Statistical Analysis of the Different Factors Affecting the Diarrhea

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1. INTRODUCTION
Looseness of the bowels with watery of discharges is called diarrhea. The problem is more common in developing countries due to the shortage of health facilities and lack of good food. Diarrhea causes rapid reduction of water and sodium if the water and salts are not replaced fast, the body starts to remove water or dry up or get dehydrated all of which are the lost contents of water and salt essential for a normal body function. Diarrhea is the most dangerous disease and is responsible for comparatively maximum deaths ratio among child’s death. Though the mortality rate for children under five suffering from acute diarrhea has fallen from 4.5 million deaths annually in 1979 to 1.6 million deaths in 2002, acute diarrhea contributes to a high that toll of acute mortality deaths ratio among child’s death.

Diarrhea may have different forms such as acute diarrhea, dysentery (blood in stool), or persistent diarrhea (lasting more than 14 days). Frequent use of antibiotics should be avoided. Anti-diarrhea drugs and anti-emetics should not be given to young children with either acute or persistent diarrhea since they medications do neither prevent dehydration nor improve nutritional status, and some have dangerous side effects. In many countries, children have a low intake of foods rich in readily absorbable zinc, such as liver, red meat, poultry, fish, oysters and crab. Diarrhea is typically more persistent and severe in infants and young children with malnutrition than in children who are not malnourished. Children with severe zinc deficiency commonly have chronic diarrhea, immune deficiency and growth retardation. Zinc can be produced in both syrup and tablet forms. Sazawal et al. (3) conducted a study to determine the effects of daily zinc supplementation on the duration and severity of diarrhea in pediatric population. In their study, a total of 937 children were included. Of these children, 462 received oral rehydration therapy. Children who received a daily oral preparation of zinc gluconate (20 mg of elemental zinc) had a 23 percent reduction in the risk of continued diarrhea, the mean number of watery stools decreased by 39 percent and the number of days with watery stools decreased by 21 percent. The authors concluded that zinc supplementation in this largely malnourished group of children was associated with a statistically significant in the severity and duration of diarrhea. Bhutta et al. (4) used Cox survival regression analysis to evaluate the overall effect of zinc on continuation of diarrhea and possible differential effects in subgroups divided by sex, age, weight-for-height, and initial plasma zinc concentration. In their study, dichotomous outcomes were analyzed by logistic regression. They concluded that zinc supplementation reduces the duration and severity of acute and persistent diarrhea. Lutfi’s (5) worked to evaluate the effect of daily zinc supplementation for 14 days on diarrhea duration, severity, and morbidity in children. In his study children were randomly assigned to zinc (n = 150) and control (n=130) groups and received dosages of 15-30 mg elemental zinc daily. His data indicated that supplementing children with acute diarrhea in Turkey with 3 Recommended Daily Allowances (RDA) of elemental zinc for 14 days...
Write the above model as

\[ Y_{\text{Recovery}} = \beta_0 + \beta_1 \text{Sex} + \beta_2 \text{Age} + \beta_3 \text{Weight} + \beta_4 \text{Height} + \beta_5 \text{Zinc} + \beta_6 \text{Residence} + \epsilon_i \]

\[ \rightarrow (1), \; (i = 1, 2, \ldots, 1000) \]

The multiple linear regression model consists of \( p \) explanatory variables and is written as

\[ Y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_p x_{ip} + \epsilon_i \]

Where \( \epsilon_i \), \( i = 1, 2, \ldots, n \) are independent normally distributed random variables with zero mean and constant variance \( \sigma^2 \). \( \beta_0, \beta_1, \beta_2, \ldots, \beta_p \) are parameters. In terms of matrix notations we can write the above model as

\[ Y = X \beta + \epsilon \]

The data of 1000 patients were collected from pediatric department Post Graduate Medical Institute Hayatabad Medical Complex Peshawar to examine the different factors which affect recovery time. Out of 1000 child patients, 500 used ORS with zinc and 500 used ORS without zinc. Zinc is considered as the binary variable and is represented by Zinc, age (in months) is continuous variable and represented by Age, weight (in kg) is continuous variable and is represented by Weight, height (in cm) is continuous variable and is represented by Height, sex is categorical (binary) variable and is represented by Sex, residence is categorical (binary) variable and is represented by Resi, and recovery time of diarrhea (in days), is also a continuous variable represented by \( Y_{\text{Recovery}} \), is a response variable (Dependent variable). In this study Z, A, W, H, S, and R are independent variables. The multiple regression model was used, for recovery time of diarrhea which has the following form

\[ Y_{\text{Recovery}} = 6.6956 - 2.4649 \text{Zinc} + 0.0022 \text{Age} - 0.0067 \text{Weight} - 0.0058 \text{Height} + 0.1818 \text{Sex} - 0.7212 \text{Resi} \]

The results given in Table tells us that it was really Zinc (Zinc) and somewhat i.e. at 0.05 Sex(Sex) that caused the recovery time. The regression coefficient for Age (Age), Weight (Weight), Height (Height), and Residence (Resi) are not statistically significantly different from zero having respective P-values (P=0.6489, P=0.8474, P=0.3394, and P=0.8067). The fact that the intercept was not significantly different from zero is irrelevant here. The intercept merely tells us where the regression line (or plane, in this case) crosses the y-axis, and does not explain any variation. In our study, zinc is the only independent (explanatory) variable which is significant. The ANOVA technique provided the strong evidence of the significance of the zinc. Thus we infer that zinc error was estimated along with a t-statistic and a P-value for the t-statistic. The t-statistic is simply the parameter estimate divided by its standard error, and it is based on the number of degrees of freedom for the error term.

Table indicates that Zinc is significant at alpha=0.01 and is the cause effect of dependent variable Y or in simple words; Zinc is the variables bring changes in the dependent variable Y. Although at alpha=0.05 Sex is al so significant but not at 0.01.

3. DISCUSSION AND CONCLUSION

So far so many studies have been contacted through the world but no study has been based on the risk factors which affect the duration of diarrhea. This study is an attempt to find the risk factor which directly or indirectly affect the recovery time of diarrhea.

2. METHODS AND MATERIALS

The multiple linear regression procedure is used for the analysis of data. The multiple linear regression is an extension of linear regression. The multiple linear regression model consists of \( p \) explanatory variables and is written as

\[ Y = X \beta + \epsilon \]

Where \( \epsilon_i, \; i = 1, 2, \ldots, n \) are independent normally distributed random variables with zero mean and constant variance \( \sigma^2 \). \( \beta_0, \beta_1, \beta_2, \ldots, \beta_p \) are parameters. In terms of matrix notations we can write the above model as

\[ Y = X \beta + \epsilon \]

The intercept, or constant, term; the coefficient for Zinc (Zinc); The coefficient for Age (Age); the coefficient for Weight (Weight); The coefficient for Height (Height); the coefficient for Sex (Sex); The coefficient for Resident (Resi). Each parameter estimate was based on one degree of freedom. For each parameter estimate, a standard
is a strong explanatory variable and is a main cause in reducing the recovery time of diarrhea.

REFERENCES


European Association of Science Editors
Third Circular

Tallinn, Estonia
8 – 10 June 2012

ELEVENTH GENERAL ASSEMBLY AND CONFERENCE
Editing in the Digital World

The conference will examine how the transfer of science publishing into the digital environment affects editors in their daily work and how they can exploit new technologies to improve their services to authors, their journals and their businesses/organizations. We welcome submitted papers for the parallel sessions (see p2). Practical workshops will be organised as below, if there is sufficient demand.

Tallinn is the capital city of Estonia, renowned for its mix of the old and the new. The enchanting centuries-old streets, towers and squares include many vibrant restaurants, cafes and clubs that give Tallinn its energy and buzz. Helsinki is an hour away by boat and there are easy links from Sweden and Riga. Several European airlines, including EasyJet and RyanAir, fly direct to Tallinn.

The 48-hour schedule for the main conference (Friday afternoon to Sunday lunchtime) allows delegates a concentrated and affordable meeting with the option of extending their visit to Tallinn should they wish.

Thursday 7 June
Optional course: Writing a scientific paper and getting published, Elisabeth Heseltine

Friday 8 June
Optional course (continued): Writing a scientific paper and getting published
Annual General Meeting, General Assembly and Opening Ceremony
Plenary session on National Journals in an International Context Juri Engelbrecht, Estonia
Welcome reception at Tallinn Town Hall

Saturday 9 June
Plenary session on Open Access & Digital Models Deborah Kahn, BioMedCentral
Plenary session on Social media and science editing/publishing Alan Cann, University of Leicester UK
Parallel sessions
Optional Conference Dinner at the Brotherhood of Black Heads

Sunday 10 June
Parallel sessions
Plenary session on The Editorial Office Linus Svensson, Oikos, Sweden
Closing ceremony - the conference will close at 1.00 pm
Optional course: How to be a successful journal editor by Pippa Smart

Monday 11 June
Optional course continued: How to be a successful journal editor by Pippa Smart
BELS Examination