TITLE PAGE

Men, Hearts and Minds: Developing and piloting culturally-specific psychometric tools assessing psychosocial stress and depression in central Australian Aboriginal men

1. Alex Brown, alex.brown@sahmri.com

Wardliparingga Aboriginal Research Unit, South Australian Health and Medical Research Institute, North Tce., Adelaide, SA, 5000, Australia

School of Population Health, University of South Australia, South Australian Health and Medical Research Institute, North Tce., Adelaide, SA, 5000, Australia

2. Ricky Mentha, ricky.mentha@bakeridi.edu.au

Baker IDI Heart and Diabetes Institute, Alice Springs Hospital Campus
Gap Road, Alice Springs, Northern Territory, 0870, Australia

3. Michael Howard, michael.howard@sahmri.com

Wardliparingga Aboriginal Research Unit, South Australian Health and Medical Research Institute, North Tce., Adelaide, SA, 5000, Australia

4. Kevin Rowley, rowleyk@unimelb.edu.au

Onemda VicHealth Koori Health Unit, Melbourne School of Population and Global Health, University of Melbourne, Vic, 3010, Australia

5. Rachel Reilly, rachel.reilly@sahmri.com (corresponding author)

Wardliparingga Aboriginal Research Unit, South Australian Health and Medical Research Institute, Adelaide, SA, 5000

School of Population Health, University of South Australia, South Australian Health and Medical Research Institute, North Tce., Adelaide, SA, 5000, Australia

Ph. +61 8 8128 4216; m: 0416 119 129

6. Catherine Paquet, catherine.paquet@unisa.edu.au

Spatial Epidemiology and Evaluation Research Group, School of Population Health, Sansom Institute for Health Research, City East Campus, University of South Australia, Internal Post Code CEA-09, GPO Box 2471, Adelaide, South Australia, 5001, Australia.

Research Centre of the Douglas Mental Health University Institute, Verdun, Québec, H4H 1R2, Canada

7. Kerin O'Dea, kerin.odea@unisa.edu.au

School of Population Health, University of South Australia, South Australian Health and Medical Research Institute, North Tce., Adelaide, SA, 5000, Australia

ACKNOWLEDGEMENTS:

The authors wish to thank the commitment and contribution of the Aboriginal men involved in this work. The Men Hearts and Minds Study was funded by grants from the Australian Institute of Aboriginal and Torres Strait Islander Studies (2006); Australian Rotary Health Research Fund (2007) and National Health and Medical Research Council (#320860). Alex Brown was supported by a scholarship from the National Heart Foundation (PA 03D 1343). AB is supported by the Sylvia and Charles Viertel Charitable Foundation Senior Medical Research Fellowship.

Men, Hearts and Minds: Developing and piloting culturally-specific psychometric tools assessing psychosocial stress and depression in central Australian Aboriginal men

Abstract

Purpose: The health inequalities experienced by Aboriginal and Torres Strait Islander Australians are well documented but there is little empirical data outlining the burden, consequences, experience and expression of depressive illness. This paper seeks to address the lack of accessible, culturally-specific measures of psychosocial stress, depression or quality of life developed for, and validated within, this population.

Methods: Building on an extensive qualitative phase of research, a psychosocial questionnaire comprising novel and adapted scales was developed and piloted with 189 Aboriginal men across urban and remote settings in central Australia. With a view to refining this tool for future use, its underlying structure was assessed using exploratory factor analysis, and the predictive ability of the emergent psychosocial constructs assessed with respect to depressive symptomatology.

Results: The latent structure of the psychosocial questionnaire is conceptually aligned with the components of the *a priori* model on which the questionnaire was based. Regression modelling indicated that depressive symptoms were driven by a sense of injury and chronic stress and had a non-linear association with socio-economic position.

Conclusions: This represents the first community-based survey of psychosocial stress and depression in Aboriginal men. It provides both knowledge of and an appropriate process for the further development of psychometric tools, including quality of life, in this population. Further research with larger and more diverse samples of Aboriginal people is required to refine the measurement of key constructs such as chronic stress, socio-economic position, social support and connectedness. The further refinement, validation against criterion-based methods and incorporation within primary care services is essential.

Introduction

Depression is a prevalent, disabling chronic illness that contributes significant financial, emotional and human burdens to societies around the world [1]. It is associated with significant levels of social and emotional impairment, a range of adverse health outcomes, poor quality of life, physical impairment, increased health care utilisation and mortality [2-5] and is the leading global cause of life-years lived with disability [6]. The impact is not only borne by the individual patient, but extends to the wellbeing of families, communities and societies.

Depression has been identified in almost all populations for which it has been sought, yet significant differences are demonstrated across cultures in the experience, expression and consequences of a range of emotional terms and illnesses [7,8]. Culture may determine or frame causative, precipitating or maintenance factors, serving to influence the onset, symptom profile, impact, course and outcome of mental illness [9].

Health inequalities experienced by Aboriginal and Torres Strait Islander people are well documented [10], but there remains little empirical data outlining the burden, consequences, experience and expression of depressive and related illnesses. Further, assessment of the potential contribution of these psychological factors to existing health disparity has yet to occur. Mental illness and psychological distress are considered to be much higher among Aboriginal Australians. Rates of self-harm and suicide are higher amongst Aboriginal people than their non-Aboriginal counterparts [11,12,13]. Aboriginal adults have reported experiencing high or very high rates of psychological distress at more than twice the rate of non-Aboriginal Australians [14]. The risk of exposure to stressful life events is two to five times greater and is highest amongst those living in remote areas [15,16]. Aboriginal men are also at risk of adverse health outcomes including cardiovascular mortality at 1.8 times the rate of non-Aboriginal men across all age-groups, with the greatest disparity among men in the 35 to 54 years age bracket [17].

In many respects, methodological and conceptual challenges have hampered efforts to delineate the burden and impact of mental illness in this population. As outlined by Cawte [18], the study of psychiatric illness across cultures requires a foundation of ethnographic study of the population involved, to understand the sociocultural context of communities and illness experienced within them. Further, culturally sensitive instruments are required which reflect Aboriginal concepts of symptoms and disorders, lexicons and taxonomies. Until now, there have been few, if any, culturally-specific measures of psychosocial stress, depression or quality of life that have been developed for, or validated within, Australian Aboriginal and Torres Strait Islander populations.

The Men, Hearts and Minds (MHM) Study was a multi-stage, mixed methods study which sought to explore a comprehensive span of the determinants of heart disease and health disparity experienced by Aboriginal men. Culturally-specific psychometric tools were developed or adapted for this purpose following an extensive qualitative exploration of the meaning and expression of psychosocial distress and depression in this population [19]. Background qualitative work relating to the expression of depression and the adaptation of the nine-item Patient Health Questionnaire (PHQ-9) has been published in detail previously [19,20]. This process was extended to develop a comprehensive questionnaire, which could be used to delineate the intra-psychic and environmental factors contributing to psychological distress and depression in this population. The aims of this exploratory study were to:

- 1) Formulate a psychosocial questionnaire of relevance to this population by drawing on pre-existing surveys and questionnaire domains determined on the basis of the foundational qualitative work;
- 2) Pilot this psychometric tool in a sample of central Australian Aboriginal men;
- 3) Determine the underlying structure of the questionnaire using exploratory factor analysis; and

- 4) Assess the predictive ability of underlying psychosocial constructs captured by the questionnaire with respect to depressive symptomatology.

This represents the first community-based survey of psychosocial stress and depression in Aboriginal men, using adapted, validated tools, alongside novel, locally-specific screening questions.

Methods

Research setting and population

The region of central Australia comprises an area of 546, 046 square kilometres in the southern half of the Northern Territory. The Aboriginal population represents around 40% of the total population of 60 000 and is spread across more than 30 remote communities and the regional town of Alice Springs. Of a population of close to 28,000 residing within Alice Springs, Aboriginal people make up 25%, compared to 80% of the population living in remote or very remote communities. Around the perimeter of Alice Springs, 19 town camps are home to approximately 2000 Aboriginal residents. These are small communities comprising members of the same family or language groups, in some cases on lands that have been traditional ceremonial camping grounds for many generations [21].

On the basis of relationships developed with communities over the preceding 8 years, the research team discussed the planned project with senior Aboriginal men and representatives of community-based organisations within Alice Springs and three discrete remote communities. Formal negotiations began with community governance structures (community councils and health committees) and presentations were given to health staff, senior Aboriginal elders and local community councils in each community. All three remote communities and 5 of the 6 Aboriginal organizations approached in Alice Springs agreed to participate. These included: a social services provider, media organization, a community alcohol rehabilitation provider, a community development employment organization and a remote community infrastructure and resource development agency.

The study was approved by the Central Australian Human Research Ethics Committee. It was conducted in accordance with the 1964 Declaration of Helsinki and its later amendments and the National Health and Medical Research Council's 'Values and Ethics: Guidelines for the Ethical Conduct in Aboriginal and Torres Strait Islander Health Research' [22].

Defining the questionnaire domains

An iterative process of key informant interviews, literature review, in-depth interviews with a cross-section of Aboriginal men, expert review and focus groups was followed, in line with the process outlined by Haynes and colleagues [23] and reported elsewhere [19,20]. Thematic analysis of interviews drew on grounded theory and ethnographic techniques and resulted in a working model of psychological distress for this population incorporating chronic stress, social deprivation, and what we term, a 'sense of injury.' These domains were discussed with several key informants and refined over a period of 12 months. *Kurunpa* [spirit] [24] was seen by men as the foundation of vitality and was central to the physical, emotional and spiritual wellbeing of Aboriginal people (Figure 1). When explaining the burden of depression in Aboriginal men, existential questions of a sense of identity, meaning and Aboriginality were dominant in men's narratives. In particular, it was the repetitive and cumulative insults to men's ability to define and pursue their own sense of self and Aboriginal way of life that was most harmful. In this setting, material hardship - which was widespread in the study population - was considered of less importance to participants than the distress brought to them by marginalisation and oppression. The experience of adverse life events, unrelenting socio-cultural change, disconnection and cumulative stress was seen to drive ill-health. These were experienced and understood as life-long insults on the construction and acceptance of Aboriginal men's sense of self and their identities as Aboriginal people. On the basis of this working model and a review of relevant literature, questions were developed or adapted to address each of these domains.

[Figure 1]

The literature review sought existing psychological, social and epidemiological instruments to find previously validated measures or items that would tap into the identified priority themes (Table 1). Whilst this strategy identified potential items for the psychosocial tool, items relating to critical components of Aboriginal life in central Australia required development, including locally relevant markers or contributors to chronic stress, sense of injury, colonisation and connectedness. Additional elements were developed and continuously adapted via consultation with key informants. The resulting list of questions was reviewed in the same manner as the PHQ-9 [20], in focus groups that were re-convened for this purpose.

[Table 1]

Questionnaire Domains

Sense of Injury: Colonisation has been remembered across generations as a process that sought to depopulate, devalue, dehumanise and institutionalise Aboriginal people [42,43]. The implications of this process for health and wellbeing were affirmed in the qualitative components of the MHM study, where distress and depression were viewed as consequences of cumulative stress, disadvantage,

marginalisation, oppression, forced separation and an overwhelming sense of loss. The harm imposed on men was bound to the things of primary importance to the survival of Aboriginal culture, expressions of self and ways of life, and was embodied and experienced as a weakness or injury of spirit [*Kurunpa*].

For this work, a 'sense of injury' was defined as the degree of perceived harm stemming from repeated opposition to the pursuit, construction and sustainability of Aboriginal people's own determination of health and self. This construct was operationalised using a 12-item scale comprising questions tapping four domains that were conceptualized to contribute to a sense of injury: inability to be self-determining; lack of recognition; racism; and disconnectedness.

The Chronic Stress Scale: This 10-item scale sought assessment of the global level of perceived stress in Aboriginal men's lives, alongside key specific stressful life events, including stress stemming from drug and alcohol use, history of family being removed by government or welfare agencies and social relations.

The Deprivation Scale was established to measure the level of absolute deprivation (or unmet needs) incorporating markers of housing, safety, financial and food security, lack of transportation and difficulties accessing health and social services.

Strengths Scale was developed to determine the effects of family and community wellbeing and functional social support in times of distress.

Outcome Measures

The following outcome measures were used to test the predictive ability of the above psychosocial constructs.

Adapted PHQ-9 [20]: The standard instrument comprises nine self-report items measured on a 4-point scale reflecting the DSM-IV diagnostic criteria for major depressive episode [44]. Scores >9 are indicative of Major Depressive Episode. The adapted instrument follows the same administration and scoring procedures [45], with all questions translated to reflect Aboriginal phraseology and with the addition of two sub-questions. For example, the fifth item of original instrument asked respondents to identify changes in appetite according to opposite ends of a spectrum:

In the past two weeks how often have you been bothered by the following symptoms:

5. *Poor appetite or over-eating?*

While the adapted questionnaire separated these phenomena into distinct questions:

In the last two weeks, how often have you been feeling the following:

5a: Have you not felt like eating much ~~even~~ when there was food around?

5b: Have you been ~~eating~~ too much food?

Adapted K6: This screening scale comprises six items designed to measure non-specific psychological distress. The choice to include the K6 within the MHM Study rested on several key features: its confirmed brevity, validity, prior use in Australia and with Indigenous populations [46,47] and that it measured non-specific psychological distress rather than mood disorders specifically [48].

Culturally Specific Depression Scale: This scale included seven items measuring locally identified features of depressive symptoms in Aboriginal men, including questions on ‘weak spirit’, ‘homesickness,’ ‘worry’ and anger. The findings of the qualitative phase of work indicated that these were critical domains of depressive experience within Aboriginal men that were not covered specifically under any existing depression case-finding or severity measures, or the broader psychosocial questionnaire [20].

Piloting the psychosocial questionnaire

The psychosocial questionnaire was administered as part of a broader survey incorporating measures of socio-economic position, self-reported health, health behaviours and anthropometric measures. Participants were assessed across six psychological domains: depressive symptoms (PHQ-9 and culturally specific depression); psychological distress (K6); ‘deprivation;’ ‘sense of injury;’ ‘chronic stress;’ and ‘strengths.’

Participants were assessed at community clinics, worksites, onsite at Aboriginal organisations, or at a central research clinic according to the preference of individual participants. In almost all instances, separate male-only spaces were preferred. Recruitment commenced in November 2008 and concluded in April 2009. Participants were considered eligible if they were: Aboriginal men; self-reported residents of Central Australia; and able to provide informed consent. Most participants volunteered and two were referred to the project.

The project was explained to participants in the language of their choice, with the use of interpreters as required. Interpreters and Aboriginal Health Workers were present during information sessions and subsequent discussions with the participants about the research. All results were discussed with the individual participant and forwarded to their nominated primary care providers. In the event that

issues of concern were identified and required follow up, referral was arranged and supported. Specifically, negotiation with social and emotional wellbeing services, mental health and male counsellors occurred to develop a streamlined assessment and referral protocol for ensuring appropriate follow up after the conduct of the psychosocial inventories.

Statistical analyses

Descriptive analyses were performed using the SPSS Program (Version 21.0, Chicago IL, USA). For continuous descriptive variables, means were compared across socioeconomic categories with one-way analysis of variance procedures. Categorical variables were compared using the χ^2 test. Where significant variation was identified across multiple groups, post-hoc testing of polynomial associations was conducted. Exploratory factor analysis for ordinal data with oblimin rotation was conducted in MPlus v 7.1 [49]. Alpha coefficients were computed in RStudio (Version 0.98.490 – © 2009-2013 RStudio, Inc.) following the approach recommended by Gadermann and colleagues for estimating reliability coefficients for ordinal data [50]. Factor loadings and reliability coefficients were considered to uniquely assign items to factors and for each factor, the uniquely assigned items were averaged to create a summary score for the factor. These summary scores were simultaneously used in regression analyses to predict depression scores obtained from the PHQ-9 and cultural depression scales as well as depressive status as established through the PHQ-9. Negative binomial models were used for depression scores to account for the discrete positively-skewed distributions. Logistic regression was used for modelling depressive status. Regression analyses accounted for age category, Socio-Economic Position Index (SEP-Index: calculated as the sum of ranked tertiles of income, employment and years of education), financial strain, risk behaviours (alcohol problems, current smoker), history of mental disorder and residential location (urban/remote). Regression analyses were conducted in SAS (v 9.4, Cary, NC).

Results

Descriptive statistics

In total, 189 participants were recruited into the study, with 186 individuals undertaking the survey and clinical components of the study. Results are presented for these 186 individuals unless otherwise outlined. Participants ranged in age from 16 to 72 years (mean=34.8, SD=12.5), with most (56.5%) falling within the 25-44 years age bracket. The majority were married (54.8%), employed (including full-time, part-time, casual or Community Development Employment Program (CDEP): 65.9%) and educated beyond the age of 15 (62.4%). These socio-demographic characteristics were not markedly different from ABS 2006 Census data for rural and urban Central Australian profiles [51]. The

majority of urban and remote males were current smokers (68.5%) and drank alcohol (85.9%). Of those who drank alcohol, 66.7% indicated that they drank less than once a week. Most (81%) indicated they drank 6 or more drinks on each occasion. Nearly all (91.9%) recognized a particular place as their homelands or traditional country.

Almost 13% of the cohort had PHQ-9 scores ≥ 10 ; 4.3% with possible major depressive disorder (MDD) based on PHQ-9 scoring criteria [52] for DSM-IV-TR major depression [44]. In total, 40% of the cohort had elevated depressive symptomatology, ranging from mild (PHQ-9 score: 5-9; 27.4%) to moderate-severe depressive symptoms (PHQ-9 scores 10-14, 15-19 and 20+; 13%). Mean depression scores were compared across a number of social categories shown in Table 2. Depression scores were related to age, with mean scores increasing across age categories then falling in those over the age of 45 years (p-value for a U-shaped relationship = 0.035). Depression scores did not vary across individual measures of socio-economic position (SEP), but were evident when using a combined SEP Index (combined score across income, employment and years of schooling) and Financial Strain indicator (defined as having no money for one week out of the last two). Higher depression scores were noted in men within the lowest and highest SEP strata (and application of a polynomial [U-shaped] function to this association was significant; $p=0.030$) and those experiencing financial strain. Depression scores were also higher among current smokers (5.2 v 3.5; $p=0.01$) and men with diagnosed mental illness (9.8 v 4.4; $p=0.001$).

[Table 2]

Factor Analysis

An examination of the Kaiser-Meyer Olkin measure of sampling adequacy suggested that the study sample was factorable (KMO = 0.745) and Bartlett's test of sphericity was significant ($\chi^2(741) = 2223.52$, $p<0.01$). Examination of eigenvalues and scree plot of the initial solution including all variables, and consideration of the underlying theoretical framework led to a 4-factor solution. Items with loadings greater than 0.4 were retained, as shown in Table 3. The four factors were aligned conceptually with the *a priori* scales, and three of the four factor labels were retained from the questionnaire. Items from the strengths scale loaded on factor 3; however after removing those below the 0.4 threshold, the three remaining items pertained to social support, and were labelled accordingly. One item pertaining to racism ('Do you get treated badly because you are Aboriginal by people in town, shops, hospital or government?') was found to cross-load on 'perceived injury' and 'chronic stress.' Items were considered to cross-load if their factor loadings differed by less than 0.2. This item was assigned to the fourth factor on the basis of the alpha coefficient as this maximised the internal

consistency of each factor. Final alpha coefficients are reported for each factor in Table 3 and were all within the acceptable range. This final structure was used to compute the summary scores.

[Table 3]

Predictive validity

Results of regression analyses predicting three depressive outcome measures are presented in table 4. Results indicate that the perceived injury and chronic stress factors were positively associated with depressive scores (measured with both the adapted PHQ-9 and cultural depression scale) and depression status (PHQ>9) in unadjusted and fully adjusted models. No statistically significant associations were found between depression measures and the deprivation and social support factors.

[Table 4]

Discussion

‘Men Hearts and Minds’ (MHM) is the first in-depth study of psychosocial stress and depression in Central Australian Aboriginal men. There were few examples in the literature to guide this work, and no pre-existing, culturally relevant psychometric tools appropriate for this purpose. In more recent years, psychometric scales measuring other psychological constructs have been developed, such as the ‘Growth and Empowerment Measure’ [53] and ‘Strong Souls,’ a measure of social and emotional wellbeing in youth [54]. These show promise for use in Aboriginal populations, alongside the measures of psychosocial stress and depression arising from this work. As in other populations, depression can be associated with adverse health behaviours, including smoking and alcohol use, framed by stressors including socio-economic disadvantage, discrimination, marginalisation and isolation [55,56]. The psychosocial tools developed for the MHM project represent a first attempt to capture these unique stressors and to explore their relationship to culturally appropriate measures of depression. The results need to be interpreted in light of the relatively small sample and cross-sectional design, and further work validating these tools in larger samples including women will be necessary before we can comment on the generalisability of the findings. However, the unique process undertaken to develop and ensure the cultural and contextual appropriateness of the scales is likely to have applicability to other communities.

In this group, almost 40% of men had elevated depressive symptomatology (mild-severe), with 4.3% reporting scores indicative of major depressive disorder. In the general population in Australia, the prevalence rate for major depression among men is estimated to be 5.3% [57]. There are few population-based studies that can provide adequate context for the high rate of sub-clinical depressive

symptomatology found in this sample. However, it has resonance with the NATSIHS 2004-05, in which it is reported that 27% of Aboriginal respondents nationally reported high to very high rates of 'non-specific psychological distress,' with serious implications for daily and occupational functioning [15]. This study advances our understanding of the psychological distress experienced by Aboriginal men away from 'non-specific' to a state firmly situated within the historical and current social processes of colonisation.

The latent structure of the psychosocial questionnaire is conceptually aligned with the components of the *a priori* model on which the questionnaire was based: Deprivation (relating to the physical environment), sense of injury (incorporating items reflecting barriers to fulfilment including a lack of respect and recognition, freedom to participate fully in culture and life, and racism), social support (comprising three items from the strengths scale relating to social support and connection) and chronic stress (comprising all 4-point items from the original chronic stress scale). Financial strain was *a priori* part of the deprivation score, however in factor analysis it loaded with 'perceived injury', perhaps because it may act as a barrier to self-determination and represents a feature of disconnection (Figure1). Chronic stress in contrast is clearly related to interactions with other people. The good internal reliability (>0.75) of the scales calculated on the basis of these factors is encouraging. Regression modelling indicated that the depressive symptoms expressed in this population are driven by a 'sense of injury' and chronic stress.

The 'sense of injury' scale attempts to capture the perceived harm stemming from repeated impediments to the pursuit, construction and sustainability of Aboriginal people's own determination of health and self. This includes experiences of racism, a lack of external validation of self and identity and an inability to care for things within Aboriginal men's lives that they themselves feel are important. The finding that a sense of injury is a predictor of depression in this sample is consistent with findings relating to the association between experiences of racism and depression in Australian Aboriginal people. In a recent survey of racist experiences, stress and depression, Paradies and Cunningham [58] report an association between racism and depression mediated by stress, lack of control, negative social connections and reactions to racism.

The issue of mastery or control is also encapsulated within the sense of injury scale but requires further exploration. An established evidence based links a sense of mastery or control with better health and mental health [59,60] and there is a small body of research extending these findings to Aboriginal Australian communities [61,62]. The 'sense of injury' construct explicitly incorporates the idea that the social processes driven by colonisation have undermined the ability of Aboriginal men to determine the direction of their own lives. As such, although not directly comparable, the current

findings indicate that a loss of control, or impediments to self-determination, may play a role in increasing depression risk.

Notably, depression was not associated with individual socioeconomic indicators measured in the conventional way (income, employment, education and housing) but it did have a U-shaped relationship with a composite measure of socioeconomic position (SEP-index). It is well documented that markers of disadvantage are all too common among Aboriginal people. Beyond health disadvantage, Aboriginal Australians are, on average, less likely to be employed, wealthy and receive the benefits of higher levels of education. They are more likely to live below the poverty line, lack access to fundamental social and health resources, be exposed to adverse life experience, be touched by the loss and grief of close family members, be incarcerated or have been affected by the forced separation of their families. Given how widespread social deprivation is amongst Aboriginal people, and the difference in social and cultural processes between Aboriginal and 'mainstream' Australian contexts, it is to be expected that social determinants of health also differ across these two cultural groups [63]. Furthermore, we propose that in the face of overwhelming material deprivation, it is in fact existential impediments to the construction of self and what these men considered an Aboriginal identity that was most salient in terms of depressive illness.

Our findings are consistent with observations in other Aboriginal settings suggesting that the social gradient in health found in the non-Aboriginal population, and often assumed to be ubiquitous across populations, does not drive health differentials in the same way within the Australian Aboriginal population. In a regional population in northern Victoria, people with a job and income were also subject to far greater demands with resultant effects on psychosocial wellbeing including risk of depression [64]. The findings are consistent with absolute deprivation being a source of stress, which is also supported by the association of depressive score with the functional measure of income in 'financial strain.'

The question of how Aboriginal people and communities continue to survive despite profound disadvantage is yet to be clearly elucidated, but may well be critical to better articulating interventions that help support community resilience and wellbeing. Importantly, in the face of profound material deprivation, it is likely to be those individuals who experience significant external 'harm' as a result of oppression, racism and colonisation, and consequent threats to their sense of self, who are most vulnerable to developing depression. There is no pan-Aboriginal reality, however. Heterogeneity is not only a strength of Indigenous peoples; it offers a window of opportunity to better understand the psychosocial pathways to health and illness, and subsequent social and biomedical action.

In this dataset, three items from the original 7-item 'strengths' scale loaded on a factor best described as 'social support.' In regression analysis, social support was not significantly related to depression or

psychological distress. In general, findings pertaining to social support and mental health support a positive association between these two constructs. However, the association is complicated by the fact that social relationships can be complicated [65]. The effect of social support on mental and physical health can vary according to whether the person is giving or receiving help [66,67], perceives that there are people that would help when in need, as opposed to actually needing or receiving support [68] and other psychosocial factors such as gender, self-esteem or levels of mastery [69]. In their recent systematic review, Priest and Paradies [70] found that social support moderated the effect of racism on mental health for Aboriginal young people. In contrast, Ziersch and colleagues [71] found that the predictive relationship between experiences of racism and poorer mental health amongst Aboriginal adults in South Australia did not change when social resources were added. Understanding the cultural salience of social support measures for Aboriginal people requires further work.

Connectedness is central to Aboriginal constructions of wellbeing as has been broadly acknowledged across a diverse range of Aboriginal communities [72-75]. This was also articulated in the qualitative work underlying this project where foundations of Aboriginal wellbeing were defined as the Law [*Tjukurpa*], Family [*Walytja*], the land [*Ngurra*] and the sense and obligations to care for and remain connected to the social, physical and emotional world around them [*Kanyini*]. Aboriginal primary explanations for the increasing burden of emotional distress in Aboriginal men were the severance from these foundations of wellbeing. At this stage, important questions remain relating to the measurement of wellbeing and this more expansive notion of what connectedness means for Aboriginal people, examples of which have been documented elsewhere [76,77].

Conclusions:

The development of depression, stress and resilience screening tools offers both a window of opportunity for future research, and a potential pathway for improving the identification and treatment of depression and psychological distress in Aboriginal people. The understanding of how depression is related to cardiovascular outcomes is rapidly evolving and the next stage of this research will be to explore the relationships between psychosocial stress, depression and cardio-metabolic biomarkers in a larger cohort of Aboriginal people, including women. The further refinement of culturally-appropriate psychosocial assessment tools, their validation against criterion-based methods and incorporation within primary care services are essential steps towards addressing the high rates of psychological distress in Aboriginal Australians.

On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

1. Cassano P, Fava M (2002) Depression and public health: An overview. *J Psychosom Res*, 53:849-857.
2. Beekman A, Deeg D, Braam A, Smit J, Van Tilberg W (1997) Consequences of major and depressed mood in later life: a study of disability, well-being and service utilization. *Psychosom Med* 27:1397-1409.
3. Fawcett J (1993) The morbidity and mortality of clinical depression. *Int Clin Psychopharmacol*, 8:217-220.
4. Penninx B, Beekman A, Honig A, Deeg D, Schoevers R, van Eijk J, van Tilberg, W (2001) Depression and cardiac mortality: results from a community-based longitudinal study. *Arch Gen Psychiatry* 58:221-227.
5. Steptoe A, Whitehead DL (2005) Depression, stress, and coronary heart disease: the need for more complex models [Editorial]. *Heart* 91:419-420.
6. Murray C, Lopez A (1996) *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020*. Harvard University Press, Boston
7. Good B, Kleinman A (1985) Epilogue: Culture and Depression. In: Kleinman A, Good B (ed) *Culture and Depression. Studies in the Anthropology and Cross-Cultural Psychiatry of Affect and Disorder*. University of California Press, Berkeley
8. U.S. Department of Health and Human Services (2001) *Mental Health: Culture, Race and Ethnicity-A Supplement to Mental Health: A Report of the Surgeon General*. U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, Rockville
9. Marsella AJ, Sartorius N, Jablenski A, Fenton FR (1985) Cross-Cultural Studies of Depressive Disorders: An Overview. In: Kleinman A, Good B (ed) *Culture and Depression. Studies in the Anthropology and Cross-Cultural Psychiatry of Affect and Disorder*. University of California Press, Berkeley
10. Australian Institute of Health and Welfare (2011a) *The health and welfare of Australia's Aboriginal and Torres Strait Islander people, an overview 2011*. Cat. no. IHW 43 Canberra: AIHW.
11. Australian Bureau of Statistics (2012) 3309.0 - Suicides, Australia, 2010: Aboriginal and Torres Strait Islander Suicide Deaths.
<http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/40080452773CE5D5CA257A4500045E5F?opendocument>. Accessed 29 May 2015
12. Social Health Reference Group (2003) Consultation paper for the development of the Aboriginal and Torres Strait Islander National Strategic Framework for Mental Health and

Social and Emotional Well Being 2004 - 2009. Commonwealth Department of Health and Ageing, Canberra

13. Australian Bureau of Statistics, Australian Institute of Health and Welfare (2005) The Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples 2005. ABS Cat No. 4704.0 and AIHW Cat No. IHW14. ABS and AIHW, Canberra
14. Australian Institute of Health and Welfare (2011b) The health and welfare of Australia's Aboriginal and Torres Strait Islander people, an overview 2011. Cat. no. IHW 42. AIHW, Canberra
15. Australian Bureau of Statistics (2004) National Aboriginal and Torres Strait Islander Social Survey 2002. ABS Cat. No. 4824.0. ABS, Canberra
16. Kelly K, Dudgeon P, Gee G, Glaskin B (2009) Living on the Edge: Social and Emotional Wellbeing and Risk and Protective Factors for Serious Psychological Distress among Aboriginal and Torres Strait Islander People. (Vol. Discussion Paper No. 10). Cooperative Research Centre for Aboriginal Health, Darwin
17. Australian Bureau of Statistics and Australian Institute of Health and Welfare (2012) The Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples, Oct 2010. ABS Catalogue No. 4704.0. AIHW Catalogue No. IHW 42. ABS and AIHW, Canberra
18. Cawte J (1972) Cruel, Poor and Brutal Nations: the assessment of mental health in an Aboriginal community by short-stay psychiatric field team methods. The University of Hawaii Press, Honolulu
19. Brown A, Scales U, Beever W, Rickards B, Rowley K, O'Dea K (2012) Exploring the expression of depression and distress in aboriginal men in central Australia: a qualitative study. BMC Psychiatry. doi: 10.1186/1471-244x-12-97
20. Brown A, Mentha R, Rowley KG, Skinner T, Davy C, O'Dea K (2013) Depression in Aboriginal men in Central Australia: Adaptation of the Patient Health Questionnaire 9. BMC Psychiatry. doi:10.1186/1471-244X-13-271
21. Foster D, Mitchell J, Ulrik J, Williams R (2005) Population and Mobility in the Town Camps of Alice Springs. Tangentyere Council Research Unit, Desert Knowledge Cooperative Research Centre, Alice Springs
22. National Health and Medical Research Council (2003) Values and Ethics: Guidelines for Ethical Conduct in Aboriginal and Torres Strait Islander Health Research. NHMRC, Canberra
23. Haynes S, Richard D, Kubany E (1995) Content validity in psychological assessment: A functional approach to concepts and methods. Psychol Assess 7:238-247
24. Goddard C (2006) Pitjantjatjara/Yankunytjatjara to English Dictionary, 2nd edn. IAD Press, Alice Springs
25. Australian Bureau of Statistics (1999) National Survey of Mental Health and Wellbeing of Adults: Users' Guide. ABS Cat No. 4327. ABS, Canberra

26. Australian Bureau of Statistics (2004) National Aboriginal and Torres Strait Islander Social Survey 2002. ABS Cat. No. 4824.0. ABS, Canberra
27. Australian Bureau of Statistics. (2006b) National Health Survey and National Aboriginal and Torres Strait Islander Health Survey 2004/05: data reference package, 2004-05. ABS Cat. No. 4363.0. ABS, Canberra
28. Hawthorne G, Richardson J, Osborne, R, McNeil, H (1997) The Assessment of Quality of Life (AQoL) Instrument: Construction, Initial Validation and Utility Scaling. Centre for Health Program Evaluation Working Paper 76. CHPE, West Heidelberg
29. The World Health Organization (2004) The World Health Organisation Quality of Life (WHOQOL) – BREF. WHO, 2004
30. Ware J, Sherbourne C (1992) The MOS 36 Item Short Form Health Survey (SF-36): 1. Conceptual framework and item selection. *Med Care*, 30:473-483.
31. Zubrick S, Silburn S, Lawrence D, Mitrou F, Blair E et al. (2005). The West Australian Aboriginal Child Health Survey: The social and emotional wellbeing of Aboriginal children and young people. Curtin University and Telethon Institute for Child Health Research, Perth
32. Westerman TG (2003) Development of an inventory to assess the moderating effects of cultural resilience with Aboriginal youth at risk of depression, anxiety and suicidal behaviours. Indigenous Psychological Services, Perth
33. The Strong Heart Study Investigators (2001) The Strong Heart Study: Cardiovascular Disease in American Indians (Phase V): Operations Manual - Vol 8: Psychosocial Questionnaires. Strong Heart Study Coordinating Center, Center for American Indian Health Research, Oklahoma City
34. Cohen S, Kamarck T, Mermelstein R (1983) A global measure of perceived stress. *J Health Soc Behav*, 24:386-396
35. Karasek R, Baker D, Marxer F, Ahlbom A, Theorell T (1981) Job decision latitude, job demands, and cardiovascular disease: a prospective study of Swedishmen. *Am J Public Health*, 71:694-705.
36. Siegrist J, Starke D, Chandola T, Godin I, Marmot M, Niedhammer I, Peter R (2004) The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med*, 58:1483-1499.
37. Whitbeck L, McMorris B, Hoyt D, Stubben J, LaFromboise T (2002) Perceived Discrimination, Traditional Practices, and Depressive Symptoms among American Indians in the Upper Midwest. *J Health Soc Behav* 43:400-418.
38. Dong M, Giles WH, Felitti VJ, Dube SR, Williams JE, Chapman DP, Anda RF (2004) Insights into causal pathways for ischemic heart disease: adverse childhood experiences study. *Circulation*, 110:1761-1766.

39. AI-SUPERPFP Investigators. National Center for American Indian and Alaska Native Mental Health Research Training Manual. Denver Colorado: NCAIANMHR.
40. Sartorius N, Janca A (1996) Psychiatric assessment instruments developed by the World Health Organisation. *Soc Psychiatry Psychiatr Epidemiol*, 31:55-69
41. The ENRICHD Investigators (2000) Enhancing recovery in coronary heart disease patients (ENRICHD): Study design and methods. *Am Heart J*, 139:1-9.
42. Spry F, Lowe H (2001) A submission from the Northern Territory Aboriginal Male Health Reference Committee to the Parliament of Australia House of Representatives Standing Committee on Employment, Education and Workplace Relations: Inquiry into the Education of Boys, Darwin
43. Wenitong M (2001) A Report on Indigenous Male Health. The Office for Aboriginal and Torres Strait Islander Health and Aged Care, Canberra
44. American Psychiatric Association (2000) Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition- Text Revision. American Psychiatric Association, Arlington, VA
45. Kroenke K, Spitzer RL, Williams, JB, Lowe B (2010) The Patient Health Questionnaire Somatic, Anxiety, and Depressive Symptom Scales: a systematic review. *Gen Hosp Psychiatry*, 32:345-359
46. Australian Institute of Health and Welfare (2009) Measuring the social and emotional wellbeing of Aboriginal and Torres Strait Islander peoples, Cat. no. IHW 24. AIHW, Canberra
47. Centre for Epidemiology and Research (2010) 2006–2009 Report on Adult Aboriginal Health from the New South Wales Population Health Survey. NSW Department of Health, Sydney
48. Kessler RC, Barker PR, Colpe, LJ, Epstein JF, Gfroerer, JC, Hiripi E, Zaslavsky AM (2003) Screening for serious mental illness in the general population. *Arch Gen Psychiatry*, 60:184-189.
49. Muthen LK, Muthen BO (1998-2012) MPlus User's Guide, 7th edn. Muthen and Muthen, Los Angeles, CA
50. Gadermann AM, Guhn M, Zumbo BD (2012) Estimating ordinal reliability for Likert-type response data: A conceptual, empirical and practical guide. *Prac Asses, Res and Eval*, 17(3).
51. Australian Bureau of Statistics. (2006a) 2006 Census Australia, Cat No. 2001.0. ABS, Canberra
52. Kroenke K, Spitzer R, Williams J (2001) The PHQ-9: validity of a brief depression severity measure. *J Gen Int Med*, 16:606-613
53. Haswell MR, Kavanagh D, Tsey K, Reilly L, Cadet-James Y, Laliberte A, Wilson A, Doran C (2010) Psychometric validation of the Growth and Empowerment Measure (GEM) applied with Indigenous Australians. *Aust NZ J Psychiatry*, 44:791-799.

54. Thomas A, Cairney S, Gunthorpe W, Paradies Y, Sayers S (2010) Strong Souls: development and validation of a culturally appropriate tool for assessment of social and emotional well-being in Indigenous youth. *Aust NZ J Psychiatry*, 44:40-48.
55. Scollo, MM, Winstanley MH (2012) Tobacco in Australia: Facts and issues (4th edn). Cancer Council Victoria, Melbourne
56. Sullivan L, Fiellin D, O'Conner P (2005) The prevalence and impact of alcohol problems in major depression: A systematic review. *Am J Med*, 118:330-341.
57. Australian Bureau of Statistics (2009) Australian Social Trends. ABS Catalogue No. 4102.0. <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features30March%202009>. Accessed 28 November 2014
58. Paradies Y, Cunningham J (2012) The DRUID study: exploring mediating pathways between racism and depressive symptoms among Indigenous Australians. *Soc Psychiatry Psychiatric Epidemiol*, 47:165-173.
59. Chandola T, Kuper H, Singh-Manoux A, Bartley M, Marmot M (2004) The effect of control at home on CHD events in the Whitehall II study: gender differences in psychosocial domestic pathways to social inequalities in CHD. *Soc Sci Med*, 58:1501-1509
60. Colman I, Naicker K, Zeng Y, Ataullahjan A, Senthilselvan A, Patten SB (2011) Predictors of long-term prognosis of depression. *CMAJ*. doi:10.1503/cmaj.110676
61. Daniel M, Brown A, Dhurrkay JG, Cargo M, O'Dea, K (2006) Mastery, perceived stress and health-related behaviour in northeast Arnhem Land: a cross-sectional study. *Int J Equity Health*. doi: 10.1186/1475-9276-5-10
62. Reilly R, Doyle J, Daniel M, Aitken L, Atkinson V, Briggs P, Rowley K (2011) A pilot study of psychosocial factors and cardiovascular risk amongst Aboriginal people living in the Goulburn Valley. *J Rural Tropical Public Health*, 10:8-14.
63. Anderson I (2001) Aboriginal health, policy and modelling in social epidemiology. In: Eckersley R, Dixon J, Douglas B (ed), *The Social Origins of Health and Well-being*. Cambridge University Press, Cambridge, pp. 247-258.
64. McKendrick J, Charles S (2001) Report of the Rumbalara Aboriginal Mental Health Research Project. Rumbalara Aboriginal Co-operative Ltd Woongi Cultural Healing Group & Dept Psychiatry, University of Melbourne, Shepparton
65. Holt-Lunstad J, Uchino BN, Smith TW, Hicks A (2007) On the importance of relationship quality: The impact of ambivalence in friendships on cardiovascular functioning. *Annals of Behav Med*, 33, 278-290.
66. De Kong Giefveld J, Dykstra P (2008) Virtue is its own reward? Support-giving in the family and loneliness in middle and old age. *Ageing Soc*, 28:271-187
67. Lu L, (1997) Social support, reciprocity and well-being. *J Soc Psychol*, 137:618-628

68. Lindorff M (2000) Is it better to perceive than receive? Social support, stress and strain for managers. *Psychol, Health & Med*, 5:271-286
69. Konrath S, Brown S (2013) The Effects of Giving on Givers. In: Newman, ML & Roberts, NA (ed) *Health and Social Relationships: The Good, the Bad and the Complicated*. The American Psychological Association, Washington DC
70. Priest N, Paradies Y (2013) A systematic review of studies examining the relationship between reported racism and health and wellbeing for children and young people. *Soc Sci Med*, 95:115-127
71. Ziersch AM, Gallaher G, Baum F, Bentley M (2011) Racism, social resources and mental health for Aboriginal people living in Adelaide. *Aust NZ J Public Health*. doi: 10.1111/j.1753-6405.2011.00681.x
72. Kingsley J, Townsend M, Henderson-Wilson C, Bolam B (2013) Developing an exploratory framework linking Australian Aboriginal peoples' connection to country and concepts of wellbeing. *Int J Environ Public Health*, 10:678-698
73. National Aboriginal Health Strategy Working Party (1989) *A National Aboriginal Health Strategy: Report of the National Health Strategy Working Party*, Canberra
74. Reilly RE, Doyle J, Bretherton D, Rowley KG (2008) Identifying psychosocial mediators of health amongst Indigenous Australians for the Heart Health Project. *Ethnicity & Health*, 13:351-373
75. Vickery J, Faulkhead S, Adams K, Clarke A (2007) Indigenous Insights into Oral History, Social Determinants and Decolonisation. In: Anderson I, Baum F, Bentley M (ed) *Beyond Band-aids: Exploring the underlying determinants of Aboriginal health*. Papers from the Social Determinants of Aboriginal Health Workshop, Adelaide, July 2004. CRC for Aboriginal Health, Darwin
76. Luke JN, Anderson, IP, Gee GJ, Thorpe R, Rowley KG, Reilly RE, Stewart PJ (2013) Suicide ideation and attempt in a community cohort of urban Aboriginal youth: a cross-sectional study. *Crisis*. doi: 10.1027/0227-5910/a000187
77. McCoy BF (2008) *Holding Men: Kanyirninpa and the health of Aboriginal men*. Aboriginal Studies Press, Canberra

Figure 1: Working conceptual model of psychosocial factors leading to psychological distress.

78.

Table 1: Reviewed Tools for the Development of the MHM Psychosocial Questionnaire.

Domain	Tool(s)/Data Source	Comments	Reference
Multiple Domains	<i>Mental Health Survey</i> <i>NATSISS</i> <i>NHS/NATSISS</i>	Nationally collated health, demographics and social surveys	ABS 1999 [25] ABS 2004 [26] ABS 2006b [27]
Quality of Life	AQoL WHOQOL (BREF) SF 36		Hawthorne et al. 1997 [28] WHO 2004 [29] Ware 1992 [30]
Child Health and wellbeing	The Western Australia Aboriginal Child Health Survey		Zubrick et al. 2005 [31]
Adolescent Mental Health	WASC-Y	A culturally specific depression and anxiety scale for Indigenous adolescents	Westerman 2003 [32]
Multiple Domains	Strong Heart Study	Study of CVD in American Indians	SHS Investigators [33]
Perceived Stress	PSS		Cohen et al. 1983[34]
Job Strain			Karasek et al. 1981[35]
Effort-Reward Imbalance			Seigrist et al. 2004 [36]
Perceived Discrimination, Deprivation, Social Support		Study of Perceived Discrimination and depression in American Indian community	Whitbeck et al. 2002 [37]
Adverse Childhood Events	ACE	Association between childhood adversity and adult disease	Dong et al. 2004 [38]
Multiple Domains	DRUID Study	Study of diabetes and related conditions in an urban Australian Aboriginal population	Cunningham J, 2006 Unpublished report, Menzies School of Health Research, Darwin

Mental Health	AI-SUPERPFP	epidemiological survey of mental health in American Indian communities	AI-SUPERPFP Investigators [39]
Cross Cultural Mental Health Instruments	WHO		Sartorius & Janca 1996 [40]
Social Support	ENRICHD Study Social Support Scale	Study of Depression, Social Support and Heart Disease	ENRICHD Investigators [41]

79.

Table 2: Depression [PHQ-9] scores across social and socioeconomic variables

		n	MEAN	95% CI	p Value
Age	<25yrs	43	4.5	3.2 - 5.8	0.035
	25-34yrs	59	5.1	4.1 - 6.1	
	35-44yrs	46	5.6	4.0 - 7.2	
	45yrs+	38	3.0	1.9 - 4.1	
Marital status	Married	102	4.4	3.5 - 5.3	0.357
	Single	84	5.0	4.1 - 5.9	
Income (fortnightly)	\$0-399	74	5.3	4.2 - 6.3	0.220
	\$400-999	72	4.0	3.1 - 4.9	
	\$1000+	40	4.7	3.2 - 6.1	
Employment	Unemployed	63	5.2	4.1 - 6.1	0.454
	Part-time/CDEP*	53	4.7	3.5 - 6.0	
	Full-time	69	4.2	3.2 - 5.2	
SEP Index†	Low	73	5.7	4.6 - 6.7	0.030
	Medium	67	3.8	2.9 - 4.6	
	High	46	4.4	3.0 - 5.8	
Financial Strain§	Yes	134	4.9	4.2 - 5.6	0.014
	No	49	3.3	2.2 - 4.3	
Prior Mental Illness	Yes	8	9.8	3.8 - 15.8	0.001
	No	178	4.4	3.8 - 5.0	
Smoking	Current	126	5.2	4.4 - 6.1	0.010
	Non-smokers	60	3.5	2.8-4.1	

*Community Development Employment Program

† Combined SES score derived from years of education, income and employment status

§ Defined as having no money for more than one week every fortnight.

Table 3: Factor structure of psychosocial questionnaire (items with loadings greater than 0.4 (absolute terms) are shown)

Item	Deprivation	Perceived injury	Social Support	Chronic Stress
Lack transport	0.41			
Not enough food	0.55			
No fridge	0.61			
No phone	0.78			
Unsafe neighbourhood	0.61			
Interrupted sleep	0.61			
Unable to care for important things		0.47		
Lack all you need to be happy and healthy		0.48		
Not enough money for needs		0.43		
Unable to live life the way you want		0.49		
Not respected		0.59		
Not recognised for skills		0.82		
Don't get what you deserve		0.68		
Unable to pass on knowledge		0.52		
Connected to family			0.69	
Help through tough times			0.68	
People close who take hold			0.68	
Treated badly as Aboriginal		0.47		0.45
Hassled by police				0.43
Feel stressed and worried				0.61
Too much grief				0.62
Relationship problems				0.73
Problems with grog				0.55
People take too much				0.67
Too much humbug*				0.76
Too much worry				0.58
Too much anger				0.70
Get treated unfairly				0.56
Number of test measures	6	9	3	9
Eigenvalues	6.43	4.33	2.44	1.72
Reliability Coefficient	0.79	0.83	0.78	0.87

*Humbug refers to people asking too much of you

Table 4: Results of unadjusted and adjusted regression models with psychosocial summary scores predicting depression outcomes.

Outcome	Predictor	Unadjusted Model			RR/OR*
		RR/OR*	95%CI	P	
Depression score (Adapted PHQ-9)	Deprivation Score	0.95	(0.79, 1.14)	0.58	0
	Perceived Injury Score	1.53	(1.25, 1.87)	<0.0001	1
	Social Support Score	1.12	(0.95, 1.33)	0.16	1
	Chronic Stress Score	2.62	(2.10, 3.28)	<0.0001	2
	Age category (< 25 vs. ≥ 45)				1
	Age category (25-34 vs. ≥ 45)				1
	Age category (35-44 vs. ≥ 45)				1
	SEP Index				0
	Days fortnightly income last (<13 days)				1
	Alcohol problems				1
	Current smoker				1
	Previous history of mental disorder				1
	Remote location (vs. urban)				0
	Town Camp (vs. urban)				1
Cultural depression (bespoke scale)	Deprivation Score	1.05	(0.85, 1.3)	0.66	1
	Perceived Injury Score	1.45	(1.15, 1.83)	0.0015	1
	Social Support Score	0.98	(0.82, 1.18)	0.85	0
	Chronic Stress Score	2.51	(1.95, 3.24)	<0.0001	2
	Age category (< 25 vs. ≥ 45)				1
	Age category (25-34 vs. ≥ 45)				1
	Age category (35-44 vs. ≥ 45)				1
	SEP Index				1
	Days fortnightly income last (<13 days)				1
	Alcohol problems				1
	Current smoker				1
	Previous history of mental disorder				0
	Remote location (vs. urban)				0
	Town Camp (vs. urban)				1
Depressive Status (PHQ-9 >9)	Deprivation Score	0.63	(0.25, 1.61)	0.34	0
	Perceived Injury Score	6.08	(2.17, 16.99)	0.0006	6
	Social Support Score	1.47	(0.66, 3.29)	0.35	1
	Chronic Stress Score	13.00	(3.96, 42.70)	<0.0001	1
	Age category (< 25 vs. ≥ 45)				2
	Age category (25-34 vs. ≥ 45)				0
	Age category (35-44 vs. ≥ 45)				0
	SEP Index				1
	Days fortnightly income last (<13 days)				2
	Alcohol problems				1
	Current smoker				2
	Previous history of mental disorder				4
	Remote location (vs. urban)				0
	Town Camp (vs. urban)				2

*Odds ratio for models predicting depressive status.