Georgia State University

ScholarWorks @ Georgia State University

Public Health Faculty Publications

School of Public Health

2010

An Examination of the Relationship Between Levels of Drinking Water Quality Indicators and the Occurrence of Self-Reported Diarrheal Disease: A Five-Month Prospective Cohort Study in the Dominican Republic, 2005-2006.

Shannon M. Kraft
Georgia State University, SKraft419@gmail.com

Christine E. Stauber
Georgia State University, cstauber@gsu.edu

Gloria M. Ortiz

Mark Sobsey
University of North Carolina at Chapel Hill, mark_sobsey@unc.edu

Follow this and additional works at: https://scholarworks.gsu.edu/iph_facpub

Part of the Public Health Commons

Any intervention was associated with a lower proportion of positive (+) tests, though the proportion + was higher in the Toilet group than with Water only. The purpose of this analysis is to generate a hypothesis for this discrepancy. The primary outcome is the magnitude of difference in proportion of stool + (*Giardia, Cryptosporidium, Entamoeba*) between groups with subgroup analysis for age and gender. There were 4 Control communities (N = 86), 4 Water (N=112) and 4 Toilet (N=53). Magnitude is measured with relative risk (RR) with 95% confidence intervals (CI) and logistic regression. The relative risk of a + test for the Control group versus any treatment was 1.98(CI 1.28-3.08). The Toilet group had less + than Control (RR1.32,CI.77-2.25), but more than Water group alone (RR 1.97,CI 1.03-3.78). By gender a trend towards increased + in the female group is seen in the Toilet group only (RR 1.49,CI.58-3.9). By multivariate analysis controlling for age and gender, the odds (OR) of having a + test were 0.42 (CI.23-.79) for any treatment compared to no treatment. For the Toilet group alone there was a trend towards increased odds for female gender (OR1.6,CI.43-5.9) not present when all patients were analyzed (OR.98,CI.52-1.8). In conclusion, though underpowered for subgroup analysis, these results indicate that the reduced improvement associated with communities who received toilet and water interventions may be due to the greater proportion of females + for parasites. The fact that women clean the toilets may account for their suspected increased parasite burden. Future investigations will include adjustments to the Toilet intervention to further test this hypothesis.

357

SEASONAL DIARRHEA INCIDENCE IN NICARAGUA, 2001-2002: IMPLICATIONS FOR THE EFFECTIVENESS OF UNIVERSAL ROTAVIRUS IMMUNIZATION

Rodolfo Pena[1], Magdaly Torres[1], **Sylvia I. Becker-Dreps**[2], Wilton Perez[1], Douglas R. Morgan[2], Peter Allebeck[3], Carina Kallestal[4]

[1]*Centro de Investigacion en Demgrafic y Salud (CIDS), Leon, Nicaragua, [2]University of North Carolina, Chapel Hill, NC, United States, [3]Karolinska Institutet, Stockholm, Sweden, [4]Women's and Children's Health, IMCH, University Hospital, Uppsala, Sweden*

Approximately 90% of diarrhea episodes are treated at home and are not captured by commonly-used hospital-based surveillance systems. In order to estimate the potential benefit of rotavirus immunization in Nicaragua, we measured the diarrhea incidence among a community-based sample of children during the dry and rainy seasons. Rotavirus, the most common cause of childhood diarrhea, is transmitted most intensely during the dry season in Central America, while bacterial pathogens are typically more common during the rainy season. The study was conducted using the Health and Demographic Surveillance System in León, Nicaragua. We randomly selected 414 households from the sampling frame of the Surveillance System. Field interviewers enrolled 726 children under age 5 from these households and returned every 2 weeks to record any diarrhea episodes. The children were followed for 13 weeks during the dry season and 20 weeks during the rainy season in 2001-2002. The diarrhea incidence rate was calculated by season and compared using Poisson regression analysis. Among a total of 726 enrolled children, 216 children experienced diarrhea; 108 occurred during the dry season and 194 occurred during the rainy season. Diarrhea incidence in all age groups increased during the rainy season. Overall, incidence was 0.072 (95% CI 0.058, 0.085) episodes per person-month during the dry season and 0.090 (95% CI 0.077, 0.102) episodes per person-month during the rainy season. In conclusion, we found a higher incidence of diarrhea during the rainy season, using a community-based sample of children. These findings have implications for the recent introduction of the rotavirus vaccine, which will likely reduce the burden of diarrhea during the dry season, but have less of an impact during the rainy season.

358

AN EXAMINATION OF THE RELATIONSHIP BETWEEN LEVELS OF DRINKING WATER QUALITY INDICATORS AND THE OCCURRENCE OF SELF-REPORTED DIARRHEAL DISEASE: A PROSPECTIVE COHORT STUDY IN THE DOMINICAN REPUBLIC, 2005-2006

Shannon M. Kraft[1], Christine E. Stauber[1], Gloria M. Ortiz[2], Mark D. Sobsey[2]

[1]*Georgia State University, Atlanta, GA, United States, [2]University of North Carolina-Chapel Hill, Chapel Hill, NC, United States*

Based on the 2010 report of the Joint Monitoring Program, 884 million people do not have access to clean water. Lack of access to clean water is a known contributor to the occurrence of diarrheal disease (JMP, 2010). The purpose of this study was to examine the potential associations between the occurrence of diarrheal disease and the levels of three water quality indicators, turbidity, total coliforms, and Escherichia coli (E. coli), in 185 households in Bonao, Dominican Republic in a four-month observational study of diarrheal disease in 2005-2006. Datasets included a biweekly water quality dataset and a weekly diarrheal disease occurrence dataset. These two datasets were merged using three different methods, which impacted the number of observations. T-tests and odds ratios were calculated for all three different datasets. Multivariate logistic regression was also conducted. P-values of <0.05 and 95% confidence intervals were used to determine statistical significance of water quality indicators in predicting diarrheal disease. There were 430 cases of diarrhea out of 14,245 observations. In the age-adjusted multivariate logistic regression, turbidity (OR = 1.36; p-value =.012) was the only water quality indicator found to be positively associated with the occurrence of diarrhea disease. In conclusion, this study strengthens the evidence supporting a positive association between turbidity and the occurrence of diarrhea as has been shown in two recent studies examining drinking water quality and diarrheal disease in the United States. Future studies are needed to further clarify which water quality variables are predictive of diarrheal disease.

359

EXAMINING THE INFLUENCE OF ECONOMIC AND POLITICAL FACTORS UPON ACCESS TO IMPROVED WATER AND SANITATION IN SELECT AFRICAN NATIONS, 2005-2008

Dlorah Jenkins, Christine Stauber, Monica Swahn

Institute of Public Health, Georgia State University, Atlanta, GA, United States

Today, 884 million people worldwide lack access to safe drinking water and 2.6 billion are without access to improved sanitation facilities. While many nations are on track towards meeting the Millennium Development Goals of decreasing the proportion of those without improved water and sanitation, progress in many developing nations is lacking**.** The purpose of this study was to determine what influence political and economic factors have on the availability of improved water and sanitation in developing nations, focusing on sub-Saharan Africa. This study addressed the following research questions: 1) Do political factors, specifically political stability (PS) and government effectiveness (GE), have an impact upon the availability of improved water and sanitation resources in sub-Saharan Africa? 2) Is gross national income (GNI) associated with the availability of improved water and sanitation resources? Data from the Demographic and Health Surveys of 11 sub-Saharan African nations conducted from 2005-2008 and from the World Bank indicators on PS, GE and GNI were analyzed using logistic regression models to examine the association between political and financial indicators and access to water and sanitation. A total of 109,606 observations were included in this study. The majority had access to improved drinking water sources (65.9%) and travel times < 30 minutes (83.3%). Most used no form of household water treatment (81.1%) and did not have an improved sanitation facility (64.1%). Overall, the strength and direction of the