3.3 NUTRITION

Chair: Prof. Mohsen Janghorbani, Iran

03-3.1 EFFECTS OF LIFESTYLE AND DIET ON BODY MASS INDEX CHANGE AMONG MARRIED WOMEN IN INDIA

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Indian women suffer a very high burden of nutritional deficiency; but the prevalence of overweight and obesity are also on the rise. This study aimed to examine the effects of lifestyle and diet factors on change of Body Mass Index (BMI) in a longitudinal, community based sample of married Indian women.

325 women (15–49 years of age) were purposively chosen from 1998 to 1999 National Family Health Survey (NFHS-2) Delhi Samples and were followed-up after 4 years. Information on women's BMI, dietary habits and lifestyle was collected through structured and semi structured questionnaires. Effect of lifestyle (determined by high, medium and low sedentary lifestyle) and diet (frequency of consumption of several food items, and specific fatty / sugary items) on BMI change of >25% were estimated using multivariate logistic regression after adjusting for age, education, religion, ethnicity, household standard of living, and previous BMI status.

A high sedentary lifestyle (aOR 2.63; 95% CI 1.29 to 5.35) emerged as the main predictor of increase in BMI of women in the adjusted multivariate analysis even after controlling for all the possible confounders. However, previous BMI status was negatively associated with weight gain. Obese women were significantly less likely to gain more weight (aOR 0.26; 95% CI 0.11 to 0.65).

Consuming a diet high in sugar and fat and a high level of sedentary lifestyle was associated with larger gains in BMI among Indian women. More epidemiologic research with better measures of diet and lifestyle is needed to validate the findings in similar other settings.

03-3.2 LOW VITAMIN D STATUS AND RISK OF TYPE 2 DIABETES: A PROSPECTIVE COHORT STUDY

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Introduction Low vitamin D status has been associated with higher risk of type 2 diabetes in cross-sectional studies. The evidence from prospective studies is limited. The aim was to examine the association between vitamin D status and risk of type 2 diabetes and markers of glucose homeostasis in a prospective cohort study.
Methods The study is part of the INTER99 study, based on a random sample of the general population of Copenhagen, Denmark. The current study included 6045 men and women aged 30–65 years at baseline (1999–2000). 4296 participated in the follow-up examination 5 years later (2004–2006). Data were collected with self-administered questionnaires, a physical examination, a 2 h oral glucose tolerance test, and various blood tests including measurement of serum 25-hydroxyvitamin D (25 (OH)D). Data were examined in multivariate logistic and linear regression models.
Results Low vitamin D status (25 (OH)D <25 nmol/l) was significantly associated with increased prevalence (OR 95% CI 1.62 (1.13 to 2.32)) and incidence (OR 95% CI 2.04 (1.38 to 4.17)) of diabetes compared to normal status (25 (OH)D ≥50 nmol/l). Moreover, low vitamin D status was significantly associated with markers of glucose homeostasis (glucose, insulin, c-peptide, Haemoglobin A1c, and insulin resistance (assessed by the HOMA model and the BIGTT test)) as well as unfavourable changes in these during follow-up.
Conclusion Low vitamin D status was associated with increased risk of type 2 diabetes and markers of glucose homeostasis in a Northern European general population sample.

03-3.3 ASSOCIATION OF LOW VITAMIN D LEVELS WITH INCREASED RISK OF STROKE IN OLDER ADULTS

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Introduction Accumulating evidence suggests that Vitamin D deficiency may be a risk factor for cardiovascular disease but its association with the risk of stroke is uncertain.
Methods 25-hydroxyvitamin D (25 (OH)D) was measured in 6803 ambulatory primary-care patients aged ≥65 years (mean age 73 years; 58% women) who participated in the German Epidemiological Trial on Ankle-Brachial Index (getABI). Participants had their baseline assessment in October 2001 and were followed for stroke for up to 7 years.
Results During a mean follow-up of 5.7 years, 249 participants had a stroke (84% ischaemic), a stroke rate of 6.5 per 1000 person-years. The risk of stroke increased with decreasing baseline 25 (OH)D levels (p for trend across quartiles <0.001). Compared to participants in the highest 25 (OH)D quartile (>53.7 nmol/l), participants in the lowest quartile (<24.5 nmol/l) had twice the risk of any stroke (HR 1.99, 95% CI 1.35 to 2.92) and a 70% higher risk of ischaemic stroke (1.72, 1.13 to 2.61) in Cox proportional hazards models adjusting for age, sex, education, smoking status, body mass index, renal function, and prior stroke. Additional adjustment for conventional cardiovascular risk factors and cardiovascular disease at baseline slightly attenuated these associations (any stroke: 1.76, 1.19 to 2.60; ischaemic stroke: 1.49, 0.97 to 2.27). Results were similar when 310 participants with prior stroke were excluded.
Conclusion Low vitamin D levels were associated with an increased risk of stroke in this prospective cohort study. This association was independent of several important confounders and only partly explained by conventional risk factors and cardiovascular disease as potential causal intermediates.

03-3.4 FRUIT AND VEGETABLES AND COLORECTAL CANCER RISK: A NON-LINEAR DOSE-RESPONSE META-ANALYSIS OF COHORT STUDIES

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Introduction The association between fruit and vegetable intake and colorectal cancer risk has been investigated by many studies, but remains a controversial issue because of inconsistent results and weak observed associations. We summarise the evidence from cohort studies in categorical, linear and non-linear dose-response meta-analyses.
Methods We searched PubMed for studies of fruit and vegetable intake and colorectal cancer risk up to May 2010. Prospective studies that reported RR estimates and 95% CIs of colorectal cancer

associated with fruit and vegetable intake were included. Random effects models were used to estimate summary RRs.

Results Nineteen cohort studies were included in the meta-analysis. The summary RR for the highest vs the lowest intake was 0.92 (95% CI 0.86 to 0.99) for fruit and vegetables combined, 0.90 (95% CI 0.83 to 0.98) for fruit and 0.91 (95% CI 0.86 to 0.96) for vegetables. The inverse associations appear to be restricted to colon cancer. In linear dose-response analysis only intake of vegetables was significantly associated with colorectal cancer risk, summary RR 0.98 (95% CI 0.97 to 0.99) per 100 g per day. However, significant inverse associations emerged in non-linear models for fruits ($p_{non\text{-}linearity}$ <0.001) and vegetables ($p_{non\text{-}linearity}$ =0.001). The greatest risk reduction was observed when increasing intake from very low levels of intake. There was generally little evidence of heterogeneity in the analyses and there was no evidence of small-study bias.

Conclusion This meta-analysis indicates that there is a weak, but statistically significant non-linear inverse association between fruit and vegetable intake and colorectal cancer risk.

03-3.5 REVISITING THE RISK OF COELIAC DISEASE IN CHILDREN BORN SMALL FOR GESTATIONAL AGE: A QUASI-EXPERIMENTAL FAMILY-BASED APPROACH

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Introduction Celiac disease (CD) is a chronic small bowel disease with a strong heritability. Several perinatal conditions are today considered as risk factors for CD in children. One of these conditions is being born small for gestational age (SGA). However, if the association between SGA and CD risk in children is causal is unknown. Therefore, we aimed to apply a quasi-experimental family based (QEFB) design that is a powerful strategy for studying causal relationships.

Methods Using the Swedish Medical Birth Registry linked to a number of other national databases we identified all singleton children born in Sweden between 1987 and 1993 (n =781 624). We applied a QEFB design, and compared sibling with discrepant exposure (ie, being or not SGA) in relation to their risk of CD from birth until they were 2-year old. We also performed classical logistic regression analyses adjusting for known risk factors for CD but without the QEFB design.

Results In the classical adjusted logistic regression analysis, we found an association between being SGA and CD risk: OR 1.34 95% CI 1.03 to 1.74. However when applying the QEFB design and conditional logistic regression this association disappeared: OR 1.05 95% CI 0.53 to 2.06.

Conclusion Our results suggest that previous finding indicating an association between being SGA and CD risk were confounded. These previous results might be explained by the fact that the offspring from mothers with CD are frequently SGA and, because the strong heritability, they have also a higher risk for CD.

03-3.6 FOOD PATTERNS AND ALL-CAUSE MORTALITY AMONG ADULTS AGED >65 YEARS: A COMPARISON OF METHODS

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Introduction Analysis of dietary patterns offers an alternative approach to the investigation of diet and health. The aim of this study was to compare different approaches to assessing dietary patterns in the same cohort, and their associations with all-cause mortality.

Methods Analysis was based on 972 participants of the British Diet and Nutrition Survey of adults aged >65 years in 1994/1995 who were followed-up for mortality status until 2008. We examined the generalisability of reduced rank regression (RRR) methods from a previous study of all-cause mortality using: (1) an RRR-derived dietary pattern (known as the "Unhealthy Eating Index—UHI"; high in red meat, added fat, potatoes, refined grains, processed meat; low in fruit) and (2) dietary patterns derived from exploratory RRR using BMI, total cholesterol, HDL cholesterol, triglycerides and blood pressure as the intermediate markers. Three measures of diet quality, the Healthy Diet Score, the Recommended Food Score (RFS) and the Mediterranean Diet Score (MDS) were also investigated. Cox proportional hazards regression was conducted using follow-up time as the time variable.

Results After adjustment for potential confounders, the MDS, the RFS and the UHI remained associated with mortality (highest vs lowest quartile; MDS HR 0.77, 95% CI, 0.61 to 0.97; RFS HR 0.67, 95% CI 0.52 to 0.86; UHI HR 1.14, 95% CI 1.09 to 1.82). No significant associations were shown for the Healthy Diet Score or any of the exploratory RRR dietary patterns.

Conclusion Not all dietary patterns were associated with all-cause mortality. Further work is needed to test the generalisabilty of dietary patterns across cohorts.

3.4 THE EPIDEMIOLOGY OF COGNITIVE RESERVE IN AGEING

Chair: Dr. Fiona Matthews, UK

03-4.1 COGNITIVE LIFESTYLE, DEMENTIA PROTECTION AND THE BRAIN'S RESERVE MECHANISMS

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Cognitive lifestyle refers to acquired patterns of cognitive and mental activity over the course of one's lifetime, and in our group has been formalised to include information about educational achievement, occupational complexity, social engagement and cognitively-loaded leisure activities. Many large-scale prospective cohort studies have shown that maintaining a more active cognitive lifestyle is linked with a reduction in incident dementia risk. Recently, we have further shown that the combination of a higher educational level with either a more cognitively challenging job in mid-life, or enhanced social activity in later life, is more important for minimising dementia risk than either factor in isolation.

Brain reserve and cognitive reserve are typically suggested to mediate this protective relationship. In this presentation, a brief history of the terms will be given, as well as a deconstruction into more specific biological mechanisms. An evaluation of the role of disease modifying, neuroprotective and compensatory mechanisms is then possible, and will be discussed in relation to the design of clinical trials and community-based studies.