

Society for the Study of Human Biology

Proffered Papers Meeting, London, May 20th, 2010

Large Lecture Theatre, Cavendish Campus, University of Westminster



- 10.00 Arrivals and Coffee
- 10.20 **Understanding Obesity as a Complex, Ill-Defined Problem.**
FE Johnston (University of Pennsylvania, Philadelphia, USA)
- 10.40 **The enrolment, nutritional status and health of school-age children in the Allai Valley, Northwest Frontier Province, Pakistan.**
A Hall & H Kirby (Centre for Public Health Nutrition, University of Westminster)
- 11.00 **Effects of menstrual dysfunction on bone geometry and bone density in female endurance athletes.**
RL Duckham, N Peirce, GD Summers, N Cameron & K Brooke-Wavell (Loughborough University, Nottingham University Hospitals Trust, English Institute of Sport, UK, Derby Hospitals NHS Foundation Trust)
- 11.20 Coffee and poster viewing
- 11.45 **Keynote Address: Links between stress, well-being and health.**
A Clow (Department of Psychology, University of Westminster)
- 12.30 Annual General Meeting
1.00 Lunch
- 2.00 Afternoon session Chair Dr Malcolm Smith, Durham
Preliminary results of worldwide variation in tooth formation.
HM Liversidge (Institute of Dentistry, Queen Mary, University of London)
- 2.20 **Accuracy of dental age estimation using three schemas.**
S AlQahtani, HM Liversidge & MP Hector (Institute of Dentistry, Queen Mary, University of London)
- 2.40 **Irish Passenger Lists: visualising local emigrant streams by isonymy.**
MT Smith (Evolutionary Anthropology Research Group, Durham University)
- 3.00 Tea and poster viewing
- 3.20 **Association between socio-economic status and childhood under nutrition in Bangladesh; a comparison of possession score and poverty index.**
M Mohsena, CG Nicholas Mascie-Taylor & R Goto (Department of Biological Anthropology, University of Cambridge)
- 3.40 **A short-term Cash-for-Work programme improved nutritional status, food expenditure and consumption of poor rural Bangladeshi women and children in the hungry season.**
CGN Mascie-Taylor, MK Marks, R Goto (Department of Biological Anthropology, University of Cambridge, Chars Livelihoods Programme, DFID, Bangladesh)
- 4.00 **Nutritional status and household food security of the ultra-poor in Bangladesh.**
R Goto & CG Mascie-Taylor (Department of Biological Anthropology, University of Cambridge)
- 4.20 Award of Student Prize

POSTERS

Parental Investment in Growth and Development: children of Cape Verdean immigrants in Portugal.

J Almeida (Health and Lifespan Research Centre, Loughborough University)

A systematic review to determine the effectiveness of interventions designed to prevent overweight and obesity in pre-adolescent girls.

J Keston (School of Sport, Exercise and Health Sciences, Loughborough University)

Migration, nutrition, and ageing (MINA) across the lifecourse in Bangladeshi families: A Transnational Perspective.

B Bogin, JL Thompson, J Merrell, P Meier, M Heinrich, V Garaj (University of Loughborough, University of Bristol, Swansea University, University of Sheffield, University of London, Brunel University)

Tooth formation in Sudanese children.

F Elamin, HM Liversidge, MPHector, (Institute of Dentistry, Queen Mary, University of London)

Parental Investment in Growth and Development: children of Cape Verdean immigrants in Portugal.

J.Almeida, Health and Lifespan Research Centre, School of Sport, Exercise and Health Sciences, Loughborough University

Parental investment is about allocation of resources to an individual offspring at the cost of parents' ability to invest in other components of fitness. As resources are limited, parents invest differently in their offspring. In most cases, this investment is determined by parents' cultural background, their socioeconomic status, and the biological characteristics of their offspring.

Scarcity of material resources (food, money, etc.) often leads people to migrate. This change of residence for an (in)determined length of time tends to reinforce or, alternatively, disrupt cultural-based parental investment models in their offspring's growth and development, depending on variables such as composition (i.e. family, individual, father, mother), space (i.e. internal, international, intracontinental, intercontinental), time (i.e. indetermined, long or short staying), destination (i.e. cultural affinities or not, human development resources, staying permit, housing and working conditions), amongst others.

Strategies adopted by Cape Verdean parents for allocating resources to growth and development of their offspring will be explored in this poster. It will be discussed how individuals, couples or families with different migratory processes, who have converged in a poor Portuguese shantytown, have preserved or changed their cultural-based parental investment strategies in growth and development, as well as the impact of the constraints (i.e. housing conditions) and the opportunities (i.e. services) of the place of residence on those strategies.

Accuracy of age estimation using three dental schemas

S. AlQahtani, H.M. Liversidge & M.P. Hector. Institute of Dentistry, Queen Mary, University of London

Developing teeth play an important role in estimating age in the absence of proper documents. The aim of this study was to compare accuracy of two older schemas: Schour and Massler Atlas (SM), Ubelaker chart (Ub) and a recently developed London Atlas (AlQahtani et al. *Am J Phys Anthropol* 2010).

Materials and method: Dental development was assessed from panoramic radiographs of children aged 3–16 (N=528) and skeletal remains of known age-at-death children aged 0 – 2 (N=66). Estimated age (EA) using each schema was compared to real age (RA). Bias (mean difference between EA and RA) and other measures of accuracy were calculated (absolute mean difference between EA and RA, proportion of individuals aged to within six months of real age for individuals aged 1-16, proportion of individuals aged to within 3 months of real age for individuals younger than one year). Intra-observer variation was calculated using Kappa after re-assessment of 60 radiographs for each method.

Results: Excellent reproducibility was observed (Kappa: SM 0.838, Ub 0.857 and LA 0.879). For individuals aged 3 – 16: older methods consistently underestimated age with significant bias (SM: -0.63, ± 0.95 years; and Ub: -0.65, ± 0.95 years. $P < 0.001$). While the London Atlas showed no bias (0.005, ± 0.67 years). The mean absolute difference was: SM 0.88, Ub 0.89 and LA 0.49; and the proportion of individuals aged to within six months of real age using Schour and Massler's and Ubelaker's charts were 44% and 43% respectively, whereas The London Atlas was considerably better at 69%.

For individuals younger than three: older methods underestimated age with bias (SM: -0.23, ± 0.51 years; and Ub: -0.13, ± 0.46 years). The London Atlas showed no bias (0.004, ± 0.39 years). The mean absolute difference for SM was 0.41, Ub 0.35 and LA 0.29. The proportion of individuals aged to within three months of real age using Schour and Massler's and Ubelaker's charts were 33% and 41% respectively, whereas The London Atlas was considerably better at 58%.

Conclusion: These results show that the London Atlas provides a substantial improvement in our ability to accurately estimate age without bias and with good measures of accuracy from developing teeth in children between the ages 0-16 years.

Migration, nutrition, and ageing (MINA) across the lifecourse in Bangladeshi families: A Transnational Perspective.

B Bogin¹, JL Thompson², J Merrell³, P Meier⁴, M Heinrich⁵, V Garaj⁶. ¹University of Loughborough, ²University of Bristol, ³Swansea University, ⁴University of Sheffield, ⁵University of London, ⁶Brunel University

The Bangladeshi community in Britain is thriving; it is both the youngest and fastest growing of all ethnic populations in the UK. However, many of its members are socially disadvantaged and suffer from poor health, including high levels of disability, obesity, type 2 diabetes, and cardiovascular disease. Little is known about the causes. Older Bangladeshi women are particularly affected as they play a lead role in caretaking for multiple generations within relatively large extended families and many struggle to cope with the complex challenges of ageing, poverty, racism, and social exclusion. As in the general population, nutrition plays a crucial role in the health status of the Bangladeshi population. Despite this there is no clear understanding of how eating patterns and migration affect this group's nutritional status and experiences of ageing. Without this information we cannot develop effective culturally tailored interventions.

The MINA project aims to explore the relation between migration, nutrition, and ageing via an intergenerational and transnational project incorporating multidisciplinary methodologies of nutrition, health psychology, public health nursing, anthropology, ethnobotany, and media design. The sample includes 40 older women (45+ years old) living in Cardiff who migrated from Bangladesh to the UK, 40 of their daughters (18-35 years old) born in the UK, and 40 women of the same two age groups, who will be interviewed and assessed in Bangladesh. Using a biocultural perspective we address the following research question: How migration impacts nutritional status, food practices, health, and ageing among first generation Bangladeshi migrants and their daughters.

Sponsor: ESRC New Dynamics of Ageing Programme, UK.

Links between stress, well-being and health

A. Clow

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Evidence from prospective long-term studies in humans indicates that both positive and negative affect are related to health and longevity. Similarly cross sectional studies have demonstrated that stress and well-being are independently associated with health. Three physiological systems could mediate these associations: the autonomic nervous system, the sympathetic adrenal medullary system and the hypothalamic pituitary adrenal (HPA) axis, activation of which causes release of the steroid hormone cortisol into the blood stream. Although all three systems are activated during stress responding only the HPA axis is specifically activated by stress. For this reason research which seeks to explore associations between stress, well-being and health have tended to focus upon measures of HPA axis functioning, although undoubtedly all three systems work in concert. In addition to being a major stress response system the HPA axis shows marked circadian rhythmicity which, in turn, regulates the circadian pattern of a range of downstream physiological systems. This talk will examine associations between stress and well-being and these daily patterns of cortisol secretion and discuss how this is relevant to health.

R.L.Duckham¹, N. Peirce², G.D. Summers³, N. Cameron¹ & K. Brooke-Wavell¹

¹Loughborough University, UK; ²Nottingham University Hospitals Trust and English Institute of Sport, UK, ³Derby Hospitals NHS Foundation Trust

Background: Oestrogen deficiency may promote bone loss particularly from the endosteal surface, resulting in lower bone mineral density (BMD), possibly accompanied by structural adaptation. Amenorrhoeic athletes have lower BMD than their regularly menstruating peers, but it is not known whether there are differences in bone geometry. Aim: To compare bone structural parameters and density according to menstrual function in female endurance athletes. Methods: 70 female endurance runners and triathletes were recruited. BMD was measured at the femoral neck using dual x-ray absorptiometry (DXA) and section modulus (Z; related to strength in bending) was estimated. Menstrual function was assessed by questionnaire and classified as a/oligomenorrhoeic (AA; < 9 periods/year), eumenorrhoeic (EA; > 10 periods/year), or hormonal contraception (HC). Bone variables were compared between groups with ANOVA. Results: 33% of athletes were AA, 37% EA and 30% HC with no significant differences found in age ($p=0.321$), height ($p=0.141$), and weight ($p=0.857$) between groups. Femoral neck BMD [mean (SD) EA 1.14 (0.09); AA 1.02 (0.09) and HC 1.07 (0.10) g/cm^2 respectively; ($p<0.001$)] was significantly higher in EA than AA. There were no significant differences between HC and other groups. Z did not differ significantly between menstrual function groups [EA 668(130); AA 628(104) and HC 649(121) cm^3 respectively; $p=0.523$]. Conclusion: Femoral neck Z and hence strength in bending was maintained in athletes with menstrual dysfunction despite lower BMD, indicating possible structural adaptation.

Tooth formation in Sudanese children.

F Elamin, H M Liversidge, M P Hector, (Institute of Dentistry, Queen Mary, University of London)

Objective: The aim of this study was to compare mean age of permanent teeth in two ethnic Sudanese groups.

Material: This was a cross-sectional study using dental radiographs in Khartoum. The sample consisted of 1646 individuals of Arab descent from Northern Sudan (844 males and 802 females) and 1249 individuals of African descent from Western Sudan (847 males and 402 females) aged 2 to 23 years. The North Sudanese sample consisted of randomly selected group of healthy university students, school and pre-school children. The West Sudanese consisted of children attending religious schools (Khalwas) in refugee and displacement camps.

Method: Developing permanent mandibular teeth were staged from radiographs according Moorrees, Fanning and Hunt (1963, J Dent Res 42: 1490-502). Three key stages initial cusp tip formation, initial root and apex closed (Ci, Ri and Ac) were assessed for selected teeth (I1, C, M1, M2 and M3). Intra-observer error was calculated using Kappa after restaging 100 radiographs. Mean age, standard error and standard deviation were calculated using logistic regression for each tooth stage, each sex and each group. Comparisons of mean age were made between males and females within groups and between groups.

Results: Kappa showed excellent agreement at 0.86. Mean ages of most teeth were not significantly different between males and females within each group. This was also the pattern between ethnic groups.

Conclusions: These findings suggest that there are no overall differences between the ethnic groups for most stages of most permanent teeth.

Nutritional status and household food security of the ultra-poor in Bangladesh.

R Goto & CG Mascie-Taylor (Department of Biological Anthropology, University of Cambridge)

The Department for International Development is funding a 10 year programme in Bangladesh to graduate up to 1,000,000 people out of poverty. 6 NGOs are involved in the asset transfer programme. Poverty, poor health and undernutrition form an unhealthy trinity and so as the income of families improves so, it is hoped, should nutritional status. In October 2009 we undertook a baseline study of 401 households and obtained information on household socio-economic status, food security and nutritional status as defined by anthropometry (measured height and weight of children and adults) and haemoglobin level. In future panel surveys will be undertaken quarterly to collect data on socio-economic and household food security and annually for nutritional status.

Total household assets were worth <1000 Taka (about £10), monthly income was <£13, and only 13% of households had any savings (median 190 Taka, <£2). Nutritional status of both adults and children was very poor based on Body Mass Index (adults) and height-for-age, weight-for-age and weight-for-height and a composite index of anthropometric failure (children) and much worse than national Bangladesh surveys. There was also evidence of lack of household food diversity and poor food security and there was evidence of some associations between nutritional status and poor socio-economic conditions.

The enrolment, nutritional status and health of school-age children in the Allai Valley, Northwest Frontier Province, Pakistan

Andrew Hall, Centre for Public Health Nutrition, School of Life Sciences, University of Westminster, Helen Kirby, formerly Save the Children, USA, Islamabad, Pakistan

A cluster survey of the age, sex and enrolment status of all school-age children was undertaken by Save the Children, USA in the Allai Valley, a remote rural sub-district of Battagram District in the Northwest Frontier Province of Pakistan, about a year after a devastating earthquake. A 30/30 cluster design was used: 30 randomly selected households were visited in 30 villages that had been randomly selected based on probability in proportion to size. Information was collected in each household on the characteristics of children, their parents, the household in general, and on the sex, age and educational status of all children aged 5 – 14 years of age, who should be enrolled in school, and on reasons for non-enrolment. The health and nutritional status of a randomly selected child in each household was assessed and enrolled and non-enrolled children were compared, by sex. The main findings of the survey will be presented.

Understanding Obesity as a Complex, Ill-Defined Problem

Francis E. Johnston, University of Pennsylvania, Philadelphia PA, USA

It is by now clear that the world is experiencing an obesity epidemic. Despite a wide range of initiatives—scientific as well as commercial—overweight and obesity, along with their associated co-morbidities, continue to display a striking increase in incidence to the extent that it represents the greatest public health failure of the 20th century even as it extends into the 21st. Clearly a new approach is needed, one that seeks to understand obesity as the complex, ill-defined problem that it is, driven by an obesogenic culture that expresses its effects through political economic forces, health and health care disparities. At the individual level, obesity is a disease that requires clinical intervention ranging from lifestyle counselling and dietary modification to bariatric surgery. But more broadly, obesity is a complex, and incompletely structured problem, based in society and rooted in culture, that network of shared beliefs, values and behaviors that govern how we perceive the world around us and act on those perceptions. Viewed in this way, obesity become an indicator of a deeper problem whose ultimate causes are to be found in an obesogenic culture that is spreading globally, to paraphrase Tanner, a “mirror” on society. Solving this complex, ill-defined problem will require adopting a problem-solving research paradigm that is based upon an authentic partnership among stakeholders and that generates the necessary knowledge through participatory action research.

A systematic review to determine the effectiveness of interventions designed to prevent overweight and obesity in pre-adolescent girls.

J Keston (School of Sport, Exercise and Health Sciences, Loughborough University)

Background. Childhood overweight and obesity is recognised as an increasing health problem worldwide.

Aims. The aim of this systematic review is to determine the effectiveness of interventions designed to prevent overweight and obesity in pre-adolescent girls focusing upon physical activity, diet or lifestyle modification within the community, family or school setting.

Subjects & Methods. The papers included in this review were those studying children (must include girls) aged 7-11 years (or inclusive of this age range) from any country and any ethnic background. The included interventions lasted at least 12 weeks and modified a combination of nutrition, physical activity levels, knowledge, attitudes or health related behaviours associated with the development of childhood overweight and obesity. Quality assessment of the included studies used a quantitative quality assessment tool. Effective studies were those achieving a statistically significant positive effect in one or more of the outcome measures.

Results. Out of 54 studies that met the inclusion criteria 30 were randomised control trials, 20 were controlled trials, and 4 were cohort pre and post trials. There were 9 low, 28 moderate and 17 high quality studies. Overall 42 studies were found to be effective of which 27 were short term (3 months to 12 months). However it is not clear whether these short term studies resulted in sustainable changes.

Conclusions. This review has shown that there are several effective interventions capable of reducing the risk factors associated with children becoming overweight and obese. This review highlights the need for long-term studies capable of producing sustainable changes.

Preliminary results of worldwide variation in tooth formation.

HM Liversidge (Institute of Dentistry, Queen Mary, University of London)

Most published data of tooth formation are of children of European origin. It has long been thought that population differences exist. The aim of this study was to compare mean age of permanent tooth formation in world groups. Archived dental radiographs (N=8221) of individuals in London, UK, South Africa, Japan, Malaysia, New Zealand and Nigeria were assessed. Ethnic groups included English and Bangladeshi in London, Xhosa/Zulu in South Africa, English, Maori and Pacific Islanders in New Zealand, Malay, Kadazan and Chinese from Malaysia. Radiographs from two previous growth studies on Australian Aborigines and Inuits were also assessed. Age range was 2-25 years. Left mandibular permanent teeth were staged according to Moorrees, Fanning and Hunt (1963, J Dent Res 42: 1490-502). Mean age was calculated using logistic regression for each tooth stage, for each sex and group. In males, mean ages for apex closed stage for I1 were 7.3 to 8.3 years, for canine were 11.9 to 13.4 years, for M1 were 8.9 to 10.0 years, for M2 were 14.0 to 15.2 years and for M3 were 18.7 to 20.1 years. A comparison of mean ages of entering stage apex closed in the central incisor, canine and molars) in males show that mean ages in Pacific Islanders, Maori, Xhosa/Zulu and Nigerian groups were earlier than other groups and New Zealand English and UK groups tended to be later than other groups. Mean ages for molars in Malaysian groups were also later than other regional groups. These results suggest a complex pattern between groups with possible interactions between anterior and posterior teeth and early and late developing teeth.

A short-term Cash-for-Work programme improved nutritional status, food expenditure and consumption of poor rural Bangladeshi women and children in the hungry season.

CGN Mascie-Taylor, MK Marks, R Goto (Department of Biological Anthropology, University of Cambridge, Chars Livelihoods Programme, DFID, Bangladesh)

We tested whether a Cash-for-work (CFW) programme during the 3-month hungry season (Monga) improved the nutritional status of poor rural Bangladeshi women and children. Over 50,000 very poor rural Bangladeshi households enrolled in a CFW programme between September and December 2007, and a random sample of 895 households took part in a panel survey with a further 921 non-enrolled households as controls. The same women and under-five year old children had their height, weight and mid-upper arm circumference (MUAC) measured at baseline and endline and the women provided household food expenditure and consumption data on both occasions. Changes in women and children's anthropometric and nutritional status, and household food expenditure and consumption were compared between the two groups. The two groups did not differ significantly at baseline in anthropometry, nutritional status or reported household food expenditure or consumption.

By endline, on average 10 weeks later, CFW women's MUAC increased by +2.29 mm and they weighed +0.88 kg more than control group women. CFW children showed significantly greater mean improvements in height (+0.08 cm, $p < 0.05$), weight (+0.22 kg, $p < 0.001$) and MUAC (+1.41 mm, $p < 0.001$), z-scores of height-for-age (+0.02 SD, $p < 0.001$), weight-for-age (+0.17 SD, $p < 0.001$), weight-for-height (+0.23 SD, $p < 0.001$) and MUAC (+0.12 SD, $p < 0.001$) than the control group children. CFW households spent more on food and ate more protein-rich food than control households at endline.

Association between socio-economic status and childhood undernutrition in Bangladesh; a comparison of possession score and poverty index

Masuda Mohsena¹, C.G. Nicholas Mascie-Taylor², Rie Goto³

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Objective: To determine how much of the variation in nutritional status of under 5 year old Bangladeshi children can be attributed to socio-economic status of the family.

Design, setting and analysis: A sample of 4891 children was obtained from the Bangladesh Demographic and Health Survey, 2004. Nutritional status used weight-for-age, height-for-age and weight-for-height reference Z-scores. A 'possession score' was generated based on ownership of radio, television, bicycle, motorcycle, telephone and availability of electricity with categories of 0 to 4+ possessions. A five point (quintile) 'poverty index' was created using Principal Component Analysis.

Results: 57.8% of the sample was either stunted, wasted or underweight (7.7% were stunted, wasted and underweight). Of those stunted (48.4%), 25.7% were also underweight.

Underweight and wasting prevalences were 40.7% and 14.3%, respectively. Mean WAZ, HAZ and WHZ did not differ by sex. Children of mothers with no education or no possessions were, on average, about 1 SD more underweight and stunted than those with higher educated mothers or with 4+ possessions. The 'possession score' provided much greater discrimination of undernutrition than the 'poverty index'. Nearly 50% of children from households with no possessions were stunted, wasted or underweight (only 27% in the poorest quintile) compared with only 3-6% of children from households with 4+ possessions (over 13% in the richest quintile).

Conclusions: Maternal education and 'possession score' were the main predictors of a child's nutritional status. 'Possession score' was a much better indicator of undernutrition than the 'poverty index'.

Irish Passenger Lists: visualising local emigrant streams by isonymy

M. T. Smith, Evolutionary Anthropology Research Group, Durham University

Emigration from Ireland grew to unprecedented levels as a consequence of the Great Famine in the mid nineteenth century. Passenger ships left ports from around the coastline of Ireland taking emigrants to Britain, the New World and the antipodes. The surnames of passengers on 74 sailings between 1847 and 1855 were transcribed with permission from the website of the Immigrant Ships Transcribers Guild <http://www.immigrantships.net/> and were used to compute random isonymy between the vessels and the ports of embarkation as represented by the householders in the Index to Griffith's Valuation, the best mid-nineteenth century census substitute for Ireland.

A simple question which can be addressed by isonymy is whether or not the ports of embarkation recruited a local or Ireland-wide catchment of migrants. Results show that for the ports of Cork, Galway, Antrim, Down and Londonderry the catchment was predominantly local, whilst the port of Dublin seems to have captured migrants from throughout the south of Ireland. Reasons for this difference will be discussed.

Plotting these results using non-metrical multidimensional scaling (MDS), conveys a strong sense of the ships sailing from Ireland's shores tagged by the passengers' name-set with a marker of their geographical point of departure.