

## International child health

### G68 DETECTION OF SEVERE PROTEIN-ENERGY MALNUTRITION BY NURSES IN THE GAMBIA

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**Aim:** To test whether nurses can use the WHO Integrated Management of Childhood Illness (IMCI) nutrition algorithm to identify reliably severe protein-energy malnutrition in children.

**Methods:** Nurses were trained to identify severe protein-energy malnutrition using IMCI training materials. They identified visible severe wasting and bipedal oedema, and categorized weight-for-age using a growth chart, in consecutive children attending outpatient clinics. Their findings were compared with weight-for-height Z (WHZ) score, bipedal oedema assessed by a trained observer and weight-for-age Z score.

**Results:** 352 children were recruited of whom 34 (9.7%) were severely wasted (WHZ score  $<-3$ ) and 18 (5.1%) had bipedal oedema. In the detection of severe wasting, the nurses' assessments showed 56% sensitivity, 95% specificity and 56% positive predictive value (PPV) and for bipedal oedema 22%, 99% and 57% respectively. Overall, the nurses identified only half of 50 children with severe wasting and/or bipedal oedema and wrongly identified a further 13 children as severely malnourished. Plotting weight for age by the nurses showed 62% sensitivity, 99% specificity and 89% PPV for the detection of children with very low weight.

**Conclusions:** Severe malnutrition was both under-diagnosed and wrongly diagnosed by nurses trained in the use of the IMCI nutrition algorithm in a clinic setting in The Gambia. These guidelines for health workers and the training materials; particularly in respect to calculation of age; need further development to improve the detection of malnourished children.

### G69 REDUCED MORTALITY FROM SEVERE PROTEIN-ENERGY MALNUTRITION FOLLOWING INTRODUCTION OF WHO PROTOCOL IN CHILDREN IN MALAWI

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**Aim:** Severe protein-energy malnutrition (PEM) is associated with a high mortality ( $\approx 50\%$ ) in children in the developing world. Faulty case-management is a contributing factor as is misinformation from outmoded teaching manuals.<sup>1</sup> Since low mortality levels from malnutrition can be achieved using appropriate treatment regimens, updated treatment guidelines have been issued recently by WHO.<sup>2</sup> We aimed to assess the efficacy of this protocol, which was instituted by March 2002 in a regional hospital in Malawi.

**Methods:** Case records of all children diagnosed with PEM ( $n=164$ ) were analysed from November 2001 to June 2002 and in May and June 2002 a proforma was used to identify compliance with the WHO protocol. Mortality rates were used as the main outcome measure. Secondary outcome measures included compliance with protocol procedures such as management of dehydration, hypothermia and hypoglycaemia.

**Results:** Mortality fell from 11/20 (55%) in November 2001 to 3/16 (15.7%) in June 2002 ( $p=0.0187$  Fishers exact test). During the final two months of the study faulty case-management continued to be observed; appropriate management was documented in only 3/10 (30%) with dehydration, 1/3 (33%) with hypoglycaemia and 0/9 with hypothermia. In the 7/31 (23%) that died precipitating causes were pneumonia (4), gastroenteritis (1), tuberculosis (1) and hypothermia (2). Only 9/23 (39%) of those discharged reached their target weight of 100% weight-for-height.

**Conclusions:** This study has demonstrated a significant decrease in mortality following implementation of the WHO guidelines. Faulty case management continued to contribute to a poor outcome in a number of cases and was probably a function of lack of adequately trained staff.

1. Why have mortality rates for severe malnutrition remained so high? Schofield C, Ashworth A. *Bull WHO* 1996;74:223–9.

2. WHO/FCH/CAH/00.1 (2000) Management of the Child with a Serious Infection or Severe Malnutrition.

### G70 MISLOCALISATION OF HEPARAN SULPHATE PROTEOGLYCAN ON ENTEROCYTES IN KWASHIORKOR

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**Introduction:** The cause of enteric protein loss in kwashiorkor remains uncertain. However recent data show that absence or mislocalisation of heparan sulphate proteoglycans (HSPG) on enterocytes may induce protein-losing enteropathy (PLE).

**Aim:** To study enterocyte HSPG expression in Zambian children with kwashiorkor, in comparison to those with marasmus, milder growth faltering or UK controls.

**Methods:** We studied HSPG expression in duodenal biopsies from 45 patients (25 M, 20 F, mean age 16m), 14 with marasmus, 9 marasmic kwashiorkor, 17 kwashiorkor and 5 were underweight. 10 specimens from age matched UK infants with normal biopsies were used as normal controls. Epithelial HSPG's (including enterocyte syndecan-1 and glypican-1) and mucosal T cells were localised immunohistochemically and sulphated glycosaminoglycans (GAGs) by cationic probe. We also studied transferrin glycosylation in serum of 10 HIV negative children.

**Results:** All specimens from Zambian infants showed increased IEL's and crypt hyperplasia with villous blunting, with no differences between marasmus and kwashiorkor specimens. UK controls showed basolateral enterocyte expression of HSPG, syndecan-1, glypican and sulphated GAGs, while there was significant reduction of epithelial HSPG expression in all Zambian children studied. There was substantially greater disruption of GAGs and individual proteoglycans in kwashiorkor and marasmic-kwashiorkor than in marasmus, despite similar T cell infiltration. Transferrin hypoglycosylation was found in only 1/10 sera tested. HSPGs remained highly abnormal despite nutritional rehabilitation.

**Conclusions:** This gross loss of enterocyte HSPGs may contribute to PLE in kwashiorkor. While mislocalisation of HSPGs is also seen in CDG-1, transferrin hypoglycosylation was not a common association.

### G71 BASIC NEONATAL RESUSCITATION IN A RESOURCE POOR SETTING

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**Background:** 1 million deaths are due to birth asphyxia each year worldwide, most in resource poor setting. Only 1% of neonates need extensive resuscitation; basic resuscitation alone would improve the outcome of thousands of babies.

**Aims and objectives:** We hoped to reduce the neonatal mortality by using basic neonatal resuscitation training and using equipment that could readily be purchased and maintained by any hospital in a poorly resourced country.

**Methods:** We trained a 5-member team of midwives in basic neonatal resuscitation and provided them with basic equipment. They attended all deliveries over a one-month period on a 24-hour rota. Setting: A delivery unit in a large teaching hospital with 22 000 deliveries each year.

**Results:** We reviewed admissions to the SCBU for the month prior to the pilot to the month of the pilot and reviewed delivery ward data. There was a decrease by 13% in admissions. During the prior month 58 babies were admitted with asphyxia and 20 of them died. During the pilot there were 15 admissions with asphyxia and only 3 of these died. In the month preceding the pilot, babies  $> 2$  kilograms accounted for 60% of overall mortality, during the pilot babies  $> 2$ kg accounted for 24% of the overall mortality. Prior to the pilot 13% of babies  $> 2$ kg died, during the pilot 5% of babies  $> 2$ kg died. Delivery ward data; in the preceding month the fresh stillbirths accounted for 68% of total stillbirths and 48% during the pilot.

**Conclusion:** Basic neonatal resuscitation in this setting may have decreased the incidence of asphyxia and improved the outcome of heavier babies.

### G72 ESTABLISHING MODIFIED ADVANCED PAEDIATRIC LIFE SUPPORT (APLS) IN A DISADVANTAGED COUNTRY—THE NEPALESE EXPERIENCE

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**Background:** APLS has revolutionized the training of doctors and nurses in the management of critically sick and injured children in countries with access to modern medical facilities. We aimed to provide such training in a country with poor resources, where it is not yet established.

**Methods:** Five 3-day modified APLS courses were conducted at Kanti Children's Hospital in Kathmandu between May 2001 and August 2002. A UK APLS instructor (MS) visited Kathmandu for 2 weeks to (i) instruct trainers in the teaching methods used in APLS, (ii) modify the UK-APLS course for local needs, (iii) run 2 full courses, and (iv) discuss methods to sustain and cascade the course. The project, including the supply of additional equipment, was funded by Child Advocacy International (UK) for less than £5000. Experienced Nepali paediatricians, some of who were APLS or PALS providers, conducted three subsequent courses.

**Results:** Sixty-three doctors and 11 nurses from 6 different hospitals in Kathmandu participated. 71/74 (96%) of candidates passed, including 10 by immediate resits. Most participants were junior doctors and paediatric PG students. Feedback indicated that this course was rated highly and a large demand subsequently developed. It is intended to incorporate the course into a national training programme, involving the Ministry of Health.

**Conclusion:** APLS can be successfully transferred into developing countries. Moderate resources allow valuable training and equipment to be introduced into poorly resourced countries. This will be further aided by facilitating links between hospitals in poor and rich countries.

### G73 ANTIBODIES THAT INHIBIT SECONDARY PROCESSING OF PLASMODIUM FALCIPARUM MEROZOITE SURFACE PROTEIN-1 (MSP-1) ARE PRESENT IN NIGERIAN NEONATES

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In several animal models, antibodies that inhibit the secondary processing of MSP-1 also inhibit erythrocyte invasion by merozoites, making MSP-1 an important vaccine candidate. We have recently shown that human immune response to malaria includes both antibodies that inhibit MSP-1 secondary processing and blocking antibodies. In the present study, we have looked for processing-inhibitory antibodies in Nigerian neonates. After obtaining informed consent, 1–2ml blood was collected from 11 non-parasitaemic newborns (ages 4–16 days) and their non-parasitaemic mothers. For the ELISAs, the plates were coated with a recombinant MSP-119 expressed in *Pischa pastoris* and purified on a nickel column. Bound human antibody was detected by horseradish peroxidase (HRP)-conjugated anti-human IgG, visualised using o-phenylenediamine dihydrochloride and read at 492nm. For the processing inhibition assay, aliquots of *P. falciparum* (FCB-1) merozoites were incubated with 10% human plasma, with appropriate controls, to allow secondary processing to occur. The products were analysed by SDS-PAGE and western blotting. The blots were probed with rabbit anti-MSP-133, to detect processing and the peptide bands were visualised by enhanced chemiluminescence, followed by autoradiography. Quantitation of the autoradiograph bands was by the Scion Image software. For each lane (plasma sample) the extent of processing, C, was calculated thus:  $C = B/(A+B)$ , where A and B were the densities of the MSP-142 and MSP-133 bands, respectively. Processing inhibition was defined as <50% of the positive control lane. All neonates were concordant with their mothers as to the presence or otherwise of processing-inhibitory antibodies. In 2/11 mother-baby pairs, inhibition of processing was present in baby and mother, a rate similar to the 6/50 we found earlier in children age 1month–15years ( $p=0.44$ ; Fisher's). ELISA titres were similar between mothers and babies and between inhibitory and non-inhibitory samples. A larger study in needed to determine the pattern of decline of processing-inhibitory antibodies in infants to identify the best time to immunise children when MSP-1 based vaccines reach clinical trials.

1. Nwuba RI, Sodeinde O, Anumudu CI *et al* (2002).

### G74 COMMUNITY BASED PREVENTION OF MOTHER-TO-CHILD TRANSMISSION (MTCT) OF HIV: RESULTS FROM THE FIRST YEAR OF A PROGRAMME IN NORTHERN MALAWI

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**Aims:** An estimated 15–30% of antenatal mothers in Malawi are HIV positive. At least 25% will transmit the virus to their infant. Funded by UNICEF, a programme began in October 2001 to reduce the incidence of MTCT by 50% within the catchment area of Embangweni Hospital in rural Malawi.

**Methods:** Building on an existing structure of static and mobile antenatal clinics, and a strong volunteer base, the elements of the programme included:

- Informing / educating the community about HIV and MTCT prevention
- Offering high quality voluntary confidential counselling and same-day testing to all expectant mothers and their partners, using well-trained volunteers
- Providing short course antiretroviral therapy (nevirapine) to HIV positive mothers and their infants at parturition
- Encouraging HIV prevention amongst HIV-negative mothers
- Supporting safe and appropriate feeding practices
- Providing co-trimoxazole prophylaxis for infants of HIV positive mothers until their HIV status is determined at 18 months
- Providing reproductive health counselling and effective contraception.

**Results:** 1559 community leaders and traditional healers received information and education regarding HIV and MTCT. 40 volunteer counsellors were trained. Between October 2001, and September 2002, 1849 women attended antenatal clinic. 1227 (66.4%) accepted counselling. 927 (50.1%) accepted testing of which 56 (6.0%) were HIV positive. Of HIV positive women, 54 (96%) accepted nevirapine therapy. Only 4% of male partners accepted testing. Most HIV positive mothers chose to breast-feed their infants.

**Conclusion:** With good community support, and well-trained volunteers offering quality counselling, an effective prevention of MTCT programme in rural Malawi is possible. Such a programme helps to 'break the silence' surrounding HIV. A 50.1% uptake rate for testing, together with a lower than predicted HIV positive rate (6%) suggests that many HIV positive women are refusing testing. Encouraging male involvement may increase uptake rates.

### G75 CARING FOR CHILDREN AFFECTED BY HIV/AIDS IN UGANDA

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**Background:** By three years, 90% of vertically infected children are dead. There is little known about the older child with AIDS.

**Objective:** To categorize a large cohort of older children with AIDS according to the CDC classification, to ascertain the prevalence of TB and to review the problems at presentation and follow-up.

**Design:** Observational case series.

**Setting:** Ugandan self-referral clinic for immunocompromised children.

**Patients:** 170 Children who were reviewed monthly at home.

**Methods:** Over a 12-month period, demographic and clinical data was prospectively collected on 150 children using a questionnaire format.

**Results:** 135 complete records. At presentation 39% were CDC stage C, 53% stage B, and 8% N or stage A. The prevalence of TB was 35%. Problems at presentation included; cough (77%), dermatitis (70%) and recurrent fevers (65%), lymphadenopathy (59%) chronic diarrhoea (57%), oral candidiasis (54%) and parotitis (52%). At follow-up, cough (67% of 645 visits) and dermatitis (62% of 645 visits) were the most frequent problems. The average age at death was 87 months, were on TB treatment and had oral candidiasis at the time of death.

**Conclusion:** The knowledge base about older children with AIDS in Africa is scarce. We describe observations made on a cohort of older children. Most of them are already in clinical stage B or C, they usually die shortly after their seventh birthday. This observational study shows that the main problems that compromise quality of life are respiratory and dermatological.