ORIGINAL RESEARCH

A PILOT STUDY OF PSYCHOSOCIAL FACTORS AND CARDIOVASCULAR RISK AMONGST ABORIGINAL PEOPLE LIVING IN THE GOULBURN VALLEY

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ABSTRACT

Objectives: Research has suggested that higher mastery is associated with lower cardiovascular disease (CVD) risk. This pilot study investigated how a range of psychosocial factors, including mastery, relate to CVD risk factors among Aboriginal people living in rural south-eastern Australia. **Methods:** Psychosocial and behavioural measures were obtained via questionnaire as part of developing a cardiovascular risk screening program (The Heart Health Project). Relationships between mastery, social support and other risk-factors were examined. **Results:** Higher mastery was associated with a greater likelihood of having quit smoking (p=0.007), higher partner support (p=0.013) and higher total cholesterol levels (p=0.004). **Conclusions:** Results were consistent with previous studies but suggested that for this population, the relationship between mastery and CVD risk may more complex than expected. Results indicated that mastery may have some utility as a point for intervention to improve health and wellbeing, however further research into these associations and their cultural salience for Aboriginal people is warranted.

KEY WORDS*:* Aboriginal wellbeing; Cardiovascular risk factors; Mastery; Australia.

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INTRODUCTION

The Heart Health Project began in 2002 as a collaboration of regional Aboriginal Community Controlled Organisations in the Goulburn-Murray region of South-Eastern Australia with university researchers. Its aim was to develop culturally appropriate, community-directed interventions to improve biomedical, environmental and psychosocial factors that influence health behaviours and outcomes, in particular relating to cardiovascular disease (CVD). Initial work aimed to identify and develop survey methods for a range of biological, behavioural and psychosocial factors linked to CVD. We have previously reported on the development and use of screening methods for clinical risk factors (The Heart Health Project Steering Committee, 2007), the results of a qualitative component of the project which identified history, relationship with mainstream, connectedness and sense of control as factors impacting on health in this community (Reilly, Doyle, Bretherton, & Rowley, 2008) and on the evaluation of an intervention programme developed on the basis of this work (Reilly, Doyle, & Rowley, 2007).

CVD is the leading cause of death in Indigenous and mainstream Australian populations but Indigenous people are affected at younger ages and suffer higher mortality. The Australian Bureau of Statistics reported that mortality for Indigenous men and women for endocrine, nutritional and metabolic diseases (including diabetes), which are major risk factors for CVD, are around 7.5 and 10 times those for non-Indigenous men and women respectively (Australian Bureau of Statistics & Australian Institute of Health and Welfare, 2008). Exposure to chronic psychosocial stress is viewed as one mechanism by which environmental and social factors influence health (Bjorntorp, 1999; Marmot, Shipley, & Rose, 1984; Pearlin, Lieberman, Menaghan, & Mullan, 1981). Psychosocial stress is also associated with behavioural risk-factors including smoking, alcohol and other drug use and poor diet (Fernander, Shavers, & Hammons, 2007; Greeno & Wing, 1994). However, susceptibility to stress-related illness varies in part because individuals differ in their capacity to access coping resources including social support and psychological mediators or buffers to stress such as mastery (Pearlin, et al., 1981).

Partly on the basis of known associations between CVD and psychosocial factors such as depression, social isolation and lower socio-economic status (Bunker, et al., 2003), the Heart Health Project was based on a holistic model of health that incorporated the social, emotional and cultural wellbeing of the whole community as a way of encouraging meaningful responses to reduce and prevent disease in an historical context of disadvantage. This strategy also acknowledged the Aboriginal cultural context within which the research is

taking place where mind, body, people, spirit and nature are experienced as interconnected (National Aboriginal Health Strategy Working Party, 1989)

Mastery is a global measure which attempts to capture the beliefs and causal models people hold about events that happen in the world, their relationship with their environment and whether outcomes are a consequence of their own behaviour or occur independently of that behaviour. Mastery, and related perceived control constructs such as 'self-efficacy' (Bandura, 1986) and 'perceived informal social control' (Moore, et al., 2010), have been associated with better health outcomes in a diverse range of settings. There is a small but growing evidence-base that extends research on mastery to Indigenous communities in Australia and overseas (Daniel, Brown, Dhurrkay, Cargo, & O'Dea, 2006; Daniel, Cargo, Lifshay, & Green, 2004; Daniel, Rowley, Herbert, O'Dea, & Green, 2001; Hobfall, Jackson, Hobfall, Pierce, & Young, 2002). For example, mastery was inversely related to smoking amongst overweight participants in a community-based chronic disease survey from a rural Interior Salishan first Nation in British Columbia (Daniel, Cargo, Lifshay, & Green, 2004). More recently, Daniel et al (2006) found a strong inverse association between mastery and perceived stress and positive correlations between mastery, vegetable consumption and physical exercise amongst Yolŋu adults (>25 years) in north-east Arnhem Land, Australia.

The relationship between social support and health outcomes is less straight forward. A large body of research recognises the health benefits of social support, and has indicated that social isolation increases susceptibility to ill health from a number of causes (Berkman, 1995; Itkowitz, Kerns, & Otis, 2002; Pearlin, et al., 1981). In particular, social support has been associated with better outcomes in patients with cardiovascular illness (Lett, et al., 2007). However a degree of vagueness in the definition and measurement of social support has led to conflicting results, with some studies showing that dimensions of social support may in fact increase the risk of negative outcomes (Itkowitz, et al., 2002; Schieman & Meersman, 2004).

Earlier community-initiated work identified high rates of depression and anxiety in the Goulburn Valley Indigenous community, particularly amongst employees of Aboriginal Community Controlled Organisations (ACCOs) (McKendrick & Charles, 2001). As a further step in understanding the salience of these psychosocial factors for the Aboriginal population of the Goulburn Valley, the present pilot study aimed to investigate how mastery and social support relate to physical and behavioural CVD risk factors. This report focuses on findings from data collected primarily from staff of ACCOs as part of the development of The Heart Health Project, with a view to designing and implementing prevention strategies through a more informed understanding of the problem of CVD and its correlates for Aboriginal people living in the Goulburn Valley.

Given the high rates of chronic disease within the Aboriginal community, preventative health research is acknowledged as a priority by community leaders. However, a history of poorly managed research projects conducted by non-Indigenous outsiders had diminished the trust of the community in research processes. The data reported here, the considerable effort required to collect it in this cross-cultural setting and the lengthy process of engagement described earlier (The Heart Health Project Steering Committee, 2007) represent significant steps taken by the Aboriginal community to build support, trust and capacity for research.

METHODS

Methods were developed under the direction of a Steering Committee comprising representatives of each participating community-controlled organisation and the University of Melbourne. The project incorporated both quantitative and qualitative methodologies. This report focuses on the results of data collected over a 12 months period from mid-2003. The research was approved by the University of Melbourne Human Research Ethics Committee.

Population and Setting

The Aboriginal population of the Goulburn Valley is estimated to be around 1500, or 2.5% of the overall population in this region (ABS, 2004). Australian Bureau of Statistics figures tend to underestimate true Aboriginal population due to the under-identification of Aboriginal people generally, and the transient nature of significant sub-sections of the population (ABS, 2006b; McKendrick & Charles, 2001). Despite the relative wealth of the region which supports a variety of agricultural industries, Aboriginal people remain disadvantaged on a range of socio-economic indicators (ABS, 2006b). The population resides mostly within the larger urban centres of the region and a smaller number live in an Aboriginal township, Cummeragunja, on the Murray River. There are a number of Community Controlled Organisations that service the region, three of whom participated in the Heart Health Project. They are the Rumbalara Aboriginal Co-operative, the Rumbalara Football Netball Club and Viney Morgan Aboriginal Medical Service located at Cummeragunja. Each of these organisations provides a range of social and health services. The total workforce of these organisations is approximately 95 people. As part of development and validation of project methods, staff members of the above organisations were invited to undergo risk factor screening by the Heart Health Project Officer, who was also a senior community member. Earlier reported results of the risk factor screening (excluding psychosocial variables) showed high rates of CVD risk factors including high BMI, periodontal disease, unhealthy diet and elevated blood pressure (The Heart Health Project Steering Committee, 2007). Thirty-one per cent of participating Indigenous staff members rated their health as "very good" or "excellent" compared to an age-adjusted prevalence of 41% in the 1994 NATSIS survey (Australian Bureau of Statistics, 1995; The Heart Health Project Steering Committee, 2007).

The analyses reported here include data for 48 staff members of Aboriginal or Torres Strait Islander (ATSI) descent as well as data from 19 members of clients and partner organisations who were opportunistically screened

(all of ATSI descent). Non-Indigenous staff members were excluded from analyses. Persons who did not complete the relevant parts of the screening questionnaire; n = 19 were excluded. This study did not seek to achieve representativeness of the overall regional Aboriginal population. Rather, given prior reports of adverse health risks noted above, it aimed to describe variations in CVD risk across a range of psychosocial factors for employees of ACCOs and their client base.

Procedure

Screening was conducted on-site at the three partner organisations and at two additional community sites. The screening involved using standard techniques to measure weight, height and waist and hip circumference. Sitting blood pressure (BP) and heart rate (HR) were measured using an automated vital sign monitor (Dinamap, Critikon, Tampa FL). Glucose and total cholesterol were measured from finger prick blood samples using a point of care analyser (L.D.X.®, Cholestec, Haywood, CA). Participants were then invited to fill out the Heart Health questionnaire and were provided with assistance interpreting and responding to questions by the Heart Health Project Officer if required. Verbal and written feedback was provided to participants and/or a doctor of their choice.

Questionnaire

The Heart Health Questionnaire included items measuring social support, mastery, community involvement, diet, exercise, smoking, alcohol use, existing medical conditions, service accessibility and oral health. The majority of questions were adapted from the NHF Risk Factor Prevalence Survey (Risk Factor Prevalence Study Management Committee, 1990), the National Aboriginal and Torres Strait Islander Survey (ABS, 1995) and the New South Wales Health Survey (NSW Health Department, 2000). Other questions relating specifically to the community and one question relating to a concept of 'communal mastery' (Hobfall, Jackson, Hobfall, Pierce, & Young, 2002) were devised specifically for the survey and were deemed relevant for inclusion by researchers and members of the Heart Health Project Steering Committee.

Mastery was measured using the 7-item scale devised by Pearlin *et al.* (1981) which includes statements such as 'There is really no way I can solve some of the problems I have' and 'I can do just about anything I really set my mind to' (reverse coded). Participants rated items on a 5-point Likert scale from strongly agree to strongly disagree. Scores were added to yield a maximum possible score of 35. Item-total correlations ranged from 0.43 to 0.83 (average 0.66). On principal components analysis, a one factor solution for the seven-item instrument closely mimicked that of the original Pearlin analysis (5). Cronbach's alpha was 0.79.

Social support was measured using two questions also adapted from Pearlin *et al*. (1981):

a) Can you talk to and rely on your partner? (Yes; No; Sometimes; I don't have a partner)

b) Do you have friends and relatives you can talk to and rely on? (none at all; one person; two or more people).

Participants were given a score of 0 or 1 for part a (0: no; 1: yes or sometimes) and a score of 0, 1 or 2 for part b depending on the number of people they could rely on. These items were analysed separately and as an aggregate 'social support' score ranging from 0 to 3.

Statistical Analysis

Data were analysed using SPSS Version 16.0 for Windows. Associations between mastery and other variables according to age were analysed with analysis of variance and cross-tabulation with participants grouped according to mastery tertiles. Pearson correlation coefficients and linear regression analyses were conducted but, apart from confirming the results of the initial analysis, they offered little new information and were not reported in detail. Given the exploratory nature of the study, to identify variables worthy of further investigation as opposed to hypothesis testing to make treatment decisions based on the outcome variables, adjustments for multiple testing were not applied. This decision is in line with current literature regarding observational epidemiology (see Bender & Lange, 2001; Feise, 2002).

RESULTS

Participants

The 67 participants ranged in age from 15 to 57 (mean=34, SD=10). Forty-eight (71.3%) were employed at the Aboriginal Community-controlled partner organisations. The remainder were either unemployed or engaged in a government-run 'Community Development Employment Program' (CDEP). There were approximately twice the number of female participants (45 women, 22 men), reflecting the ratio of women to men employed at the organisations. The female participants were on average slightly older (mean=34, SD=9) than the male participants (mean=31, SD=11) but the difference was not statistically significant. Forty-six percent were smokers and 19% were ex-smokers.

Mastery scores ranged from 15 to 35 (mean=27, SD=4.9) and approximated a normal distribution. Mean mastery scores according to age and gender were displayed in Table 1. Mastery level did not vary significantly according to age or gender.

Table 1: Mean mastery scores (SD) stratified by age and gender.

	15 to 24.9 years	25 to 44.9 years	45 years or older
Women (n=45)	28.6 (1.3); *n=5*	26.4 (4.4); *n=33*	26.0 (3.8); *n=7*
Men (n=22)	26.0 (7.7); *n=7*	27.8 (5.6); *n=10*	28.0 (6.6); *n=5*
All (n=67)	27.1 (5.9); *n=12*	26.7 (4.7); *n=43*	26.8 (5.0); *n=12*

Results of cross-tabulations and ANOVA according to mastery tertile are reported in Table 2. Total cholesterol was positively associated with mastery level, with those in the lowest mastery tertile (<25) having cholesterol levels below the national average and those in the highest mastery tertile (≥29) having cholesterol levels within the normal range for Australian adults (Dunstan, et al., 2001). This difference was not accounted for by the use of cholesterol-lowering medication (n=2, 3%), self-reported heart problems (n=5, 7%), hypertension (n=5, 7%) or diabetes (n=2, 3%). Those with higher mastery were more likely to have quit smoking and reported higher levels of support from their partners but not social or community support. Adjustment for gender made no substantial difference to these associations (data not shown).

Associations with other risk factors were generally in the expected direction but no other significant trend was identified. In bivariate correlation analysis, mastery was significantly correlated with self-reported health ($r=0.29$, $p<0.05$) and with total cholesterol ($r=0.27$, $p<0.01$).

Table 2: Clinical, behavioural and social characteristics stratified and compared to level of mastery.

	Mastery tertile			
	< 25 (n=18)	**25 – 28 (n=24)**	**≥ 29 (n=25)**	**p-value (linear trend)**
% Male gender	33%	17%	48%	0.229
Mean age (95%-CI)* [years]	33 (27-38)	35 (31-40)	33 (29-37)	0.974
% Employed at community organisation	59%	76%	80%	0.161
Mean BMI** (95%-CI) [kg/m²]	26.9 (23.4-30.3)	29.2 (26.0-32.3)	30.5 (28.1-32.9)	0.092
Mean SBP*** (95%-CI) [mmHg]	121 (112-130)	119 (111-127)	124 (117-130)	0.580
Mean DBP# (95%-CI) [mmHg]	72 (67-76)	70 (65-76)	69 (64-74)	0.437
Mean pulse pressure# (95%-CI) [mmHg]	51 (45-57)	49 (44-53)	55 (50-60)	0.254
Mean pulse rate (95%-CI) [bpm]	75 (70-80)	72 (66-78)	70 (64-76)	0.212
Mean plasma glucose (95%-CI) [mmol/L]	6.0 (4.6-7.5)	6.0 (5.2-6.9)	5.5 (5.1-5.9)	0.417
Mean total cholesterol (95%-CI) [mmol/L]	**4.4 (3.9-4.9)**	**4.8 (4.4-5.1)**	**5.3 (4.9-5.6)**	**0.004**
% With good or excellent health##	18%	29%	42%	0.101
% Eating vegetables every day	56%	29%	56%	0.524
% Eating fruit every day	39%	29%	25%	0.345
% Ex-smokers	**0%**	**17%**	**32%**	**0.007**
% With support from partner	**33%**	**57%**	**72%**	**0.013**
Mean social support score (95%-CI)	2.6 (2.3-2.9)	2.6 (2.3-2.8)	2.5 (2.2-2.9)	0.869
Mean community support score (95%-CI)	3.9 (3.4-4.5)	3.7 (3.2-4.2)	3.8 (3.3-4.2)	0.585
% Identify with clan/language group†	33%	33%	40%	0.635

*95%-CI = 95% confidence interval; **BMI = body mass index; SBP = systolic blood pressure; #DBP = diastolic blood pressure; ##Self-reported health status; †compared to persons who answered no or who chose not to answer (n=18).

DISCUSSION

The results of this study are consistent with previous reports of relationships between mastery and indicators of cardiovascular health and risk. Our data extends this body of literature to a rural-dwelling Aboriginal Australian population. Previously, such relations have been reported only for remote-dwelling Aboriginal Australians (Daniel et al., 2006) For example, having quit smoking was associated with greater levels of perceived mastery, as was the likelihood of having greater social support from a partner. Although in general the observed trends were in the anticipated direction, relatively few of these relationships were statistically significant. Several variables showed linear trends across mastery tertiles that did not reach statistical significance at the 0.05 level. To detect effect sizes of the magnitude observed with 80% power at the 0.05 significance level, estimates of the necessary samples sizes required per group were calculated to be 55 for BMI, 120 for pulse rate, and 54 for prevalence of very good or excellent health. Our pilot study was not powered to detect such statistical effects, but is nonetheless important in pointing to associations that could be the focus of future research. Such further work is needed to provide for a more informed development and implementation of culturally appropriate health interventions. To date very little published empirical research has addressed such issues amongst Aboriginal populations in Australia.

The relationship between quitting smoking and mastery has theoretical cogency given quitting smoking is likely to require a high level of personal control. Bearing in mind that rates of smoking within Aboriginal populations are generally in excess of 50% (ABS, 2006b, 46% in this sample), it is perhaps not surprising that a significant relationship was found between mastery and quitting rather than non-smoking. However, it is also possible that higher mastery may be a consequence of having quit smoking. The cross-sectional design of this study does not allow us to comment on the direction of the association and further work is required to better understand this association and its relevance to intervention designs. Daniel et al. (2004) found an inverse relationship between current smoking and mastery amongst overweight persons in a northwest Canadian First Nations community, however this finding was not replicated amongst Yolŋu people in northeast Australia where there was no significant relationship between current smoking and mastery (Daniel, et al., 2006).
The latter study did, however, observe associations between mastery and age, diet, and physical activity.

The correlation between mastery and partner support is consistent with Pearlin's model of stress and coping (Pearlin, et al., 1981). The lack of a relationship between mastery and other types of social support may reflect the

complexity of the relationship between social support and wellbeing. While perceived support may have a buffering role against the effects of stress, receiving support can also entail an obligation to provide support to others, and the provision of this support comes at a cost. Support providers share in others' troubles which increases exposure to psychological strain and can undermine health (Kessler & McLeod, 1984; Schieman & Meersman, 2004). In the Goulburn-Murray region, the rate of Aboriginal employment is estimated to be 39% including those working on government-funded Community Development Employment Projects (CDEP) and those employed for as little as one hour per week (ABS, 2006a). The fact that the sample was drawn largely from employees of Aboriginal Community Controlled Organisations could mean that these participants are more likely to have a high demand on them for support from the broader community, therefore the 'cost of giving' is also likely to be high.

The finding that Aboriginal people with lower mastery had cholesterol levels below the levels considered normal for Australian adults is surprising but not implausible. It could, for example, reflect a positive association between mastery and a diet that supports higher serum cholesterol. That is, higher personal mastery might be associated with consumption of a higher saturated fat diet consistent with personal success. The upward trend to higher BMI with greater levels of mastery would support this explanation. A second explanation relates to research findings amongst Indigenous Australians where total (and HDL) cholesterol tends to be low, on average (O'Neal, et al., 2009). Studies have suggested a possible link between low serum cholesterol and negative psychological states such as depression which would be expected to correspond to low mastery levels. For example, low circulating blood lipids have been associated with depressive behaviours such as self-harm (Garland, et al., 2007), para-suicide (Garland, et al., 2000) and completed suicide (Lalovic, et al., 2007). However, results have been mixed and the relationship appears complex (Alvarez, et al., 2000; De Berardis, et al., 2009; Fiedorowicz & Coryell, 2007). This complexity was also demonstrated by Daniel et al. (2001) who found that HDL cholesterol was related positively to mastery and negatively to depressive affect amongst Canadian Aboriginal people with and at risk for Type 2 diabetes.

It is worth noting that mastery may have different meanings in different cultural contexts, including those found in the Goulburn-Murray, Arnhem Land or across Canada. In the Arnhem Land study (Daniel, et al., 2006), the mastery instrument developed by Pearlin was translated and adapted to the local context after an extensive period of consultation which included several iterative rounds of translation into Yolngu Matta with back translation into English to assess congruency of meanings. No such adaptation occurred in the Goulburn Valley. Pearlin's mastery instrument has been criticised for measuring a version of control which is essentially western and masculine in orientation and which therefore fails to accommodate Indigenous world views (Hobfall, et al., 2002; Riger, 1993). Results of qualitative research in the Goulburn Valley Aboriginal community found that sense of control was considered important by community members, however in line with criticisms of Pearlin's model, the results suggested that control tended to be expressed as an emotion-focused ('I do not feel stressed about problems') rather than problem-focused ('I can solve problems') quality (Reilly, et al., 2008). This may point to a lack of cultural equivalence of the mastery instrument.

As noted above, the small sample recruited for this pilot study is not necessarily representative of the broader Goulburn Valley Indigenous community. Although one might assume that including a majority of individuals employed at ACCOs would result in a bias towards individuals with higher mastery, earlier findings indicated higher rates of depression amongst this population compared to the broader Goulburn Valley Indigenous population (McKendrick & Charles, 2001) as well as lower rates of "excellent" or "very good" self-reported health (The Heart Health Project Steering Committee, 2007). It is therefore possible that the opposite interpretation could apply. As such we refrain from drawing any conclusions about the generalisation of these results to the broader Aboriginal population and instead highlight a number of areas for further study.

Implications for Practitioners

The results provide some support to the growing body of evidence that mastery or related perceived control constructs may be relevant to the promotion of cardiovascular health for Aboriginal people. In particular, the findings focus attention on the relationship between mastery and quitting smoking. This is significant in light of recent research indicating that a lack a psychosocial support presents a barrier to many Aboriginal people overcoming obstacles to quitting including stress, addiction and social pressure (Johnston & Thomas, 2010). Overall this study indicates that further research into how mastery may be usefully applied in an urban Aboriginal cultural context, including as a potential point of intervention for better health and wellbeing, is warranted.

Further, more focused and properly powered research is required to better understand the relationship between mastery and cardiovascular risk factors. In addition, other work might be concurrently undertaken to explore the cultural relevance of the mastery construct and to assess whether it should be adapted to meaningfully account for social and cultural processes specific to Aboriginal people. In this limited sample there was evidence that mastery was related to established biological (cholesterol), behavioural (quitting smoking) and social (partner support) indicators of cardiovascular health. Future research should explore each of these relationships in more detail. In the meantime, the findings provide general support for approaches to health promotion which foster individual mastery and control, such as Participatory Action Research (Cargo & Mercer, 2008). Participatory research has, for example, been effectively undertaken with Mohawk community intervention in Canada (Cargo, et al., 2008; Paradis, et al., 2005; Potvin, Cargo, McComber, Delormier, & Macauley, 2003). A participatory approach is essential as, otherwise, mastery may be targeted directly by a health promotion intervention but can also be threatened in the process of a more directive engagement of individuals and communities in health promotion or research activities. This is particularly true of marginalised communities but is not always acknowledged by well-

intentioned researchers, practitioners and policy makers seeking to intervene to improve the wellbeing of such communities. In general our findings serve as a reminder to bring issues of power and control to conscious awareness and to interact in ways that respect, preserve and promote the self-determination of communities and the individuals within them.

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