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TEST FOR THE LEVEL OF ASSOCIATIONS AMONG SELECTED DISEASES INFECTING CHILDREN IN NIGERIA

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Abstract
This research tests for the level of associations among selected diseases infecting children in Nigeria. The techniques applied are parametric Pearson correlation and non-parametric Spearman Rank Correlation. These parametric and non-parametric techniques were used to determine the level of associations between two variables that is the level of association between the numbers of infected children in Nigeria by these diseases. The analysis was done using the Statistical Package for Social Science (SPSS) version 25 software. The results obtained were presented in a tabulated form for comparison purposes. Both the parametric Pearson and non-parametric Spearman Rank Correlation results showed some similar association between the two diseases and there exists a strong positive/negative association (almost perfect linear relationship) between Diarrhoeal and other diseases; Pertuss and other diseases; Tetanus and other diseases; Malaria and other diseases; Prematurity (Premature birth) and other diseases. The positive association showed the strength of the linear relationship between two diseases and the negative association indicates the direction of the association, whereby as one disease increases, the other decreases.

Keywords: Parametric test, Non Parametric test, Pearson Correlation, Spearman Rank Correlation and Diseases.

Introduction

The Pearson correlation coefficient is a measure of the strength of an association which measures the strength of the linear relationship between two variables on a continuous scale. However, the significance of association is a separate analysis of the sample correlation coefficient r, that uses the t-test to measure the difference between the observed r and the r expected under the null hypothesis. Spearman's rank correlation coefficient (Spearman rho) was designed to measure the strength of a monotonous relationship (in the direction of constant) between two variables measured on an ordinal or rating scale. Data obtained from ratings and data collected on a scale that is not the same period (e.g. data obtained from administering a Likert scale) must be subjected to Spearman correlation analysis. Similar to the Pearson correlation coefficient, Spearman's rho can be tested for significance. A similar measure of association strength is the Kendall tau, which can also be applied to measure the strength of a monotonous association between two variables measured on an ordinal or rating scale. Spearman's rho or Kendall's tau can be calculated to measure the degree of association among epidemiologists' ranks, thereby showing the collective strength of potential action (Yoon-Jae, 1998; Bonett et al., 2002).

Disease can be defined as an illness with specific, obvious symptoms affecting humans, animals or plants. It is similarly defined as an abnormal condition of a part, organ or system of the body due to various causes, such as infection, inflammation, environmental factors or genetic abnormalities, and is characterized by a group of identifiable signs, symptoms, or both. A specific destructive process in an organ or organism, with a specific cause and characteristic symptoms, of a disease; sick. (pathology) An abnormal physical or mental condition that causes discomfort or dysfunction; is distinct from trauma in that the injury is usually immediate. Any difference in health; is called disease in general. Disease is a word used by observers to describe a process that occurs when one or more

external factors interact with a living organism to produce internal physical and/or mental changes in the organism that observers consider to be at a disadvantage compared to its previous state.

Medically, disease can be defined as a pathological process, usually physical as in the case of throat infections, or bronchial cancer, sometimes of unknown origin, as in the case of schizophrenia. Disease is therefore a pathological process, a deviation from the biological norm. The diseases considered in this study are HIV/AIDS, Trauma, Malaria, Measles, Premature birth, Tetanus, Diarrhea, Acute lower respiratory tract infections, Pertussis, birth asphyxia and trauma, Sepsis and communicable diseases other neonatal infections, other infectious, perinatal and nutritional diseases, birth defects, other non-communicable diseases, (WHO 2017).

Diarrhea is the second leading cause of death in children under 5 years of age and kills around 525,000 children each year. Diarrhoea can last for several days and leave the body without the water and salt it needs to survive. In the past, for most people, dehydration and severe dehydration were the leading causes of death from diarrhoea. Today, other causes, such as septic bacterial infections, may be responsible for the increasing rate of diarrhoea-related deaths. Malnourished children or children with weakened immune systems, as well as people with HIV, are most at risk for life-threatening diarrhoea. Diarrhea is often a symptom of an intestinal infection, which can be caused by a variety of bacteria, viruses, and parasites. The infection is spread through contaminated food or drinking water, or from person to person due to poor hygiene.

Malaria is a potentially fatal disease. The disease is usually transmitted by the bite of an infected Anopheles mosquito. Infected mosquitoes carry the Plasmodium parasite. When this mosquito bites you, the parasites are released into your bloodstream. Once the parasites arrive in the body, they travel to the liver, where they mature. After a few days, the adult parasite enters the bloodstream and begins to infect red blood cells. Within 48 to 72 hours, the parasite present inside red blood cells will multiply, causing the infected cell to burst. The parasite continues to infect red blood cells, causing symptoms that occur in cycles that last every two to three days.

Malaria is commonly found in tropical and subtropical climates where the parasite can live. Reliable sources from the World Health Organization (WHO, 2017) indicate that in 2016 there were about 216 million cases of malaria in 91 countries. In the United States, the Centers for Disease Control and Prevention (CDC) reports 1,700 cases of malaria each year. Most cases of malaria occur in people travelling to countries where malaria is more common. Malaria can occur if a mosquito infected with the Plasmodium parasite bites you. Also, an infected mother can pass the infection on to her baby at birth. This is called congenital malaria. Malaria is blood-borne, so it can also be transmitted by (i) organ transplant, (ii) blood transfusion and (iii) sharing needles or syringes. The goal of this research work was to compare the effectiveness of parametric and non-parametric techniques to examine the degree of association between the numbers of children with selected diseases in Nigeria. Then, determine the positive/negative almost perfect association between diseases using the Pearson parametric coefficient and Spearman non-parametric rank correlation.

The World Health Organization's assertion that health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1946) is praised for adopting a holistic view, and equally strongly condemned for being extremely utopian: Historian Robert Hughes observes that 'the cow's state of existence is more real than that of man' (Hudson, 1993).

Over the past 15 years, the number of diagnoses of children with Attention Deficit Hyperactivity Disorder (ADHD has skyrocketed (Gottlieb, 2002), so medications have been prescribed to control the disease. Critics argue that the diagnosis of ADHD involves children whose misbehaviour cannot be controlled by parents and schools; meanwhile, advocates say the children are misbehaving because they have an illness that requires medical intervention. Are new disease entities created to support drug development? As the commercial literature shows, new clinical diagnoses are often welcomed primarily as market growth opportunities (Moynihan et al., 2002). Ogoke et al. (2013), The research assess the reliability of the foot measurements by comparing the male and female foot measurements, to know if there is a correlation between the male and female foot measurements using the standard set by Landis and Koch (1997), and identify the true positive rate and false positive rate of both male and female individuals using Receiver Operating Characteristics (ROC) considering the ages of (18-19yrs), (20-21yrs), (22-23yrs) and (24yrs and

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above). The results show that there seems to be a positive correlation between the male and female foot measurements. The Hotteling's T^2 statistic shows that the foot measurements differ.

Amadi et al. (2020), used the Pearson correlation coefficient to the relationship between some of Nigeria's economic variables such as expenditure on Agriculture, Building/Construction; Industry, Wholesale/Retail and Services variables. The five sectors indicate that Quadratic trend with appreciation and depreciation. Correlation analysis of the data set shows that there exists a strong relationship among each variable.

Khawla (2022), presented a study to determine the required sample size (the water body) to estimate the Spearman correlation coefficient in terms of its strength and direction for the variables of the total annual evaporation and annual humidity in Iraq from 1991 to 2000. The result of the Spearman correlation (SP) of total annual evaporation and annual total humidity in Baghdad governorate was negative and strong, then the result of the SP of total annual evaporation with the humidity of Najaf Governorate was positive and weak, and the result of the correlation between total annual evaporation and annual humidity in Babil Governorate was positive and weak.

In recent research, SP statistics depended on the accuracy of Spearman's simple linear correlation coefficient. And the statistical result changes according to the size of the samples and their interpretation. As in the statistical result of a large sample, low-volume coefficients are generated, and the relationship is important in practice. While the sample size is small, researchers concluded that the reliability of the estimates is low and there is no real relationship between the two variables (Cargnelutti et al. 2010, Cargnelutti et al. 2011, Cargnelutti et al. 2012).

Methods and Materials

This section presents the method and procedure that was followed in conducting the study. The procedure includes Research design, area of the study, population of the study, sample and sampling technique, instrument for data collection, validation of the instrument, reliability of the instrument, method of data collection and method of data analysis. This paper makes use of parametric and non-parametric test which is Pearson correlation and Spearman Rank Order Correlation respectively. The population of this study consist of the numbers of children infected by some selected diseases in Nigeria from 2005 to 2020 in Nigeria, using Rivers State as a case study. The dataset used for this work is secondary data, collected from the University of Port Harcourt Teaching Hospital.

Parametric Test: The Pearson correlation coefficient was calculated to characterize the foot measurements to identify significant differences at $\alpha =$ 0.05 level. The comparison was done. The level of reliability of the Pearson correlation was classified using the characterization reported by Landis and Koch (1977), Ogoke et al. (2013), and Amadi et al. (2020). These characterizations range from 0.000 to 0.20 (slight), 0.21 to 0.40 (Fair), 0.41 to 0.60 (moderate), 0.61 to 0.80 (substantial) 0.81 to 1.00 (almost perfect).

Hence, Pearson Product Moment Correlation (PPMC) Technique "r" investigates to what extent two paired measures vary in a population. To calculate this PPMC- using the whole score method, raw data.

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{\left(n\sum x^2 - \left(\sum x\right)^2\right)\left(n\sum y^2 - \left(\sum y\right)^2\right)}} \quad (1)$$

where n = number of observations, x is a disease and y is another disease.

Spearman Rank Order Correlation: This is a non-parametric test that deals with ordinal data and can determine the relationship that exists between two sets of groups. The outcome of two different results from a group variable can be compared using Spearman Rank Order. The formula is

$$\rho = 1 - \frac{6\sum d^2}{n(n^2-1)} \quad (2)$$

where n = number of observations and d^2 difference square between the ranking of observed diseases.

Results

This section deals with the results of the Parametric and non-parametric tests (Pearson correlation & Spearman Rank Order) respectively. Both the parametric Pearson correlation and non-parametric Spearman Rank Correlation results

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showed that there exist a strong positive/negative association which is also called an almost perfect relationship between Diarrhoeal, Pertuss, Tetanus, Malaria, BABT, Prematurity, SOICNB and other variables. From the analysis Table 1, there are 37 different level of reliability of correlation coefficient results between the two tests' statistics e.g.(Acute lower respiratory infections/Congenital anomalies, Malaria/Acute lower respiratory infections, Meningitis/encephalitis/Other communicable, perinatal and nutritional conditions, Diarrhoeal /Meningitis/encephalitis). Correspondingly, there are 68 similar level of reliability of correlation results between the two tests statistic e.g. (Sepsis and other infectious conditions of the newborn/Other noncommunicable diseases, Sepsis and other infectious conditions of the newborn/Injuries, Sepsis and other infectious conditions of the newborn/Congenital anomalies, Acute lower respiratory infections/Sepsis and other infectious conditions of the newborn, Malaria/Other noncommunicable diseases) results of the level association between the parametric and non-parametric techniques used on the different diseases variables. However, there is both positive and negative level of reliability between the variables.

Discussion

This research was to check for the level of association among the children infected by some selected diseases in Nigeria using parametric and non-parametric test techniques. The results were obtained using statStatistical Package sociSocial ScienceSS) version 25. The parametric Pearson correlation & non-parametric Spearman Rank Correlation were used to determine the level of association.

Conclusion

These results suggest that both parametric and non-parametric techniques can be applied to determine the level of association between the diseases. The parametric and non-parametric techniques results showed high and low association between the different diseases at a 5% level. This work was able to determine the level of relationship among the selected diseases in Nigeria, using parametric and non-parametric techniques. From these results, the, following conclusions were made:

1) There is a slight relationship between the numbers of children infected by HIV/AIDS and congenital anomalies diseases in Nigeria, both tests used confirmed it.
2) There is a slight relationship between the numbers of children infected by Measles and meningitis/encephalitis diseases; Measles and sepsis and other infections; Measles and congenital anomalies diseases; Measles and other non-communicable diseases; Measles and injuries, both tests used confirmed it.
3) There is an almost perfect relationship between the numbers of children infected between malaria and the other diseases, both tests used confirmed it.

Recommendation

This work recommends that the procedures used to determine the level of association (or relationship) between the diseases to be used in testing for significant differences between the diseases for larger observations (n > 30).

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Appendix

Table 1: **Test for the Level of Association between the Diseases**

Variable	Pearson correlation	Remark	Spearman Rank Correlation	Remark	Decision
HIV/AIDS /Diarrhoeal	-0.099	Slight (-ve)	0.031	Slight (+ve)	differ
HIV/AIDS /Pertussis	0.122	Slight(+ve)	0.124	Slight (+ve)	Similar
HIV/AIDS /Tetanus	-0.229	Slight (-ve)	0.031	Slight (+ve)	differ
HIV/AIDS /Measles	-0.333	Fair (-ve)	-0.185	Slight (-ve)	differ
HIV/AIDS/Meningitis/encephalitis	0.407	Fair (+v)	0.185	Slight (+ve)	differ
HIV/AIDS /Malaria	0.053	Slight(+ve)	0.016	Slight (+ve)	Similar
HIV/AIDS /Prematurity	-0.208	Fair (-ve)	-0.025	Slight (-ve)	differ
HIV/AIDS /Acute lower respiratory infections	0.736	Slight (+ve)	0.717	Substantial(+ve)	Similar
HIV/AIDS /Birth asphyxia and birth trauma	0.348	Fair	0.269	Fair (+ve)	Similar
HIV/AIDS /Sepsis and other infectious conditions of the newborn	0.228	Fair (+ve)	0.001	Fair (+ve)	Similar
HIV/AIDS /Other communicable, perinatal and nutritional conditions	-0.013	Slight (-ve)	0.001	Slight (+ve)	differ
HIV/AIDS /Congenital anomalies	-0.266	Slight (-ve)	-0.063	Slight (-ve)	Similar
HIV/AIDS /Other noncommunicable diseases	-0.065	Slight (-ve)	0.004	Slight (+ve)	differ
HIV/AIDS /Injuries	-0.041	Slight (-ve)	-0.025	Slight (-ve)	Similar
Diarrhoeal /Pertussis	**-0.896**	Almost perfect (-ve)	**-0.906**	Almost perfect (-ve)	Similar
Diarrhoeal /Tetanus	**0.988**	Almost perfect (+ve)	**1.000**	Almost perfect (-ve)	Similar
Diarrhoeal /Measles	0.762	Substantial (+ve)	0.721	Substantial (+ve)	Similar
Diarrhoeal /Meningitis/encephalitis	0.215	Fair (+ve)	0.553	Substantial (+ve)	differ

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Diarrhoeal /Malaria	**0.962**	Almost perfect (+ve)	**0.991**	Almost perfect (+ve)	Similar
Diarrhoeal /Prematurity	**-0.941**	Almost perfect (-ve)	**-0.997**	Almost perfect (-ve)	Similar
Diarrhoeal /Acute lower respiratory infections	0.235	Fair (+ve)	0.006	Slight (+ve)	differ
Diarrhoeal /Birth asphyxia and birth trauma	**0.895**	Almost perfect (+ve)	**0.906**	Almost perfect (+ve)	differ
Diarrhoeal /Sepsis and other infectious conditions of the newborn	**0.985**	Almost perfect (+ve)	**0.906**	Almost perfect (+ve)	Similar
Diarrhoeal /Other communicable, perinatal and nutritional conditions	**-0.962**	Almost perfect (-ve)	**-0.979**	Almost perfect (-ve)	Similar
Diarrhoeal /Congenital anomalies	**-0.919**	Almost perfect (-ve)	**-0.985**	Almost perfect (-ve)	Similar
Diarrhoeal/Other noncommunicable diseases	**-0.965**	Almost perfect (-ve)	**-0.978**	Almost perfect (-ve)	Similar
Diarrhoeal /Injuries	**-0.980**	Almost perfect (-ve)	**-0.997**	Almost perfect (-ve)	Similar
Pertussis/Tetanus	**-0.880**	Almost perfect (+ve)	**-0.906**	Almost perfect (+ve)	Similar
Pertussis/Measles	-0.653	Substantial(+ve)	-0.609	Substantial (-ve)	Similar
Pertussis/Meningitis/encephalitis	-0.214	Fair (-ve)	-0.526	Moderate (-ve)	Differ
Pertuss/Malaria	-0.877	Substantial (-ve)	-0.915	Almost perfect (-ve)	Differ
Pertussis/Prematurity	**0.888**	Almost perfect (+ve)	**0.912**	Almost perfect (+ve)	Similar
Pertussis/Acute lower respiratory infections	-0.148	Slight (-ve)	0.085	Slight (+ve)	Differ
Pertuss/Birth asphyxia and birth trauma	-0.784	Substantial (-ve)	-0.794	Substantial (-ve)	Similar
Pertussis/Sepsis and other infectious conditions of the newborn	**0.806**	Almost perfect (+ve)	**0.900**	Almost perfect (+ve)	Similar
Pertuss/Other communicable, perinatal and nutritional conditions	0.879	Almost perfect (+ve)	0.779	Substantial (+ve)	Differ
Pertuss/Congenital anomalies	**0.848**	Almost perfect (+ve)	**0.888**	Almost perfect (+ve)	Similar
Pertussis/Other noncommunicable diseases	**0.879**	Almost perfect (+ve)	**0.894**	Almost perfect (+ve)	Similar
Pertussis/Injuries	**0.900**	Almost perfect (+ve)	**0.912**	Almost perfect (+ve)	Similar
Tetanus/Measles	0.812	Almost perfect (+ve)	0.721	Substantial (+ve)	Differ
Tetanus/Meningitis/encephalitis	0.184	Slight (+ve)	0.553	Substantial (+ve)	Differ
Tetanus/Malaria	**0.931**	Almost perfect (+ve)	**0.991**	Almost perfect (+ve)	Similar
Tetanus/Prematurity	**-0.888**	Almost perfect (+ve)	**-0.997**	Almost perfect (-ve)	Similar
Tetanus/Acute lower respiratory	0.124	Slight (-ve)	0.006	Slight (+ve)	Similar

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infections					
Tetanus/Birth asphyxia and birth trauma	**0.827**	Almost perfect (+ve)	**-0.906**	Almost perfect (-ve)	Differ
Tetanus/Sepsis and other infectious conditions of the newborn	**-0.988**	Almost perfect (-ve)	**-0.950**	Almost perfect (-ve)	Similar
Tetanus/Other communicable, perinatal and nutritional conditions	**-0.949**	Almost perfect (-ve)	**-0.976**	Almost perfect (-ve)	Similar
Tetanus/Congenital anomalies	**-0.862**	Almost perfect (-ve)	**-0.985**	Almost perfect (-ve)	Similar
Tetanus/Other noncommunicable diseases	**-0.943**	Almost perfect (-ve)	**-0.979**	Almost perfect (-ve)	Similar
Tetanus/Injuries	**-0.955**	Almost perfect (-ve)	**-0.997**	Almost perfect (-ve)	Similar
Measles/Meningitis/encephalitis/	0.298	Slight (+ve)	0.462	Moderate (+ve)	differ
Measles/Malaria	0.696	Substantial (+ve)	0.732	Substantial (+ve)	Similar
Measles/Prematurity	-0.622	Substantial (-ve)	-0.729	Substantial (-ve)	Similar
Measles/Acute lower respiratory infections	-0.086	Slight (-ve)	-0.306	Fair (-ve)	Differ
Measles/Birth asphyxia and birth trauma	0.588	Moderate (+ve)	0.668	Moderate (+ve)	Similar
Measles/Sepsis and other infectious conditions of the newborn	-0.823	Almost perfect (-ve)	-0.768	Substantial (-ve)	Differ
Measles/Other communicable, perinatal and nutritional conditions	-0.746	Substantial (-ve)	-0.718	Substantial (-ve)	Similar
Measles/Congenital anomalies	-0.733	Substantial (-ve)	-0.735	Substantial (-ve)	Similar
Measles/Other noncommunicable diseases	-0.733	Substantial (-ve)	-0.703	Substantial (-ve)	Similar
Measles/Injuries	-0.732	Substantial (-ve)	-0.729	Substantial (-ve)	Similar
Meningitis/encephalitis/Malaria	0.284	Fair (+ve)	0.515	Substantial (+ve)	Differ
Meningitis/encephalitis/Prematurity	-0.353	Fair (-ve)	-0.550	Substantial (-ve)	Differ
Meningitis/encephalitis/Acute lower respiratory infections	0.254	Fair (-ve)	0.047	Slight (+ve)	Differ
Meningitis/encephalitis/Birth asphyxia and birth trauma	0.399	Fair (+ve)	0.679	Substantial (+ve)	Differ
Meningitis/encephalitis/Sepsis and other infectious conditions of the newborn	-0.170	Slight (-ve)	-0.474	Moderate (-ve)	Differ
Meningitis/encephalitis/Other communicable, perinatal and nutritional conditions	-0.393	Fair (-ve)	-0.618	Substantial (-ve)	Differ
Meningitis/encephalitis/Congenital anomalies	-0.443	Fair (-ve)	-0.609	Substantial (-ve)	Differ
Meningitis/encephalitis/Other noncommunicable diseases	-0.399	Fair (-ve)	-0.594	Substantial (-ve)	Differ
Meningitis/encephalitis/Injuries	-0.351	Fair (-ve)	-0.550	Substantial (-ve)	Differ
Malaria/Prematurity	**-0.952**	Almost perfect (-ve)	**-0.985**	Almost perfect (-ve)	Similar
Malaria/Acute lower respiratory infections	0.212	Fair (-ve)	-0.440	Moderate (-ve)	Differ
Malaria/Birth asphyxia and birth trauma	**0.935**	Almost perfect (+ve)	**-0.897**	Almost perfect (-ve)	Similar
Malaria/Sepsis and other infectious conditions of the newborn	**-0.908**	Almost perfect (-ve)	**-0.921**	Almost perfect (-ve)	Similar
Malaria/Other communicable, perinatal and nutritional conditions	**-0.955**	Almost perfect (-ve)	**-0.950**	Almost perfect (-ve)	Similar
Malaria/Congenital anomalies	**-0.951**	Almost perfect (-ve)	**-0.976**	Almost perfect (-ve)	Similar
Malaria/Other noncommunicable diseases	**-0.972**	Almost perfect (-ve)	**-0.953**	Almost perfect (-ve)	Similar

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Malaria/Injuries	**0.979**	Almost perfect (+ve)	**-0.985**	Almost perfect (-ve)	Differ
Prematurity/Acute lower respiratory infections/	-0.466	Moderate (-ve)	-0.003	Slight (-ve)	Differ
Prematurity/Birth asphyxia and birth trauma	**-0.971**	Almost perfect (-ve)	**-0.903**	Almost perfect (-ve)	Similar
Prematurity/Sepsis and other infectious conditions of the newborn	**0.851**	Almost perfect (+ve)	**0.953**	Almost perfect (+ve)	Similar
Prematurity/Other communicable, perinatal and nutritional conditions	**0.957**	Almost perfect (+ve)	**0.982**	Almost perfect (+ve)	Similar
Prematurity/Congenital anomalies	**0.991**	Almost perfect (+ve)	**0.982**	Almost perfect (+ve)	Similar
Prematurity/Other noncommunicable diseases	**0.971**	Almost perfect (+ve)	**0.985**	Almost perfect (+ve)	Similar
Prematurity/Injuries	**0.977**	Almost perfect (+ve)	**1.000**	Highly perfect (+ve)	Similar
Acute lower respiratory infections/Birth asphyxia and birth trauma	0.518	Moderate (+ve)	0.094	Slight (+ve)	Differ
Acute lower respiratory infections/Sepsis and other infectious conditions of the newborn	-0.114	Slight (-ve)	-0.015	Slight (-ve)	Similar
Acute lower respiratory infections/Other communicable, perinatal and nutritional conditions	-0.281	Fair (-ve)	0.047	Slight (+ve)	Differ
Acute lower respiratory infections/Congenital anomalies	-0.465	Fair (-ve)	0.006	Slight (+ve)	Differ
Acute lower respiratory infections/Other noncommunicable diseases	-0.303	Fair (-ve)	0.038	Slight (+ve)	Differ
Acute lower respiratory infections/Injuries	-0.299	Fair (-ve)	-0.003	Slight (-ve)	Differ
Birth asphyxia and birth trauma (BABT)/Other communicable, perinatal and nutritional conditions/ Sepsis and other infectious conditions of the newborn	**-0.812**	Almost perfect (-ve)	**-0.856**	Almost perfect (-ve)	Similar
Birth asphyxia and birth trauma(BABT)//Other communicable, perinatal and nutritional conditions	**-0.906**	Almost perfect (-ve)	**-0.888**	Almost perfect (-ve)	Similar
Birth asphyxia and birth trauma(BABT)//Congenital anomalies	**-0.979**	Almost perfect (-ve)	**-0.918**	Almost perfect (-ve)	Similar
Birth asphyxia and birth trauma(BABT)//Other noncommunicable diseases	**-0.936**	Almost perfect (-ve)	**-0.891**	Almost perfect (-ve)	Similar
Birth asphyxia and birth trauma(BABT)//Injuries	**-0.938**	Almost perfect (-ve)	**-0.903**	Almost perfect (-ve)	Similar

Footnote: The Bolded Correlation Values showed strong positive/negative association

Variable	Pearson correlation	Remark	Spearman Rank Correlation	Remark	Decision
Sepsis and other infectious conditions of the newborn (SOICNB)/Other communicable, perinatal and nutritional conditions/	**0.925**	Almost perfect(+ve)	**0.941**	Almost perfect(+ve)	Similar
Sepsis and other infectious conditions of the newborn(SOICNB)//Congenital anomalies	**0.828**	Almost perfect(+ve)	**0.935**	Almost perfect(+ve)	Similar

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Sepsis and other infectious conditions of the newborn(SOICNB)//Other noncommunicable diseases	**0.921**	Almost perfect(+ve)	**0.950**	Almost perfect(+ve)	Similar
Sepsis and other infectious conditions of the newborn(SOICNB)//Injuries	**0.929**	Almost perfect(+ve)	**0.953**	Almost perfect(+ve)	Similar

Footnote: The Bolded Correlation Values showed strong positive/negative association

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