Research letters

Low back pain in rural Tibet

Damian Hoy, Michael J Toole, Damien Morgan, Chris Morgan

In a baseline assessment of 30 rural villages surrounding Shigatse City, Tibet, many people, especially women, identified low back pain as a serious health problem. Consequently, we aimed to establish the prevalence of such pain and to develop appropriate interventions. We did a cross-sectional study of the prevalence of low back pain and related functional disability using two-stage random cluster sampling. We included 499 adults aged at least 15 years from 19 villages. The point prevalence of low back pain was 34·1% (95% CI 27·9–40·3% [170 people]); the 12-month prevalence was 41·9% (35·5–48·3% [209 people]). 100 (20%) villagers had substantial functional disability associated with low back pain. Low back pain is likely to be an important and under recognised problem in rural societies like Tibet.

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Low back pain receives little attention and research in low-income countries by comparison with industrialised countries. Results from studies of populations larger than one village have shown the prevalence of this disorder to be between 12·1% (China)[1] and 18·4% (Nepal).[2] Shigatse is a remote, arid, and sparsely populated prefecture of Tibet. In a baseline assessment for an Australian government funded primary health-care and water supply project serving 165 rural villages surrounding Shigatse City, many people, especially women, identified low back pain as a serious health problem. Consequently, we aimed to establish the prevalence and functional disability of low back pain and to develop appropriate interventions for this disorder.

We did a cross-sectional study in August, 1999, using two-stage cluster sampling based on WHO immunisation coverage survey methods.[3] We used random numbers to select five of ten subdistricts, which contained 19 of 30 villages, sampled in the baseline survey. The sample size of 499 was based on an expected prevalence of 20% (95% CI 15–25) and was doubled to compensate for the effect of cluster sampling on precision. Households within each village were chosen randomly by use of the method recommended by WHO for immunisation surveys.[3] In each household, we interviewed all residents 15 years or older until at least 26 people from each village had been interviewed.

The definition of low back that we used was "the area below the 12th rib and above the gluteal folds".[4] We divided this area into upper lumbar (below the 12th rib and above the L3–L4 intervertebral disc), lower lumbar (below the third lumbar vertebral body and above the sacrum), and buttocks (below the L5–S1 intervertebral disc and above the gluteal folds). The participants pointed to the area of pain and DH noted the anatomical location. From interviews, focus group discussions, and observation we established which specific activities were hindered by participants' low back pain. We analysed data using the CSAMPLE function of Epi-Info (version 6), which calculates proportions and CI for data that are not derived from simple random samples.

Figure 1: **The original tap stand**

The mean age of participants, of whom 307 (61·5%) were of female sex, was 42·2 years. The point prevalence of low back pain was 34·1% (95% CI 27·9–40·3% [170 people; 105 female, 65 male]). The 12-month prevalence of self-reported low back pain was 41·9% (35·5–48·3% [209 people]). Prevalence of pain did not differ significantly between sexes or

Figure 2: **The Back-Happy Tap-Stand**

age groups. 165 (97%) of those who reported back pain indicated that their pain was in the lower lumbar region.

Participants reported that low back pain prevented them from doing key activities important in maintaining their homes and livelihoods. Common activities such as collecting water (figure 1), harvesting, and carrying heavy objects, including children, increased the risk of low back pain. DH observed that activities carried out at ground level, including sweeping the floor, washing clothes, and lifting loads (such as bricks, barley, or full water containers) onto the back were done with a flexed lumbar spine and little bending of the knees.

These findings show a high prevalence of low back pain in central Tibet, affecting more than a third of adults, which is a significantly higher prevalence than noted in the few reports from other low-income countries. Reduced function associated with low back pain is especially serious in marginal living conditions such as rural Tibet.

Because the survey was undertaken in the daytime, it could be argued that our participants, who were at home, might have been more likely to have low back pain than those at work, which would certainly be the case during harvest time. However, since we did the study before harvest time, most people were at home. The observation that ground level activities are done with little knee flexion is important in guiding the development of appropriate interventions.

As a result of the survey, township and city hospital doctors, who in turn trained village health workers, were trained in prevention and management of low back pain. The training included the principle of curve-reversal of the lumbar spine to reverse the effect of lumbar flexion, and the importance of the adaptation of activities to reduce the risk of low back pain. Posters and flip charts on back pain prevention prepared by local artists were distributed to rural clinics.

A Back-Happy Tap-Stand was designed and installed in more than 30 villages (figure 2). The stand reduces the need for lumbar flexion by adding a high tap and waist-high bench to water collection points, removing the necessity of having to bend when filling and lifting water containers.

Low back pain is a significant, under recognised problem in central Tibet, impairing health and productivity, and is likely to be a problem in many rural societies combining poor economic conditions with subsistence farming. Longitudinal studies are needed to assess the effect of cost-effective and sustainable interventions to reduce the burden of low back pain. Health and development assistance projects should expand beyond communicable diseases to include conditions such as low back pain.

Contributors

All authors contributed to study design and writing of the report. D Hoy also collected, analysed, and interpreted data. M J Toole also helped interpret data.

Conflict of interest statement

None declared.

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Burnet Institute, Centre for International Health, PO Box 2284, Melbourne, Victoria 3001, Australia (D Hoy MPH, M J Toole MbBS, D Morgan PhD, C Morgan FRACP)

Correspondence to: Mr Damian Hoy
(e-mail: dhoy@burnet.edu.au)

Adiponectin and protection against type 2 diabetes mellitus

Joachim Spranger, Anja Kroke, Matthias Möhlig, Manuela M Bergmann, Michael Ristow, Heiner Boeing, Andreas F H Pfeiffer

Adiponectin is an adipocyte-derived peptide, which has anti-inflammatory and insulin-sensitising properties. We designed a nested case-control study to assess whether baseline adiponectin concentrations in plasma are independently associated with risk of type 2 diabetes. We found that adiponectin concentrations in plasma were lower among individuals who later developed type 2 diabetes than among controls (mean 5·34 μg/mL [SD 3·49] *vs* 6·87 μg/mL [4·58], p<0·0001). High concentrations of adiponectin were associated with a substantially reduced relative risk of type 2 diabetes after adjustment for age, sex, waist-to-hip ratio, body-mass index, smoking, exercise, alcohol consumption, education, and glycosylated haemoglobin A_{1c} (odds ratio 4th *vs* 1st quartile 0·3 [95% CI 0·2–0·7], p=0·0051). We conclude that adiponectin is independently associated with a reduced risk of type 2 diabetes in apparently healthy individuals.

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Adiponectin[1] is exclusively and abundantly expressed in white adipose tissue and has been shown to have insulin-sensitising and anti-inflammatory properties.[2,3] A diabetes-susceptibility locus has been mapped to human chromosome 3q27, where the adiponectin gene is located. Thus, both genetic and functional data suggest that adiponectin could be involved in the pathogenesis of type 2 diabetes. Additionally, decreased concentrations of adiponectin have been shown to precede the onset of disease in an animal model of diabetes. Alternatively, high concentrations of adiponectin might prevent the onset of type 2 diabetes.

We designed a prospective, nested case-control study within the population-based EPIC (European Prospective Investigation into Cancer and Nutrition) Potsdam cohort, which includes 27 548 individuals, to assess whether baseline concentrations of adiponectin in plasma independently modify the risk of type 2 diabetes in apparently healthy individuals. All participants gave informed consent and the study was approved by the ethics committee of Landesaerztekammer-Brandenburg, Germany. Participants (age 35–65 years at baseline) were recruited from the general population between 1994 and 1998, and were asked to complete self-administered questionnaires and to undergo a computer-guided interview by trained personnel. Anthropometric measurements (height and weight, waist and hip circumference) were taken, and body-