Fumonisin Exposure in Guatemalan Women of Child-Bearing Age: A Potential Link to the Observed High Incidence of Frontoethmoidal Encephalocele

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Background: Frontoethmoidal encephalomeningocele (FEEM) is a neural tube defect (NTD) characterized by a persistent foramen cecum and herniation of cranial contents through an anterior skull defect. The mycotoxin fumonisin, a contaminant of maize, has been implicated in the pathogenesis of FEEM as it disrupts sphingolipid metabolism and decreases folate bioavailability. Studies have demonstrated that exposure to fumonisin in experimental animals induces FEEM.

A high prevalence of FEEM has been observed at the rural Casa Colibri Clinic (CCC) in Nuevo Eden, Guatemala. Fumonisin exposure in women of childbearing age is a suspected contributory risk factor due to the high consumption of maize.

Methods: This investigation involved a review of the FEEM cases that have presented to the CCC, as well as a toxicological analysis of fumonisin exposure in women of childbearing age residing in villages surrounding the CCC. To determine the exposure level and accumulation of fumonisin breakdown products, urine and finger-stick blood samples were collected and analyzed using high performance liquid chromatography.

Findings: Eight cases of FEEM (3 males: 5 females) were evaluated. The average age at presentation was 6.3 years. Three sub-types of frontoethmoidal encephalocele were observed as follows: 5 nasoethmoidal; 1 nasofrontal; and 2 naso-orbital.

Fumonisin exposure was quantified in 104 women from two FEEM villages and four non-FEEM villages. Analysis of the exposure data demonstrated an average fumonisin intake of 6.33 μg/kg (range = 0.0 μg/kg − 118.81 μg/kg) (World Health Organization provisional maximum tolerable daily intake (PMTDI) is 2.0 μg/kg). When comparing FEEM and non-FEEM villages significant differences in mean fumonisin exposure were revealed, with a mean fumonisin exposure of 14.62 μg/kg in FEEM villages (95% confidence interval = 5.63 μg/kg − 23.61 μg/kg), and 3.12 μg/kg in non-FEEM villages (95% confidence interval = 1.79 μg/kg − 4.5 μg/kg) (p-value = 0.015).

Interpretation: Fumonisin exposure levels in villages with known cases of FEEM were significantly higher than those of non-FEEM villages. Of the villages sampled, four of six had mean fumonisin exposure levels that exceeded the WHO PMTDI. Due to the startling number of cases of FEEM in this rural region, exposure to fumonisin has been implicated as a contributory risk factor.

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Abstract #: *LAN.014*

Distributed Thermistor for Continuous Temperature Monitoring of Malnourished Infants at Risk for Hypothermia

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Program/Project Purpose: Severe acute malnutrition affects around 19 million children under 5 years worldwide, and kills 400,000 of them each year, according to the WHO. Hypothermia and hyperthermia, two clinical effects of malnutrition, often lead to death in low- and middle-income countries (LMIC) where understaffed hospitals are unable to continuously and simultaneously monitor the temperature of malnourished infants. A low-cost device that can collect temperature data of patients and wirelessly transmit this data to a single source for nurses would significantly alleviate the strain on human resources and decrease infant morbidity/mortality.

Structure/Method/Design: Since 2014, preliminary prototypes for this wireless thermistor device have been created and tested, specifically in hospitals in Malawi. The final design consists of a silicone armband, a thermistor, and a circuit board with a rechargeable battery, microcontroller, A-D converter, and antenna. The armband attaches to the child's upper arm with the thermistor situated in the axilla. Temperature data is transmitted via Bluetooth to an Android device. The device is reusable, low-cost, user-friendly, and easily sanitized, attributes well-suited for use in LMIC where malnutrition is widespread.

Outcome & Evaluation: Researchers traveled to Malawi in the summer of 2015 to introduce the design to hospitals and perform preliminary testing of communications. Nursing staff were enthusiastic about the device and could clearly grasp its function and use. The range for data-transmission was tested, and it was found that the device worked successfully at all distances within and around the hospital. This experience defined final improvements of the device before implementation, including band design and mobile application development.

Going Forward: A wireless thermistor device has the potential to permit more efficient and effective use of human resources, while reducing infant deaths due to hypothermia in LMIC. A simple interface and sustainable design is ideal for remote hospitals that suffer from this problem. With improvements to the band design and mobile application development, the device will be ready for implementation in Malawi hospitals by the summer of 2017.

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Abstract #: *LAN.015*

Knowledge, Attitudes, and Practices of Exclusive Breastfeeding at Dhulikhel Hospital, Nepal

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Background: Forty-one percent of children under five are stunted in Nepal, where infant mortality remains high. As one approach to

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addressing worldwide malnutrition, stunting and infant mortality, the WHO has promoted the practice of Exclusive Breastfeeding (EBF). The WHO defines EBF as giving infants only breastmilk for the first six months of life. Previous studies have shown that breastfeeding is prevalent in Nepal, however EBF rates are variable due to complimentary feeding practices. Investigations of breastfeeding practices have not been performed previously in Dhulikhel and the surrounding Kavre district. Dhulikhel Hospital is a non-profit academic medical center that serves a diverse population of 1.8 million people over a large geographic area.

Methods: To guide the development of future EBF interventions at Dhulikhel Hospital, we assessed the knowledge, prior experience, beliefs, and social norms related to breastfeeding practices. A quantitative survey was administered in Nepalese to pregnant women 18 years of age or older at Dhulikhel Hospital's antenatal clinic. Three local research assistants were trained to orally conduct the 93 question survey.

Findings: The questionnaire, administered during July and August 2016, was completed by 300 participants aged 18 to 38 years-old (mean of 24-years-old). Out of the 111 (37%) women who had previously breastfed, only 54 (49%) reported exclusively breastfeeding for six months or longer. While 188 (63%) of those surveyed intend to feed their child only breastmilk for the first six months, only 89 (30%) were familiar with the term "Exclusive Breastfeeding.". Two hundred and forty (80%) of women believed that it is permissible to give water in the first 6 months, and 166 (55%) believed that infants need additional food or liquids when they are ill.

Interpretation: Rates of EBF in Dhulikhel are significantly lower than the WHO's target goal of 90% compliance. The lack of EBF knowledge is a significant contributor to the low rates of EBF. Furthermore, the widespread misconceptions highlight a gap in standardized education regarding EBF practices. As the practice of EBF is crucial to addressing stunting and infant mortality, implementing a formal EBF intervention tailored to the Dhulikhel community is necessary.

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Abstract #: *LAN.016*

Healthcare-Seeking Behaviors of Females Presenting to St Paul's Hospital Millennium Medical College & its Associated Community Clinics, Addis Ababa, Ethiopia

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Background: The infrastructure of a healthcare system is a significant determining factor of the healthcare-seeking behaviors of a community. Healthcare-seeking behaviors have a strong influence on the health outcomes of a population. There are few studies on such behaviors among females in Addis Ababa, Ethiopia.

We sought to evaluate the healthcare-seeking behaviors of sexually active and non-pregnant female patients at St. Paul's Hospital Millennium Medical College and ten of its associated health centers in Addis Ababa, Ethiopia.

Methods: A questionnaire recognizing socio-demographic characteristics and healthcare-seeking behaviors was administered to 338 subjects who met inclusion criteria. Inclusion criteria included: females over the age of 18 who sought care at the clinic, non-pregnant, sexually active within the last year, and willing to provide consent. The questionnaires were administered in Amharic.

Findings: One hundred and sixteen subjects (29.9%) had prolonged seeking medical care for their current medical symptoms, for an average of 10 weeks. Factors impacting subjects' decisions to prolong care included time, belief that their symptoms would self-resolve, finances, work responsibilities, family responsibilities, transportation and distance of clinic. Among those who had prolonged care, most are between the ages of 36-40 years, have relatively low monthly incomes of 501-1000 birr ($22-45USD) and have, as their highest educational level, a non-formal education. A majority of subjects consider travel time/distance to clinic, finances and influence from third party persons to be non-significant factors behind their decision to seek medical care. Significant decision-making factors to a majority of subjects included the negative impact of medical symptoms on one's quality of life and concern over one's own future personal health.

Interpretation: The women who tend to prolong seeking out medical care were found to have lower educational and income levels. Thus, it is important to target medical education towards such women. It is also essential that this medical education help women obtain a stronger understanding of their medical symptoms and the importance of getting treated before the quality of their lives and future health statuses are compromised.

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Abstract #: *LAN.017*

Predictors of Long Acting Reversible Contraception Use among Women in the Extended Postpartum Period in Rural Uganda

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Background: Post-partum or post-abortion use of the most effective contraception is low in Uganda especially in rural settings. This study aimed at determining the predictors of long-acting reversible contraception (LARC) use among women in extended postpartum periods in rural Uganda.

Methods: A household based, cross-sectional study was conducted among 400 women in two rural communities in Mityana district, central Uganda. Eligible women were aged 15 to 45 years and had childbirth within the last 12 months of the interview. Pre-tested structured questionnaires were used to conduct respondent interviews in September 2014. The outcome variable was use of a LARC