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Evaluation of Under-Five Malaria Treatment in Sierra Leone: A Case Study Kenema District Hospital

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Abstract - Malaria remains the leading cause of both morbidity and mortality in Sierra Leone, especially among young children, despite the strive to reduce the infection rates over the past decade, and if robust mechanism is not put in place, for the eradication of the disease then the notion would still be faced with challenges in controlling of malaria that may have greater effect on under-five children. The main purpose of this research is to evaluate the efficiency of under-five malaria treatments administered in the Kenema Government Hospital. The study was descriptive and designed to evaluate under-five malaria treatment using chi-square test. The researcher used 12274 reported cases of morbidity within the period 2010 to 2012 for under-five children and 385 were mortality cases (death cases as a result of malaria) and 11916 reported cases of those treated and recovered. The study was descriptive and designed to evaluate under-five malaria treatment using chi-square test. In 2012, there was a rapid increased of 42% in morbidity reported cases with 4028 cases reported which was almost five times the morbidity cases in 2010. It sounds alarming and worrisome for a district in the eastern part of Sierra Leone. It can be observed that the rate of morbidity cases was getting higher every year in under- five children in Kenema District. In 2012 there were 3897 under five children reported to survive out of 4072 morbidity cases which indicate 40% increased of survival for under- five children in the Kenema Government District Hospital. Again, from 2011 to 2012 the chances of survival for children were almost the same as chances of morbidity cases. Moving toward 2013, there were clear indications that the rate of morbidity may increase at a proportion equal to recovery rate. There is no significant defence between the morbidity and those treated and recovered (survived) which implies that the many challenges that were faced by this hospital management were overcame. These challenges may exist in the form of number of beds available, number of qualified doctors and nurses, use of appropriate and available drugs for the treatment of malaria etc. However in mist of these challenges the management was able to treat and recover a lot of cases though more morbidity cases waiting in queue

Keywords: Morbidity; mortality; recovered; survival; treated

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INTRODUCTION

Malaria kills a child somewhere in the world every minute. It infects approximately 219 million people each year (range 154-289 million), with an estimated 66,000 deaths, mostly children in African. Ninety percent of malaria deaths occurred n Africa, where malaria accounts for about one in six of all childhood deaths. This disease contributes greatly to anaemia among children a major cause of poor growth and development (UNICEF 2013).

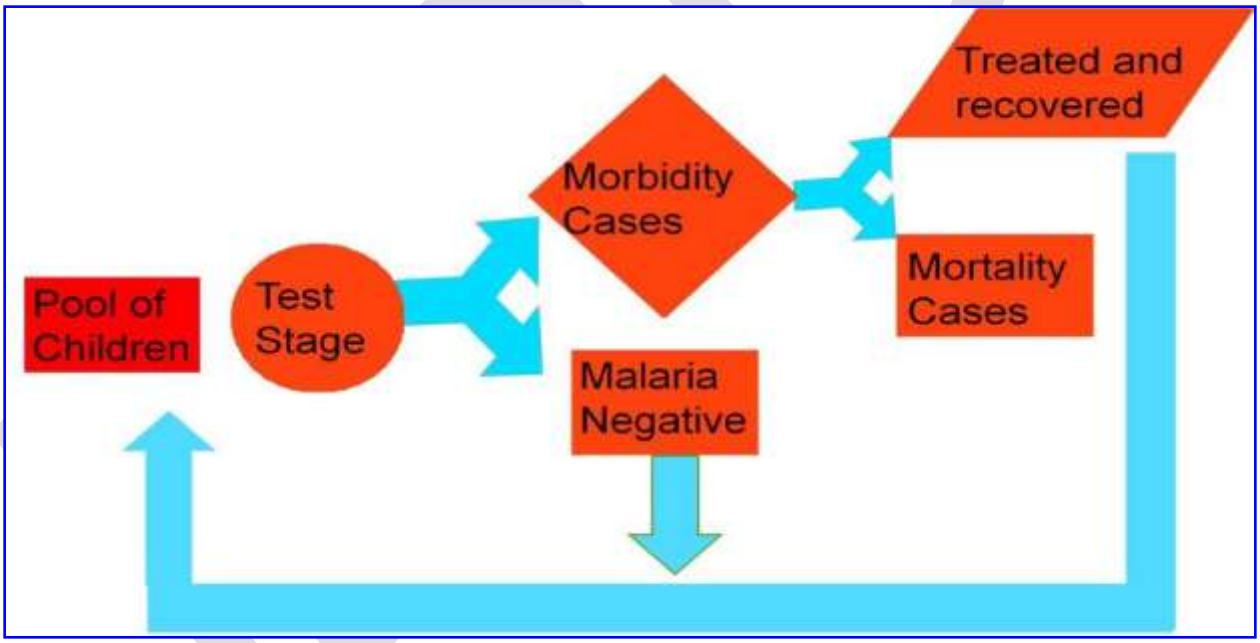
According World Health Organization (WHO) report 2013, Malaria is a disease caused by parasites that are transmitted to human via mosquito bite. Symptom of infection may include fever, chill, headache, muscle pain, fatigue, nausea, and

vomiting. In sever cases, the disease can be life threatening. In older children abdominal distress is often observed. The abdomen is distended and tender especially in hepatic and spleen areas. The other complications that may result in children with malaria are cerebral malaria and severe anaemia. The prognosis of this disease especially in children is that growth and development may be seriously impaired. Convulsion is common in children with cerebral malaria and thus significantly leads to mortality.

Malaria is the greatest contributor to rising morbidity of all infectious diseases followed by acute respiration infection (ART).30% of Sierra Leonean dies from malaria before their birthday. Currently, forty(40) children die in Sierra Leone daily from malaria disease(WHO,UNICEF, 2005).Sierra Leone is responsible for the great number of consultation(30% of new cases in health centre) within the public services at it is the most common for hospital admission. Contraceptive prevalent Rate (percent of women) is 8% and the adolescent fertility rate (birth per 1,000 women Age 15-19) is 98.Sierra Leone where 43% of the population account for youths, and under- age 15(percent), one begins to wonder the trend of malaria for under five children infected if drastic dimension of control is not considered (WHO report-2012

According to WHO report 2013, on malaria situation, it was estimated that nearly one million cases of malaria are reported every year with an estimated 6,000 children under- five years old killed yearly in Sierra Leone.

THEORETICAL AND CONCEPTUAL FRAME WORK



The above chart is a simple concept that display the in and out flow of malaria for under -five children. The pool of children is the first category we have. Test on those who are infected will get into the morbidity category and those who have proved to be negative move downwards to join another category of those who are not infected with malaria. From the category of morbidity, children are now faced with a lot of factor. Factor of better medical treatment, better prescribe medicine, qualify doctors and nurses etc. in the hospital. That will allow children either to recover and discharged and there after they will get back into the category of those proved to be negative and move upwards to the pool of children. The recycling process continues for the infection of under-five children. With all these challenges put together, there is the absolute need to find out if there is any significant difference between the morbidity cases and those children treated and recovered.

THE PURPOSE OF THE STUDY

The purpose of the study is evaluating under-five malaria treatment in Kenema District Hospital.

RESEARH QUESTION

The research questions are;

- How many morbidity cases of malaria were reported in Kenema District Hospital within the period 2010-2013?
- How many children were successfully treated and recovered from malaria treatment?
- How many mortality cases were reported from both out-patient and in-patient that were attributed to malaria within the period 2010-2013.
- Is there any significance difference between morbidity cases and those treated and recovered?

OBJECTIVES

The specific objectives of this research are:

- Give comparative analysis of morbidity of reported malaria cases within the period 20110-2013.
- Identify successful treated patients within the period 2010-2013
- Evaluate the number of mortality and morbidity attributed to malaria in kenema District hospital.
- Evaluate if there is any significance difference between morbidity cases and those treated and recovered in Kenema District Hospital.

DESCRIPTION OF DATA SOURCE

The paediatric ward of Kenema Government Hospital is situated in Nongowa chiefdom of the Eastern part of Sierra Leone and serves as a provincial headquarters of the region. The paediatric ward stretches about three miles radius .It shares boundary with a village called Tissoh in the north-east Combema in the east and Gbenderu in the sourth, Bandama in the west and Komboi hills in the north and north-east.

Kenema Government hospital is symbolic for treatment of all diseases to people of Eastern provinces. It is well staffed with qualified paediatrician, other medical officers and a good number of State Registered Nurses. It is attended by children from the entire district and beyond

STUDY DESIGNED

The study was descriptive and designed to evaluate under-five malaria treatment using chi-square test. The focused was on using non-parametric test to establish a relation between the number of morbidity of both in and out-patient malaria cases and those treated and recovered from malaria infection in Kenema Government Hospital in Sierra Leone within the period: 2010-2013 inclusive.

STUDY POPULATION

All reported cases of malaria treatment for under-five treatment of malaria in the Kenema Government Hospital within the period 2010-2013 inclusive were considered

DATA SOURCE

Data were extracted from the National Malaria Control Programme Reports (2010-2013) database system which includes information gathered via acute case investigation on all malaria cases contacted and followed-up between 2010-2013 inclusive. The researcher obtains sample of children who were diagnose for malaria infection, those who were treated successfully and the number of deaths attributed to malaria infection.

SAMPLE SIZE

The researcher considered a sample size of 12274 reported cases of morbidity within the period 2010 to 2012 for under-five children, and 385 were mortality cases (death cases as a result of malaria) and 11916 reported case of those treated and recovered.

DATA ANALYSIS

Simple multiple bar chart was used for data analysis. By using SPSS,a chi-square test was used to test if there is any significance difference between morbidity and the number of recovered cases.

VARIABLES

For the purpose of this study the variables are categorised:

- $\mathbf{Y_t}$(dependent variable) = The total number of morbidity(Both in and out-patient) that are attributed to malaria
- $\mathbf{X_1}$(independent variable) = Total number of mortality attributed to malaria
- $\mathbf{X_2}$(independent variable) = Total number treated for malaria successfully.

ASSUMPTION

- The data never consider those children who were sick, tested prove to be negative for malaria
- only those tested and prove to be positive were considered
- Morbidity cases were consider as dependent variable
- Mortality (those who died) as a result of malaria and those treated for malaria recovered(survived) are considered independent variable
-

HYPOTHESIS TESTED

$\boldsymbol{H_o}$: There is no significant difference between morbidity cases and the cases of

treated and recovered (survived)

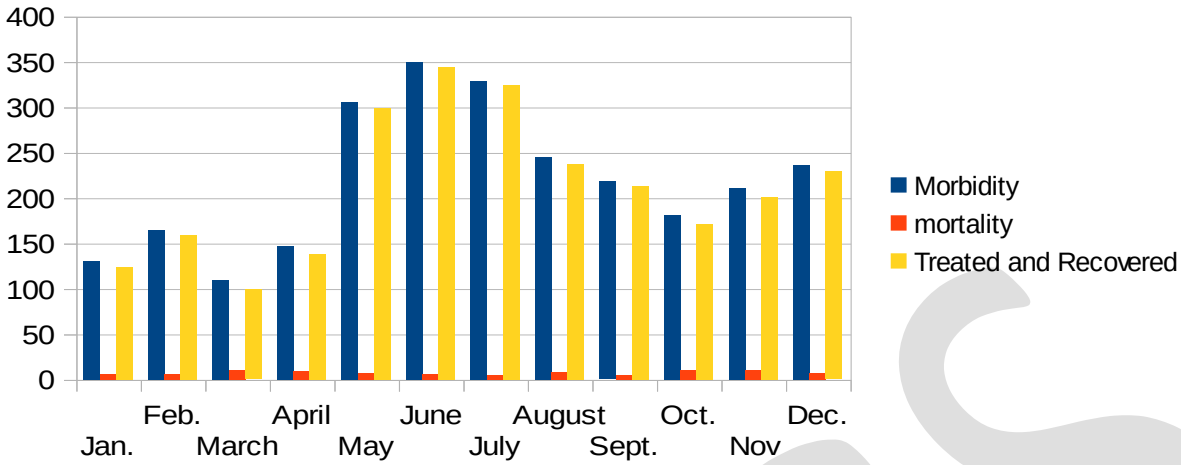
$\boldsymbol{H_1}$: There is significant difference between morbidity cases and the cases treated and

recovered (survived)

RESULTS AND DICUSSIONS

Reported Cases of Malaria for Under-Five Children, Kenema District Hospital (2010)

Chart 1: Reported cases in 2010

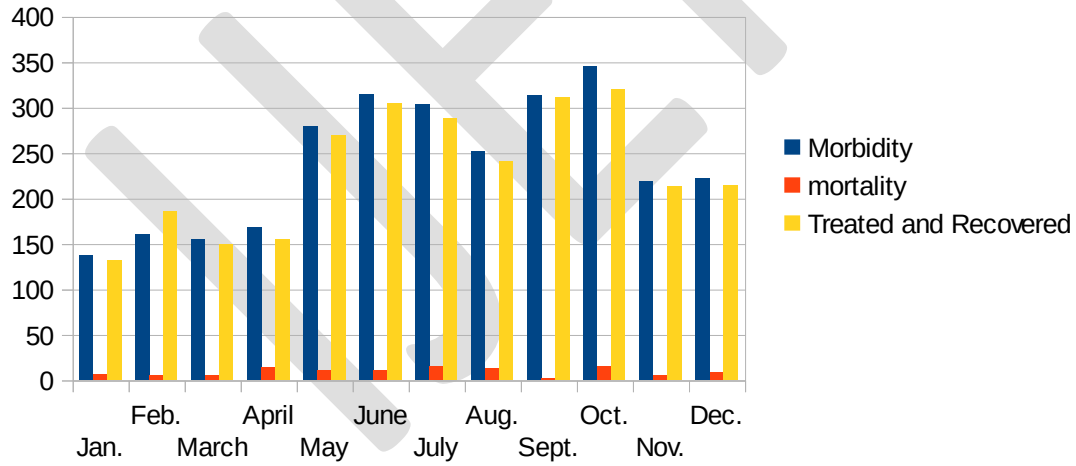


MORBIDITY AND MORTALITY-2010

In 2010, 2627 cases were reported for malaria in kenema for under-five children of whom 89 death cases were reported. 2548 cases were treated and discharged.2610 cases were in-patient and 17 were out-patient cases. There were no reported cases for of death for out-patient. And the month of July captured the highest reported cases of malaria while the month of October and November equally indicated the highest number of death cases. The morbidity cases had their pick between the month of May and ending of august, while the death cases were at equal proportion throughout the year.

Malaria Reported Cases for Under-Five Children in Kenema Government, 2011

Chart 2: Reported cases in 2011

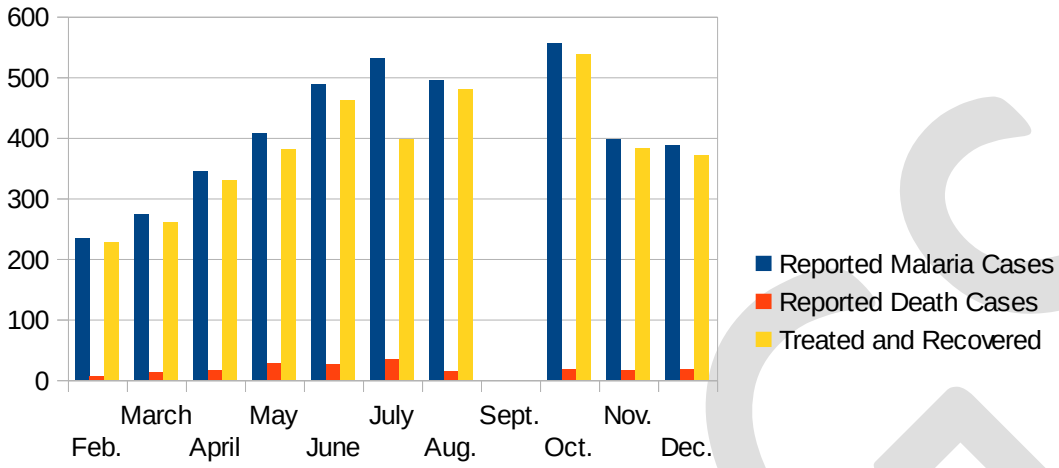


MORBIDITY AND MORTALITY-2011

In 2011, 2865 under-five malaria cases and 107 cases of death were reported respectively.2758 were successfully treated of which 2832 were in- patient cases and 33 were out-patient cases respectively. October indicates the highest cases of morbidity and mortality. There was a sharp increase in morbidity in June followed by October through July.

Malaria Reported Cases for Under-Five Children, Kenema Government Hospital , 2012

Chart 3: Reported cases in 2012

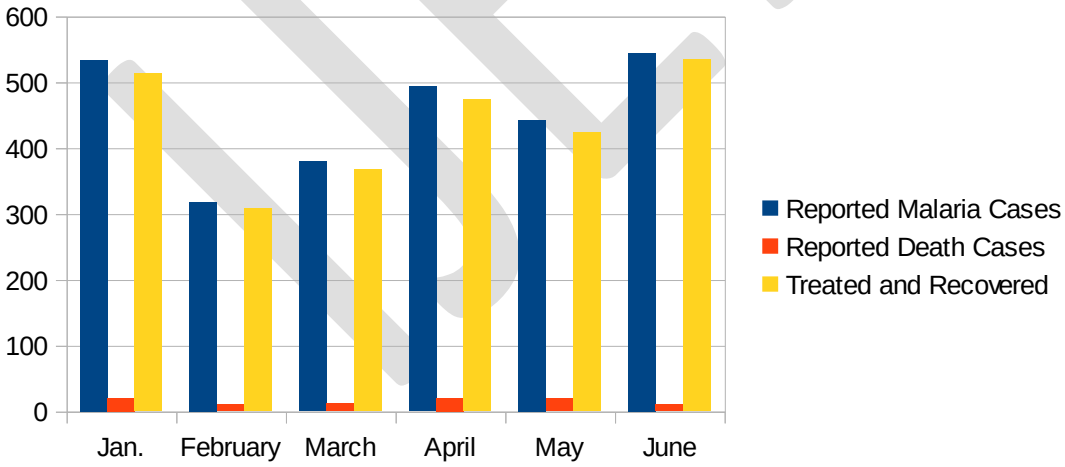


MORBIDITY AND MORTALITY-2012

In 2012, 4072 morbidity cases were reported of which 25 were out-patients and 4052 were in-patient cases respectively. 175 mortality cases were reported, of which October showed the highest morbidity cases and July the highest mortality cases. There were no reported cases for January and September.

Malaria Reported Cases for Under-Five Malaria Children,Kenema District Hospital, 2013

Chart 4: Reported cases in 2013



MORBIDITY AND MORTALITY-2013

Half way through 2013, 2710 morbidity case were reported, and 91 morbidity cases respectively.6 cases were out-patient and 2704 were in-patient cases

RELIABILITY AND VALIDITY OF DATA

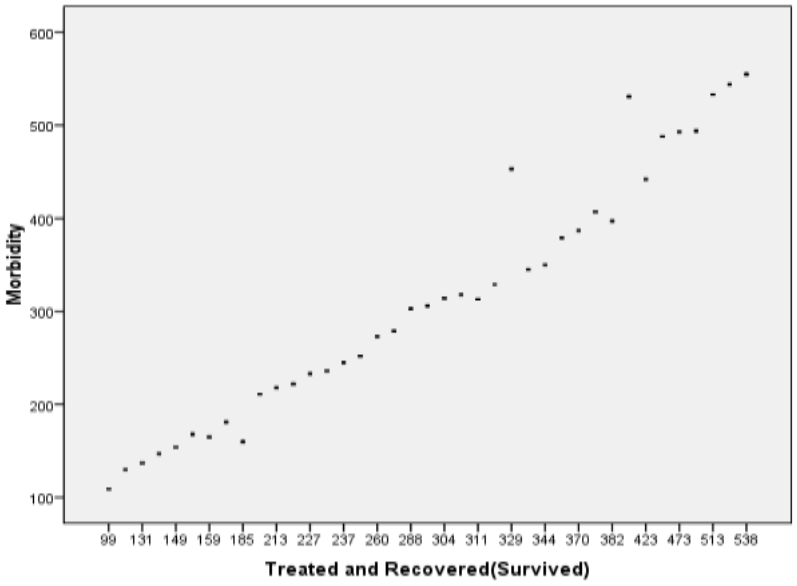
Table 1: Test of normality

Tests of Normality[b,c,d,e,f,g,h,i]

	Mortality	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Morbidity	5	.288	5	.200*	.859	5	.226
	6	.261	5	.200*	.853	5	.204
	7	.260	2	.			
	8	.260	2	.			
	10	.248	7	.200*	.922	7	.482
	12	.260	2	.			
	14	.260	2	.			
	15	.195	3	.	.996	3	.883
	17	.260	2	.			
	20	.260	2	.			

For the validity and reliability of data, Shapiro-Walk normality of test was done. Since p-value for Sharipiro-Wilk test are 0.226 and 0.204 this implies that morbidity and those who survived after treatment of under-five malaria reported cases are normal because their p-values are greater than alpha=0.05

Chart 5:Morbidity against Treated and Recovered(Survived)



The above figure shows that there is positive trend display between morbidity and number of children treated and recovered. They sense of direction displayed by scattered points is a positive straight line. The line is not a perfect one which shows that there is strong positive relation between morbidity cases and those children treated and recovered. The points of deviation moving away from the line are as a result of mortality cases. This shows that there is no perfect strong and positive relation between morbidity cases and survival cases.

TEST OF HYPOTHESIS

Table 2: Chin Square Test

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.520E3[a]	1444	.080
Likelihood Ratio	292.338	1444	1.000
Linear-by-Linear Association	37.431	1	.000
N of Valid Cases	40		

a. 1521 cells (100.0%) have expected count less than 5. The minimum expected count is .03.

DECISION

Reject null hypothesis and accept the alternative hypothesis ie there is no significant difference between the morbidity cases of malaria for under-five children and those treated and survived, since the chi-square value = 0.00152, p=0.819

CONCLUSION

In 2010 only, 2627 cases of morbidity were reported followed by an increasement of 9% in 2011 with 2865 reported cases.

In 2012, there was a rapid increasement of 42% in morbidity reported cases with 4028 cases reported which was almost five times the morbidity cases in 2010. It sound alarming and worrisome. It can be observed that the rate of morbidity cases was getting higher every year in under- five children in Kenema District.

In 2010, 2538 case were reported to have survived after treatment out of 2627 cases of morbidity in 2011, there were 2758 reported case of under- five children who survived after treatment which is 9% increasement. So the changes of recovery were increasing at the same rate as the rate of morbidity as 2010 to 2011.

In 2012 there were 3897 under five children reported to survive out of 4072 morbidity cases which indicate 40% increasement for changes of survival for under-five children in the Kenema Government District Hospital. Again, from 2011 to 2012 the changes of survival for children were almost the same as chances of morbidity cases. Moving toward 2013, there were clear indications that the rate of morbidity may increase at a rate equal to the rate at which children treated and recovered.

2010, 89 death cases were reported out of 2627 morbidity cases. And in 2011, 107 cases were reported out of 2865 reported morbidity cases. This implies that there was an increase of 2% from 2010 to 2011.

In 2012 there 175 mortality cases reported out of 4072 morbidity reported cases. This implies that there was 64% increased of mortality case from 2011 to 2012.

From the analysis, the morbidity, mortality and recovery (survival) cases are moving at the same trend. This was manifested in the graph that was plotted morbidity on treated and recovered (survived). The graph portrays a linear trend which implies that the more morbidity cases are reported the more increase for death and the more increase for the children to be treated and recovered.

The alarming rate at which disease is increasing no doubt to believe that malaria is one of the leading causes of mortality morbidity among children in Sub-Saharan Africa of which Sierra Leone is not excluded

High rate of morbidity cases of malaria for under -five children did occur between June and October of all the years, and is a manifestation of the raining season.

There is no significant deference between the morbidity and those treated and recovered (survived) which implies that the many challenges that were that were faced by this hospital management were overcame. These challenges may exist in the form of number of beds available, number of qualified doctors and nurses, use of appropriate and available drugs for the treatment of malaria etc. However in mist of these challenges the management was able to treat and recover a lot of cases though there more morbidity cases waiting in queue

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