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Assessment of Malaria Data Quality Practice and Its Potential Factors in Nedjo Woreda, West Wellega Zone, Oromia Regional State, West Ethiopia

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Research Article

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ABSTRACT

Introduction: Malaria is one of the most common infectious diseases and a great public health problem worldwide, particularly in Africa and south Asia. Even though Quality data on malarial disease is critical for planning, decision making and assessment of the efficiency and effectiveness of the intervention on malaria control program, the available data are of poor quality.

Objective: The aim of this study was to assess malaria data quality and its potential factors in Nedjo, west Wellega zone, Oromia regional state, West Ethiopia, 2013.

Methods: Institutional based cross-sectional study triangulated by qualitative study design was employed. The methods include observation of data management practices, review of existing documents and in-depth interview with key informants. All (49 kebeles) in the woreda were clustered in to 5 clusters. Three clusters were randomly selected. All the health posts and all health centers in the selected cluster were included.

Result: Findings of the result revealed out that all the assessed data quality dimensions are far below standard set by federal ministry of health. The mean percentage of timeliness was 69.7% and completeness was 73.7% compared to the standard set by federal ministry of health (90%). The ratio of recounted to reported data over six months was 0.766 with the mean discrepancy value of 54.5 (23.34%). problem of forgetting to transfer data from notebook to registration book, Lack of independent registration book for malaria, Lack of commitment and attention from health professionals to cross check registration book before reporting, Data filling by Estimation assuming as valueless were among some factors affecting data accuracy as explained by key informants.

INTRODUCTION

Statement of the problem

Malaria is one of the most common infectious diseases and a great public health problem worldwide, particularly in Africa and south Asia. About half of the world's population lives in areas where people are at risk of malaria [1]. In 2010 an estimated 3.3 billion people were at risk of malaria. There were 216 million cases of malaria and an estimated 655,000 deaths of which 91% were in Africa. Most deaths occur among children living in Africa where a child dies every minute of malaria and the disease accounts for approximately 22% of all childhood deaths. Approximately 86% of malaria deaths were of children under 5 years globally whereas at least 20% of childhood deaths in Sub-Saharan Africa countries. In addition to this there is an estimated decrease in economic growth due to malaria in highly endemic countries, greater than one percent point [2,3].

In Ethiopia, malaria accounts for up to 12% of OPD cases and 10% of admissions. About 75% of the country has malaria transmission (defined as areas less than 2000 Million above sea level), with about 68% (i.e., 50 Million) of the country's total population living in areas at risk of malaria. The FMOH estimates that there are 5-10 Million clinical malaria cases of which 2,45,499 (18%) being confirmed cases and approximately 70,000 people die of malaria each year [4].

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In Oromia malaria is also considered to be the most important communicable disease. More than three quarters of the state, i.e., 262 of 297 (88%) districts and 4,237 of 6,765 (63%) municipalities, are considered to have malaria transmission, accounting for over 17 million persons at risk of infection. There are an estimated 1.5-2 million clinical cases per year, accounting for 20-35% of OPD cases, 16% of admissions, and 18-30% of hospital deaths [4].

Data quality is a basic requirement for disease control and prevention program. If data is inaccurate, incomplete, and not timely obtained, it leads to either overestimation or underestimation of disease burden, distribution, and trends which finally results in difficulty of decision making and improper planning for intervention.

A study conducted in one district of Kenya showed that information produced by district health management information system was 26% timely, 19% complete and 30% accurate. Also study conducted in Solomon Islands indicated that the data which were being reported from clinics to government statics is in accurate and average monthly data discrepancy was big with 21.2% which shows one fifth of the cases were over reported when nurses reported the cases to the government statistics [5,6]. Even though Quality data on malarial disease is critical for the planning of malaria control as well as assessment of the efficiency and effectiveness of the intervention, the available data are of poor quality and there are few researches conducted to assess data quality and to explore potential factors to data quality.

LITERATURE REVIEW

Burden of the disease

Malaria is one of the most common infectious diseases and a great public health problem worldwide, particularly in Africa and south Asia. About half of the world's population lives in areas where people are at risk. An estimated 3.3 billion people were at risk of malaria in 2010. Of this total 2.1 billion were at low risk (<1 case per 1000 population), 94% of whom were living in geographic regions other than Africa. The 1.2 billion at high risk (>1 case per 1000 population) were living mostly in Africa (47%) and south East Asia region (37%). Also there were 216 million cases of malaria and an estimated 655 000 deaths of which 91% were in Africa. In addition to this there were an estimated 655,000 malaria deaths of which 91% were in Africa and about 86%of malaria deaths were of children under 5 years of age.

In sub-Saharan Africa (SSA), there were 91% of all malaria-related deaths and it is estimated to result in an annual loss of 35.4 million Disability Adjusted Life Years. Also 85% of the deaths amongst children below five years of age and 40% of all public health Spending is related to malaria [7].

Malaria is the leading communicable disease in Ethiopia. About 75% of the country has malaria transmission (defined as areas <2000 M) with about 68% (i.e., 50 million) of the country's total population living in areas at risk of malaria. It accounts for about 30% of the overall Disability Adjusted Life Years lost, 12% of reported outpatient visits and nearly 10% of admissions. There are an estimated 5-10 million clinical malaria cases and 70,000 people die of malaria each year in Ethiopia.

In Oromia malaria is also considered to be the most important communicable disease. More than three quarters of the state, i.e., 262 of 297 (88%) districts and 4,237 of 6,765 (63%) municipalities, are considered to have malaria transmission, accounting for over 17 million persons at risk of malaria infection. There are an estimated 1.5-2 million clinical cases per year, with malaria accounting for 20-35% of outpatient consultations, 16% of health facility admissions, and 18-30% of hospital deaths.

History and current status of malaria control in Ethiopia

In 1959, the Malaria Eradication Service was established with funding support by USAID. Ethiopia, along with Zimbabwe and South Africa, were the only three countries in Africa to embark on a malaria eradication effort in line with the Global Malaria Eradication Efforts spearheaded by WHO. In 1976, as in many other countries, the country shifted from an 'Eradication' program to a 'control' program known as the National Organization for the Control of Malaria and Other Vector-Borne Diseases. Until the early 1990's, malaria control was organized by sectors, with a sector covering about two to five districts or 75,000 to 150,000 people [8].

Starting in 1993, a major reorganization and decentralization occurred within the FMOH, and the former vertical program was dismantled. The Regional States took over responsibility for many aspects of the program, and malaria control (including vector control) was integrated with other parts of the health system. In a subsequent FMOH reorganization, malaria control became a 'Team' (i.e., the Malaria and Other Vector-Borne Disease Team) under the FMOH's Disease Prevention and Control Department, rather than a separate department [8].

From 2001-2005 the FMOH developed the first strategic plan having objective to reduce the overall burden of malaria (morbidity and mortality) by 25% by the end of the year 2005 as compared to the year 2000 levels, and to maintain malaria free areas through strong surveillance and preventive measures [9].

FMOH also had the second strategic plan from 2006-2010 to fight malaria developing important strategies. The strategies include access to effective and affordable treatment for malaria, improving coverage of all households in ITNs targeted districts with at least two ITNs per household improving coverage of villages targeted for Indoor Residual Spraying (IRS). Early detection

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and treatment for the disease and to strengthen malaria surveillance in malaria free areas for timely understanding of the situation and to institute timely preventive measures Malaria remains as the major causes of morbidity as well as mortality in the country. The RBM baseline survey indicated that only 31% of cases of fever seen in health facilities were properly managed only 7% of children with malaria received early diagnosis and treatment and the case fatality rate was 5.2%. Infant and under five mortality are 97/1000 and 140/1000 respectively [9].

Data quality

Quality data is critical to assessing the global burden of disease and developing public health initiatives. We live in an era of unprecedented technological advancement, which has provided us with increased access to data. However, just because data has become more available does not mean that all data is accurate and reliable [10].

As study conducted in Solomon Islands indicates that the data which were being reported from clinics to government statics is in accurate. The average monthly data discrepancy was big with 21.2% which shows one fifth of the cases were over reported when nurses reported the cases to the government statistics [6].

The health information system (HIS) is a key component of control programs and its accuracy is necessary for the assessment of disease risks, the formulation of priorities and the evaluation of the cost-effectiveness of different interventions. As study conducted in Vietnam shows In order to assess the quality of the HIS in estimating malaria morbidity, data obtained by active (ACD) and passive case detection (PCD) were routinely collected from health centers and compared. The majority of malaria cases (80-95%) detected by ACD were missed by the HIS. Similarly, most malaria cases (50-90%) detected by PCD were also missed by the HIS. The current HIS greatly underestimates the malaria burden although malaria has sharply decreased in the country over the past few years [11].

Due to incompleteness of reports, reported cases can be under estimated and this may lead to in appropriate performance evaluation and low emphasize to intervention towards prevention and control of the disease. As a study conducted in Netherlands to estimate the completeness of notification of malaria cases by physicians, completeness of notification by physicians was 40.2% and 69.1% for the laboratories. This implies that many cases may go unreported [12].

Public decision makers require timely information for timely planning and intervention towards prevention and control of the disease for that report delayed is report denied. Study conducted in Mozambique shows that 87.5% Monthly reports were received timely from health facilities in first week of every month according to the program policy whereas in rest of health facilities (12.5%) reports were received against the program policy. The entries in reports at the time of submission were verified from recording registers in only 75% of the health facilities. Feedback on the monthly reports from health facility staff was received regularly by 70% health workers. Based on scoring system, only 47.5% of monthly reports were categorized as accurate [13].

The report forms include variables that are essential in calculating most of the relevant malaria indicators which are in turn very crucial for appropriate decision making. A study conducted in Mozambique shows huge discrepancy between laboratories confirmed cases reported on the forms and positive tests counted in the laboratory register book. In general the cases reported by far outnumber the tests registered in the laboratory and show unusual variations. One health center had reported 2,721 confirmed cases, while only 255 positive malaria tests were counted in the laboratory register [14].

Similar study conducted in Mozambique showed a significant discrepancy of 62% for cases and 48% for deaths reported comparing inpatients malaria cases and deaths of adults' categories in paper format at a district level with the digital data at the provincial level [14]. A study conducted in Madhya Pradesh (Central India) also shows despite the higher burden, reported malaria cases declined much faster in the districts than the aggregated data at state level. However, the aggregated state level data do not tell the correct trend as it would be expected in a site-by-site review of reported district level data [15].

A study conducted in Tanzania shows that Monthly supervision visits highlighted incomplete recording of information between OPD and laboratory records, where on average 40% of laboratory visits were missing the record of their corresponding OPD visit [16].

Clinical and epidemiologic surveillance of malaria cases and deaths is required to follow the progress of the reinvigorated malaria control programs nationally and internationally. The result obtained from American Journal of tropical Medicine and Hygiene showed that the recording, transmittal, analysis, feedback and use of malaria surveillance information are delayed and imprecise substantially <10% of the malaria cases and deaths were being reported. Denominators to compute rates of illness and death require accurate censuses of communities from which patients come to health units and specialized disease and demographic household surveys designed and performed by nationals are needed to complement hospital-based numerator data [17].

The result obtained from American journal of tropical Medicine and Hygiene also indicted that National disease burdens are often not estimated at all or are estimated using inaccurate methods like representative household surveys and demographic surveillance sites which have their own limitations and it suggested that routinely collected data on confirmed cases of disease would be a more consistent quantification of the population at risk of malaria. However, before routinely collected data can be

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used to assess trends in the incidence of clinical cases and deaths, the incompleteness of reporting and variation in the utilization of the health system must be taken into account [18].

Without accurate, timely, and complete information, managers at all level of health system hierarchy are not able to process their day-to day operational management properly. A study conducted in one district of Kenya on evaluation of existing district health management information system showed that information produced was 26% timely, 19% complete and 30% accurate.

Justifications

Data quality has become very crucial because public health decision makers require data of high quality for good decision making, appropriate planning, resource allocation and improving quality of care. Performance of malaria prevention and control activities cannot be well measured if there is no reliable data on the intervention. Currently, the government has paid great attention towards data quality rather than focusing on provision of the service merely.

Trends and burden of a disease could only be appropriately estimated if there is good data quality on the program. Data of poor quality leads to in appropriate planning and inefficient budget allocation. The issue of data quality problems is also raised frequently on various meetings without common understanding of potential factors that affect quality of data.

Poor data quality fails to contribute to decision making, appropriate planning and resource allocation and finally these results in poor quality health services. As to my knowledge there is no study conducted related to this topic in the study area. Thus, I hope this study will assess what quality of data is being compiled and reported in the district and explore potential factors that affect quality of data on malaria control and prevention program.

Objective

General objectives: To assess malaria data quality practices and its potential factors in Nedjo woreda west Wellega zone, Oromia regional state, West Ethiopia, 2013.

Specific objectives:

1. To verify the timeliness of malaria reporting system practices.
2. To verify the completeness of malaria reporting system practices.
3. To measure the accuracy of malaria reporting system practices.
4. To explore potential factors to malaria data quality practices.

Methodology

Study area and study population: The study was conducted in Nedjo woreda. Nedjo is found in West wellega zone Oromia regional state. Nedjo is located in the west parts of the region with 515 Km from Addis Ababa. Nedjo woreda has 49 Kebeles. It covers around 958 km^2. Concerning the population statistics it has a total population of 129,606 with 63,506 males and 66,099 females. In the woreda there are 6 health centers and 49 health posts providing services to the population. Concerning health personnel there are 30 nurses 4 midwifery Nurse 4 lab technician 5 public nurses 6 druggist and 4 health officers. The study was conducted in the selected health centers and health posts in Nedjo district, west wellega zone, Oromia regional state which is located at 515 Km far from Addis Ababa, towards the west Ethiopia. The study was carried out from March to April.

Study design: Institutional based cross-sectional study triangulated by qualitative study design was employed to assess malaria data quality and its potential factors in Nedjo woreda health facilities. The methods include observation of data management practices, review of existing documents and in-depth interview with key informants. Study area and period.

Data sources and study population: Data was obtained from the available written malaria data documents related to malaria cases records (registration books and monthly reports) and health professionals working on management of malaria data from July 2011 to December 2012. Health facilities in Nedjo woreda was study population for this study.

Sampling procedures: All (49 kebeles) in the woreda was clustered in to 5 clusters based on their proximity one to another since all kebeles are malarious. Each cluster consists of 10 health posts and their corresponding health centers. For this study, three clusters were randomly selected and all the health posts and health centers in the selected clusters were included. Key informants were selected for interview from health extension workers, laboratory technicians/technologists. Health officers, nurses, head of health centers, malaria focal person, and head of woreda health office.

Operational definitions

Data quality: "The state of completeness, consistency, timeliness and accuracy that makes data appropriate for a specific use."

Accuracy: Accurate data are considered correct: it is the ratio of the recounted value of the indicator to the reported value [19].

Completeness: Number of completed reports that are received from reporting institutions during a given time period divided by number reports expected. 90% completeness is a minimum level of acceptability [19,20].

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Timeliness: Number of reports received from reporting institutions according to schedule during a given time period divided by the number of expected.90% timeliness is a minimum level of acceptability [19,20].

Data collection methods and tools: Both qualitative and quantitative data collection methods were used. Data were collected by reviewing malaria registration books and monthly reports, observation of malaria data management systems and key informants interview using semi-structured questionnaire.

Document review: Documents related to malaria in the selected health facilities were assessed. During document analysis, available data in registration book and report formats was collected for comparison of the recounted and reported data and the timeliness, completeness and accuracy of reports was reviewed.

Observation: Observation method was also used using check lists at health facilities while actual activities going on. During observation, data recording, daily count of malaria cases, and data collection situation of the health facilities regarding malaria activities were under taken.

Key informant interview: Health workers were interviewed concerning problems related to reporting time, problems related to discrepancy between recounted and reported data, the ease and suitability of report formats, relevant malaria indicators, data quality assurance and etc.

Data quality assurance: Data was collected by principal investigator and trained health workers in the study kebeles to keep the data quality at optimal level. A pre-test and standardizing of the data collection material was done in different setting from the study area prior to conducting the actual survey. There was daily data checking for their completeness and clarity to give necessary corrections on time.

Data processing and analysis: After all data were collected, the data were prepared and organized in a manner that is suitable for analysis. Since there were quantitative data to measure the accuracy, completeness, and timeliness of data quality dimensions, their descriptive summaries was analyzed by SPSS version 16 and excel worksheet and result was displayed in the form of graph, table. The qualitative data was analyzed by thematic analysis and result was displayed in the form of text.

Ethical consideration: Ethical clearance was obtained from the ethical review committee of school of public health, college of medicine and health sciences, University of Gondar. Permission to conduct the study was also obtained from Oromia region health bureau. Official letter was submitted to West wellega zonal health office and then finally Nedjo woreda health office. During the study, the purposes and various importance of the study were maintained and the confidentiality of study participants were secured at all stages of the study.

RESULTS

Document review

In this Assessment, timeliness, completeness and accuracy of data quality dimensions and potential factors that affect these data quality dimensions particularly that of malaria prevention and control program has been assessed. Health facilities in Nedjo woreda, 4 health centers and 29 health posts were included in the assessment. Health information system in Nedjo wereda was totally being implemented manually.

In health posts, outpatient morbidity registration books were primary data sources for malaria morbidity while for health centers outpatient, inpatient and laboratory registration books serve as primary data sources on which patients diagnosed for malaria are registered on daily basis. Raw malaria data were collected and entered manually in malaria reporting formats after being categorized by age, sex, diagnosis method (clinical/confirmed), plasmodium species, and pregnancy and death variables.

At health post, malaria data were reported using two reporting formats systems namely the monthly malaria morbidity reporting systems that contain RDT consumption report and weekly integrated disease surveillance system. At health centers level, malaria data were reported using monthly morbidity and mortality reporting format; integrated disease surveillance system and international disease classification codes report. All these three reports used different formats but obtain data from the same source.

Health posts are linked to woreda health office particularly to malaria prevention and control team via Health centers. Data were compiled at health centers and send to woreda health office. All health facilities in Nedjo woreda stored malaria data on hand paper written formats. Nobody is assigned to coordinate malaria data in health facilities. But, woreda health office has a focal person for communicable disease prevention and control that coordinates activities including malaria reporting. All health centers and health posts have showed their registration books from which routine reports are compiled for monthly malaria morbidity, IDSR and international disease classification codes.

The highest match between recounted and reported data occurred in November, 30.3% (10/33) of all health facilities and the lowest match occurred in august, 12.1% (4/33) of all health facilities. Most of the data reported form health facilities were incompatible with data recounted from registration books.

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The reported malaria data and primary sources (registration books) had differences with the mean discrepancy value of 163 among health centers and the highest discrepancy 202 was occurred in Gori health center. Among health posts, the highest discrepancy between reported and recounted was occurred in Hobora komis health post with value of 127. The highest monthly data discrepancy between recounted and reported data was occurred in September with 27% and the lowest was occurred in October with 16.8%.

The ratio of recounted to reported data over six months period was 0.766 with the mean discrepancy value 54.5, (23.36%).

According to Federal ministry of health, the national standard for both timeliness and completeness is 90% for all reporting levels. Concerning timeliness of report, Since health posts are linked with health centers they are expected to report to health centers from 1st-4th days as the new month begins, health centers are expected to report to woreda health office from 5th-8th days and woreda health office are expected to report to zone health office from 9th-15th days of the next month.

As the result shows, Over all timeliness, cumulative timeliness, completeness, and cumulative completeness are below the standard. The highest timeliness percentage was 78.8% and the lowest timeliness percentage was 63.6% which was occurred in November and December respectively.

The highest completeness percentage was 81.8% which was occurred in November and the lowest completeness percentage was 66.7% which was occurred in December. The mean timeliness and completeness of all health facilities for the six months period are 69.7% and 73.7% respectively. This implies that out of 198 expected reports from health facilities only 138 were reported timely and 146 were complete during six months period while 178 Reports are expected to be reported being both timely and complete during this period according to FMOH standard. The study also showed that there was huge data discrepancy among monthly malaria cases reported through different reporting systems from July 2015.

Key informant interview

A total of 29 key informants were interviewed. These includes 8 health professionals working on OPD and Laboratory, 4 heads of health center, 15 health extension workers, malaria focal person and head of woreda health office. This supplementary method was used to explore potential factors that affect malaria data quality. Eighty nine point seven percent of the respondents knew the deadline of reporting time but only 69.7% of health facilities report to next level on standard reporting time **(Tables 1-10)**. Among all respondents 82.8% did not know malaria national indicators and measurements used to measure these indicators.

Table 1. Percentage distribution of Socio-demographic characteristics of Ambo Town secondary and preparatory schools students (n= 494), Oromia, Ethiopia, January, 2019.

Variable	Values	Frequency	Percent
Sex	Male	296	59.9
	Female	198	40.1
Age in year	14-18	260	52.6
	19-22	217	43.9
	>22	17	3.4
Grade/Educational level	Grade 9	89	18
	Grade 10	109	22.1
	Grade 11	157	31.8
	Grade 12	139	28.1
Religious	Orthodox	224	45.3
	Protestant	203	41.1
	Muslim	32	6.5
	Catholic	12	2.4
	Wakefata	23	4.7
Place of origin	Urban	382	77.3
	Rural	112	22.7
Ethnicity	Oromo	361	73.1
	Amhara	70	14.2
	Gurage	37	7.5
	Tigire	26	5.3

Table 2. Percentage distribution of Socio-demographic characteristics of the respondents' family (n=494), Oromia, Ethiopia, January, 2019.

Variables	Values	Frequency	Percent
Conditions of the family	Living together	434	87.9
	Divorced/Separated	33	6.7
	Either one or both parents dead	24	4.9
	No response	3	0.6

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	With Both parents, brother &sister	377	76.3
	With Father only	21	4.3
	With Mother only	28	5.7
	With relatives	33	6.7
	With peers/Friends	26	5.3
	Alone	9	1.8
Educational status	Illiterate	72	14.6
	Primary school completed	109	22.1
	High school completed	146	29.6
	Diploma holder	50	10.1
	1st degree holder	63	12.8
	2nd degree holder & above	54	10.9
Family Monthly Income / in Birr/	Low (<2000)	38	7.7
	Middle (2000-5000)	124	25.1
	High (>5000)	332	67.2
Family occupation	Merchant	175	35.4
	Housewife	39	7.9
	Government employee	191	38.7
	NGO employee	21	4.3
	Daily laborer	36	7.3
	Private Employee	32	6.5

Table 3. Percentage distribution of substance use among Ambo Town secondary and preparatory schools students (n= 494) by sex, Oromia, Ethiopia, January, 2019.

Variables	Values	Frequency	Percentage
Any Substance			
Sex	**Male**	**127**	**25.7**
	Female	**62**	**12.6**
Khat			
Sex	**Male**	**102**	**20.6**
	Female	**32**	**6.5**
Alcohol			
Sex	**Male**	**111**	**22.5**
	Female	**64**	**12.96**
Cigarette			
Sex	**Male**	**67**	**13.4**
	Female	**14**	**2.8**
Shisha			
Sex	**Male**	**15**	**3.03**
	Female	**3**	**0.6**

Table 4. Percentage distribution of substance use behavior and experiences among Ambo Town secondary and preparatory schools students (n= 494), Oromia, Ethiopia, January, 2019.

Variables		Frequency	Percent
Length of time since start			
How long you have been using drugs?	<12 Months	11	2.2
	12-18 Months	58	11.7
	18-24 Months	46	9.7
	24 Months and more	78	15.8
Frequency of drug use			
How often do you take drugs?	Daily	58	11.7
	Three times a week	35	7.1
	Twice a week	14	2.8
	As needed	88	17.8
Age of start			
Age interval in year	<11	21	4.3
	Dec-14	115	23.3
	>15	58	11.7
With whom do take drugs			

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Friends	Yes	168	34
	No	21	5.1
With parents	Yes	86	18
	No	103	20.9
With anyone	Yes	22	4.7
	No	169	34.2
Alone	Yes	24	4.9
	No	165	33.4

Table 5. Percentage distribution of Factors influencing Substance Use and Abuse among Ambo secondary and preparatory schools students (n=494), Oromia, Ethiopia, January, 2019.

Variables	Values	Frequency	Percent
Peer pressure	**Yes**	**165**	**33**
	No	**24**	**4.9**
To get relief from stress	**Yes**	**23**	**4.7**
	No	**166**	**33.2**
Having a lot of pocket money	**Yes**	**39**	**7.9**
	No	**150**	**30**
Availability and Affordability of drugs	**Yes**	**104**	**20.6**
	No	**85**	**17.2**
To be accepted by friends	**Yes**	**162**	**32.8**
	No	**27**	**5.5**
Influence of mass media and Advertisement	**Yes**	**41**	**8.3**
	No	**148**	**30**
To increase intelligence	**Yes**	**53**	**10.3**
	No	**136**	**27.5**
To stay awake	**Yes**	**58**	**11.7**
	No	**131**	**26.5**
Parents take drugs	**Yes**	**119**	**24.1**
	No	**70**	**14.2**
To have pleasant relaxation	**Yes**	**132**	**26.7**
	No	**57**	**11.6**

Table 6. Percentage distribution of magnitude of substance Abuse among Ambo Town secondary and preparatory schools students (n=494), Oromia, Ethiopia, January, 2019.

Variables	Values	Substance abuse	
Any substance		Frequency	Percentage
Sex	Male	72	14.6
	Female	7	1.4
Khat	Yes	52	10.5
	No	82	16.6
Alcohol	Yes	13	2.6
	No	162	32.6
Cigarettes	Yes	19	3.8
	No	62	12.6
shisha	Yes	5	1.01
	No	13	2.6

Table 7. Prevalence of drugs Abuse, perceptions and experiences among Ambo Town secondary and preparatory schools students (n=494), Oromia, Ethiopia, January, 2019.

Variables	Values	Frequency	Percent
Do you perceive drugs as harmful?	Yes	411	83.2
	May be	22	4.5
	No	36	7.3
	Don't know	25	5.1
Perform routine activities without using drugs	Yes	415	84
	No	79	16
Failed to do what was normally expected to do during the past three months.	Yes	79	14
	No	415	8476

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Tried and failed to control, cut down or stop using drugs during the past three months.	Yes	72	14.6
	No	415	85.4
Had a strong desire or urge to use drug.	Never	385	77.9
	Once or Twice	30	6.1
	Daily or Almost Daily	79	16
Experience of any of health, social and legal problems during the past three months	Yes	79	16
	No	415	84
Get annoyed when people comment about your drug use.	Yes	63	12.8
	No	431	87.2
Need an eye-opener to get started in the morning.	Yes	70	14.2
	No	424	85.8

Table 8. Multiple Logistic regression analysis of factors associated with substance use and abuse among Ambo Town secondary and preparatory schools students (n=494), Oromia, Ethiopia, January, 2019.

Variables	Values	Substance use		COR [95% CI]			AOR [95% CI]		
		Yes	No						
Sex	Male	127	169	1.65	1.13	2.41*	3.57	1.91	6.66*
	Female	62	136	1			1		
Age	14-18	99	161	1					
	19-22	83	134	0.993	.685	1.43			
	>22	7	10	0.878	.324	2.38			
Grade	9	31	58	1.3	.749	2.25			
	10	45	64	0.989	.594	1.64			
	11	56	101	1.25	.784	2.01			
	12	57	82	1					
With whom do you live at present?	With Both parents, brother & sister	136	241	1.00			1		
	With Father only	7	14	1.13	.445	2.86			
	With Mother only	14	14	0.564	.261	1.21			
	With relatives	14	19	0.766	.372	1.57			
	With peers/Friends	12	14	1.52	1.45	5.88*	3.56	1.57	5.94*
	Alone	6	3	0.282	0.069	1.15			
Parent child relationship	Democratic	108	202	1.00			1		
	Autocratic	49	90	0.982	.646	1.50			
	Indulgent	22	12	0.292	.139	1.73			
	Neglected	10	1	0.053	.621	2.89			
condition of your family	Living together	157	277	1.00			1		
	Divorced/Separated	18	15	2.12	1.37	4.76*	1.55	1.37	4.81*
	Either one or both parents dead	11	13	0.67	.293	1.53			
	No response	3	0	0	0				
Positive parental role modeling	yes	137	275	1					
	N0	52	30	3.48	2.21	6.65*			
Living in high levels of family conflict	Yes	40	34	2.14	1.66	5.17*			
	No	149	271	1					
Do your parents use drugs	Yes	100	47	6.18	4.72	13.70*	4.46	2.11	9.46*
	No	89	258	1			1		
Having friends who take drugs at school	Yes	112	51	7.24	5.57	11.54*	4.57	1.61	12.98*
	No	77	254	1			1		
Presence of khat House around school?	Yes	100	93	2.51	1.86	3.84*			
	No	45	105	1					
Peer pressure	Yes	165	190	4.16	1.06	9.94*	5.79	1.43	9.49*
	No	24	115	1			1		
To get relief from stress	Yes	25	23	1.87	1.72	19.16*			
	No	164	282	1					

e-ISSN:2319-9865
p-ISSN:2322-0104

Having a lot of pocket money	Yes	41	18	4.42	2.65	11.90*	4.59	1.94	10.84*
	No	148	287	1			1		
Availability and Affordability of drugs	No	104	109	2.2	1.36	4.88*			
	No	85	196	1					
Influence of mass media and	Yes	41	18	4.42	1.23	5.03*			
	No	148	287	1					
To increase intelligence	Yes	52	28	3.74	1.97	7.50*			
	No	137	276	1					
To stay awake	Yes	58	34	3.53	1.34	4.78*			
	No	131	271	1					
***P value<0.05**									

Table 9. Reasons for increased prevalence of drug abuse among Ambo Town secondary and preparatory schools students (n=494), Oromia, Ethiopia, January, 2019.

Variables	Values	Frequency	Percent
Do you think drug use is increasing in your school?	Yes	370	74.9
	No	124	24.9
Reasons for increased prevalence			
Poor school rule and regulation police implementation	Yes	310	62.8
	No	184	37.2
Poor parental control	Yes	278	56.3
	No	216	43.7
Poor child-family relationship	Yes	254	51.4
	No	240	48.6
Absence of drug police on school curriculum	Yes	286	57.9
	No	208	42.1
Increased availability of drugs everywhere.	Yes	302	61.1
	No	192	38.9
Mass media and Advertisement	Yes	291	58.9
	No	203	41.1

Table 10. Analysis of factors Associated with increased prevalence substance use/abuse among Ambo Town secondary and preparatory schools students (n=494), Oromia, Ethiopia, January, 2019.

Variables	Values	Prevalence drug use		COR [95% CI]			AOR [95% CI]		
		Yes	No						
Poor school rule and regulation police implementation	Yes	305	6	9.82	7.91	22.79*	8.3	6.44	16.45*
	No	66	117	1			1.00		
Poor parental control	Yes	270	9	9.74	4.48	19.04*	7.69	3.09	19.14*
	No	101	114	1			1		
Poor child-family relationship	Yes	247	8	8.52	3.49	17.28*			
	No	124	115	1					
Absence of drug police on school curriculum	Yes	276	11	9.47	5.21	19.13*	4.56	1.80	11.57*
	No	95	112	1			1		
Increased availability of drugs everywhere.	Yes	294	9	8.2	3.88	29.37*	9.04	3.49	23.30*
	No	77	114	1			1		
Mass media and Advertisement	Yes	282	10	9.68	3.91	19.07*			
	No	89	113	1					
*p value<0.05									

Trainings and Information flow: Training on HMIS procedures were given down up to health center level and none of health extension workers trained on HMIS. Regarding information flow within health facilities and to upper level, the response of respondents clearly showed that there was no discussion on monthly basis at health post level. But it is held at woreda health office level and sometimes at health center level.

FACTORS

Factors that affect the time reporting were mentioned by the respondents. These are overlapping of training during reporting time, delaying of time to print out and distribute report format for health facilities due to problem of electricity, work overload, lack

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of commitment of supervisors to collect and compile reports from Health extension workers, distance of health posts from health centers they are linked to. Lack of trainings/orientation on report formats and not being clear with some statements written in the report formats were main factors affected completeness of the report.

Factors that affect data accuracy/that lead to discrepancy between recounted and reported data were described as Lack of independent registration book for malaria which results in difficulty to count malaria cases among other diseases easily, problem of forgetting to transfer to registration book what has been recorded on notebook during home visits, Lack of commitment and attention from health professionals to check registration book before reporting, Data filling by Estimation assuming as valueless, and Being careless in side of health professionals.

SUPERVISION AND FEEDBACK

supervision and feedback given from upper level to lower level, the response of most respondents was that nothing was done to cross check what is recorded on registration book and what is reported but the emphasis is only on the monthly performance and how to properly use registration books some times. Eighty six point two percent of the respondents did not get feedback from upper level regarding data quality even though there was feedback on another issue.

OBSERVATION

In all health facilities in the woreda, health management information system is totally being done on paper written formats. As the finding of the assessment showed, there was no clear documentation in written form on health management information system. There were also no operational indicator definitions meeting relevant standards that are systematically followed by all service points. The study also revealed out that only very few (36.36%) health facilities recorded their activities with sufficient precision on daily basis. Except in some health facilities the source documents were not kept appropriately during the study time. There were no adequate provisions of registration books for health facilities. About less than half of health facilities (48.3%) have independent registration books for malaria while (51.7%) use a single registration book for all diseases and this made complex to easily record and collect data on malaria. Even though there are standardized reporting formats distributed by Oromia regional health bureau, data filling in health facilities is different from the expectation of the region. Most of health facilities are not clear to fill out what is actually required on the formats. Collection, aggregation and manipulation of data were poor so that data quality challenges were not addressed.

In health facilities there were no clearly defined and followed procedures to periodically verify source documents against reported data. Even though reporting system of the program is linked to the regional reporting system, the reporting period was not uniformly understood by all health facilities. As observed in one health post malaria cases that are reported on monthly malaria morbidity report are only those which were not reported weekly on IDSR report. But these reporting systems are two different reporting systems even though they use the same data. This situation led to great discrepancy between what is actually on registration books and what is reported.

DISCUSSIONS

Generally, quality data is critical to assessing the global burden of disease and developing public health initiatives. We live in an era of unprecedented technological advancement, which has provided us with increased access to data. However just because data has become more available does not mean that all data is accurate and reliable [10].

As seen from results, the mean timeliness was 69.7%. Though this result is greater than a study conducted in Kenya that showed only 26% timely information produced by existing district health management information system, It is far below the standard timeliness set by FMOH which is 90% and The achievement is also below the Study conducted in Mozambique where 87.5% Monthly reports were received timely from health facilities according to the program policy [5,13]. Similar result obtained from American journal of tropical Medicine and Hygiene showed that the recording, transmittal, analysis, feedback, and use of malaria surveillance information are delayed and imprecise substantially <10% of the malaria cases and deaths were being reported [17]. Due to the delay of reporting, though more cases are available in specific month, reported cases can be under estimated for the same month and this may lead to in appropriate performance evaluation and low emphasize to intervention towards prevention and control of the disease.

The main factors mentioned by key informants for delay in reporting were: overlapping of training during reporting time, delaying of time to print out and distribute report format for health facilities due to problem of electricity, work overload, lack of commitment of personnel assigned as supervisors to collect and compile reports from Health extension workers, distance of health posts from health centers they are linked to.

Regarding problems related to reporting time, one Health extension worker replied: ‘‘This health post is far from health center; the person who was assigned as our supervisor may not have commitment to collect and compile our report every month. At this time we send our report via any person we get from any sector those who come to our kebele for another purpose and in middle the report may remain without reaching the upper level on time or even it may be lost.”

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According to this study, the mean data completeness was 73.7%. Though This result is much more than result obtained from study conducted in kenya which is 19% it is still below the anticipated standard (90%) for data completeness which was set by FMOH [5,20]. Due to incompleteness of reports, reported cases could be under estimated. This affects the overall performance. Also it leads to improper planning and misallocation of budget that would enable to control and prevent the disease effectively. The main reasons attempted to be explored for data incompleteness were: being not clear with some statements written in the report formats, work overload and lack of orientation on reporting formats. On the ease and suitability of reporting formats, one health extension worker responded: ''it is going to be two years since I was assigned to this health post. Nobody oriented me on reporting format during this time. Even if it is written in Afan Oromo, I am always confused with some statements which have similar ideas but on different pages and I am still confused". These circumstances pave way to data incompleteness.

The other finding of this study was that the ratio of recounted to reported data was 0.766(mean discrepancy 23.34%) which implies excessively reported data. Although this result is lower than study conducted in Mozambique which showed a significant discrepancy of 62%. It is higher than the study conducted in Solomon Islands which indicated 21.2% average monthly data discrepancy [6,14]. Due to these discrepancies, despite much faster Decline in malaria cases, the over reported cases could be misinterpreted as existence of higher burden of the disease. Eventually this results in unnecessarily excess budget allocation which could be allocated for the area which is actually suffering from burden of the disease. Also if there is mismatch between the recounted and reported data, there will no proper planning for the intervention to control and prevent the disease.

This assessment also attempted to reveal out the main factors that affect data accuracy/that led to discrepancy between recounted and reported data. These were described as Lack of independent registration book for malaria which results in difficulty to count malaria cases among other diseases easily, problem of forgetting to transfer from notebook on to registration book what has been recorded on notebook during home visits, Lack of commitment and attention from health professionals to cross check registration book before reporting, Data filling by Estimation assuming as valueless, and being careless in side of health professionals.

The reasons for over reported and under reported data were tried to be assessed and one of health extension workers replied: ''our work is not only at health post but also we conduct home visits. During home visits I record each activity I have done on my notebook. But, sometimes I forget to transfer from my notebook to registration books things that are very important for monthly report; Most of the time my monthly report is based on my note book." This implies that even if the there is over reported data, It might be true report.

Because here the reported data were the actual data which were on notebook even if not registered on registration book. However, how to reconcile notebook and registration book need to have attention.

In contrary to the above, one of the health extension workers said''. In fact, most of the time my monthly report is very low because I report on monthly reporting format only those which are missed on weakly IDSR report as a chance". But these reporting systems are two different reporting systems even though they use the same data. This situation leads to under estimation of cases though high burden of the disease exists in the community.

The observation of data management showed that there were no adequate provisions of registration books for health facilities. Only some health facilities had independent registration books for malaria. Malaria program is expected to have its own independent registration book at health post level so that all necessary data elements could easily be filled. But, if a single registration book is used for many kinds of disease, it creates confusion since different kind of information is required for each disease. Even though there are standardized reporting formats distributed by Oromia regional health bureau, data filling in health facilities is different from the expectation of the region. Dissimilar data were filled for the same information required due difficulty of understanding what is required on the format.

Even though reporting system of the program is linked to the regional reporting system, the reporting period was not uniformly understood by all health facilities. The deadline of report expected to be reported by health posts is from 1st-4th day on onset of new month. During this days it is expected to be reported those activities which were done from 1-30 days in previous month. Although few health posts were reporting only what they have done from 1-30 days, but, some health posts were reporting by adding those activities they did in reporting period. This dissimilarity of reporting period affects the figure of monthly cases at each level.

CONCLUSION

Generally the study revealed out that malaria reporting system in the woreda is being suffered from poor data quality in terms of timeliness, completeness and accuracy dimensions of data quality. Overlapping of training/meetings during reporting time, delaying of time to print out and distribute report format for health facilities due to problem of electricity, work overload, lack of commitment of supervisors to collect and compile reports from Health extension workers and distance of health posts from health centers they are linked to were main factors that affected time of reporting. Data incompleteness was resulted from confusion of some statements written in the report formats, work overload and lack of orientation on reporting formats.

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Lack of independent registration book for malaria, problem of forgetting to transfer data from notebook on to registration book what has been recorded during home visits, lack of commitment and attention from health professionals to cross check registration book before reporting, data filling by estimation assuming as valueless, and being careless in side of health professionals were major factors that led to poor data accuracy. Though data management system is suffering from several problems, less attention is paid to data quality. Source documents and reporting formats were not given due attention even if they are bases for overall data quality.

Eventually, it can be concluded that if the obtained data with current quality is used for planning, resource allocation and decision making, it could probably mislead decision makers at all level.

LIMITATIONS

Time, human and financial constraints limited the scope of this paper to assess data quality of malaria data generated at peripheral health facilities and sent to woreda, zone, region, and national levels. There are also no adequate literatures on the topic.

RECOMMENDATIONS

Based on the findings via the study, the following recommendations are forwarded.

1. The Health management information system developed by federal ministry of health need to be completely implemented by providing training at health posts.
2. The Regional health bureau need to modify some statements on report formats which have the same ideas but on different pages so that the required information can easily be collected with common understanding throughout the region
3. The Woreda health office needs to search means by which training/meetings undertaken in the woreda do not overlap with the time of reporting and it also needs to prepare reporting formats in advance as these are mentioned as main factors affecting reporting time
4. The Woreda Health office need to provide training/orientation independently on data quality focusing on reporting formats, How to handle registration books, reporting period and difference between different reporting system (weekly/ monthly) so that uniform report will be reported in the same time period.
5. The Woreda health office need to assign Statisticians at health centers so that there will be proper data storage, scientific analysis, interpretations with minimum wastage of resource.
6. Supervisors are always need to cross check registration books, reports and notebooks which Health extension workers use for daily activities. Because sometimes they may forget to transfer from their notebook to registration book all things they have done and which is important for monthly report. Supervisors are also need to have commitment to collect and compile reports especially from Health posts which are far from health centers.

REFERENCES

1. WHO. World Malaria Report 2008.
2. WHO. World Malaria Report 2011.
3. WHO, RBM, UNICEF. World Malaria Report 2005.
4. Presedent's malaria initiative. Malaria Operational Plan (MOP) 2011.
5. Odhiambo-Otieno GW. Evaluation of existing district health management information systems a case study of the district health systems in Kenya. Int J Med Infrm 2005;74:733-44.
6. Kunimitsu A. The accuracy of clinical malaria case reporting at primary health care facilities in Honiara, Solomon Islands. Malaria J 2009;8:p:80.
7. Meyrowitsch DW, et al. Is the current decline in malaria burden in sub-Saharan Africa due to a decrease in vector population. Malaria J 2011;10:p:188.
8. Presedent's malaria initiative. Malaria operational plan (MOP) 2012.
9. FMOH. Five year strategic plan for malaria prevention and Control in Ethiopia 2006.
10. Unite For Sight. Quality Health Data 2011.
11. Erhart A, et al. Accuracy of the health information system on malaria surveillance in Vietnam. 2007;101:216-225.
12. Van Hest NA, et al. Underreporting of malaria incidence in the Netherlands: Results from a capture-recapture study. Epid Infect 2002;129:371-377.

e-ISSN:2319-9865
p-ISSN:2322-0104

13. Mahmood S, et al. Accuracy of primary health care statistics reported by community based lady health workers in district Lahore. JPMA J Pakistan Med Assoc 2010;60:649-653.
14. Chilundo B, et al. Analysing the quality of routine malaria data in Mozambique. Malaria J 2004;3:p:3.
15. Singh N, et al. Fighting malaria in Madhya Pradesh (Central India): Are we losing the battle. Malaria J 2009;8:p:93.
16. Maokola W, et al. Enhancing the routine health information system in rural Southern Tanzania: successes, challenges and lessons learned. Trop Med Int Health 2011;16:721-730.
17. Breman JG, et al. Malaria surveillance counts. Am J Trop Med Hyg 2007;77:36-47.
18. Cibulskis RE, et al. Estimating trends in the burden of malaria at country level. Am J Trop Med Hygn 2007;77:133-137.
19. WHO. Data Quality AUDIT Tool Guidelines for implementation 2008.
20. FMOH. Health sector strategic plan (HSDP-IV) 2010.