

educational attainment and low sense of well-being. The impact of household food insecurity on an individual's quality of diet depends on their role within the household and mothers may be more adversely affected than other family members. Studies have linked food insecurity with mental health problems in women of childbearing age. This study examines the relationship between food insecurity, well-being and quality of diet in women of childbearing age.

**Design** Cross-sectional survey of educational attainment, food insecurity, well-being and quality of diet in women of childbearing age.

**Setting** Sure Start Children's Centres (SSCCs) in three south coast towns with high levels of disadvantage- Southampton, Gosport and Havant.

**Participants** 1022 women attending SSCCs between January and April 2009.

**Main outcome measures** Food insecurity, assessed using the short form of Blumberg household food security scale; dietary quality score from a 20-item food frequency questionnaire; well-being by the WHO-5 questionnaire.

**Results** 11% of women had insufficient money to buy food, and 9% reported going hungry. Women of lower educational attainment were twice as likely to be food insecure as women of higher educational attainment (prevalence rate ratio 2.02, 95% CIs 1.42 to 2.86). Women who reported lower well-being were three times as likely to go hungry as women of higher well-being (prevalence rate ratio 3.18, 95% CIs 2.04 to 4.93.) Women who experienced food insecurity had poorer quality diets: becoming food insecure was accompanied by a 0.79 standard deviation reduction in dietary quality score (95% CIs -1.10 to -0.48). In a multivariate regression analysis, having lower educational attainment, lower well-being, being food insecure and going hungry were significant independent predictors of dietary quality, after adjusting for age and number of children in the household. Being food insecure predicted a 0.32 standard deviation reduction in dietary quality score (95% CIs -0.61 to -0.28), and going hungry a 0.45 standard deviation reduction (95% CIs -0.77 to -0.12).

**Conclusion** Food insecurity was common: one in five women lived in food insecure households. Women of lower educational attainment were twice as likely to be food insecure as women of higher educational attainment. National survey data indicate that disadvantaged young women have diets of poor quality. Our study suggests that food insecurity and low sense of well-being are aspects of disadvantage that predict poor quality of diet.

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## SYSTEMATIC REVIEW AND META-ANALYSIS OF SCHOOL-BASED INTERVENTIONS TO IMPROVE FRUIT AND VEGETABLE INTAKE

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**Objective** The aims of the review were to identify school-based randomised and non-randomised controlled trials to increase daily or lunchtime fruit and vegetable intake in children and to determine the impact of school-based interventions to change fruit and vegetable consumption at lunchtime and over the whole day.

**Design** A systematic literature review was carried out to identify appropriate trials. This was followed by meta-analysis techniques to determine the pooled estimate of the difference in daily fruit and vegetable intake in the intervention group compared with the control group.

**Participants** Trials carried out in schools where children were aged 5 to 11 years were included. All trials reported in English language journals were eligible.

**Results** 28 randomised and non-randomised controlled trials were identified that reported daily fruit and/or vegetable intake. A median intake of 0.4 portions more fruit and vegetables was consumed in the intervention group compared to the control group. The qualitative review of 7 studies reporting lunchtime intake, either in addition to daily intake or independently in studies concentrating solely on lunchtime intake, revealed a median difference of 0.2 portions more fruit and vegetables in the intervention group at lunchtime. The meta-analysis of daily intake included 13 studies classified into one of two groups: behavioural change studies with a school and/or home component that relied on families improving eating behaviour; and free school fruit and vegetable scheme where fruit and vegetables are distributed to children. The short term impact of both type of programme was determined using the follow up data collected within 3 months of the end of the intervention. This was the longest follow-up period in most cases. The pooled estimates (95% CI) for behavioural change studies and free fruit and vegetable schemes were 0.43 (0.21 to 0.65) and 0.44 (0.20 to 0.67) portions respectively. The pooled estimate (95% CI) for all studies was 0.42 (95% CI 0.27 to 0.58) portions more in the intervention group. The majority of the difference was due to fruit not vegetables. Heterogeneity was high for the meta-analysis with lunchtime intake but reasonable for daily intake.

**Conclusion** School-based interventions have the potential to moderately improve fruit and vegetable intake in children, with approximately half of the increase attributable to improvements in lunchtime intake.

## Physical activity

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## LONGITUDINAL ASSOCIATION BETWEEN EARLY LIFE ADVERSITY AND PHYSICAL ACTIVITY AT AGE 36 YEARS

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**Background** Periods early in life, between birth and adolescence, could be especially important for the establishment of health behaviours. Early adversity may influence the level and types of physical activity in adulthood.

**Objectives** To investigate the associations between early adversity and adult physical activity, and the role of depression and education as potential mediators of these associations. Structural equation models were used to 1) identify five latent factors of early adversity: socio-economic conditions (father's unskilled job, lack of home amenities and overcrowding), parental health (parental poor health, maternal neuroticism); family structure during childhood (death of parents, divorce), chronic illness (hospitalisation for >1 month); and social isolation; 2) model the effect of depression/anxiety (at ages 15 and 36 years) and education level (at age 26 year) on the relationships between early adversity and physical activity.

**Design** Prospective cohort study.

**Setting** England, Scotland and Wales.

**Participants** Approximately 3300 men and women from the MRC National Survey of Health and Development, followed up since birth in March 1946.

**Main outcome measures** Four physical activity types measured at age 36 years—cycling/walking, heavy gardening, sports/recreational activities, and activity during the working day—with three levels of intensity (most active, less active, inactive).

**Results** There was no evidence of direct paths between early adversity and adult physical activity ( $p > 0.05$ ). However, there was a strong indirect effect of socio-economic adversity on activity at work (0.24) and on sports/recreational activity (-0.10) via education. The significant indirect effects of adolescent emotional problem on activity at work day (-0.01) and on sports/recreational activity (-0.01) via adult depression/anxiety were of smaller