the health facilities were forced to use the old reporting formats that do not have the new variables. The second reason was incomplete primary information collected from respondents during interview. The respondent from WHO said that

"….lack of updated forms in health facilities forces surveillance officers to use the old formats in which lack some of the variables. For example, residence of deceased mother was included in the recent reporting format. When the reporting formats are changed we update the database automatically, and then print and distribute the new formats to the health facilities. But, in between the reports from the health facilities continue to come. Because the new indicator is not included in their reporting format it will be missed. The missing may be 100% because they are using the old version …The other reason for missing is, there are information that were not found in the review process. For example educational status and age, the respondents may not know about the age and the educational status of the deceased mother. So missing may happen from the respondent. "

Other reasons stated were lack capacity building support to health professionals working on surveillance, absence of refreshment training on the revised tools, and turnover of trained staff especially surveillance officers. Absence of continuous monitoring of MDSR and giving feedback to identify and address gaps timely was also mentioned as additional reasons. Health workers may also have difficulty of understanding the revised tools and fail to complete all variables in the reporting format. The respondent from EPHI said that

"*…one of the reasons for missing values is inability to make the frequently revised formats accessible to lower level health facilities. As I told you before, it may be delayed 1 to 2 years for updated format to be available at lower level health facility due to poor management. The data we will take from them will be in previous format. That is why we encounter missing value. But the knowledge and appropriately filling skill of the surveillance officers also contribute to this problem…. there is high staff turnover, there is no refreshment training, and there is unavailability of updated format. Such things result in missed values in data."*

5.2.2 The Timeliness Rate of MDRF report

We assessed the timeliness of the MDSR using MDSR guideline which was developed in 2016. Based on the guideline for any maternal deaths the MDRF should be filled and reach at national database within one month. The rate of timelines was computed by comparing the date at which the mother deceased and the reporting date of MDRF sent to surveillance unit.

Of the reported 1448 maternal deaths on the national MDSR database only half 812 (56.1%) of deaths were reported timely and 576 (39.78%) of deaths were reported late. For the rest of 60 (4.14%) of the deaths the time of reporting was not known.

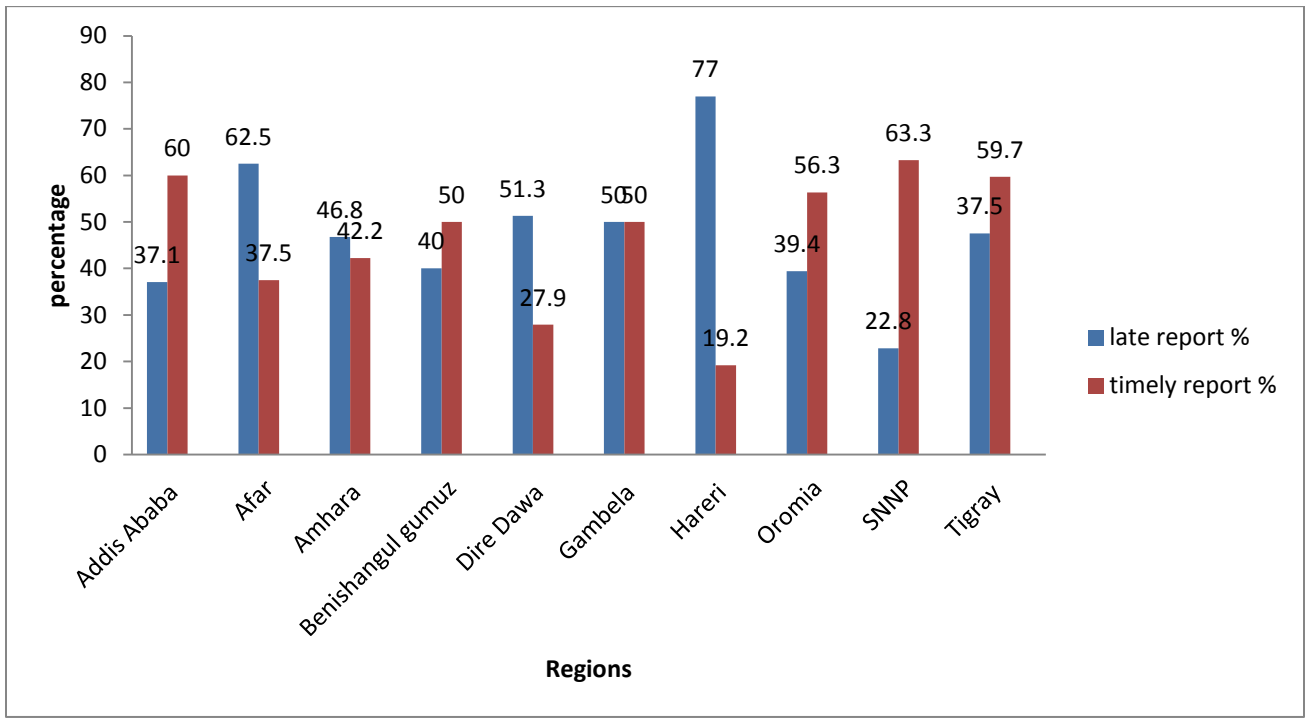

Figure 9. Timing of MDSR data reporting regions in Ethiopia from December 2006 to February 2009 E.C

There was regional variation in reporting the case based MDRF report within defined period of time. Addis Ababa ,Afar ,and SNNP were regions that sent the MDRF report more than 60% timely and 77% of the MDRF report from Hareri was late.

The reasons given by the key informants for not reporting timely were: delay in maternal cause of death review process at facility level, shortage and delay in provision of MDRF tools for reviewing of maternal causes of death, capacity gap of health professionals how to perform verbal autopsy, absence of continuous monitoring and evaluation and intensive feedback.

The key informant from WHO said that

"*There is delay on reporting of maternal deaths based on timeline outlined in the national guideline …… Death should have been reviewed, reported, action plan developed and reported should have reached at PHEM within one month. But there are cases where reporting took two or three months. ……there is delay in reviewing deaths and problem in data quality in terms of timeliness".*

A key informant interview from EPHI also acknowledged the challenge in timely reporting maternal deaths.

"*There is gap in timely availing the updated reporting formats to the health facilities. The other one is absence of continuous monitoring and follow up in identifying gaps at the health facilities.…Since there is no continuous monitoring and no one follows the notification and the case based MDRF, there is delay in reporting*."

5.2.3. Consistency of the MDRF data-base variables

Some variables on the database showed inconsistency. These variables were timing of death during post partum deaths versus post partum post abortion deaths, ANC attendant and ANC place of the deceased mother, number of pregnancy versus age at pregnancy, parity versus age at parity and pregnancy versus parity.

Post partum deaths and timing of death in relation to pregnancy during postpartum.

Maternal deaths were classified in to ante partum, intrapartum and post partum deaths based on the timing of death in relation to pregnancy. On the other hand post partum death by itself was

classified in to deaths during the first twenty four hours, second and third day, between the fourth and seventh day and between eight and forty two days of delivery.

From the total 1448 reported maternal deaths 879(60.7%) of them died during postpartum period but only 41 (2.8%) mothers were registered in the postpartum classification when we disaggregate the postpartum death by hours and days of death in the postpartum period. Moreover one case of maternal death which has been reported in postpartum was coded as died in the ante partum period.

Table 5. Cross tabulation of timing in relation to pregnancy (postpartum) death with timing of death during post partum on MDSR data base in Ethiopia 2006-2009 E.C.

Timing in relation to pregnancy	Timing of death during post partum				
	1st 24 hrs	2nd-3rd day	4th-7th day	8th-42 days	
Postpartum	16	10	8	6	40
Ante partum	1				1
Total					41

Age at pregnancy and number of pregnancy

There were also seemingly inconsistencies when we look at the number of pregnancies by the age group of deceased mothers. The database has documented two mothers that had five and six pregnancies before they died in the age group of 14-19 years. There were also mothers who presumably had 10 and 11 pregnancies before they passed away in the age interval of 20-24 years. The mean number of pregnancies in the age group 25-29 was three, however there are outliers of two mothers who had nine and one deceased mother had ten pregnancies. The mean number of pregnancies was 6 in the age group between 35-39 however, there are outliers.

Table 6. Cross tabulation of age at pregnancy and number of pregnancies of the decease mother on the MDSR data base in Ethiopia 2006-2009 E.C.

Age group	Number of pregnancies														Mean number of pregnancy
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
14-19		5	3		1	1									1.25
20-24			18	14	4	2	2	1		1	1				1.8
25-29				53	38	16	18	6	2	1					3.3
30-34						48	31	17	12	9	4				4.9
35-39							44	22	12	10	13	3	1		6.1
40-44								8	6	10	1				6.7
45-49									2		1				7.8

Comparison of Gravidity and parity of the deceased mother

However the mean number of children ever born is 3, there is an outlier of one deceased mother with six parity within one pregnancy. Table 10 below revealed that a deceased mother who was pregnancy only once in her lifetime had 6 children ever born indicating fallacious documentation of data

Table 7.Cross tabulation of gravidity and parity of the deceased mother on the MDSR data base in Ethiopia 2006-2009 E.C.

Number of pregnancies	Number of children ever born														Mean number of children ever born
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1						1									3.2

ANC follow up and ANC place of deceased mother

Attended ANC and place of ANC were the other variables observed for consistency; from maternal death registered on the data base 227(15.7%) of them had ANC follow up but the place of ANC where they attended were filled for only 206 of them and also for one deceased mother who had no ANC follow up place of ANC was mentioned.

Table 8. Cross tabulation of ANC attended and place of ANC of the deceased mother on the MDSR data base in Ethiopia 2006-2009 E.C

Attended	ANC place				
ANC	Health post	Health centre	Hospital	Both hospital & Health centre	
No	1			1	2
Yes	18	162	19	5	204
total					206

Age at parity and parity of the deceased mother

The other inconsistency was observed on the variables Age at death and parity of the deceased mother. In all age group the numbers of children ever born were more than the mean number of children that the deceased mother had. For instance, one deceased mother had 9 children when she died in the age of 20-24 years and two mothers had 5 children when they died in the age interval between 14-19 years. There were also outliers in the age group 25-29 years, three mothers had 8 children and two of them had 9 children.

Table 9. Cross tabulation of age of the deceased mother and parity on the MDSR database in Ethiopia 2006-2009 E.C.

Age group	Number of children ever born													Mean number of children
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
14-19		3			2										0.6
20-24		29	16	7		5	1		1						1.2
25-29			66	31	30	11	8	3	2						2.3
30-34					38	39	17	13	6	8	1	1			4.1
35-39						47	26	21	7	10	5	2			5.3
40-44							8	10	4	3					5.8
45-49								1	2	1					6.7

In the qualitative part of the study key informants mentioned the main reasons for the inconsistent variables. The main reasons were basically three. The first reason was related to the

revised reporting formats; in the revision of reporting tools there are some variables newly added through time .The second one was a delay in distributing the revised reporting tools thus resulted reporting by the old version of reporting formats which didn't include the new variables. Lack of skill related to data entry was the other mentioned reason for the inconsistent variables.

"*After revision of the tools we didn't print and distribute the new reporting format soon….some of the indicators you mentioned were included recently so some of the regions and health centre are still using the old reporting format…,*" as the key informant from EPHI PHEM department narrated.

"*…The review committee agreed to introduce the indicator timing of death in relation to pregnancy recently in the reporting tool of MDRF….the other thing is that there is data entry problem related to lack of skill in filling the reporting formats"* the respondent from WHO.

The key informant interview from EPHI also said that

"*….there may be a problem of data entry .Surveillance training might have been given to whom it may not concern. Such problems may be resulted to low capacity. The problem may be from data entry. As I told you previously, it could have been solved by continuous monitoring and evaluation. Since there is no such well-functioning structure, we couldn't pick and give immediate response to the problem but what I observe in this data is an added variables ,for instance residence, ANC place and the like …"*.

5.2. The quality of MDSR data base management system

Table 10.Codes of the qualitative study and their categories and thematic areas

Aspects of poor quality data base			Aspects of good quality data base		
Code		category	Code		category
-resource shortage -staff turnover -competitive priorities -less value for COD by the HS -Less community awareness -poor organizational environment - punishment of health professionals	-Wrong decision -Delay tool distribution -No substitution of staff -limited data utilization -Job burden -pushing responsibility -un reported community death - no updated training	poor owner ship	-Hiring professionals -Ownership -Inter sectoral advocacy -prepared Plat form -Maintain confidentiality -more facilities start to report	- Data sharing policy -Budget allocation -Awareness creation -Availing supplies -leadership -conducive organizational environment	good owner ship
-Externalizing cause -Fear of accountability -Hiding maternal death -fear to report	-sensitivity -fear of blame -started in MCH -pushing of responsibility between departments	Weak responsib ility/liabi lity	-Capacity building -Intensive feedback - supportive supervision	-Review meeting -Report improvement -Functional MDSR committee -Gap identification	Continuous monitoring and evaluation
-Absence of feedback -No identifying gaps -No regular review meeting -No supportive supervision	-Delay reporting -under reporting -Report incompleteness	lack of M &E	-Fills information gap -Gives timely data -Generate evidence -Decision making -real COD data		Initiation of the program
-Non functional MDSR committee -Not doing verbal autopsy -Not filling MDSR tools -Delay in review -Difficulty in recalling cause of death	- miss classifying COD -miss understanding COD -Double coding -Difficulty of doing VA soon	COD capturing problems	-Reportable among PHEM -Periodically reported using bulletin -Regular reporting -Using existing professionals -Enables maternal death analysis		integration
-Data entry problem -lack of skill on filling formats -newly added variable -missing	-periodically revised formats --lack information from respondent Capacity gap	data inconsist ency	-Commitment -Understand the importance of data quality -Utilizing the data -Experience sharing -Responsibility -Understanding the system		capacity

In the qualitative study different strengths of MDSR database management system were mentioned. Being integrated to the PHEM system and giving timely maternal cause of data were the most cited strengths mentioned by all informants. In our country there is a gap of information, so initiating the MDSR program or the system by itself to have timely and real maternal data for proper decision making was the other stated strength of MDSR data base management system. The other mentioned strengths were making the reporting structure regular; having its own MDSR data base at national level for periodic analysis of the maternal death, using the existing health professionals working in PHEM system and being one of the data reported using bulletin. The key informant from MOH said that

"*Starting the MDSR system by itself is one of the strength. In our country there is a problem of information, not only in our country, in developed country too especially tiered information is very important for decision making. In our country MDSR is the real timely maternal mortality data used for decision making. It's important for decision making and we are using it…..Making it integrated is one of the strength generally the surveillance data was generated so that the maternal death also is generated. There is also bulletin, the bulletin also used by decision makers so that this is one of the strength."*

The key informant from EPHI PHEM team also said that

"*…integrating the MDSR into the 14 immediately reportable diseases can be considered as one strength. This means the database is managed in the PHEM structure. The other one is even though the report is sent through PHEM structure; it has its own maternal death MDRF case based reporting data base at national level…Being integrated with the former PHEM system is one of the strength. This is because we don't need to hire new professionals. ....and this could be mentioned as one of the strength."*

Different limitations of the MDSR data base management system were mentioned by the respondents of key informant interview. Being started vertically by maternal health wing of MOH at the beginning, not having MDRF data base at all level, the absence of follow up and refreshment training for the revised tools and paper based reporting system or absence of user

friendly software for capturing maternal cause of death data which resulted data quality problem were the reported limitations by the respondents. The other limitations of the MDSR data-base management system mentioned were not all reports are coming to EPHI because the issue of maternal death was politically sensitive and the surveillance system in the community was weak and resulted less capturing of maternal death by the data base .The informant from EPHI PHEM team stated as follows

"*….the second is regarding the system. Even Reportable Disease that are included in the PHEM system the data is entered using Excel sheet we need to have user friendly software if this so we can keep the data quality because we collect the surveillance data mainly for the response. We do maternal surveillance data, the first one is to know why mothers died, what was the causes and to prevent another maternal death with similar causes in order to do this we need to have quality surveillance data ehee…… so we need software that guide us in entry not to miss even one indictors for instance as we discussed above some indicators are missed hence, not to miss indictors the software should help us not to jump any indicators and to make it the sheet inactive unless it is completed*."

The informant from WHO said that

"*Since it is new it has data quality problems. There are maternal causes of deaths, contributing factors, maternal health related indicators, so during data entry it may be affected. It needs something like exhaustive data quality modifications…*"

There are also more challenges affecting the MDSR data quality identified by the qualitative part of the study. The challenges mentioned by the respondents were difficulty of coding cause of death based on the standard WHO ICD, presence of capacity gap on health professionals in identifying the exact cause of death, fear of reporting or externalizing the cause of death from them as if not preventable and shifting the cause of death to community side (delay one and two) in order not to be accountable which resulted lack of trust on the report and delay in reporting. The respondent from MOH department of MCH said that

"*…there is a problem in capturing cause of death, health professionals working at health facility externalize the cause of maternal death from them in order not to be accountable and miss classification of the cause of death, for instance if a mother died due to delay 3, they shifted her*

cause death to delay 1 or 2, as far as they can. For example if there is miss management in the facility they made the cause of death from the community side."

The key informant from EPHI, PHEM team said that

"Since we didn't have a strong evaluation system, we faced a challenge in evaluating exact cause of maternal death from national report, for instance, if the maternal death was happened in the health centers or hospitals, the report would lack it truthfulness because they externalized the cause of death, due to fear of blame especially for mother died at health facility level"

The other mentioned challenges by the key informants were: problems related to cause of death review process such as not reviewing the cause of death at all, not having regular meeting and non functionality of the MDSR committee at some places. The respondent from EPHI, PHEM department said that

"*…the review of maternal death should be done for immediate action to stop maternal death with similar cause but the reviewing process of maternal death is not regular at all level i.e. Woreda, zone, region including the nationwide…"*

The respondent from WHO also said that

"*On the review process, there is the problem of completeness of information about the deceased mother. Because of trained staff turnover that were doing verbal autopsy, the verbal autopsy didn't capture all the information needed. Not having enough information for review."*

The respondent from MOH said that

"…. in the review process and there are facilities with non-functional committees, however the committee members posted by name but they didn't even meet each other. "

The other challenges mentioned by the respondents were on the scaling up the program. Limitation of resources, fear of blame, hiding of maternal death and the sensitivity of the issue of maternal death at all level. The key informant from UNFPA said that

"*…there is a problem of awareness starting from professionals to communities, zonal, woreda and health facility level parallel to awareness, there is also a problem on ownership because the*

program is still on infant stage, So there are different problems on issues like not reporting, hiding, fear of blaming, medico legal issues. If the health professions reports the death peoples on zonal or woreda level may use the data for medico legal issues…"

The respondent from WHO said that

"The problems are capacity building and technical support. There are multidisciplinary committees at the health facilities, you have to give the training for all facilities, and there are more than 3000 health centers and 200 hospitals. So you have to mentor them especially how to review the deaths but it needs resource. So, resource is the other important thing for both training and mentoring. Plus there is also the problem of hiding deaths. There is hiding of deaths due to fearing of political issues so that death is not reviewed and reported…".

Different factors were mentioned from respondents that affects the MDSR data quality in the qualitative part of the study. Trained staff turnover especially surveillance officers and not substituting timely, presence of competitive priority works and assigning many jobs to the surveillance officers, absence of continuous monitoring and evaluation, delay in availing of reporting formats and other necessary materials that resulted not reporting maternal death ,absence training for new recruited staffs and refreshment training on the revised tools, not allocating budget for the program ,the availability of data sharing policy to maintain the confidentiality of maternal death ,not giving awareness for communities and limited utilization of the MDSR data were mentioned as an organizational factors that affects the MDSR data quality. The key informant interview from EPHI said that

"*…the other thing is data quality training was not given at all levels; it was only given at regional and national level. This means, if the report comes with data quality problem from the lower level, the data quality can be maintained only at regional or national level. The other challenge that we have faced is that, turnover of surveillance officers; it may be at health facility level, woreda level, zonal level, regional level or at national level. For surveillance officers leave their work, there is no substitution of staffs timely. Additionally assigning many jobs on an individual will be a challenge. The other thing is that there is no budget allocated for MDSR and PHEM. For example if there is a training gap ,you should have to cascade it, if there is scarcity*

of reporting formats ,you have to print and distribute timely, you have to make supervision and review meetings…so no budget is assigned for these things."

The key informant from WHO also said that

"*…there were competitive priority works of an outbreak like AWD and Ebola as a result the management of MDSR was not full as needed, additionally there was one focal person for each region at national level. Similarly there is one data manager at EPHI level; in addition to all what I have said earlier there is also staff turnover, which means you trained someone on the database management system, then s/he resigned. This is the way data quality was affected. Generally there is staff turnover and competitive priority works as an organization that can affect the data quality."*

The other factors mentioned by the respondents were monitoring and evaluation. Under this category giving recognition without evaluating the performance, presence of plat form and evaluation frame work for the program but not undergoing due to different reasons, absence of regular supportive supervision to identify data quality problems and other related gaps on the system and absence continuous review meeting were mentioned. The key informant from EPHI said that

"*Monitoring and evaluation has positive impact in every aspect of work activities. That is why I told you before. It is very important tools to identify data quality problems and to give a response timely. We have our own monitoring and evaluation standardized framework on our guideline like what type of indicators we are using. But as I told you before monitoring and evaluation is not undergone every time due to absence of sufficient budget. If you make monitoring and evaluation, you can identify the gaps, you can evaluate your performance that how much you have done from your plan. Since it is not done as scheduled, we have faced the data quality problem currently because of we are poor in monitoring and evaluation process, we had poor database. "*

The other factor mentioned were system related factors ;absence of free cell phone to notify immediately maternal death, importance of fast internet access and paper based MDSR reporting system that exposed to poor data quality. For instance the key informant from EPHI said that

". *There was a time that formats are not distributed regularly, at that time the surveillance was highly affected so supplies are very important, for surveillance if there are no any supplies we cannot give training, cannot have computer, telephone and formats.…"*

Individual related factors that affect the quality of MDSR data mentioned from the respondents were limited utilization of the data starting from district to national level , importance of understanding the data quality , understanding the system well and having good knowledge and capacity on the system were mentioned as important factors from the respondents. For instance the key informant from WHO said that

"*…Starting from the district to national level there is a gap on utilization of the data. So limited utilization of the data has an effect on data quality… Not utilizing data can affect the quality. It is when you used the data that you can trace the gaps and identify the problems. If you don't use it, you don't know the quality gaps It is difficult that collecting the data without knowing the importance of collecting and the use of the data*"

The key informant from EPHI also said that

"*…individuals at health facility were careless they didn't have commitment for example sometimes they know that the data is incomplete for example they know that there are 10 zones but they only received the 8 zone reports and then they defended as if they sent all reports but the surveillance data should be complete if the data is complete the intervention will also be complete. Personal commitment's and understanding the importance of MDSR data affect the quality of the data."*

6. Discussion

The main objective of this study was to evaluate the quality of MDSR database qualitatively using key informant interview and quantitatively by computing coverage and content errors of the variables in the database.

The overall national MDSR coverage rate was 2.98 % and captured a total number of 1448 maternal death over the study periods (2006 to 2009E.C.), the number of captured maternal death showed variation from year to year, the minimum number of deaths were captured in 2009 which was 183, while the maximum number of cases were captured in 2008 which was 669. The average deaths captured throughout the study period was 425. The total captured maternal deaths (1448), was far lower than the estimated number of 58,036 maternal deaths for entire period of the study (49). The main reasons for low capturing of maternal deaths are poor management system of the MDSR system including inadequate budget allocation, lack of refreshment training and mentorship, delay in the distribution of reporting tools, less value for maternal COD by the health system, inadequate incentive for health personnel, non-conducive organizational environment which includes absence of user friendly software to capture maternal cause of death.

The coverage rate of 2.98% was extremely low in comparison with finding from Malawi which was 68% of maternal deaths captured by MDSR for deaths that took place between October 2014 and June 2015.This difference might be due to the engagement of village leaders to community MDSR committee, availability of community linked approach , existence of electronic maternal mortality auditing platform which captures the details of maternal deaths, maternal morbidity and mortality audit system in Malawi (26) and the absence of such systems in Ethiopia. Similarly this finding was also much lower than the report from India which captured 42% of maternal deaths from estimated maternal death of 44,000 in 2014-2015.The variation of these report might be related to the development of MDR software and presence of well-established structure for the conduct of maternal death review in some of their states (48). As indicated above, there is no standard software in place in our country and the death review is also done haphazardly. The result of this study is again lower than finding from Bangladesh which was 28% of maternal deaths captured by MDSR database. This difference may be due to the establishment of social

autopsy which trigger community for an action on maternal death, they carried out death mapping that helps to identify areas with high incidence of maternal death and enables the health system for an action and to improve health professional's accountability (31).

Although, nationally reliable and timely maternal causes of data are required to regulate the progress towards achieving the targets set in the Health Sector Transformation Plan (HSTP), the total maternal death captured by MDSR database was obviously very low which hampers an intervention to avert some of the maternal deaths.

This study has also identified content errors in the national MDSR database; different variables in the national maternal cause of death database were incomplete. A variable labeling whether the maternal death occurred during postpartum period was the one with the highest incompleteness rate which showed that 97% of the deceased mothers' information was not captured followed by place of delivery with a missing value of 96.7%. Similarly, mode of delivery, place of ANC, and ANC Attendance have incompleteness rate of 96.8%, 85% and 76% respectively for deceased mothers recorded by the MDSR. Moreover, variables such as cause of death, preventable causes and gaps contributing to delay have 3.5%, 10% and 9.3% of incompleteness rate respectively. This finding was agreed with study done on MDSR in East and Southern Africa which showed incompleteness of some variables due to lacking of some information from the community, the effect of confidentiality and lying of blame that affects the completeness of facility based review(42). It also in line with the policy brief report on MDSR in Ethiopia which showed the incompleteness of 19 selected variables such as Date of MDRF reporting Deceased ID ,Date of Death ,Age at Death , Place of death ,Death Place other specified ,Marital Status , Religion of the deceased ,Level of Education ,Gravidity, Parity ,Timing in relation to the pregnancy ,Attended ANC ,Causes of death ,Other direct causes specified ,Other In direct causes specified ,is the Death Preventable)on the MDRF data base (14). To sum up, this study indicated that the data is far from complete when the content of each variable is assessed. This is because of the revision of the reporting formats over time which leaves empty values for recently added variables, absence of mentorship for surveillance officers to timely update and use revised forms, poor understanding of importance of quality data, incomplete

information for some deceased mothers which are collected from distant family members and fear of blaming and accountability from the health care providers side.

Preventing maternal deaths can be effective if accurate and complete information of deceased mothers is available to understand the situation that lead to death. However, missing values for the majority of the variables in the database deters clear understanding of the situation of each maternal death and to design mechanisms to avert subsequent maternal deaths. For instance, if the timing and place of death of the deceased were not recorded it would be difficult to understand which mother is dying and when they are dying that would help to design a specific intervention for each place and time. The large incomplete information deters identifying preventive cause of maternal deaths, setting up a framework for accurate estimation of maternal deaths and assessing the effectiveness of interventions and planning.

Similarly, this database was also evaluated for consistency; some of the variables were found inconsistent. For instance, there were 879 maternal deaths that happened in postpartum period but only 41 of them are recorded under the variable timing of death in postpartum. Additionally for cases with no ANC follow up the place of ANC follow up was registered. The reasons for such inconsistency have been explained as periodical revision of reporting tools which resulted in addition of new variables and delay of distribution of revised tools. There were high number of pregnancies and parities for younger age group of mothers. In some instances the number of children ever born (parities) is higher than the number of gravidities for a mother. This could be attributed to lack of capacity building for professionals on data entry and management, lack of timely reviewing data, in concede with MDSR manuals and guidelines. This makes accurate identification of maternal deaths and gaps contributing to death difficult. Several missing values for the characteristics of the deceased mother may lead to erroneous labeling of cause of death in the ICD-10 coding since information on where, when, and why maternal deaths occurred are not available that make averting preventable causes of maternal death difficult.

In the qualitative part of the study different challenges of the MDSR data base management system have been explained. The challenges were high staff turnover, lack of training and updates, limitation of resource/ budget, fear of blame which resulted under reporting, absence of monitoring and evaluation and non functionality of the MDSR committees. In addition there is maternal cause of death coding problems on health professionals; competitive priority works that

resulted job burden on surveillance officers, miss conceptions, poor management that was predictors for poor data quality. These challenges were also identified in different MDSR program implementing countries. Malawian health professionals were reluctant to report maternal death for fear of being blamed and consequently disciplined (26). The finding is also similar with, the report on experience on MDSR in Cameron that reported the absence of trained health professionals to maintain the system (27). Again, it is similar with the finding from Moldova" instilled fear" in the country's health professionals which finally lead to falsification of medical documents to mask the true circumstances of death (25). Moreover, the findings of this study is similar with the study done in East and Southern Africa that documented limited resources (both financial and human), lack of a legal framework for MDSR, misconceptions about confidentiality and accountability, lack of adequate community engagement, absence of policies and guidelines, competing priorities in an already stressed health care system and inadequate leadership (23)

7. The Strength and Limitation of the study

Strength of the study

The study has been conducted on national MDRS database that will improve surveillance and response on maternal cause of death for each region in the country. Use of mixed research methods can also be cited as the strength of the study.

Limitation of the study

The study does not see challenges and strengths at facility level by interviewing key informants at regional, zonal, woreda and facility level. It does not either recruit study participants from the community and health care providers. Moreover, there was no attempt to assess the data at facility level.

8. Conclusion

The overall coverage rate of national MDSR database was 2.98 % which was below expected level. The database had also content error which was expressed by rate of completeness; variables such as death during postpartum, mode of delivery, residence of the deceased and place of ANC, had incompleteness rate of 97.2%, 96.8%, 92%, and 85% respectively which was far from acceptable range (80%). The timeliness of national MDRF report was 56.8% which was less than 80% and variables such as post partum deaths and deaths during post partum post abortion, gravidity and parity, age at gravidity and gravidity, age at parity and parity were inconsistent variables in the database.

The reasons for extremely low coverage includes but not limited to poor capturing of maternal cause death, hiding of maternal death in fear of accountability and punishment, frequent revision of reporting tools which lead to missing values for newly added variables, delay of distribution of revised tools and lack of capacity building for professionals related to data entry, inconsistent timing to review death reports, absence of continuous monitoring and evaluation and intensive feedback. The fact that the MDSR system is using paper based reporting system can be cited as another major limitation of the MDSR database.

9. Recommendations

Based on the results of this study the following recommendations are made:

For federal ministry of health and

- Strong and continuous coordination to leverage resources from stakeholders to fill the gap in funding the MDSR database system is required.
- Ensuring legal protection for health professionals who are truly reporting the occurrence of maternal death due to unavoidable cause
- Institute periodic refreshment training for surveillance officers working on MDSR
- Hire adequate number of surveillance officers and put incentive mechanisms to curb the high turnover of surveillance officers.

EPHI

- Revitalize maternal death review committees at all level.
- Ensuring adequate provision of reporting formats and guidelines at all facilities.
- Regular monitoring and evaluation and intensive feedback should be undertaken for facilities.
- Design user friendly software that has internal consistency checks
- The database has to automated to get real and timely of data on maternal cause of death,
- Conduct nationally representative mixed methods survey to identify gaps at facility and other levels

Stake holders WHO and UNFPA

- Provision of technical support at all level

At program level

- Surveillance officer should regularly review all deaths and use information for decision making.

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ANNEX

Annex 1: Questioner

English version Interview Guide for Key Informants

Addis Ababa University College of Health Science School of Public Health

Researcher-Guiding Questioners to be filled by Key Informants.

A. ENGLISH VERSION PARTICIPANT'S INFORMATION SHEET

Hello my name is Alem Begna post graduate student from school of Health Sciences in Addis Ababa University. I am currently conducting a research for the partial fulfillment of Masters in Public Health. The title of my project is "Evaluating the quality of MDSR database management system in Ethiopia". The project has gone through an ethical approval process and has secured clearance from Research Ethics Committee of the School of Public Health in AAU. The purpose of the study is to evaluate the quality of MDSR database management system in Ethiopia using a mixed research methods. The study will identify some caveats in the MDSR database management system to help improve the system and explore the limitations of the database system. Data managers and the policy makers will have adequate information to set appropriate intervention strategies.

You are purposefully approached because of your engagement in one or another form in the MDSR data collection, coding causes of death, reviewing verbal autopsy data collection tools or data management activities. Your genuine response to the questions posed will be highly appreciated. You can decline from participating in the study or stop to answer questions at any time. You will not get payment for participating in the study and your participation in this study will not have any risks or harm related to the work you are currently doing or the service you are getting. However, participating in this study will be useful to have an evidence to improve and scale-up the MDSR system in Ethiopia. If you agree to participate in the study you will be asked some questions about your experience on MDSR database management system and factors affecting its quality. The interview will take about 30 minutes. The interview will be tape recorded to help me capture all important information that you will share with me. The information you will be providing will be kept completely confidential. Please note that your

name will not be record and mentioned in the report. Furthermore, no one except the principal investigator will have access to the audio information.

You can ask me any question you like for further clarification now and I am ready to answer your questions. However if you wanted to ask me later I am the principal investigator and my contact details are as follows.

Alem Begna

Tele: 0912264227

Email:alembegna2@gmail.com

B. Consent Form

In signing this paper, I am giving my full consent to participate in the study entitled `` evaluating the quality of MDSR database management system in Ethiopia". I have been informed the purposes of the study using the language I can understand. It is to evaluate the quality of MDSR database management system in Ethiopia. The study aims to particularly explore the quality of MDSR database management system in terms of improving maternal health. I am informed that I am selected to involve in this study by virtue of the position I held related to the MDSR database system. I learnt that I will spend some 30 minutes for the interview. I am also told that the information I am sharing will be audio taped. However, I am assured that this information will not be shared to other persons except to the research team members. I have been told that my answers to questions will be kept completely confidential. I asked questions for things which I am not clear with and got enough explanations by the interviewer. I was even told not to participate in the study if I am not convinced by its purpose. I then decided:

A. To participate in the study

B. Not to participate in the study

Respondent's signature_____ Date _____

Guiding Questions for MOH and EPHI and WHO

1. What are the main strengths of the MDSR database system?

2. What are the main limitations of the MDSR database system?

3. What are the main challenges related to capturing maternal cause of death for deaths that happened in health facilities?

4. What are the main problems for capturing maternal causes of deaths for deaths that happened at the homes of the deceased mothers?

5. Can you mention some of the challenges related to coding maternal causes of death?

6. Can you please describe problems related to the review process of maternal signs and symptoms of cause's death using VA procedure?

7. How do you describe the challenges in reporting causes death at the different level of reporting?

8. Can you please describe challenges related to data entry, archiving and analyzing the MDSR database?

9. How do you think organizational factors affect the quality of MDSR data?

10. How do you think policy and regulation affects the quality of MDSR data?

11. How do you think monitoring and evaluation could affect the quality of MDSR data?

12. How do you think personal factors affect the quality of MDSR data?

13. How do you think the system related factors affect the quality of MDSR database?

14. How do you think the quality of MDSR data base management system will be kept?

15. What are the main challenges to scale up the MDSR at national level?

16. What are your recommendations to alleviate these challenges?

17. Is there a reason for missing values? E.g type of hfs =17%,COD method abstraction =22%, residence =91.92%,anc attendance =75%, anc place =85%

18. What is the difference between missing values and missing? Some variables like educational status, Timing of death in pregnancy they had an option for coding "missing"

19. Method of COD abstraction nearly a quarter doesn't designate a reviewing procedure out of expected, what is the problem with this?

20. Why car accident is reported as maternal death? Even it was reported on the place of death why?

21. Discrepancies/inconsistencies

Death occurred due during intrapartum and postpartum =1325 but the delivered mothers are only 46 .death occurred during post partum post abortion is only 41 , ANC attended is =227 but place of ANC is only 215 why this difference

One woman had 5 pregnancies and the other one had 6 pregnancies with the age group between 14-19 how it possible could? Can we say it is reliable? The other example is the number of pregnancy is only one but she had 6 children, can we say it is reliable?

22. How do you handle missing values?

23. How do you recode your data?

Guiding Questions for stakeholders UNFPA

1. What are the main strengths of the MDSR database system?

2. What are the main limitations of the MDSR database system?

3. How do you describe the challenges in reporting causes death at the different level of reporting?

4. What are the main challenges to scale up the MDSR at national level?

5. What are your recommendations to alleviate these challenges?

የሚጃ ገለፃ እና የፈቃደኝነት ማጠየቂያ ቅፅ

ዓለምቤኛ እባላለሁ፡ ፡ እኔ በአዲስ አበባ ዩንቨርሲቲ ጠፍ ሳይንስ ኮሌጅ የህብረተሰብ ጠፍ ትምህርት ቤት የድረ ምረቃ ተማሪ ነኝ፡ ፡ በአሁኑ ሰዓት ለሁለተኛ ድግሪ ማሞፂያ የሚሆን የመመረቂያ ፅሁፍ በእናቶች ሞት

አሰሳ እና ምላሽ የማጠት ፕሮግራም ዙሪያ የመመረቂያ ጥናቴን እየሰራሁ እገኛለዉ ፡ ፡ የጥናቱ ዓላማም በ ኢትዮጵያ ወስጥ ያለዉን የእናቶች ሞት አሰሳ እና ምላሽ የማጠት ሚጃ አያያዝን ጥራት መገምገም ሲሆን የምጠቀማቸዉ ዘዴዎተችም በኢትዮጵያ ሕበረተሰብ ጠፍ ኢንስቲቲዩት ያለዉን የእናቶች ሞት አሰሳ እና ምላሽ የማጠት ሚጃን በመገምገም እና በስራዉላዩ እና ዙሪያ ያሉትን የሜሞላከታቸዉን ባለሞያዎች እና ባለድርሻ አካላቶችን በቃለማጠይቁ ላይ በማተፍ ነዉ ፡ የህ ጥናት በእናቶች ሞት አሰሳ እና ምላሽ የማጠት ሚጃ አያያዝ ዙርያ ያሉትን ክፍተቶች እና ችግሮች የሚለይ ሲሆን ይህ ደግሞ የሚጃ አያያዝ ሂደቱ ለወደፊት እንዲሻሻል ይረዳል፡ ፡ ስለዚህ የሚጃ ተቆጣጣሪዎች እና መመሪያ አወጪዎች በቂ ሚጃ እንዲያገኙ እና ትክክለኛዉን ዕቅድ እንዲያቅዱ ይረዳቸዋል፡ ፡

ለዚህ ጥናት ተመረጠበት ምክንያት እርሶ የሚኖሩበት ቦታ በአንድምሆነ በሌላ መልኩ ከእናቶች ሞት

አሰሳ እና ምላሽ የማጠት ሚጃ መተብሰብ፤ መመዝገብ፤ የቨርባል አወጵፕሲ መተብሰቢያ ቅጽ መገምገም ወይም የሚጃ አያያዝ እና አጠቃቀምጋር ግንኙነት ስላለዉነዉ፡ ፡

በዚህ ጥናት ላይ የሚተፉት በእረሶ መልካም ፈቃደኝነት ብቻ ነዉ፡ ፡ ቃለ ማጠይቁን ፈቅደው ስላደረጉ የሚያገኙት ምንም አይነት ክፍያ የለም፡ ፡ በቃለ ማጠይቁ ወቅት መመለስ የሚይፈልጓቸው ጥቄዎች ካሉ አለመመለስ ይችላሉ፡ ፡ ያልገባዎት ወይም የሚቸግሮት ነገር ካለ በመገል በሜረጥ ያልገባዎትን ነገር ማጠየቅ፣ ለሌላ ግዜ ቀጠሮ መወሰድ ብሎም ቃለ ምልልሱን ለሜረጥ ከፈለጉ ሜረጥ ይችላሉ፡ ፡ ቃለ ምልልሱን ለሚድረግ ፍቃደኛ ከሆኑ ቃለምልልሱ 30 ደቂቃዎችን የሜወስድብን ሲሆን ስለፕሮግራሙለምጠይቆት ጥያቄዎች የሚጠትን ምላሽ ልማዘግብ እንዲሁም በሞረፀ ድምፅ ልይዝ እችላለሁ ነገር ግን ስሞዎትንም ሆነ የእርሶን ማንነት የሚ ልፅ ምንም አይነት መረጃ አልማዘግብም፡ ፡ ከእርሶ የማገኘዉ መረጃ በጥብቅ እና ሚስጥራዊነቱ በተጠበቀ፣ እኔ እና የጥናቱ አማካሪዎቼ ብቻ ልንደርስበት በምንችልበት ቦታ ተቆልፎበት የሜቆመጥ መሆኑን እገልፅሎታለዉ፡ ፡ ጥናቱን የሜረጥም ሆነ እምቢ የሚለት መሉ መበት ያሎት ቢሆንም ነገር ግን ከእርሶ የምገኘው መረጃ ጠቃሚ መሆኑን አወቀው በጥናቱ ላይ እዲሳተፉ በአክበሮት እጠይቆታለሁ፡ ፡ ጥናቱን በተመለከተ ጥያቄ ወይም ቅሬታ ካሎት በሚከተለውአድራሻ ማጠቀም ይችላሉ፡ ፡ ዓለምቤኛ፡ ስልክ ቁጥር+251-

912-264227፣ ኢሜል:alembegna2@gmail.com ጥናቱን በተመለከተ ግልፅ እንዲሆንሎት የሚፈልጉት ነገር አለ?

ቃለ መጠይቁን ለመካሄድ ፈቃደኛ ኖት?

አዎን □--- ቃለ መጠይቁን ይቀጥሉ አይደለሁም □----- ያቁሙ

ቃለ መጠይቁን የሚያደርገው ሰውስም ---------- ፊርማ ---------- ቀን -----/-----/-----

ቃለ መጠይቁ የሚቆጣጠረው ሰውስም---------- ፊርማ ---------- ቀን -----/-----/-----

በእናቶች ሞት አሰሳ እና ምላሽ የሚጠኑ ፕሮግራም ዙሪያ ለጠፍ ጥበቃ ሚኒስቴር እና ለኢትዮጲያ ህብረተሰብ ጠፍ ኢኒስቲቲዉት የተዘጋጀ የ ቃለ ሚጠይቅ መምሪያ

1. በእናቶች ሞት አሰሳ እና ምላሽ የሚጠኑ ሚጃ አያያዝ ሂደት ዉስጥ ያሉት ዋና ዋና ጥንካሬዎች ምንድን ናቸዉ?

2. በእናቶች ሞት አሰሳ እና ምላሽ የሚጠኑ ሚጃ አያያዝ ሂደት ዉስጥ ያሉት ዋና ዋና ክፍተቶች ምንድን ናቸዉ?

3. በጠፍ ተቋማት ዉስጥ ለተከሰቱት የእናቶች ሞት መንስዔ አመዘጋገብ ጋር ተያይዞ ያሉት ዋና ዋና ችግሮች ምንድን ናቸዉ?

4. በ መኖርያ ቤታቸዉ ዉስጥ ለተከሰቱት የእናቶች ሞት መንስዔ አመዘጋገብ ጋር ተያይዞ ያሉት ዋና ዋና ችግሮች ምንድን ናቸዉ?

5. የእናቶች ሞት መንስዔዎችን በትክክል ለይቶ ከመመዝገብ ጋር ተያይዞ ያሉትን ችግሮች ሊጠቅሱልኝ ይችላሉ?

6. ጉዳዩን በቅርብ ለሚያዉቁ ሠዎች በሚደረግ የቃል መጠይቅ (የቨርባል አዉቶፕሲ) ሂደት ዉስጥ የእናቶች ሞት መንስዔ እና ምልክቶችን ከመገምገም ጋር ተያይዞ ያሉትን ችግሮች ሊገልጹልኝ ይችላሉ?

7. የእናቶችን ሞት መንስዔዎችን በየ ደረጃዉከሚከተላለፍ ጋር ተያይዞ ያሉትን ችግሮች ሊጠቅሱልኝ ይችላሉ?

8.ከእናቶች ሞት አሰሳና ምላሽ መስጠት መረጃ አመዘጋገብ ፡አያያዝ ትንተና ጋር ችግሮች ሊጠቅሱልኝ ይችላሉ?

9.ከመስርያቤት ጋር ተያይዘዉ ያሉ ችግሮች የእናቶች ሞት አሰሳና ምላሽ መስጠት መረጃ ጥራትን በምን መልኩ ይጎዳል ብለዉ ያስባሉ?

10. መመርያዎች እና መተዳደርያ ደንቦች የእናቶች ሞት አሰሳና ምላሽ መስጠት መረጃ ጥራትን በምን ዓይነት መልኩ ይጎዳል ብለዉ ያስባሉ?

11. የቁጥጥር እና ግምገማ ሂደቶች የእናቶች ሞት አሰሳና ምላሽ መስጠት መረጃ ጥራትን በምን ዓይነት መልኩ ይጎዳል ብለዉ ያስባሉ?

12. የ ግለሰብ ሁኔታ የእናቶች ሞት አሰሳና ምላሽ መስጠት መረጃ ጥራትን በምን ዓይነት መልኩ ይጎዳል ብለዉ ያስባሉ?

13. የተለያዩ የሚጃ ሚስተላለፍያ ዘዴዎች እንደ ኢንተርኔት የተለያዩ ቅጾች አቅርቦት ጋር ተያይዞ ያሉ ችግሮች

የእናቶች ሞት አሰሳና ምላሽ መስጠት መረጃ ጥራትን በምን መልኩ ይጎዳል ብለዉ ያስባሉ?

14. **የእናቶች ሞት አሰሳና ምላሽ መስጠት መረጃ አያያዝ ሂደትን ጥራት በምን መልኩ በቋሚነት ማስጠበቅ ይቻላል ብለዉ ያስባሉ?**

15. **የእናቶች ሞት አሰሳና ምላሽ መስጠት ፕሮግራምን በ ሀገር አቀፍ ደረጃ በማስፋፋት ዙርያ ያሉት ዋና ዋና ችግሮች ምንድን ናቸዉ?**

16. **እነዚህን ችግሮች በመቅረፍ ዙሪያ እርስዎ የሚሰጡት አስተያት ምንድን ነዉ?**

በእናቶች ሞት አሰሳ እና ምላሽ የሚከተሉ ፕሮግራም ዙሪያ ለአጋር ድርጅቶች የተዘጋጀ የቃለ ማጠይቅ ማሞሪያ

1. በእናቶች ሞት አሰሳ እና ምላሽ የሚከተሉ ሚጃ አያያዝ ሂደት ወስጥ ያሉት ዋና ዋና ጥንካሬዎች ምንድን ናቸዉ?
2. በእናቶች ሞት አሰሳ እና ምላሽ የሚከተሉ ሚጃ አያያዝ ሂደት ወስጥ ያሉት ዋና ዋና ክፍተቶች ምንድን ናቸዉ?
3. **የእናቶችን ሞት መንስዔዎችን** በየደረጃዉ ከሚከተላለፍ ጋር ተያይዞ ያሉትን **ችግሮች ሊጠቅሱልኝ ይችላሉ**?
4. **የእናቶች ሞት አሰሳና ምላሽ መስጠት ፕሮግራምን በ ሀገር አቀፍ ደረጃ በማስፋፋት ዙርያ ያሉት ዋና ዋና ችግሮች ምንድን ናቸዉ?**
5. **እነዚህን ችግሮች በመቅረፍ ዙሪያ እርስዎ የሚሰጡት አስተያት ምንድን ነዉ?**

Annex 2: Identification and Notification form

This form will be filled for *ALL* deaths to women of reproductive age (15-49 years)

(To be filled in triplicate; one copy kept at HP (with section 1 filled), one at Health center and one sent to Woreda, both sections filled)

Notification (section one)		
1.	Name of the deceased	----------
2	Name of head of the household:	----------
3	Household address:	Woreda/Subcity _____ Kebele _____ Gott _____ HDA team _____ house number: _____
4	Date of the woman's death	DD/MM/YYY ____/____/_____
5	Who informed the death of the woman?	1. HDA 2. Religious leader 3. Self (HEW) 4. Others (specify) _____
6.	Date of Notification:	DD/MM/YYY ____/____/_____
Screening (to be filled by Health Extension Worker)		
7.	Age of the woman:	
8.	Did she die while pregnant?	☐ Yes ☐ No
9.	Did she die with 42 days of termination of pregnancy?	☐ Yes ☐ No

10.	Has she missed her menses before she dies?	☐ Yes ☐ No ☐ unknown
11.	Place of death:	1. At home 2. On the way to health post 3. At health post 4. On the way to Health facility (HCs, hospitals) 5. At health facility (HC, Hospital)
12.	Name of the HEW:	----------
13.	Telephone number of HEWs	----------
Section two (The section below is to be filled at the Health Centre level)		
Classification and reporting		
1.	Suspected maternal death:	☐ Yes ☐ No
2.	**If suspected maternal death, ID number given at HC**	----------
Reporter Information		
3.	Name of health center	----------
4.	Name of Health Center Head/MDSR focal person	----------
5.	Telephone Number of Health Centre head/focal person	----------
6.	Date of Notification	DD/MM/YYYY ____/____/_____
7.	Signature	----------

Annex 2A: Verbal autopsy tool (maternal death review tool at community level)

[To be undertaken for all suspected maternal deaths irrespective of place of death, including facility deaths

I. People who participated in the interview:				
***Note*:** A person who was there at the time of illness or death can participate in the interview**.** Up to four interviewees can be interviewed.				
s.no	**Name of the Interviewees**	**Relationship with the diseased**	**Was around at the time of:**	
			Illness	**Death**
1.			☐ ***Yes***☐ ***No***	☐ **Yes** ☐ **No**
2.			☐ **Yes**☐ **No**	☐ **Yes** ☐ **No**
3.			☐ ***Yes***☐ ***No***	***Yes*** ☐ ***No***
4.			☐ ***Yes***☐ ***No***	***Yes*** ☐ ***No***
II. Interviewer Information				
1.	Interviewer name:	----------		
2.	Date of interview:	DD/MM/YYYY _____/_____/_____/		
3.	Language of interview:	----------		
4.	Phone number of	----------		

	interviewer	
III. Identification/ Back ground information:		
No	Questions	Response
1.	ID Number	
2.	Age of deceased	
3.	Time of death and date of death	
4.	Ethnicity	
5.	Address where death occurred (***Note:*** select only one and provide the name)	1. Home/ Relatives' Home (Name: _____) 2. Health Post (Name of HP: _____) 3. Health Centre (Name of HC: _____) 4. Hospital (Name of hospital: _____) 5. In Transit (Distance from the destination in km: _____)
6.	Place of residency of deceased	Woreda/subcity _____ Got_____ Kebele _____ House number_____
7.	Marital status of the deceased	1. Single 3. Divorced 2. Married 4. Widowed
8.	Religion of deceased	1. Orthodox 3. Protestant 2. Muslim 4. Others (specify)------
9.	Educational status of the deceased	1.Illiterate 2.No education, but can read and write 3. Grade completed _____ 4. Don't know
10.	Level of education of the husband	1. Illiterate 3. Grade completed ___ 2. No education, but can read and write 4. Don't know
11.	Occupation of the	1. Farmer 5. Unemployed

	deceased	2. Merchant/tradesperson 6. Public employee 3. House wife 7. Others (specify) _____ 4. Daily labourer
12.	Occupation of the husband	1. Farmer 4. Daily labourer 2. Merchant/tradesperson 5. Unemployed 3. Public employee 6. Others _____
13.	Family's monthly income if possible	_____ Birr
14.	Do you have a death certificate?	☐ ***Yes*** ☐ ***No***
If Yes to Q14, ask to see the documents. Record important cause of death and identified problems _____		
15.	Has she ever attended basic Antenatal care(ANC)	☐ **Yes** ☐ **No** ☐ **Not known**
16.	If yes to Q15, where did she receive ANC Services (Check all that apply)	☐ HP ☐ Public Hospital ☐ Public HC ☐ Private clinic or hospital (specify) _____
17.	Do you know is she had any medical problems before she died? If yes, Check *ALL* that apply	

Condition	Check if identified	**If Yes, When was the condition identified?**
Malaria (fever, chills, rigors)	☐ Yes ☐ No	
Tuberculosis (cough> 3 weeks, fever, night sweating, etc.)	☐ Yes ☐ No	
HIV/AIDS	☐ Yes ☐ No	

Anemia	☐ Yes ☐ No	
Hypertension	☐ Yes ☐ No	
Diabetes	☐ Yes ☐ No	
Epilepsy		
Others (Specify) _____	☐ Yes ☐ No	

18.	Did she receive treatment for any of the conditions mentioned above? Specify Treatment provided for each condition (separating modern and traditional treatments) If NO treatment was provided, leave blank.

Disease	Modern treatment	Traditional/cultural treatment
Malaria (fever, chills, rigors)	☐ Yes ☐ No	
Tuberculosis (cough> 3 weeks, fever, night sweating, etc.)	☐ Yes ☐ No	
HIV/AIDS	☐ Yes ☐ No	
Anemia	☐ Yes ☐ No	
Hypertension	☐ Yes ☐ No	
Diabetes	☐ Yes ☐ No	
Epilepsy	☐ Yes ☐ No	

Others (Specify) _____	☐ Yes ☐ No	

IV. Pregnancy related questions

1.	Number of pregnancies including those that ended in miscarriage and still births _____	
2.	Number of births, including that ended in Stilll births and early neonatal deaths _____	
3.	Number of living children _____	
4.	Duration of the index pregnancy in months_____	
5.	State of the pregnancy at the time of death	1. Delivered live birth 3. Undelivered 2. Delivered still birth 4. Abortion
6.	If it was delivery, who assisted the delivery?	1. Family/elderly 3. HEWs 2. TBA 4. HCWs
7.	Were any of the following problems experienced during pregnancy? Tick ALL those that apply	1. Seizure/abnormal body movement 2. Bleeding 3.Fever 4. Other (specify)
8.	Did she seek care for the problems experienced?	☐ Yes ☐ No if yes, briefly describe

V. Community factors

1.	Number of days/hours she was sick before she died (Number of hours and days - specify) _____	
2.	Problems before she died: Tick *ALL* that apply	☐ Vaginal bleeding ☐ Baby stuck/Prolonged labor ☐ Fits Other (specify ☐ Fever
3.	Was any care sought for the problem? If "No" to question number 3 go to number 9	☐ Yes ☐ No

4.	If yes to Q3 above, how long after the problem/illness was detected was care sought? (Number of hours and days - specify) _____	
5.	Where was care sought and obtained?	☐ Traditional Healer ☐ Health Centre ☐ Health Extension Worker Hospital ☐ Others (specify) _____
6.	How long after seeking care did she arrive at a health facility? (Number of hours and days - specify) _____	
7.	What mode of transport was used if care was obtained?	
8.	For how long was the care given? (Number of hours and days - specify)	
9.	If no to Q3 above, what was the main reason why care was not sought?	☐ Not knowing the impact of the illness ☐ Lack of transport ☐ Past good obstetric outcomes at home ☐ Lack of money ☐ No nearby health facility Others (Specify
10.	How long would it take to walk from this house to the nearest (Number of hours and days - specify	Health post _____ Hours/days Health center _____ Hours/days Hospital _____ Hours/days
11.	If you want to go to health center or hospital, what mode of transport would you be able to use? (Tick *ALL* that apply)	☐ Rented /public transport ☐ Private car ☐ Ambulance Others (specify) _____

Annex 3: Facility based notification form

This form will be filled for *ALL* suspected maternal deaths in the facility/ hospital

(To be submitted to the Medical Director or Health Centre Head within 48 hours

Notification (section one)		
1.	Name of the deceased	
2.	Medical Record Number/ Client Card Number:	
3.	Household address:	Woreda/Subcity _____ Kebele _____ Got _____ HDA team _____ house number: _____
4.	Date of the woman's death	DD/MM/YYY ____/____/_____
5.	Time of the woman's death	
6.	Date of Notification:	DD/MM/YYY ____/____/_____
7.	WARD on which death occurred	
8.	Name of the person reporting death:	
9.	Signature	

Annex 3A: Facility based abstraction form

I. Abstractor related Information		
Name of the abstractor:_____ Qualification of the Abstractor_____ Telephone number of the abstractor:_____ Date of abstraction:_____ Was the abstractor involved in the management of the case? 1. Yes 2. No		
No	Question	Response
1.	Medical Record Number of the deceased	
2.	Age of deceased	
3	Date and time of death	Date _____ Time_____
4	Ethnicity	
5.	When did the death occur?	1. In transit 2. While waiting for treatment 3. Following start of treatment
6	Place of usual residence Woreda/sub city---------- Kebele---------- Got---------- House number----------	
7.	Religion	1. Orthodox 3 Protestant 2. Muslim 4. Others (specify)----
8.	Educational status of the deceased	1.Illiterate 2.No formal education, but can read and write 3. Grade completed _____ 4. Don't know
9.	Marital status of the deceased	1. Single 3. Divorced

		2.Married 4. Widowed
10.	Level of education of the husband	1.Illiterate 2.No formal education, but can read and write 3. Grade completed _____ 4. Don't know
11.	Occupation of the deceased	1. Farmer 2. Merchant/tradesperson 3. House wife 7. Others (specify) _____ 4. Daily labourer 5. Unemployed 6. Public employee
12.		1. Farmer 4. Daily labourer 2. Merchant/tradesperson 5. Public employee 3. Unemployed 6. Others _____
13.	Monthly income if possible	
III. Obstetric characteristics		
1.	Gravidity	
2.	Parity	
3.	Number of living children	
4.	Attended ANC ?	□ Yes □ No □ Not known
5.	If yes, where is the ANC?	1. Health post 3. Hospital 2. Health center 4. Other (specify)

6.	If yes, number of visits	
7.	Basic package of services provided in ANC (Tick ALL that apply)	☐ RPR ☐ BP measurement during the follow up ☐ Hgb, ☐ Fefol supplementation ☐ Blood grou☐, TT immunization ☐ HIV status, ☐ Other (Specify) _____ ☐ U/A
8.	Problems or risk factors in the current pregnancy:	
i	Pre existing problems (Tick ALL that apply)	☐ Hypertension ☐ Cardiac problem ☐ Anaemia Tuberculosis ☐ Diabetes Hepatitis ☐ HIV positive ☐ Other (Specify) _____ ☐ Malaria
ii	Antenatal/ intranatal problems/risks (Tick ALL that apply)	☐ Pre eclampsia / eclampsia ☐ Anaemia ☐ Placenta praevia ☐ Malaria ☐ Previous Caesarean Section ☐UTI/pyelonephritis ☐ Multiple gestation Unintended pregnancy ☐Abnormal lie/presentation Other (specify)

9.	State of pregnancy at the time of death	1. Ante partum 4. Post abortion 2. Intrapartum 5. Ectopic 3. Postpartum
10.	If delivered, what is the outcome?	1.Live birth 2. Stillbirth
11.	Date and place of delivery	Date: _____
12.	Place of delivery:_____	1. Health post 3. Hospital 2. Health center 4. Other (specify)
13.	Gestational Age at the time of death in ante partum and /or intra partum events (specify time period in months & weeks)	
14.	If the death was post partum or post abortion, after how many days did the death occur?	days
IV. Facility Episode		
1.	Date and time of admission	Date_____ Time_____
2.	Day of admission	1. Working days 2. Weekends 3. Holiday
3.	Main reason/symptom for admission	
4.	Is it a referred case? If "No" to question number 5 go to number 9	☐ Yes ☐ No
5.	Referred from (Name of health facility)	
6.	Reason for referral	
7.	Comment on referral ☐ Accompanied by HCWs ☐ Appropriate management	
8.	Summary of management at hospital	

9.	Qualification of the most senior attending health professional(s)	
10.	Primary cause of death	
11.	Is this preventable death?	
12.	If preventable maternal death, specify factors according to the three delay model	
I	Delay in seeking care	
ii	Delay in reaching at right facility	
iii	Delay within the facility (diagnostic and therapeutic)	

Annex 4: Maternal Death Reporting Format (MDRF) [VA summary form]

(To be filled in 4 copies by the Health Center and send one each for woreda, RHB and EPHI One kept at HC)

Reporting Facility Information		
Reporting Health Facility:_____	Woreda: _____	
Zone : _____	Region: _____	Date of Reporting DD/MM/YYYY ____/____/_____
Deceased Information		
Deceased ID: _____	Date of Death DD/MM/YYYY ____/____/_____	Age at death: ___ Years
Place of Death	1. at home 2. at health post 3. at health center	4. at Hospital 5. on transit 6. Other specify _____
Marital status	1. Single 2. Married	3. Divorced 4. Widowed
Religion: _____	Ethnicity :_____	
Level of Education	1. Illiterate 2. No formal education, but can read and write 3. Elementary school 6. I do not know 4. High school 5. College and above	
Gravidity _____	Parity_____	

Timing in relation to pregnancy	1= Ante partum	2= Intrapartum	3= Postpartum
Antenatal Care (ANC)			
Attended ANC?	1. Yes 2. No 3. Not known		
If yes, where is the ANC?	1. Health post 3. Hospital 2. Health centre 4. Other (specify) _____		
If yes, number of ANC visits	_____		
Basic package of services provided on ANC (**Tick ALL that apply)**	☐ RPR ☐ U/A ☐ HIV status ☐ BP measurement during the follow up ☐ Fefol supplementation ☐ Hgb ▭ Blood group ☐ TT immunization		

Cause of death						
Direct obstetric	1= haemorrhage	2= obstructed labor	3= HDP	4=abortion	5= sepsis	6. Others
Indirect obstetric	1=anemia,	2= malaria	3= HIV	4= TB	5. Others _____	
If delivered, what is the outcome?	1. Live birth		2. Stillbirth			
Is the death preventable?	1= Yes	2= No	3= I do not know			
Contributory factors (Thick all that apply)						
Delay 1	☐ Traditional Practice					

	☐ Family poverty ☐ Lack of decision to go to health facility ☐ Failure of recognition of the problem ☐ Delayed Referral from home
Delay 2	☐ Delayed arrival to referred facility ☐ Lack of Roads ☐ Lack of transportation ☐ Lack of many for transport ☐ No of facility within reasonable distance
Delay 3	☐ Delayed arrival to next facilityfrom another facility on refferal ☐ Delayed or lacking supplies and equipments(specify) ☐ Delayed management after addmission ☐ Human error or mismanagement

Reported by: _____ signature: _____ seal

Declaration

I the undersigned, declare that this is my original work, has never been presented in this or any other University and all the all people and institutions who gave support for this work are fully acknowledged.

Name of the student: Alem Begna Bayissa (Bsc.)

Date._____ Signature _____

Place: Addis Ababa University, School of Public Health, Ethiopia

Approval of the primary Advisor

This thesis work has been submitted for examination with my approval as university advisor.

Name of the primary advisor: Wubegzeir Mekonnen (PhD)

Date._____ Signature _____

Place: Addis Ababa University, School of Public Health, Ethiopia

Date of submission :_____