

breakfast and adequate hydration, especially because insufficient hydration could affect the proper function of the kidneys in the long term.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2014-3330T

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Health Seeking Behavior of Caregivers Whose Children (6–60 Months) Presented With Severe Malaria in a Tertiary Health Institution in Nigeria

BACKGROUND AND OBJECTIVES: Early recognition of symptoms of malaria and commencing appropriate home-based treatment or seeking prompt treatment in a health facility are malaria control strategies recommended under the Roll Back Malaria initiative. This initiative aims at reducing malaria morbidity and prevention of mortality in children aged <5 years. The success of this strategic plan for malaria control depends on the health-seeking behavior of caregivers of these children. The goal of this study was to document the health-seeking behavior of caregivers whose children (aged 6–60 months) presented with severe malaria in a tertiary health institution.

METHODS: This descriptive cross-sectional study was conducted from July 2012 to June 2013. Appropriate health-seeking behavior included seeking prompt treatment in a health facility within 24 hours of onset of severe malaria symptoms or presentation in a health facility within 48 hours with symptoms of severe malaria while on home-based treatment. Features of severe malaria were identified by using the criteria of the World Health Organization. Data were obtained by using a researcher-administered questionnaire, and malaria was confirmed in each child by using microscopy and following a standard protocol. Analysis of data was performed by using SPSS version 16.0.

RESULTS: Of the 120 caregiver (31.4 ± 7.0 years)/child pairs (24 ± 14.7 months) recruited, 35 (29.2%) caregivers had appropriate health-seeking behavior. Of the 85 (70.8%) caregivers with poor health-seeking behavior, 82 (96.5%) inappropriately managed malaria at home by administering the wrong malaria medications (given, in most cases, at incorrect dosages), and 3 (3.5%) did nothing during the

illness ($P = .003$). Appropriate health-seeking behavior did not significantly depend on level of education of the caregivers ($P = .17$). The most common place for home-based care was the patent medicine vendor in 65 (79.3%) of 82 cases, and 20.7% was from neighbors and traditional physicians. The mortality rate observed in this study was 150 per 1000; 94.4% were children whose caregivers had poor health-seeking behavior ($P = .02$).

CONCLUSIONS: Health education regarding appropriate malaria care should be intensified for caregivers and other community-based health care providers such as the patent medicine vendors.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2014-3330U

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Blood Pressure in Children: Role of High Altitude?

BACKGROUND AND OBJECTIVES: There is controversy regarding the role of high altitude on blood pressure. The goal of this study was to evaluate the blood pressure of children aged 6 to 18 years who permanently lived at sea level in Al Ain ($n = 417$), the United Arab Emirates (UAE), and the Himalayan mountain villages in Pakistan (altitude of 3000 m, $n = 372$).

METHODS: Population-based samples of children and adolescents were selected from the Himalayan mountain villages of Pakistan and UAE as part of a global health project for noncommunicable disease prevention. The same anthropometric scales and automated blood pressure monitors were used by trained nurses to measure systolic blood pressure (SBP) and diastolic blood pressure (DBP). Participants classified as being overweight were defined as having a BMI percentile ≥ 85 th and < 95 th percentile, and obesity was defined as being ≥ 95 th percentile according to the growth charts of the Centers for Disease Control and Prevention. Prehypertension was defined as having an SBP or DBP reading that was ≥ 90 th percentile to < 95 th percentile, and hypertension was defined as having an SBP or DBP ≥ 95 th percentile, according to the age-, gender-, and height-specific guidelines of the National Heart, Lung, and Blood Institute.

RESULTS: Participants were similar with respect to age in the UAE (11.2 years [55.1% boys]) and the Himalayan region (11.1 years [51.6% boys]). A higher proportion of children in the UAE were overweight (15.5%) and obese (13.1%) compared with the Himalayan children (2.2% overweight and 3.0% obese). Mean SBP was significantly higher in Himalayan children than in the children living in the UAE (112.1 ± 12.1 mm Hg vs 107.0 ± 11.8 mm Hg, respectively; $P < .001$). Similarly, mean DBP was significantly higher in

Himalayan children than in those living in the UAE (70.2 ± 15.2 mm Hg vs 62.2 ± 8.8 mm Hg, respectively; $P < .001$). A higher proportion of Himalayan children had prehypertension (24.7%) and hypertension (15.1%), respectively, compared with their counterparts in the UAE (9.7% with prehypertension and 3.9% with hypertension).

CONCLUSIONS: A difference of 3000 m in altitude was associated with higher SBP and DBP in these children aged 6 to 18 years.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2014-3330V

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A “NEC Free NICU” Through Breastfeeding Quality Improvement Project (QIP)

BACKGROUND AND OBJECTIVES: Breastfeeding offers the best nutritional support for newborn infants. The value of breast milk in reducing the incidence of necrotizing enterocolitis (NEC) among premature infants admitted to the NICU has been reported. Ireland has one of the lowest breastfeeding rates in the developed world, however, and pursuing quality improvement projects (QIPs) aimed at improving use of breast milk among premature infants could be challenging. Our goals were to: (1) improve breast milk exposure of extremely low birth weight infants in the NICU from 80% to 100% over a 2-year period and among very low birth weight infants from 60% to 80% during the same period; (2) reduce the incidence of NEC in our NICU to a level below that reported by other network centers in Ireland benchmarked in the Vermont Oxford Network; and (3) improve the breastfeeding culture of our unit by ensuring the sustainability of a QIP.

METHODS: A QIP was commenced in January 2011 with a clear goal statement and time lines, as well as agreed and quantified written goals. Primary and secondary drivers were established and Plan-Do-Study-Act cycles initiated for demonstrating “small improvements” and acquiring “buy-in” from the medical and nursing staff as well as the parents of premature infants. The World Health Organization’s definition for the mother’s own milk and donor breast milk and modified Bell stage IIA or above for NEC were the denominators. The project was conducted in the tertiary NICU attached to University Maternity Hospital, Limerick, Ireland, which has an in-birth rate of 5000 per year. Approval of the hospital audit committee was obtained. During the project, senior medical and nursing teams of the unit as well as major clinical guidelines remained unchanged. Results of the study were analyzed by using SPSS version 18.

RESULTS: In a country with a low national breastfeeding rate, we found that 100% breast milk exposure to extremely low birth weight infants and 80% uptake by very low birth weight infants could be established through a QIP. For the first time in the history of our unit, in 2013, we had no NEC; the information is now uploaded to the Vermont Oxford Network. Our post-QIP staff surveys show evidence of sustainability of the project.

CONCLUSIONS: Through the adaptation of quality initiatives, breastfeeding rates among premature infants could be optimized, even in countries with traditionally low breastfeeding rates. Such low-cost interventions could significantly improve morbidity among premature infants, perhaps more than generally appreciated, as evidenced by our NEC-free tertiary unit.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2014-3330W

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Zinc and Copper Concentrations in Breast Milk During the First Nine Months of Lactation: A Longitudinal Study

BACKGROUND AND OBJECTIVES: A wide variation in the composition of breast milk has been reported from various countries. The aim of this study was to evaluate zinc (Zn) and copper (Cu) concentrations in the breast milk of lactating mothers as a function of lactation time and the relationship between these concentrations and the characteristics of mother–infant dyads.

METHODS: Mother–infant dyads were recruited immediately at the second week postpartum. Inclusion criteria were as follows: (1) gestational age ≥ 37 weeks; (2) birth weight ≥ 2500 g; and (3) no chronic illness in the infant or mother. Anthropometric measurements of the mother–infant dyads were taken. Maternal hemoglobin was measured at week 2 and month 4 postpartum. The samples of human milk were collected postpartum at week 2 and months 2, 4, and 9 postpartum. Zn and Cu concentrations were determined by using an atomic absorption spectrophotometer. Data were presented as mean \pm SD.

RESULTS: The mean concentrations of Zn and Cu ($n = 172$) were 4.84 ± 2.24 mg/L and 452 ± 129 μ g/L, respectively, at week 2. There was a correlation between Zn and Cu concentrations at week 2. There was a significant reduction ($P < .05$) in Zn and Cu concentrations at 4 months’ postpartum ($n = 108$; 4.88 ± 2.40 mg/L and 453 ± 123 μ g/L

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Pediatrics 2015;135;S12

DOI: 10.1542/peds.2014-3330V

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Pediatrics 2015;135;S12

DOI: 10.1542/peds.2014-3330V

The online version of this article, along with updated information and services, is located on the World Wide Web at:

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