

interventions for the management of nausea and vomiting for these children. Future research is needed to develop and update other forms of relaxation techniques.

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## **Relationship Between Microalbuminuria and Kidney Scars in Children With Vesicoureteral Reflux**

**BACKGROUND:** Vesicoureteral reflux (VUR) is one of the most common anomalies of the urinary system that predisposes to recurrent pyelonephritis, hypertension, renal parenchymal scars, and chronic renal failure if not managed properly. Recent studies show that microalbuminuria is a marker of glomerular damage at early stages. In adults, microalbuminuria is considered a risk factor for the occurrence of nephropathy. However, the data are limited in children.

**OBJECTIVES:** The goal of this study was to evaluate the relationship between microalbuminuria and kidney scarring, creatinine clearance, and severity of reflux in children with VUR.

**METHODS:** In this cross-sectional study, 87 children aged <14 years with VUR referred to Children's Hospital of Tabriz, Iran, were studied from 2012 to 2013. VUR was detected by using radiologic voiding cystourethrography. Urine microalbumin measurements and renal <sup>99m</sup>Tc-dimercaptosuccinic acid (DMSA) scans (for detecting scars) were performed in all patients 3 months after treatment of urinary tract infections. Creatinine clearance was calculated according to the Schwartz formula by using serum creatinine and patient height. Microalbuminuria was defined as 30 to 300 mg of microalbumin in 24-hour urine or a microalbumin to creatinine ratio of 0.03 to 0.3 in random urine. The relationship between variables was assessed by using SPSS software.

**RESULTS:** The mean age of the patients was 4.49 ± 2.64 years, and 82.8% of patients were female. Severity of reflux was mild (grades 1–2) in 23%, moderate (grade 3) in 33.3%, and severe (grades 4–5) in 43.7% of patients. Results of the DMSA scan were abnormal in 58 patients (66.6%). Microalbuminuria was detected in 19 patients (21.8%), and the amount of microalbumin was in the normal range in 68 patients (78.2%). With increasing grading of reflux, the amount of microalbuminuria increased and the amount of creatinine clearance decreased, but the changes were not statistically significant ( $P > .05$ ). Urinary microalbumin in patients with scarred kidneys (33.32 ± 28.69 mg) was significantly higher than in patients without scarring (10.82 ± 8.83 mg) ( $P = .006$ ). The frequency of scarred kidneys in

mild, moderate, and severe grades of reflux was 50%, 62.1%, and 78.9%, respectively ( $P = .07$ ). Frequency of microalbuminuria was 31% in patients with scarring, and only 3.4% of patients without scarring had microalbuminuria ( $P = .003$ ). There was no significant difference in frequency of microalbuminuria and kidney scarring between boys and girls ( $P > .05$ ).

**CONCLUSIONS:** In this study, we found no significant correlation between microalbuminuria, creatinine clearance, and abnormality on DMSA scans with grading of reflux. However, there was a significant correlation between microalbuminuria and presence of scars in the kidney. Microalbuminuria may be considered a marker for renal parenchymal damage.

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## **High Prevalence of Morning Hydration Deficit in Egyptian Schoolchildren**

**BACKGROUND AND OBJECTIVES:** Water is a vital nutrient, and adequate hydration is important for the body to function properly. Children who drink too little water to meet their daily requirements are likely to become dehydrated, and even mild dehydration can have negative effects on the body. This issue is even more important in Middle Eastern countries, where high ambient temperatures increase the risk of dehydration. This study is the first cross-sectional trial aimed at measuring morning hydration status in a large cohort of 519 Egyptian schoolchildren aged 9 to 11 years.

**METHODS:** Children were recruited from schools in and around the city of Damanhour, Egypt. With the help of an experienced nutritionist, the children completed a questionnaire on breakfast foods and fluids intake and collected a same-day urine sample after their breakfast. Breakfast food and fluid nutritional composition were analyzed, and urine osmolality was measured by using osmometry.

**RESULTS:** Surprisingly, >60% of the children skipped breakfast, leaving home without eating or drinking anything. The mean urine osmolality of these recruited Egyptian children was 814 mOsm/kg. Fifty-seven percent of the children had a urine osmolality >800 mOsm/kg, reflecting a hydration deficit, and 24.7% of children recorded high urinary osmolality (>1000 mOsmol/kg). Furthermore, results showed that a total water intake of <400 mL was associated with a significantly higher risk of dehydration.

**CONCLUSIONS:** This study found that a majority of Egyptian schoolchildren arrive at school with a hydration deficit. These results highlight the fact that there is a need to educate schoolchildren regarding the importance of having

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

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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.

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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  $\geq 85$ th and  $< 95$ th percentile, and obesity was defined as being  $\geq 95$ 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  $\geq 90$ th percentile to  $< 95$ th percentile, and hypertension was defined as having an SBP or DBP  $\geq 95$ 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

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