Annals of Global Health, VOL. 82, NO. 3, 2016
May–June 2016: 511–531

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Background: Knowledge of utilization of health services and associated factors is important in planning and delivery of interventions to improve health services coverage. This knowledge is however limited in many developing countries. We determined the prevalence and factors associated with health services utilization in a rural area of Kenya. Our findings inform the local health management in development of appropriately targeted interventions.

Methods: Design: Cluster sample survey. Population: Residents of Kaloleni sub-County in Kenya.

Participants/respondents: Household key informants. Outcomes: (i) History of illness for household members and (ii) health services utilization in the preceding month, (iii) factors associated with health services utilization. Analyses: Estimation of prevalence (outcomes i and ii) and random effects logistic regression (outcome iii).

Findings: 1230/6,440 (19.1%, 95% CI: 18.3%-20.2%) household members reported an illness in the month preceding the survey. Of these, 76.7% (95% CI: 74.2%-79.0%) sought healthcare in a health facility. The majority (94%) of the respondents visited dispensary-level facilities and only 60.1% attended facilities within the study sub-counties. Of those that did not seek health services, 43% self-medicated by buying non-prescription drugs, 20% thought health services were too costly, and 10% indicated that the sickness was not serious enough to necessitate visiting a health facility. In the multivariate analyses, relationship to head of household was associated with utilization of health services. Relatives other than the nuclear family of the head of household were five times less likely to seek medical help (Odds Ratio 0.21 (95% CI: 0.05-0.87).

Conclusion: Dispensary level health facilities are the most commonly used by members of this community, and relations at the level of the household influence utilization of health services during an illness. These data enrich the perspective of the local health management to better plan the allocation of healthcare resources to health facilities according to need and demand. The findings will also contribute in the development of community-level health coverage interventions that target the disadvantaged household groups.

Abstract #: *2.018_MDG*

Epidemiology of childhood diarrheal diseases in the Niger-Delta region of Nigeria: a retrospective study

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Background: Sub-Saharan African children are 15 times more likely to die than their counterparts in developed countries. Diarrhea is the leading cause of malnutrition and the second leading cause of death in children under 5 years old. This study seeks to determine the incidence, demographic and clinical characteristics, and outcomes of childhood diarrheal diseases in the Niger-Delta region of Nigeria.

Methods: We conducted a retrospective analysis using hospital records for all pediatric patients seen at the Niger-Delta University Teaching Hospital (NDUTH), Bayelsa, Nigeria. We identified and reviewed case notes of all patients complaining or diagnosed of diarrheal disease. Demographic (date, age, sex, maternal education) and clinical (diagnosis, complications, comorbidity, mortality) information were extracted from case notes. We analyzed relationship between incidence of diarrheal disease and the patients' age, sex, and maternal level education. We calculated the mortality rate, and generated a time series plot for the incidence of diarrheal diseases. The data were analyzed using STATA 12 and expressed using descriptive statistics, rates, tables and charts. This study received ethical approval.

Findings: From April 1, 2013 – August 30, 2015, 10,722 children were seen at the NDUTH pediatric department, and 221 of them had diarrheal disease. The cumulative incidence (risk) was 21 cases per 1000 patients. The male: female ratio was 1:1.25, with a mean age of 17 months [14, 20 months]. There was a seasonal peak in incidence around February. Children of mothers whose highest level of education was primary, secondary, or tertiary education accounted for 55%, 23% and 9% of cases respectively. Four clinical types were identified: 1) acute water diarrhea (70%), gastroenteritis (17%), dysentery (8%), and chronic diarrhea (5%). Complications and comorbidities were malnutrition (55%), malaria (17.6%), anemia (11%), sepsis (1.4%), and death (0.84%).

Interpretation: Acute watery diarrhea is the commonest clinical type. Maternal formal education appears protective Diarrheal diseases were 6 times commoner among children of women only primary education than children of women with tertiary level of education. Malnutrition is a leading comorbidity. Mortality is low for those who seek hospital care. Observed seasonal peaks occur at the onset of the rainy season. This is important for public health interventions and hospital preparation.

Funding: None.

Abstract #: *2.019_MDG*

Evaluating the epidemiology of *P. falciparum* parasitemia in three areas of Uganda with different transmission intensities

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Background: Parasite prevalence, defined as the proportion of people infected with malaria parasites, is a commonly used metric to evaluate the burden of malaria in endemic areas. Estimates of parasite prevalence are generally based on microscopy which lack sensitivity for detecting low level parasitemia. Newer, highly sensitive molecular techniques such as loop-mediated isothermal amplification (LAMP) may improve our understanding of the epidemiology of parasitemia. The aim of this study was to compare

estimates of parasite prevalence between microscopy and LAMP among persons living in different epidemiological settings in Uganda.

Methods: A malaria surveillance system was established in areas of Uganda with low (Walukuba), medium (Kihihi), and high (Nagongera) transmission intensity. Cohorts of children aged 0.5-10 years and 1 adult from 300 households (100 per site) were followed for 2 years. Blood samples were collected every 3 months to estimate parasite prevalence using microscopy, and the samples negative by microscopy were tested for sub-microscopic parasitemia using LAMP. Comparisons of parasite prevalence were made using generalized estimating equations with adjustment for repeated measures in the same study participants.

Findings: The 24-month study period included 2,662 samples among 397 study participants in Walukuba; 3,389 samples among 432 study participants in Kihihi; and 3,248 samples among 417 study participants in Nagongera. The proportion of study participants with parasitemia was significantly higher when using LAMP plus microscopy compared to microscopy alone at all 3 sites: Walukuba 6.1% vs. 20.5%; Kihihi 7.9% vs. 30.1%; Nagongera 22.5% vs. 64.9% ($p<0.001$ for all comparisons). Among participants with any parasitemia, the proportion with sub-microscopic parasitemia (only detected by LAMP) was higher among adults compared to children (88.4% vs. 62.8%, $p<0.001$), and these differences were consistent across the 3 sites.

Interpretation: As expected, parasite prevalence increased with increasing transmission intensity. However, traditional microscopy vastly underestimated the true prevalence of parasitemia across the range of transmission intensity. With increasing age, the proportion of infected subjects with sub-microscopic parasitemia increased, likely due to increasing immunity. These findings have important implications for malaria control programs in Africa that target populations with asymptomatic parasitemia as a means of reducing the parasite reservoir.

Funding: National Institutes of Health, International Centers of Excellence in Malaria Research (U19AI089674). UCSF Resource Allocation Program summer research fellowship.

Abstract #: *2.020_MDG*

The bridge project: Linking US to Ghanaian children to foster service and education

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Program/Project Purpose: Kybele, Inc. and the Ghana Health Service (GHS) have partnered to improve maternal-newborn healthcare since 2007. Through local connections, Kybele learned the needs of two community schools near Accra. One school was without running water and adequate toilet facilities for 150 children. Kybele and the GHS, worked outside the context of medicine to incorporate US schoolchildren into a service project. The organizers wanted to learn what impact traveling to Ghana would have on US children and determine the long term sustainability of two projects co-led by children. The premise was that not only raising money for a cause, but actually experiencing the cause, would enhance the development of social responsibility for US children.

Structure/Method/Design: One week service trips were taken to Ghana November 2012 and 2013 to link US and Ghanaian schoolchildren. Prior to travel, the US students raised funds, collected school supplies, and researched internet capability in Ghana. While in Ghana, the GHS provided transportation and technical support for computer installation. The US students utilized modest housing and meals were catered by the GHS. Cultural excursions were taken to former slave castles and to local markets; however, most in-country time was spent with Ghanaian children at the two local schools.

Outcome and Evaluation: Five US children (aged 10-16) traveled to Ghana in 2012; they all returned in 2013. The children co-organized activities that raised $13,000. Two libraries and computer labs were built that have been sustained. Thirty-two donated computers still function. Water lines and toilet facilities were installed at one school. Over 1,500 books and 800 pounds of school supplies were donated. In 2014, the US students began sponsoring a Ghanaian girl they met to attend junior high school. She would have otherwise been unable to attend school. One US student returned to Ghana in 2015 with the Kybele medical team.

Going Forward: The cultural immersion experience in Ghana by five US schoolchildren was sustained beyond the initial visit. They are encouraging wider participation from their school and are continuing fundraising. They are planning another visit to Ghana in 2016 with additional students to assess their projects.

Funding: Funding was provided through Lovell's Little Bits, Kybele, Inc. and the Ghana Health Service.

Abstract #: *2.021_MDG*

Reviewing implementation fidelity to leverage impact in a multi-country maternal and child health and nutrition study

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Program/Project Purpose: WVI partnered with the Johns Hopkins Bloomberg School of Public Health (JHSPH), to evaluate its key Maternal and Child Health and Nutrition (MCHN) programming models in Cambodia, Guatemala, Kenya and Zambia. The Child Health & Nutrition Impact Study (CHNIS) is a multi-year quasi-experimental study designed to assess the attribution of World Vision's work to improve MCHN outcomes. This is the first time WV has commissioned a large multi-country impact evaluation to generate scientifically rigorous, objective evidence.

Structure/Method/Design: Following baseline data collection and 1.5 years of implementation of three MCHN interventions, a midterm review was conducted in implementation sites to assess implementation fidelity and changes in MCHN health behaviors, outcomes of direct beneficiaries. Assessing implementation fidelity was critical at this point of the study. Without good implementation fidelity, it is unlikely that the intended effect of interventions will be realized. Evaluators looked at five domains of implementation fidelity – adherence, dose & exposure, quality of delivery, participant responsiveness, programme documentation, and assessed changes in direct beneficiaries.