

# Determining diseases influencing mortality of under 5 years children in Gazira state "Sudan" 2003-2012

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#### Abstract

The aim of the study is to find out the most important diseases influencing child mortality in Gazira state "Sudan"from five diseases(diarrhea, Malaria, Pneumonia, Meningitis and Measles). Thesediseaseswere selectedbecause thev arethe mostprevalentin the state. The source of data for the present study is Wad *MedaniEducational Hospital* for Children, which is the main hospital in the Gazira state, for the period (2003-2012). Multiple linear regression analysis "stepwise regression" used as a method of analysis. The study concluded that about 71% of the under 5 year's children death is caused by diarrhea andPneumonia, 12% caused bv Malaria. Meningitis and Measles andabout 17% due to other reasons. also concluded that Pneumonia isthe mostfrequentdiseaseduring the study period, while Measles is theleastfrequent and Measles has the highest growth rate

(14.1%) and Diarrhea has the less (3.1%).

The study recommended that the Ministry of Health must give more attention to the causes of diarrhea and Pneumonia and quick intervention is required in case of infection and this procedure requires availability of well-trained Physicians especially in rural areas.

#### **Introduction:**

The infant mortality rate has dropped by half in the last few decades due to better nutrition. health care and living standards. In 1990, 13 million children died in developing countries before the age of five due to diseases such as diarrhea and malnutrition, pneumonia, AIDS, malaria and tuberculosis (TB). By 2006, that number had dropped to 10 million. However, the rate of under-five mortality remains unacceptable, because there are 8 million children under five die each year because of preventable



causes. Half of those deaths are in Africa "south desert" and are caused by outbreaks of Epidemics and civil strife, which hindered progress in the region. In addition, the proportion of children under the age of 5 is about 15% of the population in the Sudan based on estimates of the Sudan family health survey for 2006. These younger citizens daily threats of malaria and diarrhea diseases, acute respiratory infections and diseases are preventable through vaccines and good nutrition. Half of the Sudanese population cannot access adequate health-care services, while 40% of Sudanese cannot access safe water.

Research problemcomes from that there is more than one child out of every ten children who are born alive in the Sudan do not survive until the age of five where the rate of under-five mortality is 112 deaths per 1,000 live births (family health survey, 2006, Sudan).

The importance of the study is that the most important diseases that lead to the death of children -who are the most important determinants of the evolution of human societies- will be highlighted and hence put powerful impact diseases on mortality in control priorities.

#### Data description:

Year	Deaths	Diarrhea	Malaria	Pneumonia	Meningitis	Measles
2003	251	2189	2423	3683	117	139
2004	224	3392	2859	4711	98	449
2005	200	3130	3595	5687	190	14
2006	198	3091	3157	4132	123	135
2007	185	3113	3303	3791	117	109
2008	151	3571	4011	3851	114	25
2009	178	4385	3446	4903	145	0
2010	134	2972	2596	2851	93	3
2011	131	2504	3019	874	69	46
2012	137	2893	5343	1719	73	39
mean	178.93	3123.94	3375.17	3620.24	113.92	95.83
Standard deviation	40.73	596.11	835.983	1460.73	35.34	134.78

#### Table1:mean and standard deviation of diseases

Table1showsthat,accordingtothemeanPneumoniaisthe

mostfrequentdiseaseduring the period, while Measles is theleastfrequent.



However, one can say in general, that Pneumonia, Malaria and Diarrhea aremostfrequentthan Measles. In addition, according to the standard deviation there is highly homogeneity in the number of patients of Meningitis and the number of deaths during the periodof the study.

Disease	Growth rate	Disease	Growth rate
Deaths	6.7.%	Pneumonia	8.5.%
Diarrhea	3.1%	Meningitis	5.2.%
Malaria	8.8%	Measles	14.1.%

Table2: growth rate

Table 2 shows that Measles has the highest growth rate (14.1%) and Diarrhea has the less one (3.1%).

**Research model** : the dependent variable is the child mortality, symbolized as (y) and the independent variables are The following diseases: diarrhea and symbolized as (X1)·Malaria and symbolized as (X2), Pneumonia and symbolized as (X3), measles and symbolized as (X4), meningitis and symbolized his icon (X5) and the mathematical model can be formulated for multiple regression line as follows:

$$y = \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + Ui$$

Where:  $(\beta_k)$  are model parameters to be estimated.

**Application of the model**:Statistical package for social sciences "SPSS" usedfor analyzing data and yields the following output:

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.647 <sup>a</sup>	.418	.346	32.93947	
2	.841 <sup>b</sup>	.708	.624	24.95884	2.332

Table 3 : Model Summary

a. Predictors: (Constant), X3

b. Predictors: (Constant), X3, X1

c. Dependent Variable: y

Table1 shows that model 2 has R Square (0.708) which indicates that X1 and X3 explain 71% of the variation in the dependent variable y, so that the two

variables X1 and X3 are the variables that will enter the model. Durbin Watson is closer to 2 which means that there is



no serial correlation.ie the residuals are

uncorrelated

Model	_	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6244.831	1	6244.831	5.756	.043ª
	Residual	8680.069	8	1085.009		
	Total	14924.900	9			
2	Regression	10564.293	2	5282.147	8.479	.013 <sup>b</sup>
	Residual	4360.607	7	622.944		
	Total	14924.900	9			

Table 4: ANOVA

a. Predictors: (Constant), X3

b. Predictors: (Constant), X3, X1

c. Dependent Variable: y

Table 2 shows that the tow regression models 1 and 2 are significant since the significant values are less than 0.05, but model 2 is the best, because its more significant than model 1.

Table 5: Coefficients

		Unstandardize	ed Coefficients	Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	113.616	29.138		3.899	.005
	X3	.018	.008	.647	2.399	.043
2	(Constant)	215.150	44.432		4.842	.002
	X3	.028	.007	.989	4.085	.005
	X1	044-	.017	638-	-2.633-	.034

a. Dependent Variable: y

Table 3 determined coefficients of the model, hence the regression model is: y = 215.150 - 0.044X1 + 0.028 X3

Table 6: Excluded Variables



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					Partial	Collinearity Statistics	
Model		Beta In	t	Sig.	Correlation	Tolerance	
1	X1	638ª	-2.633-	.034	705-	.712	
	X2	341ª	-1.287-	.239	437-	.959	
	X4	364ª	651-	.536	239-	.250	
	X5	.463ª	1.933	.094	.590	.944	
2	X2	141 <sup>b</sup>	587-	.579	233-	.801	
	X4	595 <sup>b</sup>	-1.570-	.167	540-	.240	
	X5	.356 <sup>b</sup>	1.957	.098	.624	.896	

a. Predictors in the Model: (Constant), X3

b. Predictors in the Model: (Constant), X3, X1

c. Dependent Variable: y

Table 4 shows variables X2, X4 and X5 are excluded from the model, because they are not significant since their significant values are all greater than 0.05

Table 5: Mah-1

Case No	Mah-1
1	4.27
2	7.30
3	6.46
4	0.23
5	0.02
6	2.19
7	5.55
8	4.53
9	7.52
10	6.89

Table 5 shows that allMahalanobis values are less than the value of chisquare with 9 degrees of freedom at 0.05 level of significant which is 16.09, which indicates that there is no extrememultiple values.

Shape1



Shape 1 shows that data is normally distributed

Shape 2





Shape 2 shows that the pointsclustered around the lineard therefore

thedata(residuals) are distributedaccording to the normal distribution.

## Shape 3

#### Scatterplot



Shape3 shows that the relation between residuals and expected values has no certainpattern, which is consistent with linearity condition.

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.908ª	.825	.606	25.56655

a. Predictors: (Constant), x5, x1, x2, x4, x3

Table 6 shows R square When all variables are entered using enter method

which is 0.825

## **Results**:

1. The study concluded that about 71% of the under 5 year's children death is caused bydiarrhea andPneumonia, 12% caused byMalaria, Meningitis and Measles andabout 17% due to other reasons.

2. Pneumonia isthe mostfrequentdiseaseduring the study period, while Measles is theleastfrequent.

3. Measles has the highest growth rate

(14.1%) and Diarrhea has the less (3.1%) in the study period.

**Recommendation**:ministry of health must give more attention to the causes of diarrhea andPneumonia and quick intervention is required in case of



infection and this procedure requires availability of well-trained Physicians and this procedure requires availability of well-trained Physicians especially in rural areas.in addition, more studies are to be done inThe Gazira state focusing ondiarrhea andPneumonia.

## **References**:

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