Australian Collaborative International Research

In the era of globalisation, much research involves worldwide collaboration. This is certainly so with blood pressure research. In the fields of epidemiology and clinical trials, Australian researchers have been active in many collaborative projects with overseas colleagues. There has quite naturally been a strong focus on the Asia-Pacific region, our own part of the world, but also very far-flung collaboration across all continents. We bring together here a sample of projects reaching out to the massive populations in the developing world, showing some work in progress in India, China and South Africa.

Professor John Chalmers

Cardiovascular mortality and morbidity in rural Andhra Pradesh, India

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India is undergoing rapid epidemiological transition as a consequence of economic and social change, and cardiovascular disease is becoming an increasingly important cause of death. While some information is available for urban areas, data about cardiovascular disease in rural areas, where 70% of the Indian population resides, is scant.

The George Institute for International Health, together with the Byrraju Foundation, Hyderabad, CARE Foundation, Hyderabad and Centre for Chronic Disease Control, New Delhi established a research collaboration (The Andhra Pradesh Rural Health Initiative). The overall goal of this initiative was to develop and evaluate locally applicable new strategies for the improvement of health in poor rural communities. In order that the interventions selected address the leading burdens of disease and their cause the collaboration has collected data about morbidity and mortality through a large-scale survey and a mortality surveillance system.

The survey used simple standardized instruments to measure the prevalence of non-fatal cardiovascular disease and cardiovascular risk factors amongst a random sample of 4535 adults aged 30 years and over (response rate 81%) in 20 villages broadly representative of the East and West Godavari region of Andhra Pradesh.

The mortality surveillance system was established in 45 villages and all deaths occurring in the villages (population 180,162) were recorded during a 12-month period in 2003-4. Primary healthcare workers trained in the use of a standard verbal autopsy tool collected data about the deaths. Algorithms were used to define causes of death according to a limited list derived from the international classification of disease version 10. Causes were assigned by two independent physicians with disagreements resolved by a third.

The survey found high levels of diabetes (13.2%), hypertension (27.0%), overweight/obesity (men 18.4%, women 26.3%) and smoking (men 45.2% and women 4.8%). A third of the adult population had total cholesterol above 5.2 mmol/l and 15.2% had a positive family history of cardiovascular disease. A diagnosis of coronary heart disease (myocardial infarction and angina) was reported by 4.8% and stroke by 2.0%.

1354 deaths were identified (crude death rate 7.5/1000) with verbal autopsies completed for 98% of all deaths. Cardiovascular diseases were the leading causes of mortality, responsible for 33% of all deaths. The rates of ischemic heart disease and cerebrovascular disease were similar and these two constituted the majority of the vascular deaths recorded (ischaemic heart disease 14%, cerebrovascular disease 13%, and other vascular causes 6%). Cardiovascular diseases were responsible for a greater proportion of deaths among men than women and about one quarter of all cardiovascular deaths occurred below the age of 60 years.

Conclusions

Cardiovascular disease is a surprisingly large health problem in this developing rural region. In addition to the many deaths caused by vascular disease there are also a significant number of very high-risk individuals with prevalent cardiovascular disease and many with substantially abnormal levels of other major risk factors. It appears that in large part the burden of cardiovascular disease in this community is attributable to broadly the same chief causes as in other parts of the world. Addressing the problem will however present a significant challenge to a health system whose resources are currently focused on communicable diseases and reproductive health. Novel low-cost strategies that are suited to this very resource poor setting need to be developed and evaluated if the epidemic of vascular disease affecting India is to be attenuated. The collaboration is currently midway through a first cluster-randomised trial evaluating a strategy seeking to identify and treat some of the highest risk individuals.

Table 1: Cardiovascular morbidity and mortality in rural Andhra Pradesh

Cardiovascular risk factors	Male (n)	%	Female (n)	%
History of MI or angina	119	4.7%	**114**	5.0%
History of stroke	66	2.5%	39	1.4%
Diabetes	361	14.6%	294	12.2%
Hypertension	667	26.6%	686	27.5%
Current smoking	1034	45.2%	120	4.8%
Overweight/obesity BMI≥25	405	18.4%	609	26.3%
Total cholesterol > 5.2 mmol/L	141	26.5%	204	33.9%
Family history of premature CVD	340	16.1%	326	14.2%

Top five causes of death	Male (n)	%	Female (n)	%
Diseases of the circulatory system	258	34.2	173	30.1
Ischaemic heart disease	*121*	*16.0*	*62*	*10.8*
Cerebrovascular disease	*87*	*11.5*	*83*	*14.5*
Others	*50*	*6.6*	*28*	*4.9*
Injury	110	14.6	67	11.7
Infectious and parasitic diseases	88	11.7	69	12.0
Neoplasm	41	5.4	56	9.8
Diseases of the respiratory system	44	5.8	27	4.7

The Rishi Valley Vascular Disease Survey

Mandy Thrift from the Baker Heart Research Institute

Although the most common causes of disease burden in countries such as India include malnutrition and infectious disease, vascular disease is being increasingly recognized as an emerging epidemic. In urban Indian populations, changes in lifestyle exposures (resembling those seen in developed nations) may underlie this phenomenon. However, even less is known about the burden of vascular disease in those living in rural communities. The aim of this study is to obtain important baseline data on the extent of vascular disease (heart disease, stroke) and its risk factors in a typical rural Indian community.

This survey is being conducted in the Rishi Valley, an area situated in the interior of rural Andhra Pradesh, a major South Indian State. It is a sheltered, drought-prone valley about 140 km northeast of the city of Bangalore, and is home to the villages of a stable rural community of approximately 35,000 residents. The population consists primarily of shepherds and marginal subsistence farmers, with landholdings of less than one acre. The average monthly income for a family of five (husband, wife, two children, and one dependent elder) ranges from between Rs. 700 to Rs. 1,000 per month (which is equivalent to 65 to 93 cents per day). This is well below the global standard for poverty.

Residents of the villages are being interviewed to obtain information about their lifestyle (diet, activity, smoking, alcohol). Blood pressure, height, weight, waist and hip are being measured using standard criteria. In addition, finger-prick tests for blood glucose, cholesterol, triglyceride and haemoglobin are also being performed.

This survey will provide important and comprehensive data regarding the prevalence of vascular disease risk factors in a rural Indian community. It will be the first major step in planning effective public health interventions to treat or prevent vascular disease in a disadvantaged Indian community.

This is a collaborative project between Mandy Thrift, Sharyn Fitzgerald (Baker Heart Research Institute), Velandai Srikanth, Roger Evans (Monash University), Kartik Kalyanram and Kamakshi Kartik (Rishi Valley Rural Health Centre).

The Heart of Soweto Study

By Geraldine Lee and Melinda Carrington (Baker Heart Research Institute)

The Heart of Soweto study is a landmark study initiated to establish the baseline profile of heart disease and its antecedents in the population of Soweto, South Africa. The project is co-ordinated by expert personnel in cardiology (Professor Karen Sliwa, Witswatersrand University), preventative cardiology (Professor Simon Stewart, Baker Heart Research Institute) and Professor David Wilkinson, from the School of Medicine, University of Queensland).

Soweto in South Africa compromises of a series of townships and is located southwest of Johannesburg. It contains the largest urban concentration of Black Africans with an estimated population of 1 to 1.5 million, which includes a steady influx of migrants. The townships are undergoing economic transition leading to increased affluence. This in turn has resulted in the development of chronic forms of cardiovascular disease (CVD) and this has necessitated the need for systematic surveillance programs to monitor & implement prevention/management programs for the emerging CVD.

The primary goal of the "*Heart of Soweto Study*" is to systematically examine and respond to the epidemiologic transition in risk behaviours and clinical presentations of heart disease in the internationally renowned and celebrated community of Soweto. Within the Baragwanath Hospital (with a 3,500 bed capacity), the Coronary Care Unit has observed more than a 10-fold increase with patients suffering heart attacks over the past 20 years and approximately 100 patients a day attend the out-patient clinic for heart-related complaints. Approximately 5000 patients per annum are diagnosed with heart disease.
A clinical registry of all patients managed by the Cardiology Unit has been established. The Cardiologists/Trainee Cardiologists carries out medical reviews according to standard protocols and diagnoses and the data are validated and entered on-site via a dedicated research team with support, verification and analyses via University of Queensland & the Baker Heart Research Institute in Australia.

The clinical registry has revealed that at least 20% of new cases of heart disease presenting to the Cardiology Unit at the Baragwanath Hospital have developed CHF; this equates to approximately 250 new cases of heart failure presenting to the clinic each year. The aetiology of heart failure includes dilated cardiomyopathy, valvular heart failure right heart failure and ischaemic cardiomyopathy.

Several sub studies have also been initiated in areas including HIV, nutrition, screening for CVD risk factors, ECG abnormalities and socio-economic status. In summary, demonstrated the broad & substantive spectrum of heart disease in Soweto, South Africa, the high prevalence of risk factors such as hypertension, smoking and a positive family history and late clinical presentations. The study has demonstrated the need for sustained surveillance & new health care programs.

References: Stewart S, et al.. Mapping the emergence of heart disease in a black, urban population in Africa: The Heart of Soweto Study. Int J Cardiol 2006;108: 101-108

The ChinaQUEST (QUality Evaluation of Stroke care and Treatment) study

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Background: China, as the most populous country on earth, has a heavy burden of stroke and other vascular diseases. According to WHO estimates, nearly 30% of the 5.5 million deaths from stroke that occurred in the world in 2002 were in China, reflecting the very large (1.4 billion) population who are at high risk of vascular disease. Studies have shown marked geographical variation in rates, prevalence and case fatality of stroke in China, with a well-described North-South gradient favouring southerners and a widening urban-rural gap in the burden of disease. The extent to which current patterns of stroke in China are driven by differences in the prevalence of risk factors and case fatality is unclear. The decreasing stroke mortality rate seen in the WHO-MONICA study in China during 1982-1995 was almost all due to improvements in survival rather than a fall in stroke incidence per se. This may be due to improved medical care for stroke patients, although changes in stroke risk factors over time may have lead to the occurrence of milder forms of stroke with improved outcomes.

Currently, the country is experiencing significant management issues in stroke arising from the increasing numbers of patients from the rapidly ageing population who are undergoing social and economic change. There has traditionally been a heavy reliance of acute hospital care for chronic diseases and very little preventative and community care. Only recently has a health insurance scheme been introduced to help support the cost of health care in a largely fee-for-service health care setting. In the absence of reliable epidemiological data, it is difficult to quantify the degree of disparities in care and plan services, both preventative and therapeutic, in an equitable and evidence-based manner.

Methods: The ChinaQUEST (QUality Evaluation of Stroke Care and Treatment) project is a large-scale, China-Australia partnership, epidemiological project that aims to (a) describe current patterns of stroke management in China, and (b) determine the influence of various socio-economic and organisational variables on key clinical and health outcomes. The project has enrolled over 6,400 patients with acute stroke (ischaemic and haemorrhagic) through a 62 hospital (36 city) registry network in representative urban and semi-urban sites over a 5-month period in late 2006. Data collection has occurred over four time points (baseline, hospital discharge, and 3 months of follow-up, or death if this occurs earlier) and the assessment of survivors to 12 months of follow-up is currently ongoing. Outcomes being assessed include case fatality, disability, health-related quality of life, adherence to secondary prevention strategies, and economic and social impact.

Preliminary observations: In China, strokes occur at approximately a decade younger age and are more often haemorrhagic and lacunar (ischaemic) in nature than in Australia. There is a heavy reliance on unproven traditional Chinese medicines alongside modern therapeutic agents and technology as part of routine care. Patients stay in hospital for long periods of time and few receive community care follow.