

women. Vaccination against HPV offers a primary prevention strategy. This study investigates knowledge of and attitudes towards CC and HPV vaccine in Japanese mothers.

**Methods** Mothers (n=2192) with daughters aged 10–14 yrs were recruited from five elementary and 14 junior high schools in Sapporo city. After ethical approval, an anonymous questionnaire was distributed in schools and returned to the main investigator by post between July and September 2010.

**Results** In total 876 questionnaires (40%) were returned and 862 used for analysis. Median age was 42 yrs. A total of 61.6% of mothers had undergone recent CC screening and 12.3% had experienced abnormalities. If vaccination were free 92.6% of mothers would vaccinate, but this decreased to 4.3% if the cost was >40 000 yen. While 52% of mothers knew of HPV, only 6.4% knew it caused CC. While, 73.1% thought their daughter was at risk of HPV infection, 72.5% also believed their daughter may die from it. While 85.7% wanted more information, 67.6% said they would use the Internet. Only 9.8% would ask a doctor. Factors significantly associated with vaccination intent were recent screening (OR=1.6, 95% CI 1.0 to 2.7), >13 yrs education (OR=1.4, 95% CI 1.0 to 2.3), believing vaccines prevented disease (OR=15.1, 95% CI 6.3 to 36.5) and no concerns about childhood vaccine safety (OR=3.8, 95% CI 1.9 to 7.9). Abnormal smears were not significant.

**Conclusion** Knowledge of HPV is poor. However, high HPV vaccination coverage may be possible if appropriate funding and education are provided.

## P2-112 ASSOCIATION BETWEEN PPARG2 PRO12ALA GENE VARIANT AND HBA1C IN A MIDDLE-AGED JAPANESE POPULATION

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**Introduction** The peroxisome proliferator-activated receptor- $\gamma$ 2 (PPARG2) Pro12Ala gene variant has been consistently associated with diabetes mellitus (DM). However, interactions between this polymorphism and lifestyle factors on DM remain poorly understood. The purpose of this study was to examine if carrying Ala allele was inversely associated with haemoglobin A1c (HbA1c) levels with any such interactions.

**Methods** We made a cross-sectional analysis using the data from the baseline survey of the Japan Multi-institutional Collaborative Cohort Study. After excluding 1882 participants who had medication for DM, dietary energy intake >4000 kcal/day, and/or any missing data on PPARG2 polymorphism or HbA1c, 1281 men and 1356 women aged 40–69 were analysed. PPARG2 polymorphism was determined by multiplex PCR-based invader assay. BMI and fat/energy intake were categorised into four levels. Multiple linear regression analysis and analysis of covariance were used to control for confounding variables (age, BMI, fat/energy intake, alcohol, smoking, and physical activity) and to examine possible interactions.

**Results** After adjustment for the above covariates, Ala allele was significantly inversely associated with HbA1c in women, but not in men. This inverse association in women was evident in the highest level of BMI or fat/energy intake. Contrarily, in men, a significant positive association between Ala allele and HbA1c was observed in the highest level of fat/energy.

**Conclusion** These results indicate that the association between PPARG2 Pro12Ala polymorphism and HbA1c may be modified by gender, obesity, and high fat diet. This study was conducted for J-MICC Study Group.

## P2-113 EVALUATION OF VITAMIN D DEFICIENCY DETERMINANTS IN URBAN AREAS OF IRAN BY GENERALISED ESTIMATING EQUATIONS ANALYSIS METHOD

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**Introduction** Vitamin D plays an integral role in bone mineralisation. Its deficiency has been shown to be associated with some cancers, cardiovascular disease, diabetes and osteoporosis. We aimed to evaluate the factors determining vitamin D levels using Generalised Estimating Equation (GEE). Its main application is evaluation of related data in longitudinal and hierarchical states, especially in cluster samples which can result in an unbiased estimation.

**Methods** In a random cluster sample, 5232 subjects from five urban areas (Tehran, Tabriz, Mashhad, Shiraz and Booshehr) were recruited. A fasting blood sample was taken for measurement of 25-hydroxy vitamin D levels.

**Results** In the GEE model, age group, sun block usage, use of Islamic coverage and geographical variables were removed from the model as was city of residence (as it was collinear with geographical and environmental factors), sex and the interaction of age and sex group were correlated with vitamin D deficiency. Living in Tehran, Mashhad and Shiraz was associated with vitamin D deficiency [OR (95% CI) 2.1 (1.7 to 2.5), 0.9 (0.7 to 1.1) and 0.7 (0.5 to 0.9) respectively]. The ratio for males to females was 1.3 (1.1 to 1.6).

**Conclusion** Analyses showed that environmental factors in residential locations, female sex and the interaction of sex and age are protective on vitamin D levels. Moreover, analysis by GEE method compared to logistic regression did not show any significant variation in the results which indicate that variation in vitamin D deficiency is due to differences between factors such as location and sex rather than deviation in samples of each cluster.

## P2-114 HETEROCYCLIC AROMATIC AMINES AND CANCER RISK - A STUDY OF DIETARY EXPOSURE AND BIOMARKERS OF EARLY BIOLOGIC EFFECT

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**Background** Heterocyclic aromatic amines (HAAs) are formed during the cooking of meats at high temperatures and are a suspected risk factor for cancer. However, inconsistent results have been reported on the HAA-cancer relationship in epidemiologic studies. This is potentially due to the difficulty in measuring HAA exposures and variation in individual susceptibilities to HAAs. Metabolites of HAAs form DNA adducts in cells, an initiating step in chemical carcinogenesis, which may represent an early carcinogenic effect of HAA exposure.

**Methods** This cross-sectional study aims to provide further understanding of the relationship between dietary exposure to HAAs and levels of HAA-DNA adducts measured in easily accessible white blood cells among a sample of 125 healthy volunteers. A detailed questionnaire was used in combination with a database that estimates average intake of HAAs in cooked meats. A blood sample was