Published: June 2013

PURE-ifying research on chronic non-communicable diseases in South Africa

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Chronic non-communicable diseases (NCDs) such as diabetes, cardiovascular disease (CVD) and cancers are a major public health problem as these are a major cause of ill-health and deaths worldwide. The World Health Organization (WHO) has estimated that by 2020, one third of the global burden of disease will be attributable to chronic diseases (1). In South Africa, the number of people suffering from NCDs is also increasing (2) and this has been attributed to the increase in the contributing risk factors such as a change from traditional to a Westernized diet which includes consumption of food low in fruit and vegetables, rich in refined carbohydrates and saturated fat; lack of physical activity; alcohol abuse and smoking.

The South African population, which totals approximately 52 million people, is ethnically and economically diverse. The Census data reveals that there is continuing migration of people from rural to urban areas and that 63% of the population now live in urban centres (3).

Urbanization of the black population has increased rapidly, particularly since democratization in the country. Furthermore, this rapid urbanisation combined with globalization has been accompanied by large shifts in the health problems among South Africans, which include the increasing prevalence of NCDs. For example, ischemic heart disease and stroke were the second and fourth leading causes of death in South Africa in 2000, resulting in the loss of 65 000 lives (4). Furthermore, South Africans have a high prevalence of overweight and obesity, with over 50% of women and more than 20% of men having a BMI (kg/m^2) in excess of 25 . (5)These risk behaviours are confounded by both environmental and socioeconomic factors, which may act to amplify the effects.

Community-based project on NCDs

In an effort to address the behavioural risk factors for NCDs, the School of Public Health(SoPH) at the University of the Western Cape (UWC) has been working with community health workers (CHWs) in Site C, Khayelitsha, an urban black township in the Western Cape, on primary prevention of NCDs. This resulted from a request of community members of Khayelitsha who had noticed an increasing number of people with diabetes and hypertension in their area. Thus a community-based project to increase community awareness about primary prevention of NCDs was implemented, the aims of which were: 1) to utilise CHWs, lay people who were elected by the communities in which they serve, as change agents in their community, and 2) to develop a NCD model, whereby an urban township community can benefit.

Participatory action research (PAR), utilising the 'triple A' approach of assessment, analysis, and action, was used for planning and implementing the interventions. There was an assessment of CHWs' own personal risk factors, knowledge and attitudes, a baseline community survey to determine the extent of the problems of hypertension and diabetes and a review of available resources in the community for promoting healthy lifestyles. This was followed by the development and implementation of a training programme for primary prevention of NCDs among CHWs and finally, the implementation of community interventions by the CHWs (6). The programme resulted in a reduction in BMI, an increase in physical activity levels through the use of buddy/mentoring systems, and an improvement in knowledge regarding NCDs' risk factors and prevention in the CHWs. In addition, a health club was established (community-based support group) and through the involvement of other stakeholders, the first fitness centre within the community was also equipped. The project benefited an estimated target population of 1 000 households residing in the Cape Town township, with a population estimated at between 350 000 and 900 000. The success of this project was recognised by the Western Cape Department of Health, which requested assistance with training of support group facilitators in other centres. Thus, this pilot programme successfully managed to increase awareness of NCDs among people living in an under-served urban township and some of the interventions are still ongoing. The success in increasing awareness about risk factors was also accompanied by environmental barriers which did not make healthy choices easier among community members. For example, barriers to physical activity and healthy eating among other factors included poor overcrowded environment, lack of easy access to healthy food and lack of safety (6).

Lessons learned from this project

Although this was a small intervention project, it highlighted the complexity of the risk factors of NCDs, and the importance of developing prevention strategies that extend beyond the traditional lifestyle

approach that focuses on diet and exercise. It provided information which made us realize that mitigating NCDs is beyond knowledge and choice; it's beyond giving people knowledge in the hope that they limit their exposure to the risk factors of these diseases or simply make healthier choices. We became aware that responding effectively to the growing burden of NCDs has more to do with addressing societal and biologic pathways, from environmental causes (such as mal-adaptation to urbanization) to primordial predispositions (such as genetics and obesity) as well as adequately managing the primary risk factors (such as high blood pressure or abnormal blood glucose) which lead to these health problems. It is about identifying and addressing the "cause-of-the-cause" of this group of health conditions.

The birth of the PURE study at the University of the Western Cape

Informed by this and building on our initial work with CHWs in peri-urban communities in South Africa, the SoPH joined a global consortium of health researchers led by the Population Health Research Institute of McMaster University, Canada, and involving 17 upper-, middle- and low-income countries in the Prospective Urban and Rural Epidemiology (PURE) study in January 2009.

The study seeks to scientifically document the root-causes of the traditional risk factors for NCDs by following-up over 150,000 adults aged 30 to 75 years for 12 to 15 years and collecting individual-, household-, community- and national-level information about them.
The framework of the PURE study is based on the assumption that the 'causal' pathways for the development of CVD involves influences at multiple levels The belief is that individuals develop obesity, diabetes and CVD as a normal biologic response to abnormal environments; and that biologic factors that put people at risk for CVD are well known therefore interventions that have been successfully utilized can be easily applied to other individuals with similar conditions. On the other hand, each society has a different context and environmental influences, therefore interventions should be developed to respond to each context.

Detailed knowledge of the factors that cause populations as a whole to develop elevated risk factors is still required. Such knowledge will be appropriate to inform broad scale interventions to reduce the increasing burden of chronic NCDs in the population.

PURE sites in South Africa

There are two PURE collaborating institutions in South Africa. The first is North West University where the study is lead by Professor Annmarie Kruger. The second is UWC where the study is lead by Professor Thandi Puoane. Collaborating departments within the university include the South African Herbal Science and Medicine Institute, Bio kinetics, Dietetics and Psychology. Collaborators outside UWC include the Sports Science Institute, University of Cape Town and Medical Research Council.

Participants in the PURE Cape Town study were selected from two communities of black South Africans: Mount Frere, a rural community located in the Eastern Cape Province and Langa, an urban settlement close to Cape Town in the Western Cape Province. The communities were purposively selected on the basis of having a relatively stable (less migratory) black population thus allowing for feasibility of follow-up in a prospective cohort study. A total of 2 058 men and women between the ages of 35 to 70 years were recruited at baseline (2009-2010) from both rural and urban sites and they will be followed for 12 to 15 years.

What information is collected in the PURE Study?

Data collected includes community level factors (urban-rural differences, built environment, policy environment related to tobacco and food, and social factors), household level factors (family structure, income, housing, etc.) and individual level factors (lifestyle behaviours and attitudes, and genetic markers). Detailed bio-medical measurements including weight, height, body mass index, body circumference, lung function tests, electrocardiographs, blood and urine analyses are all conducted. Additional data is collected to obtain the environmental profile of the communities where the study participants reside through direct observations of the community environment and through survey of community members to assess their perceptions and attitudes towards their environment.

It is envisaged that knowledge of both individual and societal factors will lead to a body of information that will allow development of societal interventions adaptable to a range of communities.

What are the lessons can we learn from PURE

We need to be aware that reducing NCDs impact is beyond knowledge and choices. Responding effectively to the growing burden of NCDs has more to do with addressing societal and biological pathways from environmental causes to primordial predispositions and adequately managing the primary risk factors. It is about identifying and addressing the drivers: the cause of the cause.

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