

Beneficial impact of the Homelands Movement on health outcomes in central Australian Aborigines

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Declines in Aboriginal infant and perinatal mortality during the past two decades have been countered by rising mortality and morbidity among adults due to injury, diabetes, cardiovascular and respiratory disease.¹

Alcohol-related problems and diabetes have been identified by Aborigines as the two most pressing health issues in communities in a recent national survey.²

Poor health outcomes among Aborigines in remote communities have their roots in the history of physical and social dislocation of traditional family-based groups and the poor living conditions persisting in many of these settlements today.

From the late 19th Century until the end of the 1960s, a number of factors combined to move Aboriginal groups from their traditional lands to government settlements and missions in remote Australia. These included the expansion of pastoralism, particularly in northern and central Australia, government assimilation policies of the 1950s and 1960s, and rations offered by missions. Many Aboriginal people found employment on pastoral properties but changes in the industry in the late 1960s forced movement to already crowded remote settlements or to the fringes of outback towns. The poor physical environment in these places was worsened by overcrowding and the tensions arising from the forced association of different tribal groups. In outback towns, 'fringe camps' grew and poor living conditions led to high rates of infectious disease, malnutrition and substance abuse.

Changes in government policy in the 1970s, notably the replacement of an assimilationist policy with one of self-determination, gave Aboriginal people the opportunity to regain a degree of control over where they lived. Many small family groups began moving back to traditional homelands from settlements, towns and missions.³

There are several objectives of the homelands movement according to Aboriginal people,⁴ including:

- returning to traditional country in order to look after the land and its sites of cultural significance;
- seeking a safer, healthier and culturally more satisfying lifestyle, free of the social stresses, alcohol abuse, petrol sniffing and domestic violence of some of the larger communities and towns;
- re-establishing the importance and authority of the family;
- teaching young people about their cultural heritage;
- living a healthier lifestyle, with better food and opportunities for hunting; and
- keeping young people out of trouble with the police.

Supporting the homelands movement has resource implications for service providers, as many outstations are quite remote from existing service centres.⁵ Until this study, there has been little evidence either to support anecdotal claims of health benefits⁶ or refute scepticism in the popular press⁷ arising from the move to homelands.

The present study aimed to compare health outcomes associated with living on

Abstract

Objective: This study compares prevalence of obesity, hypertension and diabetes in two groups of Aboriginal adults: those living in homelands versus centralised communities in central Australia. It also compares weight gain, incidence of diabetes, mortality and hospitalisation rates between the groups over a seven-year period.

Methods: Baseline survey of 826 Aboriginal adults in rural central Australian communities in 1987-88 with a follow-up survey of 416 (56% response rate, excluding deaths). Each time, they had a 75 g oral glucose tolerance test (OGTT), and blood pressure and anthropometry measurement. Deaths and hospitalisations for all of the original cohort were recorded for the seven-year period.

Results: Homelands residents had a lower baseline prevalence of diabetes (risk ratio [RR]=0.77, 0.59-1.00), hypertension (RR=0.66, 0.54-0.80) and overweight/obesity (RR=0.70, 0.59-0.83). The incidence of diabetes was lower among homelands residents (RR=0.70, 0.46-1.06). They were less likely to die than those living in centralised communities (RR=0.56, 0.37-0.85) and less likely to be hospitalised for any cause (RR=0.79, 0.71-0.87), particularly infections (RR=0.70, 0.61-0.80), injury involving alcohol (RR=0.61, 0.47-0.79) and other injury (RR=0.75, 0.60-0.93). Mean age at death was 58 and 48 years for residents of homelands and centralised communities respectively.

Conclusion: Aboriginal people who live in homelands communities appear to have more favourable health outcomes with respect to mortality, hospitalisation, hypertension, diabetes and injury, than those living in more centralised settlements in Central Australia. These effects are most marked among younger adults.

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homelands with those associated with living in centralised communities in a group of central Australian Aboriginal people.

Methods

Subjects

Study subjects were drawn from a cohort of 832 Aboriginal adults who volunteered for health screening in two areas of rural central Australia in 1987⁸ and 1988.⁹ Response rates were 83% and 92% of resident adults over the age of 15 in 1987 and 1988 respectively. These numbers were estimated from a community census done at the time of the surveys. One area was predominantly a centralised, ex-mission community with a long history of acculturation, where 103 of 354 (29%) participants lived on homelands. The second area was mainly decentralised ex-pastoral settlements where 432 of 478 participants (90%) lived on homelands.

Measurements

Participants underwent a two-hour, 75 g oral glucose tolerance test and had sitting blood pressure (BP) measured (average of three readings). Diabetes and impaired glucose tolerance were defined according to WHO criteria.¹⁰ Hypertension was defined as systolic BP>140 or diastolic BP>90 or taking medication for high blood pressure. Height and weight were recorded and body mass index (weight in kg/height in metres squared) calculated. Details of laboratory methods and anthropometry have been reported previously.^{8,9}

The communities surveyed were served by only two first referral hospitals in Alice Springs and Tennant Creek. Hospitalisation data was collected for the seven years December 31, 1987, to January 1, 1995, for each member of the original cohort and up to the

time of death for those who died. Hospitalisation rates were calculated in person-years based on these seven years of records or up to the time of death. Date of admission, length of stay and principal diagnosis were recorded, including referrals to other tertiary centres. In the case of injury, if alcohol was mentioned in the hospital record as associated with the injury, this was also noted.

Adult residents in these two areas were offered screening again in 1995 and 416 (56% excluding deaths) of the original cohort were re-examined. As these communities are small and the residents mobile in a fairly circumscribed region, it was possible to determine the reasons for non-attendance in all but two of the non-responders, from information provided by relatives or health workers (Table 4).

There were 78 deaths among the original group during the interval. Date and cause of death were checked in clinic records, hospital records and the Register of Births, Deaths and Marriages in Alice Springs and Darwin.

Residence on a homeland community was defined as nominating such a community as the place of normal residence at the time of the first survey. Of the original cohort of 295 who were on homelands at baseline and who were followed up, 216 (73%) were still there at follow-up. As movement had occurred at different times, analysis was done according to the original grouping.

Causes of death and hospital separations were classified into four main groups according to the International Classification of Diseases, Version 9 (ICD-9) chapters;¹¹ Infectious diseases (001-009); diseases of pregnancy, childbirth and the puerperium (630-676); endocrine, circulatory and renal diseases were grouped together (240-279, 390-459, 580-629); and all others in a separate category. Additionally, injury was subcategorised into alcohol-

Table 1: Baseline characteristics of the survey sample, 1987-88.^a

	Men <35 years	Men 35+ years	Women <35 years	Women 35+ years	All	p (χ ²)
Number:						
homelands	141	95	178	116	530	
centralised	89	46	107	54	296	
Age (years):						
homelands	22(6)	49(11)	23(6)	52(13)	33.8(16.6)	
centralised	23(5)	49(12)	22(6)	50(13)	31.8(15.2)	p=0.077
BMI (kg/m²):						
homelands	22.2(3.9)	24.3(4.4)	23.0(5.8)	24.8(6.2)	23.5(5.2)	
centralised	25.0(5.0)	25.6(5.1)	25.4(5.8)	28.9(7.2)	25.7(6.1)	p<0.001
NIDDM (%)						
homelands	2/140(1.4)	17/95(18)	9/176(5)	18/115(16)	46/526(8.7)	
centralised	0/88(0)	16/46(35)	6/106(6)	15/54(28)	37/294(13)	p=0.080
Hypertension (%)						
homelands	20/141(14)	33/95(35)	13/178(7)	42/114(37)	108/528(20.5)	
centralised	43/89(48)	22/45(49)	12/107(11)	21/52(40)	98/293(33)	p<0.001
Hypertension (%)		MEN	WOMEN			
homelands	BMI<25	29/166 (17)	20/177 (11)			
centralised		27/72 (37)	6/75 (8)			
		p=0.001	p=0.431			
Hypertension (%)						
homelands	BMI>25	24/69 (35)	35/115 (30)			
centralised		37/61 (61)	27/84 (32)			
		p=0.003	p=0.797			

Note:
(a) Continuous data are mean (standard deviation), p values refer to 'All' column.

related or not, based on hospital and clinic records of the event.

Incidence of diabetes and mortality rates were calculated per 1,000 person-years based on the time accumulated for each individual from the time of first screening to either the second screening or death.

Data analysis

Demographic and clinical characteristics of subjects were compared by chi-squared statistics and Mantel-Haenszel summary risk ratios adjusted for age and sex where appropriate, with 95% confidence intervals. All reported *p*-values are two-sided.

Results

Baseline characteristics

Demographic and clinical characteristics of the survey sample at baseline are summarised in Table 1. Mean age of the two groups at baseline was not significantly different, but homeland residents were less likely to have diabetes at baseline (RR=0.77, 95% confidence interval 0.59-1.00), although this did not reach significance at the 5% level. Baseline BMI was significantly lower in homeland residents, particularly women. Among non-diabetics, male homeland residents were less likely to have hypertension (RR=0.66, 0.54-0.80). This effect was seen independently of BMI (shown at the bottom of Table 1). There was no difference in prevalence of hypertension among women in homelands or centralised communities at either high or low BMI levels.

Mortality and hospitalisation

There were 78 deaths in the cohort of 826 during an average of 7.3 years of follow-up, with 39 of these deaths among homeland residents. Overall mortality, under-35 mortality and general categories of cause of death are in Table 2. People living on homelands had a significantly lower overall and under-35 mortality rate and the mean age at death was 10 years older among homeland residents. Injury, especially alcohol-related fatalities, contributed most to the excess mortality experienced by those living in centralised communities.

There were 1,396 hospital separations over the seven-year period. The mean age of the hospitalised subgroup was similar to the denominator population. Overall, homelands residents were much less likely to be hospitalised for any reason during the seven years and among those hospitalised, the separation rate and occupied bed-days were significantly lower. Admissions for injury, especially alcohol-related injury, and infections accounted for most of the difference in hospital admission rates (Table 3).

Characteristics of non-participants at follow-up

Of the 335 from the original cohort who had not died and were not re-examined in 1995, 88 (26%) had moved to a town, 99 (30%) had moved to another community, one was in hospital, seven (2%) were in jail, two (0.5%) were hunting and 140 (42%) were present at the time of the survey but chose not to participate. There was no great difference between those on homelands and centralised communities with respect to the reasons for non-participation at follow-up, except for a larger number of homelands residents

Table 2: Mortality, age at death and cause of death, homelands and centralised communities, Central Australia, 1987-95.

	Homelands	Centralised	<i>p</i> (χ^2)
Subjects <35 year at baseline			
Number	319	196	
Deaths	9	15	
Person-years (py)	2160	1482	
Mortality (deaths per 1,000 py)	4.2	10.1	0.003
All subjects			
Number	530	295	
Deaths	39	39	
Person-years	3572	2229	
Mortality (deaths per 1,000 py)	10.9	17.5	0.016
Mean age at death (SD)	58 (22)	48 (18)	0.036
Cause of death, n			
Infections	11	8	
All injury	8	11	
Alcohol-related injury	2	10	
Circulatory, renal, endocrine	14	15	
Other	6	4	

(73 vs. 27) who moved to new homelands in the interval due to the acquisition of new ex-pastoral leases. Among this group of non-participants, hospitalisation rates were lower among homelands residents who moved to Alice Springs (RR=0.70, 0.53-0.93) and those who moved to another rural community (RR=0.71, 0.53-0.96), and were similar among those who were present at the time of the second survey but who chose not to participate (RR=0.75, 0.52-1.07) (Table 4). This suggests that selection bias with respect to health reasons for non-participation in the follow-up survey between homelands and centralised community residents was unlikely to be operating.

Other characteristics of those not re-examined are summarised in Table 5. Those not followed up in the second survey overall were more likely to be male, younger and slightly more likely to be hospitalised during the seven-year interval (RR=1.20, 1.05-1.37) and less likely to live on a homeland community than those who were re-surveyed. Otherwise, they did not differ from those who participated in the follow-up survey with respect to baseline BMI (*p*=0.0539), prevalence of diabetes (*p*=0.109) and hypertension (*p*=0.279). The greater loss to follow-up among residents of centralised settlements may reflect higher levels of social instability in these places. These data are summarised in Table 5.

Weight gain and incidence of diabetes

Weight changes in those followed up are shown in Table 6. Weight gain was observed in all groups, except for women over 35 years in centralised communities where baseline BMI was already very high. Weight gain was greatest in those under 35 years, particularly among women in the centralised communities. This result could be biased due to the lower levels of follow-up in younger participants in the centralised communities.

Among the group re-surveyed in 1995, there were 33 new diabetics diagnosed, 19 living on homelands and 14 who were not.

Table 3: Hospitalisations, 1987-95, homelands and centralised communities.

	Homelands	Centralised	$p(\chi^2)$	Risk ratio (CI)
Number ever hospitalised	249(49%)	188(65%)	0.75(0.67-0.85)	
person-years (py)	3696	2016		
mean age hospitalised population	33.6(16.4)	30.5(14.0)	0.105	
All causes				
Separations	781	605		
Separation rate (per 1000 py)	211	300	<0.001	
Total bed-days	5419	4329		
Bed-days per 1000 py	1466	2147	<0.001	
Pregnancy-related				
Number	84	58		0.90(0.78-1.04)
Separations	212	126		
Separation rate (per 1000 py)	57	62	0.795	
Infections				
Number	108	87		0.70(0.61-0.80)
Separations	177	162		
Separation rate (per 1000 py)	48	80	<0.05	
Alcohol-related injury				
Number	35	52		0.61(0.47-0.79)
Separations	71	133		
Separation rate (per 1000 py)	19	66	<0.05	
Other injury				
Number	42	46		0.75(.060-0.93)
Separations	64	64		
Separation rate (per 1000 py)	17	32	<0.05	
Total injury				
Separation rate (per 1000 py)	36	98	<0.05	
Circulatory, renal and endocrine				
Number	38	26		0.92 (0.78-1.04)
Separations	117	162		
Separation rate (per 1000 py)	32	30	0.687	
Other causes				
Number	74	41		0.99 (0.86-1.15)
Separations	145	66		
Separation rate (per 1000 py)	39	33	0.820	

Table 4: Reasons for non-participation in the follow-up survey.

Reason	Centralised communities	Homelands communities
Moved to Alice Springs	45	43
Moved to another community	27	73
Hunting	0	2
In hospital	0	1
In jail	4	3
Died	39	39
Present in community but chose not to participate	66	74
Total	181	236

Table 5: Characteristics of participants and non-participants in the follow-up survey (excluding deaths).

	Participants	Non-participants	$p(\chi^2)$
Number	416	337	
Mean age in years (SD)	32(15)	29(13)	<0.01
Homelands resident	300(72%)	195(58%)	<0.01
Female sex	60%	51%	<0.05
Mean BMI at baseline	24(5.5)	24(5.6)	NS
Diabetes at baseline	9.4%	6.0%	NS
Hypertension at baseline	13%	16%	NS
Hospitalised	49%	58%	<0.01
Mean bed-days (SD)	15(14)	20(28)	NS

Table 6: Weight gain in those followed up.^a

	Men <35 years	Men 35+ years	Women <35 years	Women 35+ years	All ^b
Number:					
Homelands	76	45	101	73	295
Centralised	24	18	43	32	117
Follow-up rate (%):					
Homelands	76/136 (56)	45/83 (54)	101/174 (58)	73/103 (71)	295/491 (60)
Centralised	24/78 (31)	18/33 (55)	43/102 (42)	32/44 (73)	117/257 (46)
Person years of follow-up					
Homelands	516	302	681	489	1988
Centralised	182	133	324	241	881
Weight gain (kg)					
Homelands	9.7(10.0)	0.8(5.8)	7.3(8.4)	1.8(7.4)	5.6(9.0)
Centralised	11.3(10.5)	-0.2(7.8)	13.8(9.0)	-2.4(10.3)	6.6(11.9)
<i>p</i> (χ^2)	0.526	0.591	0.000	0.021	0.341
Change in BMI (kg/m²)					
Homelands	3.1(3.0)	0.6(1.9)	2.9(3.0)	1.2(1.9)	2.2(2.8)
Centralised	3.7(3.3)	0.4(2.7)	5.3(3.5)	-0.4(3.8)	2.6(4.2)
<i>p</i> (χ^2)	0.368	0.781	0.000	0.039	0.190

Notes:

(a) Continuous data are mean (standard deviation); follow-up rates calculated excluding deaths.
 (b) Missing values (n=4).

This corresponds to an incidence of diabetes of 10.3 cases per 1,000 person-years among homelands residents and 19.3 cases per 1,000 person-years among those living in centralised communities. The risk of new diabetes among homelands residents was lower than for people in centralised communities (RR=0.70; CI 0.46-1.06) but this difference was not significant, possibly due to small numbers.

Of the 41 diabetics at baseline who were re-tested in 1995, 4/21 (19%) of those living on homelands were not diabetic at follow-up, compared to 2/20 (10%) with similar findings among residents of centralised communities.

Discussion

This study suggests that in this group of central Australian Aboriginal adults, those living on homelands have lower rates of diabetes, cardiovascular risk factors, hospitalisation and death compared to those in more centralised communities.

The benefits observed here are in two main areas: mortality and hospitalisation due to injury, particularly alcohol-related injury in young people and, less obviously, diabetes and cardiovascular risk factors. This is consistent with claims made by Aboriginal groups about the nature of the physical health benefits expected from homelands living.³

An alternative interpretation of these data is that living on an outstation merely selects healthy people or people who are concerned enough about their health to make such a move (including non-drinkers) and that those who are already ill will prefer to live in more centralised situations close to amenities such as clinics and food stores. This interpretation is not supported by the hospitalisation data, which shows that admissions for chronic conditions (diabetes, cardiovascular, renal, respiratory disease, cancers) are not different for outstation residents. However, it is probably the case

that more non-drinkers (many of whom are ex-drinkers) than drinkers have elected to live on homelands.

Lower hospitalisation rates among homelands residents could also be explained by reduced access to referral services. It is difficult to measure this and the study design in general has not allowed for it. However, the fact that hospital admissions for chronic conditions were not different between the two groups suggests that access to hospital was probably similar for each group. In the case of injury, alcohol exposure was probably a significant determinant of better outcomes among homelands residents. Even though the centralised communities were nominally 'dry', this law was seldom enforced during the time of the study. In contrast, the homelands communities of an extended family group were generally alcohol free.

In practice, it seems that Aboriginal people choose homelands living principally for cultural and social survival^{12,13} and that considerations of physical health tend to flow from this, rather than form the main reason for living on homelands. This is consistent with Aboriginal notions of 'health as life' as a more global concept (including relationships with the land and cultural survival)¹⁴ than the Western biomedical model of health. The powerful effect of the social environment on host susceptibility to disease has been recognised for centuries but until recently has not been considered an important determinant of outcomes in epidemiological studies, which have generally concentrated on analysing individual biological risk factors for disease and treating social variables as confounders.¹⁵

The findings reported here are consistent with previous anthropological studies, notably in the Top End of the Northern Territory, where homelands living was associated with high levels of physical and social activity and a diet of much more variety and micro-

nutrient value than the store-bought foods in the centralised communities.¹⁶

Although health benefits derived from living on homelands do not need to be demonstrated in order to gain support in policy terms (such policies already exist in principle) these gains should be considered in the overall calculus of the level of investment in supporting homeland communities as an instrument of healthy public policy. It is beyond the scope of this paper to attempt to cost this, but implications for health service provision could be interesting, where increased autonomy and improved general health status of homelands communities might be expected to lead to reduced demand for curative care (often ineffective and expensive) and more opportunities for preventive services.

Currently in remote Australia there are three different kinds of groups involved in the Homelands Movement: those who have always lived in relatively stable decentralised communities (the majority of homelands residents in this study), those who are moving to permanent homelands and those who go to homelands seasonally (generally in northern monsoonal areas where access is difficult in the wet season). There is no reason apparent to the authors why the benefits demonstrated in this study would not be realised at least partly by those in the latter two groups.

Some of the benefits of homelands life described here support claims by Aboriginal groups, summarised below by a former director of the Central Australian Aboriginal Congress:

*"I have seen many people go from town back to their land. They get away from their poor food, the trauma, the grog. They walk and hunt on their country and they get fit, they eat better. They are in touch with their sacred places. They are in control of their lives, and living with their families. Being on the land does not magically solve all their health problems, but it provides a base from which they can be tackled."*¹⁷

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