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Research paper on Ebola Virus outbreak

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ABSTRACT

The aim is to find the trends in death caused by Ebola virus 2013-16. Statistical analysis tools of data analysis were used to find correlation, trendline, moving average, regression analysis and future value. Data was extrapolated and predicted.

Keywords— *Ebola Virus, Correlation Regression analysis, Moving averages, Trend line*

1. INTRODUCTION

The Western African Ebola virus epidemic (2013–2016) was the most widespread outbreak of Ebola Virus Disease (EVD) in history Causing major loss of life and socioeconomic disruption in the region, mainly in Guinea, Liberia, and Sierra Leone. The first cases were recorded in Guinea in December 2013. Later, the disease spread to neighbouring Liberia and Sierra Leone, with minor outbreaks occurring elsewhere. It caused significant mortality, with the case fatality rate reported which was initially considered, while the rate among hospitalized patients was 57–59%The final numbers 28,616 people, including 11,310 deaths, for a case-fatality rate of 40%.

2. DATA

Month	Death	Moving average
Sep-14	9693	
Oct-14	9693	
Nov-14	11035	12246.66667
Dec-14	16012	13249.33333
Jan-15	12701	14986
Feb-15	16245	17086.66667
Mar-15	22314	19533.66667
Apr-15	20042	21991.33333
May-15	23618	20971
Jun-15	19253	26289
Jul-15	35996	25183.66667
Aug-15	20302	25917
Sep-15	21453	22039.33333
Oct-15	24363	24308
Nov-15	27108	24715.66667
Dec-15	22676	25941.33333
Jan-16	28040	25494
Feb-16	25766	25726.66667
Mar-16	23374	20299
Apr-16	11757	

3. ANALYSIS

Correlation

	No. of suspected deaths	No. of confirmed deaths
No. of suspected deaths	1	
No. of confirmed deaths	0.915513	1

Interpretation: There is a positive relation between the No. of suspected death and the No. of confirmed death due to Ebola virus.

Regression Analysis:

Regression Statistics	
Multiple R	0.915513
R Square	0.838164
Adjusted R Square	0.837893
Standard Error	522.5969
Observations	599

ANOVA

	df	SS	MS	F	Significance F
Regression	1	8.44E+08	8.44E+08	3091.923	2.9E-238
Residual	597	1.63E+08	273107.6		
Total	598	1.01E+09			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	132.6438	25.28166	5.246643	2.15E-07	82.99203	182.2956	82.99203	182.2956
No. of confirmed deaths	1.116342	0.020076	55.60507	2.9E-238	1.076914	1.155771	1.076914	1.155771

Interpretation: These are results of the regression analysis between suspected death due to Ebola Virus and the actual deaths.
The equation of the regression line would look like:

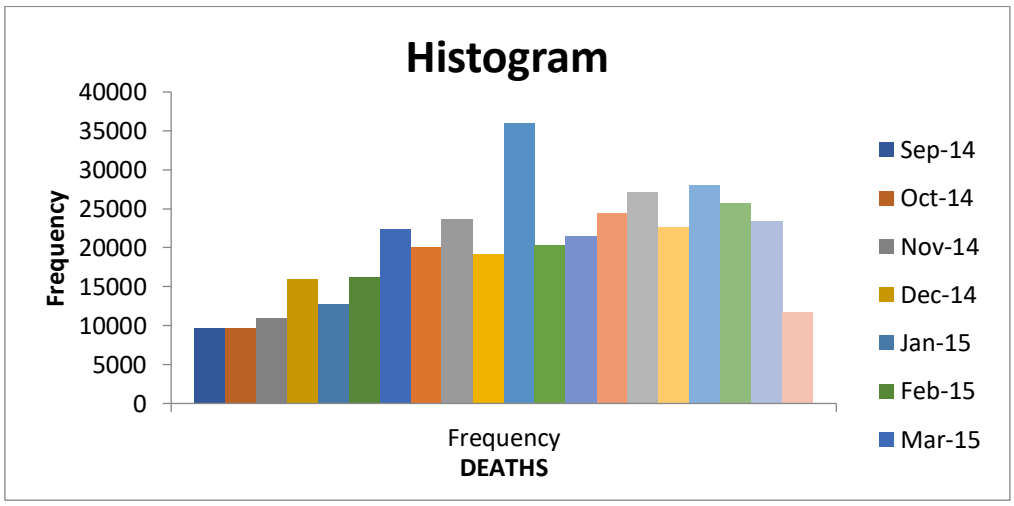
$$Y=132.6438+ 1.116342X$$

This means that when there is 1.116342 increase in suspected deaths, the confirmed deaths increase by 1.

Estimated number of the deaths for May-2016:

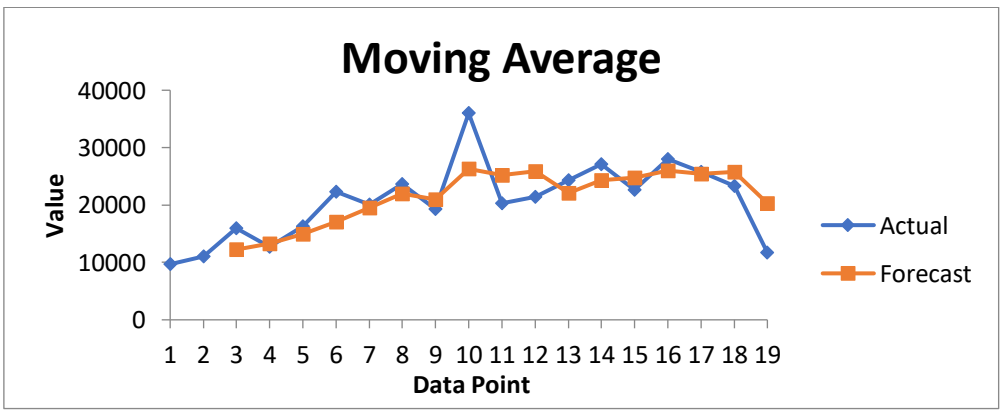
$$Y=132.6438 + 1.116342(20299)$$
$$Y=22793.27$$

Graphical Analysis:



The histogram above shows the frequency of deaths for different months. It illustrates that most of the deaths occurred during mid 2015 and started to decrease since then. The lowest number of death occurs in April 2014 with a count of 9693 and the highest occurred in November 2015 with a count of 27108.

Moving Average:



4. CONCLUSION

To conclude the research found the number of deaths due to Ebola virus outbreak from 2014-2016. It shows the rate at which it increases thus caused a panic and then slowly decreased. Total deaths were around 28616.

5. REFERENCES

[1] www.kaggle.com
[2] www.wikepedia.com
[3] www.statisticalanalysis.com

