ORGANIZATIONAL, TECHNICAL AND BEHAVIORAL FACTORS ASSOCIATED WITH MALARIA ROUTINE DATA REPORTING AMONG HEALTH WORKERS IN SELECTED HEALTH FACILITIES IN TRANS-NZOIA COUNTY, KENYA

N. K. Lagat, J. P. Oyore and J. Korir
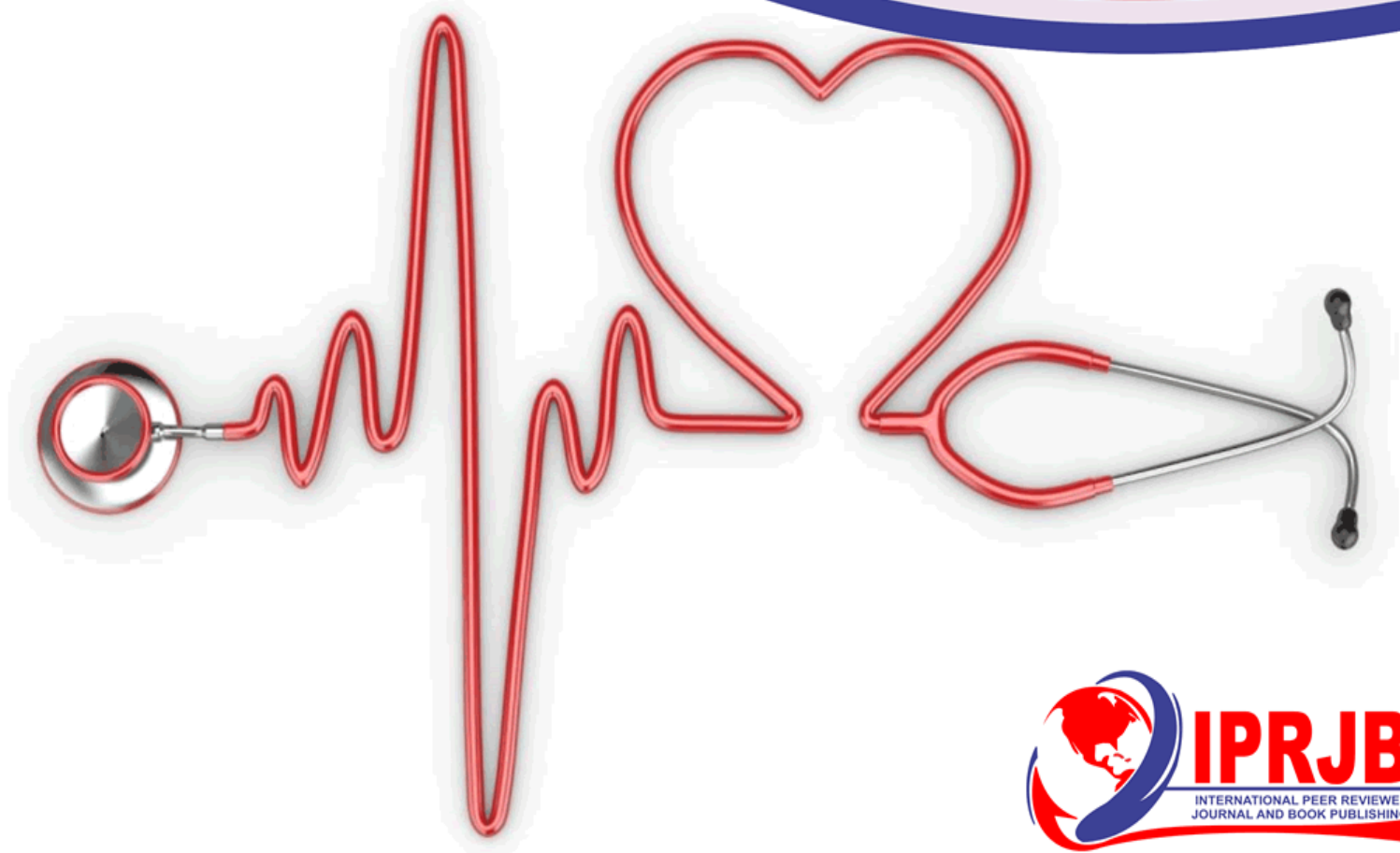
Organizational, Technical and Behavioral Factors Associated with Malaria Routine Data Reporting among Health Workers in Selected Health Facilities in Trans-Nzoia County, Kenya

[1*]N. K. Lagat,

Post Graduate Student: School of Public Health and Applied Human Sciences
Kenyatta University
*Corresponding Author's E-mail: nicolaijnr@gmail.com

[2]J. P. Oyore

Lecturer, School of Public Health and Applied Human Sciences: Kenyatta University

[3]J. Korir

Lecturer, School of Public Health and Applied Human Sciences: Kenyatta University

Abstract

Purpose: Malaria remains to be among the primary causes of sickness, infirmity and cases of deaths and has continued to negatively affect health and socio-economic progress in the country. Rapid reporting of malaria cases could avert prospective epidemics which would lead to a high proportion of sickness and deaths. The study, therefore, sought to assess the determinants of malaria routine data reporting among health workers in selected health facilities in Trans-Nzoia County.

Methodology: A descriptive cross-sectional study was conducted to evaluate the organizational, technical, and behavioral aspects that influence the reporting of malaria routine data among health workers. The sample size was 123 health facilities that were selected randomly based on their strata. Research tools that were utilized were structured questionnaires, focused group discussion, and key informant interview guide. Chi-square (χ^2) was used to test the hypothesis with a p ≤ 0.05 being considered significant.

Findings: The findings on socio-demographic characteristics indicated that majority of the research participants were females 76(62.6%), had college education 85(69.1%) and 81 (65.9%) had worked in the health facility for 5 to 10 years. Most 76(61.8%) of the health facilities were Level 3 (Health Centres). There was significant relationship between level of health facility and malaria routine data reporting at (χ^2 =9.999, df=3, p-value = 0.019). Other organizational factors that had significant association with malaria routine data reporting (p< 0.001) include inadequate budget, low staffing, poor ICT infrastructure and complex data management procedures. In terms of technical aspects, limited training on technologies had significant relationship with malaria routine data reporting (p< 0.001). Regarding behavioral aspects, identified factors include lack of incentives and inadequate resources.

Unique contribution to theory, practice and policy: The outcomes of the study provide proof for support, tactical organization, and collaboration in the health sector in Trans-Nzoia County as well as to the other developmental agencies working in the field of malaria control. The study recommends that the county government of Trans-Nzoia should provide adequate funds and ICT infrastructure to boost malaria routine data reporting. The county department of health with support from the national government through Division of National Malaria Program (DNMP)should consistently conduct in-service training, support supervision and data quality audits.

Key words: *Malaria, Determinants, Socio-Demographic, Behavioral, Technical, Routine Data Reporting*

INTRODUCTION

Malaria transmission imposes immense suffering to individuals and communities regardless of massive investments made in the prevention and control in the previous years. Recent information from World Health Organisation (2016) has shown that nearly 214 million cases of malaria occurred in 2015 and resulted to 438,000 demises globally, with Sub-Saharan Africa accounting for most overall incidents (88%). The disease has thus imposed a significant burden on Africa's health systems as the average expenses per year for case management has been approximated to be 300 million US Dollars. Kenya is regarded as a malaria-prevalent state with yearly malaria incidents cost projected to be 6.7 million dollars (CDC, 2016).

Dehcheshmeh et al. (2015) states that adequate control measures for infectious ailments depend on appropriate response systems that are reliant on adequate and reliable disease reporting. Reporting forms the foundation of disease surveillance in a health organization. It is a vital element in all health strategy makings across nations given that the information is regarded as a health priority (Breman et al., 2007). Malaria routine data is, therefore, crucial as it aids in program planning and management, provides governments and donors with relevant information concerning the advancement towards malaria management as well as supporting advocacy. Additionally, it offers the foundation to design, refine, and distribute resources of different control programs (World Health Organisation, 2016). Traditionally, community-based health assessments have been carried out worldwide to provide information for both planning and policy requirements. However, such countrywide health reviews are occasionally conducted, are costly, and may not reveal the present state of affairs predominantly in a vibrant health setting (World Health Organisation, 2016). In Contrast, statistics from health amenities are routinely gathered and are capable of presenting more factual evidence for appropriate decisions to be made, thus enabling disease programs to channel interventions sensibly (Finten et al., 2017). Conversely, the absence of valuable data has occasioned numerous impediments in utilizing routine information to trace and assess the effectiveness of malaria interventions.

The World Health Organization (WHO) has frequently utilized modeling to approximate malaria illness and mortality patterns in various states across the African continent owing to the unreliable routine data. Despite International Health Regulations (IHR) emphasis on strengthening essential aptitude for disease surveillance and response among WHO member countries, sub-Saharan Africa's routine health information is still inadequate and of poor quality. Kenya adopted DHIS2 after launching it in 2011 to become the first African state to utilize the online platform (Maina et al., 2017). Although the improvements in Kenya resulted to a substantial drop of national malaria prevalence from 11% in 2010 to 8% in 2015 (KMIS, National Malaria Control Programme, 2015), the achievements are delicate, and the control exertions necessitate consolidation.

However, by focusing on ways to improve the collection and reporting of malaria routine data by health facilities, Kenya can embark on accurate tracking of development by use of high quality and timely information hence making steps towards the innovative SDG objectives especially the third goal (Maina et al., 2017). Nationwide and health facility surveys have progressively been conducted though they have yielded limited information required to direct elimination objectives. Periodic intervals between the studies have also been widespread. Thus, they cannot be trusted for instantaneous resolution making (Chuchu et al., 2015). It is therefore, imperative to enhance malaria routine data reporting and its

utilization by relevant stakeholders, especially in highland areas like Trans-Nzoia whose peripheral surroundings support unsteady malaria transmissions.

Several studies have examined the quality and effectiveness of data routinely reported by health facilities. For example, a survey by Njoka (2015) noted that a lack of information from health facilities could lead to a poor understanding of the real depiction of routine health information at all levels of service delivery. However, the study did not examine the underlying factors in regular reporting of disease data such as malaria. Nevertheless, few academic surveys have been carried out to evaluate the determinants of malaria routine data reporting among health workers. The purpose of this study, therefore, was to assess the determinants of malaria routine data reporting among health workers in selected health facilities in Trans-Nzoia County.

METHODS

A. Study Area Description

The study area was Trans-Nzoia County, located between River Nzoia and Mount Elgon. The county borders Bungoma to the west, Uasin-Gishu and Kakamega to the south, Elgeyo Marakwet to the east, West Pokot to the north and the Republic of Uganda to the Northwest. It covers an area of 2495.5 square kilometers. The area is traditionally inhabited by Bukusu and Kalenjin, although people from diverse ethnic backgrounds have also settled in the area. Located at the slopes of Mount Elgon, Trans Nzoia enjoys a cool and temperate climatic condition. The key illnesses in the county are malaria (34.8%), influenza (22.8%), respiratory tract illnesses (9.5%), stomach conditions (5.3%) and diarrheal case (2.8%). Epidemiologically, Trans-Nzoia is classified as a malaria epidemic-prone region where malaria transmission is periodic with substantial yearly disparities. Figure 1 shows a map of the study area.
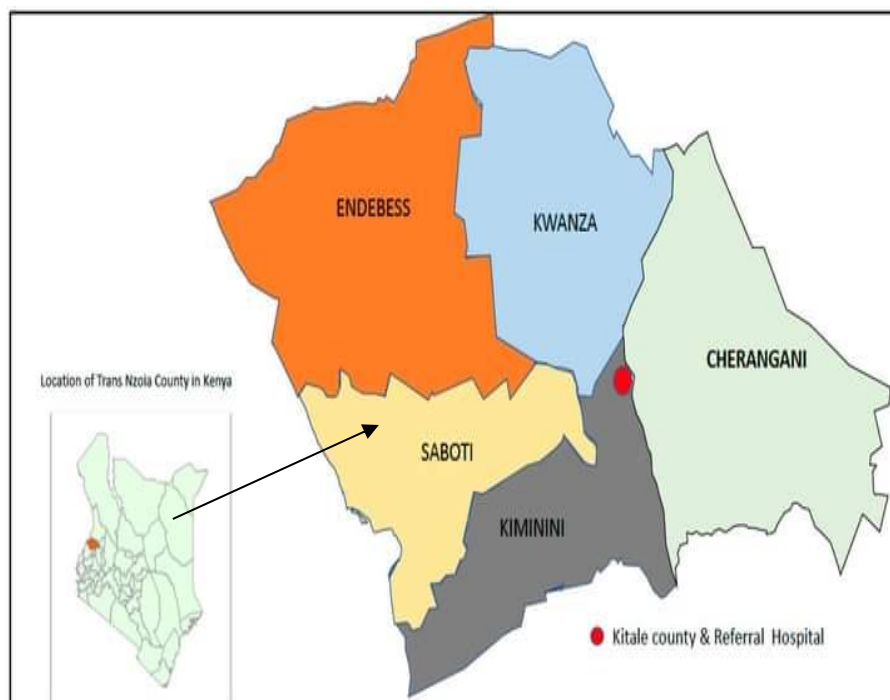

Figure 1 Map of the study area

B. Research Design

The study adopted a descriptive cross-sectional study design among the health facilities. The aim of this investigation was to provide evidence on the various aspects that affect the reporting of malaria routine data from health facilities as per the Integrated Disease Surveillance and Response (IDSR) strategy. The study consisted of both quantitative and qualitative techniques of data collection. On the quantitative aspect, the researcher used questionnaires. The method is considered suitable for the study owing to its capability to stimulate a varying array of baseline information (Mugenda, 2008). Additionally, key informant interviews were used to acquire views from various health administrators. Focused Group Discussions (FGDs) were done among public health officers, nursing in-charges, health records officers as well as laboratory officers present in the selected health facilities in Trans-Nzoia County. The study area was purposefully selected due to its susceptibility to malaria outbreaks (KMIS, National Malaria Control Programme, 2015). Cluster sampling was used to select health facilities in Trans Nzoia County for the study. A list of all health facilities was made in each of the sub-counties in Trans-Nzoia County to form the sampling frame from which the health facilities for the study were selected. The sample size was determined using Slovin's formula; $n=N/(1+N(e)^2)$ where;

n= number of facilities which were sampled,

N=Total number of facilities in area

e=level of precision; 5%.

From the County Ministry of Health administrative statistics for 2018, there were 155 health facilities required to report malaria routine data in Trans-Nzoia County. From the above formula,

$$n= \frac{155}{1+155(0.05)^2}$$

$$= 111.71$$

$$= 112 \text{ health facilities}$$

Sample size (n) = 112 + 10% owing to non-response

$$n = 123 \text{ health facilities}$$

The sample size was then distributed proportionately among the sub-counties as shown in the table 1 below.

Table 1 Sampling Frame

S. No	Sub-County	Total No. of Health Facilities	Total Sample Size
1.	Cherangany	43	34
2.	Saboti	37	29
3.	Kiminini	35	28
4.	Endebess	18	14
5.	Kwanza	22	18
Total Health Facilities		155	123 (100%)

C. Data Analysis and Quality Control

The data collected from questionnaires were entered into the Statistical Package for Social Sciences (SPSS Version 22.0) computer software program for descriptive and inferential statistical analysis. Data cleaning was done to check for discrepancies or inaccuracies in the

www.iprjb.org

data entry course. Description analysis was presented in the form of tables and figures. Chi-square (χ^2) with a P ≤ 0.05 being regarded significant was used to test the hypothesis.

A pilot study was conducted in West Pokot sub-county, precisely in Siyoi ward before the data collection to assess the clarity of the research instruments. Pilot study allowed the investigator to detect any probable faults in the instruments as well as rephrasing some questions (Goertz & Mahoney, 2012). The researcher identified the validity of investigation tools at pre-test by establishing the capacity of the tools to gather the necessary information on various study variables. The raw information was amended to identify faults and exclusions to guarantee precision, steadiness, and consistency in the course of data examination. To guarantee reliability, the researcher evaluated whether the data collection tools exhibit steadiness after the pilot study. Additionally, the researcher utilized the test-retest reliability technique to ascertain the correctness of the information collected (Gyapong, 2016). The researcher began with an appropriate overview, and the aim of the study was expounded to the study respondents. Research assistants who were chosen to take part in the study as data collectors were trained on proficient interview techniques and also, they had formal education (minimum of secondary level).

RESULTS

A. Socio-demographic Characteristics

The majority of the study respondents were females at 77 (62.6%) while a minority was male at 46 (37.4%). On the highest education level attained by the respondents, a majority at 85 (69.1%) had attained diploma level while a minority at 4 (3.2%) had attained masters level. The respondents were from different cadres. The participants were public health officers, pharmacy technicians, health records, nurses and clinical officers. The majority at 81 (65.9%) were nurses; while the least at 8 (6.5%) were health records officers. The respondents had worked in the health facilities for a varied duration of time. The majority at 81 (65.9%) had worked in the health facility for 5 to 10 years. On the other hand, only 11 (8.9%) participants had worked in the health facilities for more than fifteen years as shown in table 2.

Table 2 Socio-demographic characteristics of the respondents

Characteristics	Category	Number (n)	Per cent (%)
Gender	Male	46	37.4
	Female	77	62.6
	Total	**123**	**100**
Marital Status	Single	15	12.2
	Married	85	69.1
	Widowed	13	10.6
	Divorced	10	8.1
	Total	**123**	**100**
Religion	Roman Catholic	32	26.0
	Protestant	58	47.1
	Muslim	13	10.6
	No religion	20	16.3
	Total	**123**	**100**
Highest education level attained	Certificate	7	5.7
	Diploma	85	69.1
	Bachelor's degree	27	22.0
	Master's degree	4	3.2
	Total	**123**	**100**
Profession	Nurse	81	65.9
	PHO	10	8.1
	Pharmacy tech	13	10.6
	Clinical officer	11	8.9
	Health records	8	6.5
	Total	**123**	**100**
Position at workplace	Health facility Incharge	12	9.8
	Deputy in-charge	22	17.9
	Health staff	89	72.4
	Total	**123**	**100**
Work experience at the facility	Less than 5	14	11.4
	5-10 years	81	65.9
	10-15 years	17	13.8
	Over 15 years	11	8.9
	Total	**123**	**100**

B. Malaria Data Submission

In the past three months (May-July 2020), 72.4% (n=89) had not submitted malaria routine data to the sub county level. Only 27.6% (n=34) had submitted malaria routine data to the sub county level as shown in figure 2.
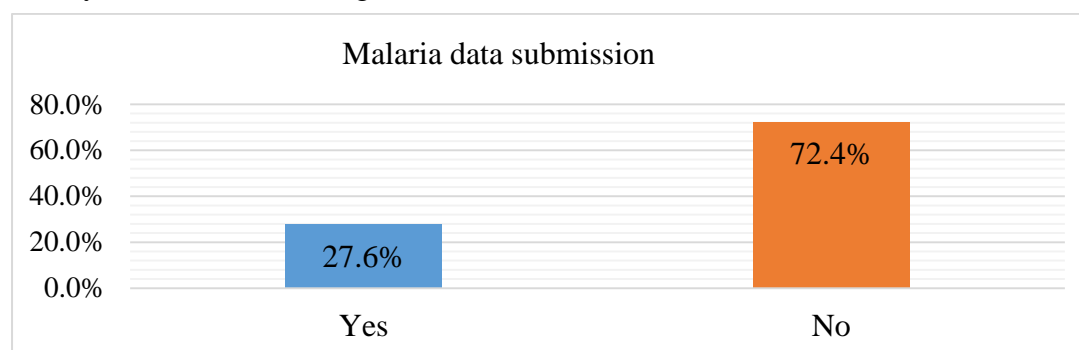

Figure 2 Malaria data submission

C. Organizational Aspects Associated with Malaria Routine Data Reporting

Availability of standard forms for malaria data

A majority at 77 (62.6%) of the study participants indicated that the health facility had standard forms for malaria data routine reporting while a minority at 46 (37.4%) reported that their health facilities did not have the standard forms. These findings are illustrated in figure 3.
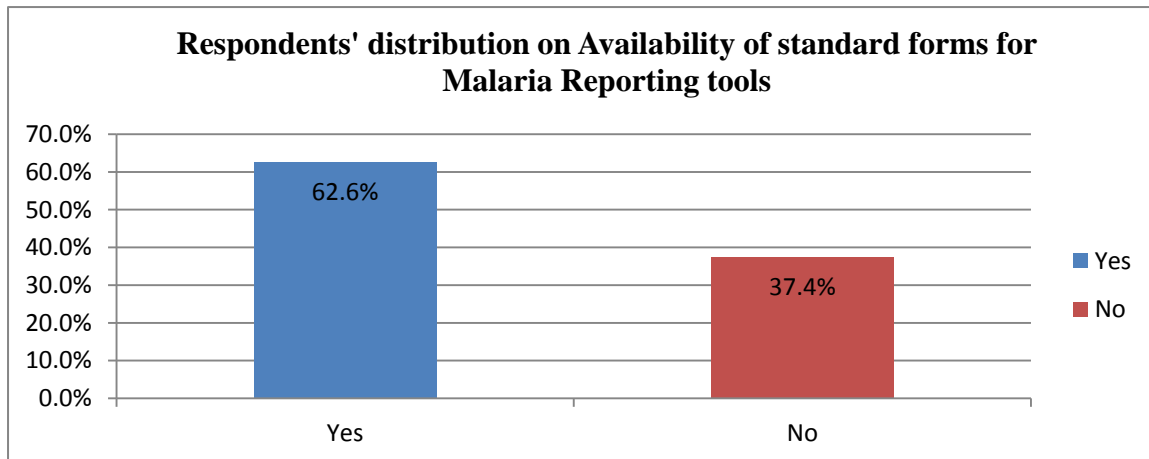

Figure 3 Distribution of respondents on availability of standards forms for malaria data

Correctness of the Filled Forms in Past 3 Months

As shown in figure 4, 29 (38%) of the respondents noted that the forms were filled correctly, whereas 48 (62%) noted that the reporting forms were not filled correctly.
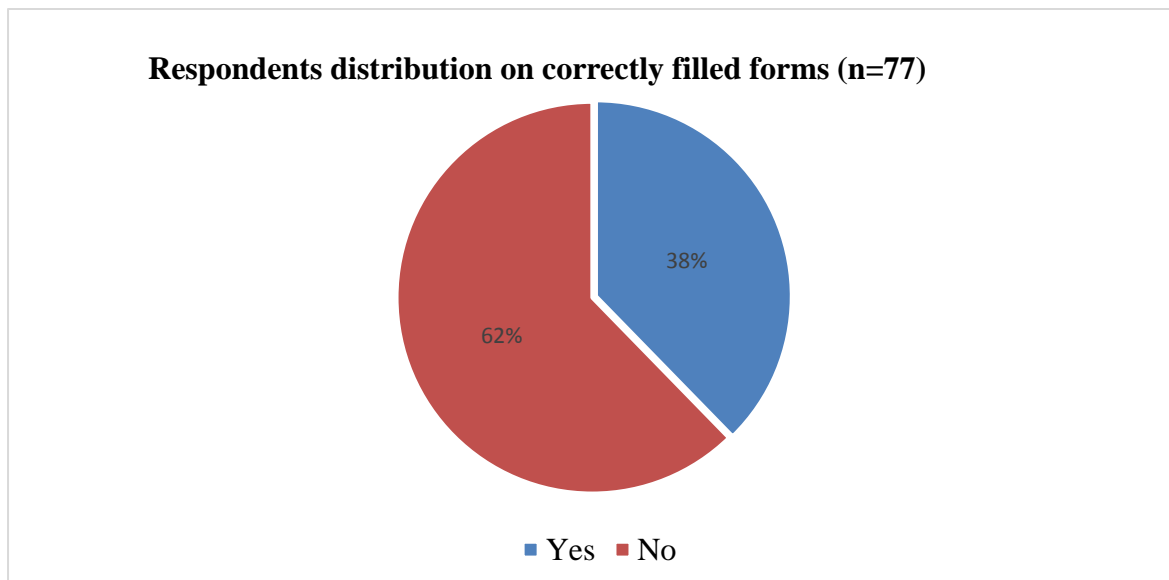

Figure 04 Respondents distribution on correctness of the filled forms in past 3 months

Health Facility Characteristics and Malaria Routine Data Reporting

The health facility characteristics in terms of type and level are shown in table 3. Majority of the health facilities (67.5%) according to type were public, whereas Level 3 formed the

www.iprjb.org

majority (61.8%) with regards to level. The results indicated a significant association (x^2=9.999, p=0.019) between the level of health facility and malaria routine data reporting.

Table 3 Health Facility (HF) Characteristics and Malaria Routine Data Reporting

Characteristics	Malaria data reporting			
	Yes n (%)	No n (%)	Statistics	p-value
No. of participants	**34**	**89**		
Type of HF			χ^2=0.207	p=0.649
Public	24 (70.6%)	59 (66.3%)	df = 1	
Private	10 (29.4%)	30 (33.7%)		
Level of HF				
Dispensary	9 (26.5%)	30 (33.7%)	χ^2=9.999	p=0.019*
Health centre	19 (55.9%)	57 (64.0%)	df = 3	
Sub-county hosp.	5 (14.7%)	2 (2.2%)		
County referral	1 (2.9%)	0 (0.0%)		

Performance of Organizational Factors

A Likert scale of range 1-5 was used on various statements that touched on organizational factors that are associated with malaria routine data reporting. Majority at 72 (58.5%) disagreed with the statement that the health facilities had an adequate budget line for malaria routine data reporting whereby only 19 (15.4%) agreed with the statement. On whether the health facility had a functional ICT infrastructure for reporting malaria routine data, a majority at 70 (56.9%) disagreed while a minority at 2 (1.6%) remained neutral. Seventy-three (59.3%) respondents indicated that their health facility had a source of power whereas 11 (8.9%) disagreed with the statement. Most of the study participants at 56 (45.5%) disagreed that the health facility had adequate staff for malaria routine data reporting, while minority 12 (9.8%) strongly disagreed with the statement. Lastly, on whether the health facility had procedures for compiling and transmitting malaria routine data, 74 (60.2%) strongly disagreed while the least 5 (4.1%) remained neutral. The results are as indicated in table 4.

Table 4: Performance of Organizational Factors

Statement	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	N	%	n	%	N	%	N	%	n	%
The health facility has adequate budget line for malaria routine data reporting	18	14.6	72	58.5	7	5.7	19	15.4	7	5.7
The health facility practices timely submission of malaria routine data reporting	56	45.5	67	54.5	0	0.0	0	0.0	0	0.0
The health facility has a functional ICT infrastructure for reporting malaria routine data	20	16.3	70	56.9	2	1.6	15	12.2	16	13.0
The health facility has a reliable source of power	8	6.5	11	8.9	31	25.2	73	59.3	0	0.0
The health facility has adequate staff for malaria routine data reporting	12	9.8	56	45.5	14	11.4	25	20.3	16	13.0
The health facility has procedures for compiling and transmitting malaria routine data	74	60.2	12	9.8	5	4.1	20	16.3	12	9.8

Chi square test was done on various organizational aspects against the level of malaria data submission. There was a significant negative association between malaria data reporting and the following factors; Adequate budget ($P<0.001$), Functional ICT ($P<0.001$), adequate staff for malaria routine data reporting ($P<0.001$) and procedures for compiling and transmitting malaria routine data ($P<0.001$). Table 5 below summarizes these results.

Table 5 Association between Organizational aspects and malaria routine data reporting (n = 123)

Organizational Aspects		Malaria data reporting		Statistics	*P*-value
		Yes (n=34 27.6%)	No (n=89 72.4%)		
Adequate budget	S.D	0 (0.0)	18 (100.0)	118.07	<0.001
	Disagree	1 (1.4)	71 (98.6)	df=4	
	Neutral	7 (100.0)	0 (0.0)		
	Agree	19 (100.0)	0 (0.0)		
	S.A.	7 (100.0)	0 (0.0)		
	Total	34 (27.6)	89 (72.4)		
Timely submission of MRDR	S.D	12 (21.4)	44 (78.6)	1.985	0.159
	Disagree	22 (32.8)	45 (67.2)	df=4	
	Neutral	0 (0.0)	0 (0.0)		
	Agree	0 (0.0)	0 (0.0)		
	S.A.	0 (0.0)	0 (0.0)		
	Total	34 (27.6)	89 (72.4)		
Functional ICT	S.D	0 (0.0)	20 (100.0)	118.072	<0.001
	Disagree	1 (1.4)	69 (98.6)	df=4	
	Neutral	2 (100.0)	0 (0.0)		
	Agree	15 (100.0)	0 (0.0)		
	S.A.	16 (100.0)	0 (0.0)		
	Total	34 (27.6)	89 (72.4)		
Reliable Power Source	S.D	2 (25.0)	6 (75.0)	1.462	0.691
	Disagree	2 (18.2)	9 (81.8)	df=4	
	Neutral	7 (22.6)	24 (77.4)		
	Agree	23 (31.5)	50 (68.5)		
	S.A.	0 (0.0)	0 (0.0)		
	Total	34 (27.6)	89 (72.4)		
HC has adequate staff	S.D	0 (0.0)	12 (100.0)	68.518	<0.001
	Disagree	0 (0.0)	56 (100.0)	df=4	
	Neutral	4 (28.6)	10 (71.4)		
	Agree	18 (72.0)	7 (28.0)		
	S.A.	12 (75.0)	4 (25.0)		
	Total	34 (27.6)	89 (72.4)		
Procedures for compiling MRD	S.D	3 (4.1)	71 (95.9)	69.195	<0.001
	Disagree	2 (16.7)	10 (83.3)	df=4	
	Neutral	4 (80.0)	1 (20.0)		
	Agree	15 (75.0)	5 (25.0)		
	S.A.	10 (83.3)	2 (16.7)		
	Total	34 (27.6)	89 (72.4)		

D. Technical Aspects Associated with Malaria Routine Data Reporting

The study respondents were required to highlight various technical aspects associated with malaria routine data reporting within the health facilities. Most of the respondents, 81 (81.3%), indicated that there was no national handbook for surveillance in the health facility. On whether there were posters with surveillance functions, a majority 100 (81.3%) reported that they were not available. Most of the respondents at 94 (76.4%) reported that the health facilities did not have the latest national guidelines for malaria diagnosis. Forty-three (35.0%) participants indicated that the people who were responsible for malaria routine data reporting had been trained on various technologies which are applied while 80 (65%) had not been trained. A majority at 97 (78.9%) of the participants highlighted that there was no zero reporting at the facility. Worthy to note, 15 (12.2%) of the study participants indicated that the health facilities did not receive any supervisory visit. When probed on the number of times the visits occurred, 46 (37.4%) stated once, 39 (31.7%) noted twice, 20 (16.3%) reported thrice and 3(2.4%) reported more than 3 times. Only 49 (45.4%) of the supervisory visits were reported to have malaria routine data reporting as part of the activity. Lastly, 18 (16.7%) of the respondents indicated that they were given feedback concerning malaria routine data reporting. The results are summarized in table 6.

Table 6 Technical Aspects Associated with Malaria Routine Data Reporting

Question	Yes		No	
	N	%	N	%
Is there a national handbook for surveillance in the health facility	23	18.7	100	81.3
Are there posters with surveillance functions displayed at the health facility	23	18.7	100	81.3
Does the facility have the latest national technical guideline for malaria diagnosis (5th edition, 2016)?	29	23.6	94	76.4
Is the person responsible for malaria routine data reporting trained on technologies used in malaria routine data reporting?	24	19.5	99	80.5
Is there "zero reporting" at the health facility	26	21.1	97	78.9
Has the health facility received any supervisory visit?	108	87.8	15	12.2
If Yes, how many such visits in the last six months?	Once 46(37.4)	Twice 39(31.4)	Thrice 20(16.3)	>Three 3(2.4)
During the supervisory visits, was malaria routine data reporting part of the visit(s)?	49	45.4	59	54.6
Was the health facility given any feedback concerning malaria routine data reporting?	18	16.7	90	83.3

The sub-county public health officer in one the FGDs stated "*although there are national handbooks and posters for surveillance of malaria, we do not have the latest national guidelines in the facilities. There is also a limited training on malaria routine data reporting in most of the hospitals.*" From the KII, the county disease surveillance coordinator (CDSC) stated, "*the latest malaria national guideline is lacking in most of the healthcare facilities. Healthcare providers also perceive zero cases as insignificant and thus, they ignore reporting them.*"

After chi square test analysis was conducted between technical aspects and malaria routine data reporting, no *p*-value was lower than 0.05 except on trained persons on malaria routine data reporting ($p<.001$). The results are as shown in table 7.

Table 7 Association between staff training and malaria routine data reporting

Characteristics	Malaria data reporting			
	Yes n (%)	No n (%)	Statistics	*P*-value
No. of participants	**34**	**89**		
Trained on MRDR			$\chi^2 = 87.421$	*p<0.001*
Yes	34 (100.0%)	9 (10.1%)	df = 1	
No	0 (0.0%)	80 (65.9%)		

E. Behavioural Aspects Associated with Malaria Routine Data Reporting

The study participants had different opinions on whether the behavioral aspects are associated with malaria routine data reporting. A majority at 77 (62.6%) disagreed that the facility had an incentive structure for good malaria routine data reporting and only 8 (6.5%) of the participants were neutral. A majority at 63 (51.3%) strongly disagreed on whether there was a dedicated resource to support malaria routine data reporting. Seventy-eight (63.4%) of the respondents disagreed with the statement that the health facility had done enough concerning the reporting of routine malaria data. A minority at 7 (5.7%) were neutral. On whether the malaria routine data reporting system is beneficial, a majority at 88 (71.5%) strongly agreed while a minority at 9 (7.3%) remained neutral. The results are as summarized in table 8 below

Statement	1		2		3		4		5	
	N	%	N	%	N	%	N	%	N	%
The facility has an incentive structure for good malaria routine data reporting	7	5.7	77	62.6	8	6.5	21	17.1	10	8.1
There are dedicated resources to support malaria routine data reporting	63	51.3	25	20.3	2	1.6	16	13.0	17	13.8
Health facility has done enough concerning the reporting of routine malaria data	16	13.0	78	63.4	7	5.7	12	9.8	10	8.1
Good and reliable malaria routine data reporting system is beneficial	0	0.0	0	0.0	9	7.3	26	21.1	88	71.5

.

Table 8 Behavioral Aspects Associated with Malaria Routine Data Reporting

Strongly Disagree-1, Disagree-2, Neutral-3, Agree-4, and Strongly Agree-5

From the FGDs and KIIs, it was noted that although good and reliable malaria routine data reporting is beneficial, there are still gaps in collection and dissemination. As the health records and information officer (HRIO) stated, "*the government has not dedicated enough resources towards malaria routine data reporting and control. The incentive structure for the same is not well structured, and thus, there is a challenge in malaria routine data reporting.*"

A Chi-square statistical analysis established significant association between malaria routine data reporting in the facility and the following factors; incentive structure for good malaria

routine data reporting ($P<0.001$) and dedicated resources to support malaria routine data reporting ($P<0.001$). These findings are illustrated in table 9.

Table 9 Cross tabulation between Behavioral Aspects and malaria data reporting

Behavioral Aspects		Malaria data reporting		Chi (χ^2) value	P-value
		Yes (%)	No (%)		
Incentive structure	S.D	0 (0.0)	7 (100.0)	80.040	<0.001
	Disagree	3 (3.9)	74 (96.1)	df=4	
	Neutral	6 (75.0)	2 (25.0)		
	Agree	19 (90.5)	2 (9.5)		
	S.A.	6 (60.0)	4 (40.0)		
	Total	**34 (27.6)**	**89 (72.4)**		
Dedicated resources	S.D	1 (1.6)	62 (98.4)	102.031	<0.001
	Disagree	1 (4.0)	24 (96.0)	df=4	
	Neutral	1 (50.0)	1 (50.0)		
	Agree	14 (87.5)	2 (12.5)		
	S.A.	17 (100.0)	0 (0.0)		
	Total	**34 (27.6)**	**89 (72.4)**		
Health facility has done enough on reporting	S.D	4 (25.0)	12 (75.0)	1.557	0.816
	Disagree	22 (28.2)	56 (71.8)	df=4	
	Neutral	2 (28.6)	5 (71.4)		
	Agree	2 (16.7)	10 (83.3)		
	S.A.	4 (27.6)	89 (72.4)		
	Total	**34 (27.6)**	**89 (72.4)**		
Good Malaria data reporting is beneficial	S.D	0 (0.0)	0 (0.0)	1.907	0.385
	Disagree	0 (0.0)	0 (0.0)	df=4	
	Neutral	1 (11.1)	8 (88.9)		
	Agree	6 (23.1)	20 (76.9)		
	S.A.	27 (30.7)	61 (69.3)		

DISCUSSION

The study highlighted different organizational aspects of malaria routine data reporting. According to the findings, 66.6 percent of the participants reported that the health facility had standard forms for malaria data routine reporting. From the findings, only 36 percent had correctly filled the forms. The findings are consistent with those of Bruckner & Checchi (2011) who noted that despite the accessibility of malaria surveillance forms, only a fraction of the healthcare givers correctly fill them. The findings also identified that the ICT infrastructure for reporting was lacking. These findings are in concurrence with different studies which have been initiated in developing countries such as one by Mwatondo et al., (2016) that noted organizational challenges which are characterized with lack of enough resources in many countries.

Minority of the study participants indicated that there were national handbook and posters with surveillance information displayed for malaria surveillance in the sampled health facilities. These findings were in disagreement with (Sewe et al., 2017) who observed that many health institutions in Kenya have a national handbook and poster for malaria control as one of the interventions for reducing the prevalence of malaria. The study found out that there were few latest guidelines for malaria diagnosis; also, there were very few personnel who had been trained on different technology on malaria reporting and surveillance. The findings are

contrary to those by Mwatondo et al. (2016) who observed that many African countries are putting a focus on malaria through ensuring that there are guidelines and that the personnel have the needed training. The findings noted that there was minimum zero reporting in the sampled health facilities and that not all facilities received supervisory visits. The results agree with Njoka (2015); however, the findings are inconsistent with a study which was done in Qatar by Chehab et al. (2018). The discrepancies can be attributed to the fact that Middle Eastern nation is developed and thus, it has better malaria routine data surveillance and reporting systems in place.

On behavioural aspects, some of the issues that were highlighted were incentive structure and dedicated resources for malaria routine data reporting. The findings indicate that the health facilities have not dedicated enough resources towards malaria routine data reporting. The results agree with Njoka (2015) who noted that many African states are investing little resources towards disease surveillance and monitoring. The study also indicated that most of the participants understood the importance of reporting malaria cases. The findings agree with Mwatondo et al. (2016), who observed that an increasing number of healthcare providers understand the importance of disease surveillance and reporting.

CONCLUSION

The study found out that different organizational aspects have statistically significant association with malaria routine data reporting. These include inadequate budget, low staffing, poor ICT infrastructure and complex data management procedures. Among all studied technical aspects studied, limited training on technologies was found to have a significant relationship with malaria data reporting. Most health facilities were unable to submit data owing to behavioural issues that affects malaria data reporting. In this respect, most had no incentive structure for good malaria routine data reporting. Similarly, there are no dedicated resources to support routine data reporting.

RECOMMENDATIONS

The county government should provide adequate funds, ICT infrastructure through needs assessment of IT tools, staffs, and enforce simple, clear technical guidelines for data management in the health facilities. To improve routine health data reporting, in-service training, support supervisions and data quality audits should be consistently conducted by the county Department of Health, with support from the national government through Division of National Malaria Program. The County health management team (CHMT) should initiate and implement inspirational and acknowledgement mechanisms in workers' accurate information generation and use. More resources should be set aside by the county health department in order to fund processes and procedures to improve users' knowledge, attitude and efforts.

ETHICAL CONSIDERATION

The investigator sought informed consent from the study participants before administering questionnaires. The researcher also guaranteed the anonymity of the study participants. Confidentiality of the information gathered was assured. The approval for research implementation was acquired from Kenyatta University Graduate School. Ethical clearance was obtained from Kenyatta University Ethical Review Committee, whereas research permits were obtained from the committee of the National Council for Science and Technology

(NACOSTI). Moreover, clearance from the County Government of Trans-Nzoia Department of Health and Education was obtained respectively. The researcher also sought permission from the County Commissioner as well as administrators of the selected health facilities to carry out the study.

LIMITATION OF THE STUDY

The study adopted a cross-sectional strategy; therefore, limiting the period spent with the study participants. Some study questions involved recall by study participants, and thus, the study was limited to their ability to remember as well as their trustworthiness.

ACKNOWLEDGEMENT

REFERENCES

Breman, J., Alilio, M., & White, N. (2007). Defining and defeating the intolerable burden of malaria III: Progress and perspectives. *American Journal of Tropical Medicine*, *77*(6).

Bruckner, C., & Checchi, F. (2011). Detection of infectious disease outbreaks in twenty-two fragile states, 2000-2010: A systematic review. *Conflict and Health*, *5*(1), 1–10. https://doi.org/10.1186/1752-1505-5-13

CDC. (2016). Preconception counseling: for women and men living in areas with ongoing spread of Zika virus who are interested in conceiving. Atlanta. *MMWR. Morbidity and Mortality Weekly Report*, *67*(31), 1077–1081. https://doi.org/10.15585/mmwr.mm6731e2

Chehab, M. A., Bala, M. O., Al-Dahshan, A., Selim, N. A., Al-Romaihi, H. E., Al-Thani, M., & Farag, E. A. (2018). Evaluation of the Completeness and Timeliness of National Malaria Surveillance System in Qatar, 2016. *Cureus*, *10*(6). https://doi.org/10.7759/cureus.2851

Chuchu, S., Adoyo, M., & Osuga, Onyango, B. (2015). Information management for essential medicines supplies in public primary care facilities in Nairobi County, Kenya. *African Journal of Pharmacy and Pharmacology*, *9*(34), 861–874. https://doi.org/10.5897/AJPP2015

Fadaei Dehcheshmeh, N., Arab, M., Rahimi Fouroshani, A., & Farzianpour, F. (2015). Survey of Communicable Diseases Surveillance System in Hospitals of Iran: A Qualitative Approach. *Global Journal of Health Science*, *8*(9), 44. https://doi.org/10.5539/gjhs.v8n9p44

Finten, G., Garrido, J. I., Agüero, M. V., & Jagus, R. J. (2017). Irradiated ready-to-eat spinach leaves: How information influences awareness towards irradiation treatment and consumer's purchase intention. *Radiation Physics and Chemistry*, *130*. https://doi.org/10.1016/j.radphyschem.2016.09.004

Goertz, G., & Mahoney, J. (2012). *A tale of two cultures: Qualitative and quantitative research in the social sciences*. Princeton University Press.

Gyapong, O. (2016). An overview of neglected tropical diseases in Sub-Saharan Africa. In Neglected Tropical Diseases-Sub-Saharan Africa. *Springer, Cham*, 1–14. https://doi.org/10.1007/978-3-319-25471-5_1

KMIS, National Malaria Control Programme, M. of H. (2015). *Kenya Malaria Indicator Survey 2015*. 2. https://dhsprogram.com/pubs/pdf/MIS22/MIS22.pdf

Maina, J. K., Macharia, P. M., Ouma, P. O., Snow, R. W., & Okiro, E. A. (2017). Coverage of routine reporting on malaria parasitological testing in Kenya, 2015-2016. *Global Health Action*, *10*(1), 1413266. https://doi.org/10.1080/16549716.2017.1413266

Mugenda, A. (2008). Social science research: Conception, methodology and analysis. *Nairobi: Kenya Applied Research and Training Services*, *10*(1).

Mwatondo, A. J., Ng'ang'a, Z., Maina, C., Makayotto, L., Mwangi, M., Njeru, I., & Arvelo, W. (2016). Factors associated with adequate weekly reporting for disease surveillance data among health facilities in Nairobi County, Kenya, 2013. *The Pan African Medical Journal*, *23*, 165. https://doi.org/10.11604/pamj.2016.23.165.8758

Njoka, P. M. (2015). Factors Influencing Utilization of Routine Health Data in Evidence Based Decision Making in HIV/AIDS Services By Public Health Facilities in Nakuru County. *Imperial Journal of Interdisciplinary Research*, *58*(3), 538–545. http://erepository.uonbi.ac.ke:8080/xmlui/bitstream/handle/11295/90875/

Sewe, M. O., Tozan, Y., Ahlm, C., & Rocklöv, J. (2017). Using remote sensing environmental data to forecast malaria incidence at a rural district hospital in Western Kenya. *Scientific Reports*, *7*(1), 1–10. https://doi.org/10.1038/s41598-017-02560-z

World Health Organisation. (2016). Integrated Disease Surveillance Quarterly Bulletin - 1st Semester 2016. *WHO Regional Office for Africa*, *June*, 1–20. https://apps.who.int/iris/bitstream/handle/10665/251728/IDS_2016-01-end.pdf?sequence=1&isAllowed=y