Abstracts

Sexual violence and the health of female children in Swaziland

Sexual violence against girls – defined as female children younger than 18 years of age – is a substantial global health and human-rights problem, and a growing concern in sub-Saharan Africa. According to WHO, about 150 million girls had experience of sexual violence with physical contact in 2002. In parts of South Africa and Tanzania, up to a third of adolescent girls reported that their first sexual experience was forced. A nationally representative study done in 1998 showed that 1.6% of South African girls and women aged 15 - 49 years reported that they had been raped before 15 years of age. Understanding the prevalence and nature of sexual violence is important because it has devastating short-term and long-term mental, reproductive, and physical health consequences. Some common consequences are pregnancy and gynaecological complications, infection with HIV and other sexually transmitted diseases, mental health problems (such as depression and post-traumatic stress disorder), and social ostracisation. Sub-Saharan Africa is the region most heavily affected by HIV worldwide – accounting for 67% of people living with HIV in 2007 – and sexual violence might be an important route of HIV transmission. In particular, Swaziland is disproportionately affected; the country has the highest prevalence of HIV in girls and women aged 15 - 24 years of age at 22.6%.

The authors of this paper in *The Lancet* report the prevalence and circumstances of sexual violence in girls in Swaziland, and assess the negative health consequences.

They obtained data from a nationally representative sample of girls and women aged 13 - 24 years from selected households in Swaziland between 15 May 2007 and 16 June 2007, with a two-stage cluster design. The questionnaire examined demographics, type of sexual violence that took place before the respondent was 18 years of age, circumstances of the incident, and health-related conditions. Information was gathered from 1 244 women and girls (response rate 96.3%), of whom 1 242 provided retrospective responses to questions about sexual violence. We used regression models adjusted for relevant demographics to estimate the odds ratios for the associations between sexual violence and health-related conditions.

A total of 33.2% (95% CI 29.9 - 36.7) of respondents reported an incident of sexual violence before they reached 18 years of age. The most common perpetrators of the first incident were men or boys from the respondent's neighbourhood (32.3% (28.8 - 36.1)) and boyfriends or husbands (26.2% (22.2 - 30.7)). The first incident most often took place in the respondent's own home (26.1% (21.6 - 31.2)). Sexual violence was associated with reported lifetime experience of sexually transmitted diseases (adjusted OR 3.69 (95% CI 1.78 - 7.66)), pregnancy complications or miscarriages (3.54 (1.47 - 8.55)), unwanted pregnancy (2.92 (1.87 - 4.55)), and self-report of feeling depressed (2.30 (1.70 - 3.11)).

Knowledge of the high prevalence of sexual violence against girls in Swaziland and its associated serious health-related conditions and behaviours should be used to develop effective prevention strategies.

Reza A, *et al. Lancet* 2009; 373: 1966-1972.

Early diagnosis of type 2 diabetes

The Whitehall II study suggests that there are biomarkers that could predict the onset of type 2 diabetes as much as 6 years before diagnosis.

Adam Tabák and colleagues aimed to characterise the trajectories of fasting and post-load glucose, insulin sensitivity and insulin secretion in individuals who develop type 2 diabetes. At present, little is known about the timing of changes in glucose metabolism before the disease starts. The current global focus on prevention of type 2 diabetes means that we need to understand better the pathophysiological changes leading to diabetes at the earliest possible stage. The authors postulate that the risk of developing diabetes and macrovascular complications might already be present at glucose concentrations below the current cut-off for prediabetes.

The team analysed data from the prospective occupational cohort study (Whitehall II study) of 6 538 (71% male and 91% white) British civil servants without diabetes mellitus at baseline. During a median follow-up period of 9.7 years, 505 diabetes cases were diagnosed (49.1% on the basis of an oral glucose tolerance test). We assessed retrospective trajectories of fasting and 2-hour post-load glucose, homoeostasis model assessment (HOMA) insulin sensitivity, and HOMA β-cell function from up to 13 years before diabetes diagnosis (diabetic group) or at the end of follow-up (non-diabetics).

Multilevel models adjusted for age, sex, and ethnic origin confirmed that all metabolic measures followed linear trends in the group of non-diabetics (10 989 measurements), except for insulin secretion that did not change during follow-up. In the diabetic group (801 measurements), a linear increase in fasting glucose was followed by a steep quadratic increase (from 5.79 mmol/l to 7.40 mmol/l) starting 3 years before diagnosis of diabetes. Two-hour post-load glucose showed a rapid increase starting 3 years before diagnosis (from 7.60 mmol/l to 11.90 mmol/l), and HOMA insulin sensitivity decreased steeply during the 5 years before diagnosis (to 86.7%). HOMA β-cell function increased between years 4 and 3 before diagnosis (from 85.0% to 92.6%) and then decreased until diagnosis (to 62.4%).

In this study we show changes in glucose concentrations, insulin sensitivity, and insulin secretion as much as 3 - 6 years before diagnosis of diabetes. The description of biomarker trajectories leading to diabetes diagnosis could contribute to more accurate risk-prediction models that use repeated measures available for patients through regular check-ups.

Tabák AG, *et al. Lancet,* Early Online Publication, 8 June 2009. doi:10.1016/S0140-6736(09)60619-X

Test your memory: diagnosing Alzheimer's disease

Dementia and other cognitive defects are common among ageing populations. Alzheimer's disease is the most common form of dementia, with milder forms of cognitive defects seen in stroke, Parkinson's disease, epilepsy and many other neurological and medical diseases. So, testing cognitive function is a crucial part of many medical examinations – but it is not always easy.

The authors of this paper published recently in the *British Medical Journal* designed and assessed the TYM test ('test your memory') to be easily administered by the non-specialist. The test fulfilled 3 critical requirements: it takes minimal operator time to administer, tests a reasonable range of cognitive functions

and is sensitive to mild Alzheimer's. Thorough testing in a reasonable time was achieved by allowing patients to fill in the questionnaire themselves.

The TYM is a series of 10 tasks on a double-sided sheet of card with spaces for the patient to fill in. The patient's ability to complete the test is an 11th task. The tasks are orientation (10 points), ability to copy a sentence (2 points), semantic knowledge (3 points), calculation (4 points), verbal fluency (4 points), similarities (4 points), naming (5 points), visuospatial abilities (2 tasks, total 7 points), and recall of a copied sentence (6 points). The ability to do the test is also scored (5 points), giving a possible total of 50 points. The scores for the subsets are printed on the card and the total score is calculated by adding the subset scores. To ensure consistent scoring a single sheet of scoring instructions is available.

They enrolled 540 control participants aged 18 - 95 and 139 patients attending a memory clinic with dementia/amnestic mild cognitive impairment. Control participants completed the TYM with an average score of 47/50. Patients with Alzheimer's disease scored an average of 33/50. The TYM score shows excellent correlation with the two standard tests. A score of 42/50 had a sensitivity of 93% and specificity of 86% in the diagnosis of Alzheimer's disease. The TYM was more sensitive in detection of Alzheimer's disease than the mini-mental examination, detecting 93% of patients compared with 52% for the mini-mental state examination. The negative and positive predictive values of the TYM with the cut-off of 42 were 99% and 42%, with a prevalence of Alzheimer's disease of 10%. Thirty-one patients with non-Alzheimer dementias scored an average of 39/50.

The TYM can be completed quickly and accurately by normal controls. It is a powerful and valid screening test for the detection of Alzheimer's disease.

Brown J, *et al. BMJ* 2009; 338: b2030.

BRIDGET FARHAM

Single Sutures

New uses for Botox

Botulinum neurotoxin (BoNT), sold as Botox, can do more than immobilise face muscles to smoothe wrinkles. The substance has now been modified to possibly be used to treat asthma and even cancer.

BoNT works by slicing up proteins called SNAREs, which allow cells to release various substances. In its natural form, BoNT cleaves only those SNAREs that are specific to neurons. This prevents the release of neurotransmitters, cutting off neural communication between muscles and the brain.

Different SNAREs allow other cells to release substances such as mucus or cytokines. Joseph Barbieri and colleagues from the University of Wisconsin have modified BoNT to slice up the SNAREs found in epithelial cells. The team re-engineered the cutting section of BoNT molecules, installing an amino acid that has an affinity for epithelial SNAREs. When this modified toxin was added to human cells grown in culture, it inhibited the release of cytokines and mucin, suggesting that it could be used to treat asthma and cancers. The next step is to bind the modified toxin to receptors that will ensure that it acts only on cells where it is needed.

New Scientist 2009; 6 June.

Health care in a pandemic

What if doctors and other health care workers stayed at home during a flu pandemic? According to surveys of doctors, nurses and other staff such as lab technicians, secretaries and porters taken around the world, these people will desert their posts in large numbers unless the safety and psychological issues they face are addressed.

The UK is likely to be the worst affected; as few as 15% of workers would go to work in a pandemic. Two Australian surveys suggest that 60 - 80% of workers would go to work, and studies in Hong Kong and the US predict an 85% and 50% turnout, respectively.

Existing pandemic plans focus on making sure that workers can get to work, but providing transport, or that they can work by offering training for new roles. However, no plans address 'willingness to work', which is apparently the most important factor. Plans should include ways of making workers feel valued, particularly important for ancillary staff, who are both most likely to stay away and the least likely to feel that their role is essential.

However, for all health care workers, even those not in contact with sick patients, the biggest factor is safety; theirs and their family's. This means that vaccines and drugs should be offered to health care workers' families as well as to the workers themselves.

New Scientist 2009; 30 May.