

health than they have, whereas the fraction of women in very good health is higher on the original than on the adjusted scale. In other words, these findings suggest that men under-report and women over-report good health.

Conclusion Our preliminary findings challenge the prevailing assumption of women over-reporting and men under-reporting health problems and highlight the importance to attend to health problems reported by women and men equally carefully.

P36 **CANCER PREVENTION IN VULNERABLE WOMEN: AN EXPLORATORY QUALITATIVE STUDY WITH WOMEN WHO HAVE EXPERIENCED DOMESTIC VIOLENCE AND OFFENDING BEHAVIOURS**

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10.1136/jech-2018-SSMabstracts.162

Background Cancer is more common among disadvantaged communities. Women who have experienced domestic violence or offending behaviours are at higher risk of cancer through multiple risk factors: addictive behaviours, low levels of activity and poor screening uptake. Such women are also likely to come from socially marginalised backgrounds where persistent health inequity remains. Addressing their needs is an important factor in cancer prevention and early diagnosis. This exploratory study aimed to explore women's health behaviours in terms of excessive alcohol consumption, tobacco use, physical activity, diet, weight and cancer screening within their context and experiences of vulnerability. We also aimed to assess perceptions of risk to cancer and barriers to health promoting activities.

Methods We conducted 14 semi-structured interviews and two focus groups with vulnerable women attending support groups in a Housing Association women's centre, and seven interviews with the staff who support them. Verbatim transcripts were analysed thematically.

Results We identified three themes: risk factors as markers of distress, inhibiting views of self, and navigating the healthcare system. Risk factors of alcohol use, smoking, physical inactivity and unhealthy eating were common but reported in context of distressing experiences of mental ill-health, poverty, addition and abuse. Walking, for example, was reported as the result of lost driving licences or a symptom of anxiety; smoking was reported as part of other addictive behaviour such as alcohol abuse and drug taking. Women's views of themselves such as self-worth were often negative, shaped by experiences of neglect and abuse, or of perceived negative treatment by social and mental health services. This shaped their trust in health services, as well as low perception of risk for cancer susceptibility and potential for delay in presenting with cancer symptoms. Women frequently reported fatalistic attitudes to cancer, chronic diseases and early death but paradoxically also reported high levels of screening uptake. Despite narratives of distress, women showed self-reliance and resilience, and this might have helped navigating the health systems to some degree, for example using screening services. Women and staff were receptive to health promotion in cancer prevention.

Conclusion Women in this study were at high risk of chronic diseases, including cancer. Their experiences of social disadvantage and personal and structural violence profoundly shaped their practices, aspirations and attitudes towards risk, health and healthcare. Our findings will inform the design of a feasibility study to test a cancer prevention strategy co-designed by and tailored to vulnerable women.

P37 **RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND BLOOD GLUCOSE MARKERS DURING PREGNANCY AMONGST A MULTI-ETHNIC MATERNAL COHORT: RESULTS FROM THE BORN IN BRADFORD COHORT STUDY**

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10.1136/jech-2018-SSMabstracts.163

Background Physical activity is associated with positive health biomarker profiles during pregnancy and resultant birth outcomes. Furthermore, there is some evidence to suggest that physical activity both prior to and during pregnancy may reduce the risk of gestational diabetes. In this study we aim to investigate the relationship between physical activity and biomarkers associated with gestational diabetes (GDM) risk and clinical diagnoses of GDM.

Methods Participants were pregnant women recruited to the Born in Bradford cohort study who completed phase 1 or 2 of the baseline questionnaire and provided a fasting blood sample between approx. 26–28 weeks of gestation, and had a singleton birth. Where mothers had two births during the study period, only the first was included in the present analyses. Physical activity level was measured using the General Practice Physical Activity Questionnaire (GPPAQ) and questions about usual walking speed. The relationship of self-reported physical activity, using both of the two definitions above, with levels of fasting blood glucose was evaluated using multivariate linear regression. GDM risk was assessed using logistic regression analyses. Models were adjusted for other key covariables including age, ethnicity, body mass index and parity.

Results Data were available for 6119 maternal participants. White British women reported higher levels of physical activity and physical function (i.e. higher self-reported average walking speed) relative to their Pakistani and Other ethnic group peers. Despite the higher GPPAQ scores in the White British group, over 67 per cent still fell into the inactive or moderately inactive category.

Higher levels of activity as measured by GPPAQ scores was not associated with fasting blood glucose or odds of gestational diabetes. Walking speeds were associated with lower levels of fasting glucose, and remained so after adjustment for other relevant covariables (−0.04 (−0.08, −0.05). Adjusted odds of gestational diabetes diagnosis were also lower in those reporting the highest self-reported walking speeds OR 0.49 (0.27–0.87).

Conclusion Faster self-reported walking speeds, which may result from greater residual fitness prior to pregnancy, were shown to be associated with lower fasting blood glucose levels and lower odds of a gestational diabetes diagnosis. These

results provide first time evidence that self-reported walking speed, an indicator of functional reserve, is associated with positive pregnancy related biomarker profiles and require independent confirmation. Given the lower physical activity and functional profile of Pakistani women, there remains high potential for behaviour change interventions in this population group. To realise this ambition further research must focus on understanding specific cultural and socio-economic barriers to implementation.

P38 SOCIAL ISOLATION IN RELATION TO VASCULAR DISEASE INCIDENCE AND MORTALITY AMONG 325,000 UK WOMEN; A PROSPECTIVE COHORT STUDY

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10.1136/jech-2018-SSMabstracts.164

Background Research suggests that social isolation may increase the risk of developing or dying from vascular disease, but the evidence is inconsistent and may be affected by confounding and reverse causation, whereby poor health leads to being more socially isolated. We examined the association between social isolation and vascular disease incidence and mortality in the Million Women Study after accounting for confounding and reverse causation biases.

Methods Among 3 25 770 women (mean age 68 years) without vascular disease or cancer, frequency of contact with family or friends, groups, and number in household was reported and used to calculate a three-item social isolation score. Cox regression was used to estimate the relative risks (RR) and 95% confidence intervals (CI) of coronary heart disease (CHD) and stroke incidence and mortality in relation to social isolation. To reduce reverse causation bias, women who reported fair/poor self-rated health were excluded. Analyses were adjusted for demographic (age, region), socioeconomic (education, area deprivation), behavioural (smoking, alcohol consumption, physical activity and body mass index), disability, and health-related (hypertension, diabetes) risk factors. We assessed the proportion of the association that could be explained by each risk factor by calculating the percentage reduction in the likelihood ratio X^2 test statistic after each adjustment.

Results During 6 years of follow-up, there were 10 853 incident CHD events, 557 CHD deaths, 6269 incident stroke events and 585 stroke deaths. Compared to the least isolated women, the most isolated women (12% of participants) were not at an increased risk of incident CHD ($RR=1.07$, 95% CI 1.01 to 1.14, $p=0.06$) but were at increased risk of CHD mortality ($RR=1.80$, 1.40–2.31, $p<0.0001$); they were also at an increased risk of stroke incidence ($RR=1.28$, 1.18–1.38, $p<0.0001$) and mortality ($RR=1.70$, 1.33–2.16, $p<0.001$). With the exception of stroke mortality, adjustment for confounders, particularly for the behavioural factors, led to large reductions in the X^2 test statistic (e.g. 92% for CHD incidence; 64% for CHD mortality; 67% for stroke incidence; and 41% for stroke mortality).

Conclusion We found no association between social isolation and CHD incidence, but social isolation was associated with increases in CHD mortality and stroke incidence and mortality. Given the attenuation in these associations after adjustment

for health and lifestyle factors, residual confounding cannot however be ruled out.

P39 INTERVENTION DIFFERENTIAL EFFECTS AND THRESHOLD SELECTION: AN EVALUATION OF METHODS ILLUSTRATED IN WEIGHT-MANAGEMENT STUDIES

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10.1136/jech-2018-SSMabstracts.165

Background Intervention differential effects (IDE) occur when *change* in a health outcome following an intervention depends upon the *baseline* value of that outcome. Oldham's method and multilevel modelling are methods used to detect IDEs. However, the conditions under which these methods are robust are not well documented. One condition that has not been explored is detection of IDEs in studies which recruit according to baseline health status (i.e. above a threshold). We hypothesised that recruiting/selecting above a threshold affects the reliability of existing methods to detect IDEs because of regression to the mean. We hypothesised that comparing these 'truncated' samples with a control group restores the robustness of these methods. Using weight-loss interventions as an example, we show how to overcome the challenges of regression to the mean in studies with threshold selection criteria.

Methods We simulated two datasets comprising repeated measures of body mass index (BMI) data for 1000 males aged 25–34 ('population' datasets). One dataset was simulated to have an IDE, and the other ('null') dataset was simulated without. Half the population in each dataset were simulated to receive a weight-loss intervention. To emulate real-world weight-loss interventions, we truncated each population dataset to select intervention and control group samples with BMI scores above ≥ 30 kg/m². Oldham's method and multilevel modelling were used on the 'population' intervention groups and corresponding 'truncated' samples for each simulation. We repeated each analysis to contrast the intervention and control group datasets (using Fisher's z-transformation and student's t-test for Oldham's method, and the likelihood ratio test for multilevel modelling). Simulations were repeated 10 000 times to generate Type I error rates and 95% credible intervals. Simulations were performed in R and MLwiN.

Results Under the null of no IDE, Oldham's method and the multilevel model yielded Type I error rates $>90\%$, confirming that selecting above a threshold leads to bias due to regression to the mean. Type I error rates returned to 5% for the multilevel model when a control group was introduced and the likelihood ratio test employed, while Type I error rates improved but remained elevated when Fisher's z-transformation and student's t-test were used to contrast groups.

Conclusion Our study shows that multilevel models can robustly detect IDEs in 'truncated' samples (selected above a threshold) if analyses involve a control group. For study designs that do not collect control group data (such as most evaluations of weight management programmes), the identification of IDEs currently remains intractable.