

ORIGINAL RESEARCH

Prevalences of overweight and obesity among children in remote Aboriginal communities in central Australia

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Submitted: 22 July 2011; Revised: 3 December 2011; Published: 9 March 2012

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Rural and Remote Health 12: 1872. (Online) 2012

Available: <http://www.rrh.org.au>

ABSTRACT

Introduction: The chronic diseases associated with overweight and obesity are major contributors to the excess disease burden of Aboriginal Australians. Surveillance of overweight and obesity is required to monitor these conditions, and to develop and evaluate interventions to improve health and wellbeing. Remote Aboriginal communities in Australia's Northern Territory (NT) are where approximately two-thirds of the NT Aboriginal people live, a proportion which has been stable over many years. However the remote communities suffer significant socioeconomic disadvantage including limited education and employment opportunities, and poor quality and overcrowded housing. Approximately one-third of Aboriginal people in NT live in central Australia, which consists of the Alice Springs and Barkly districts. The Healthy School-Aged Kids Program includes health promotion and child health screening, and is run in remote Aboriginal communities of NT. This report provides estimates of prevalences of overweight and obesity among children in central Australia who participated in health checks as part of Healthy School-Aged Kids Program in 2010.

Methods: All children in remote central Australian Aboriginal communities were invited to participate in health checks. Children who attended were weighed and measured. Date of birth, sex, height and weight for each child were used to determine prevalence of overweight ($\geq +1$ standard deviation [SD] BMI-for-age) and obesity ($\geq +2$ SD BMI-for-age) according to WHO Growth Standards. Differences in proportions of overweight and obesity by age group and sex, and their statistical significance were calculated.



Results: Weight, height, sex and age data were available for 996 children from a population of 1764. It was found that 22.1% of girls and 20.7% of boys were overweight; and 5.1% of girls and 5.8% of boys were obese as defined by BMI-for-age. Prevalence of overweight but not obesity increased with age (for overweight $z=3.28$, $p=0.0011$; for obesity $z=0.68$; $p=0.50$).

Conclusion: The prevalences of overweight and obesity as estimated by BMI-for-age among children in remote central Australian Aboriginal communities were compared with those in other Australian surveys. They appear unlikely to reflect future relative risk of the chronic diseases with which overweight and obesity are associated. Routine collection of data on BMI-for-age may not provide adequate estimation of future risk of chronic disease burden attributable to overweight and obesity among these children. Alternative measures for surveillance for overweight such as waist circumference may prove more useful. Appropriate interventions to reduce risk of chronic disease are required, including interventions to reduce prevalences of overweight and obesity.

Key words: Aborigines, Australia, child, chronic disease, Northern Territory, obesity, overweight.

Introduction

High prevalences of chronic diseases at young ages in remote Northern Territory (NT) Aboriginal populations have been documented. For example, by 15 years of age 8.6% have renal disease, 0.4% have type 2 diabetes and 0.3% have ischaemic heart disease¹. Compared with all Australians the overall burden of disease suffered by the Aboriginal people of NT is close to four times higher; much of this excess is due to ischaemic heart disease, renal disease and diabetes, for which overweight and obesity are important risk factors². This report contributes to the limited published data on population prevalence of overweight and obesity in Aboriginal children, with community based data on children in remote communities in central Australia.

Remote Aboriginal communities in NT have populations of from less than 50 to more than 1000 people, and over 90% of people in these communities are Aboriginal³. These communities are classified by Australian Remoteness Index for Areas (ARIA+) as Very Remote, indicating the highest levels of remoteness from service centres³⁻⁵. The populations of these communities are growing, leading to increasing levels of overcrowding and limited educational and employment opportunities^{3,6}. However approximately two-thirds of Aboriginal people in NT live in these communities rather than move to urban centres, and this proportion is not declining⁷.

In this report, 'central Australia' consists of Alice Springs and Barkly districts of NT, where 20 000 or 31.3% of the NT Aboriginal people live³.

The Healthy School-Aged Kids Program is a joint initiative of the NT Departments of Health and Education, run throughout remote Aboriginal communities in NT. It is a population health program involving health promotion, service integration and health checks. An evaluation was performed in 1998, leading to a revision of the manual published in 2007^{8,9}. The manual provides detailed guidelines for child health and remote area nurses and Aboriginal health workers, including health checks to identify and manage common health problems in children aged 5–15 years. The recommended checks include height and weight of children aged 5, 10 and 15 years⁹.

The poor health and socioeconomic status of NT Aboriginal children is of national concern, and led to the NT Emergency Response (NTER). The 2007–2008 phase of the NTER involved visiting teams offering health checks to all children aged up to 16 years¹⁰. Implementation of the Healthy School-Aged Kids Program was variable during the NTER but returned to the standard program in 2010. This report describes the prevalence of overweight and obesity among children in central Australia who underwent health checks in Healthy School-Aged Kids Program in 2010.



Methods

The Healthy School-Aged Kids Program entails engagement of health staff and community Elders, teachers and parents of children in remote communities. Health checks are offered to every child aged 5–15 years. Parents or guardians are asked to give written consent for their children to be checked. Children not at school are encouraged to participate⁹.

Participating children are measured by nurses and Aboriginal health workers using stadiometers and digital scales. The guidelines include measuring and weighing children at 5, 10 and 15 years⁹. Weight is measured to 0.1 kg, and height to the nearest centimetre. Equipment is calibrated monthly¹¹. For this report, the children's date of birth, sex, height and weight were entered into WHO AnthroPlus application (<http://www.who.int/growthref/tools/en/>) to calculate BMI and BMI-for-age z-scores based on WHO 2007 growth standards. The significance of the difference between proportions was calculated using two-tailed z-tests for independent proportions, utilising the VassarStats (<http://faculty.vassar.edu/lowry/VassarStats.html>) statistical calculator.

Results

The program ran between March and October 2010. Participating children's ages ranged from 3 to 17 years, although guidelines recommend measuring weight and height only at 5, 10 and 15 years⁹.

The BMI-for-age data were available for 996 children in 26 communities, with between 4 and 109 children measured in each community. This included 883 in the target population of 1764 children aged 5 to 15 years, giving 50% coverage among these children. It was found that 21.4% of children were overweight ($\geq+1.0$ standard deviation [SD] BMI-for-age; 95% CI 18.6–24.5%) and 5.4% were obese ($\geq+2.0$ SD BMI-for-age; 95% CI 4.2–7.0%). No community had BMI-for-age distribution significantly different from the overall distribution.

The BMI-for-age according to age groups and sex is shown (Table 1). Overweight increased with age ($z=3.28$, $p=0.0011$), while obesity did not ($z=0.68$; $p=0.50$). There was no difference in the prevalence of overweight or obesity between boys and girls (overweight $z=0.52$; $p=0.60$; for obesity $z=0.50$; $p=0.62$).

Discussion

Health checks performed on children in remote Aboriginal communities in 2010 showed that 21.4% of children were overweight and 5.4% obese. Other cardiovascular risk factors were not assessed in the Healthy School Aged Kids Program.

Comparative data from other recent studies of prevalence of overweight and obesity among Australian Aboriginal children shows a diversity of results (Table 2). Data from the NTER defined 'overweight' as BMI-for-age >95 th centile, which is consistent with other definitions of obesity. The prevalence of overweight reported in the NTER was significantly higher than the prevalence of obesity in this study¹². The lower prevalence of overweight and obesity among the remote-dwelling children in the Aboriginal Birth Cohort Study is also notable because there are lower prevalences of chronic diseases among Aboriginal people in the 'Top End' (the northern region of NT) compared with central Australian Aboriginal people of NT, although different standards for overweight and obesity were used^{13–15}. Alternatively a lower prevalence reported in the Aboriginal Birth Cohort Study approximately 10 years before the present study may reflect an increased prevalence of overweight and obesity over the past 10 years. The higher prevalence of obesity among the children at Inala in Brisbane may reflect differences between urban and rural populations noted in the Aboriginal Birth Cohort Study^{13,16}.

The 2007–2008 National Health Survey identified that 25% of children aged 5 to 17 years were overweight, including 8% obese. Data on Aboriginal children were not reported separately¹⁸.



Table 1: Prevalence of overweight and obesity among children in remote central Australia, according to age group and sex

Variable	n	Overweight % ≥ +1SD (95% CI)	Obesity % ≥ +2SD (95% CI)
Age group (years)			
5–9	552	18.1 (13.9-23.3)	5.3 (3.6-7.6)
10–15	331	27.5** (22.6-33.0)	6.9 (4.5-10.6)
Sex			
Girls	494	22.1 (18.8-25.7)	5.1 (3.3-7.7)
Boys	502	20.7 (17.2-24.8)	5.8 (4.1-8.1)

CI, Confidence interval; SD, standard deviation: ≥ +1 SD BMI-for-age is threshold

for childhood overweight, ≥ +2 SD BMI-for-age is threshold for childhood obesity.

**p< 0.01, for 5-9 year-olds compared with 10-15 year-olds. No other differences statistically significant.

Table 2: Reports of prevalence of overweight and obesity among Australian Aboriginal children^{12,13,15-17}

Study, date [ref]	Population	N	Age (years)	Reported %	
				Overweight (≥ +1SD)	Obesity (≥ +2SD)
Healthy School Aged Kids, 2010	Central Australia remote communities	996	3–17	21.4	5.4
NT Emergency Response, 2007-2008 [12]	Central Australia urban and remote	2080	0–16	NA	9.6
Aboriginal Birth Cohort Study, 1998–2001 [13,14,15]	Aboriginal children born in Royal Darwin Hospital 1987–1990, remote dwelling subset	344	8–14	10†	4¶
Child Health Checks, Inala, 2007 -2009 [16]	Aboriginal and Torres Strait Islander children, Inala (Brisbane)	332	0–14	25	11
National Youth Cultures of Eating, 2006 [17]	Australian Aboriginal children	184	6–11	Boys: 16.0 Girls: 12.6	Boys: 8.6 Girls: 6.8

NA, Not available; NT, Northern Territory. SD, standard deviation.

†Overweight based on >85th centile and ¶obesity based on >95th centile of the Australian Health and Fitness Survey (1985) [15].

The sample was limited to children who attended the health checks, and included children whether or not they attended school. The sample of 996 included 883 in the age range 5–15 years, of 1764 children in remote central Australia. Aboriginal status was not recorded in the health checks which are targeted at the needs of the Aboriginal children. Australian Bureau of Statistics reports that 92.4% of 5–15 year-olds in remote central Australia are Aboriginal¹⁹.

Conclusion

The high burden of chronic diseases attributable to overweight among Aboriginal people in central Australia is a devastating problem. Rates of childhood overweight and obesity described here do not reflect the four-times greater burden of disease in this population compared with all Australians². Possible reasons for the discrepancy include BMI-for-age not adequately predicting future cardiovascular risk in this population; selective non-participation of overweight children; and increasing overweight after school



age. The NHMRC *Clinical practice guidelines for management of overweight and obesity in children and adolescents* recommended further research to determine whether children's BMI-for-age correlates with medical morbidity, and that Aboriginal children may need separate consideration²⁰. These Healthy School Aged Kids Program health check data results support this recommendation, and the proposition that waist circumference may be a better predictor of cardiovascular risk than BMI-for-age in this population^{21,22}.

Attention to the underlying causes of the disease burden of Aboriginal people in remote central Australia includes measures to promote healthy eating and physical activity. A review of current Healthy School-Aged Kids Program guidelines and implementation, particularly the monitoring of waist circumference, should be considered. In the absence of standardised survey methods, conclusions about relative rates of overweight and obesity in different populations of Aboriginal and non-Aboriginal children cannot be drawn. Aboriginal children in particular are diverse populations.

Acknowledgement

The author acknowledges all who enable the Healthy School Aged Kids program in central Australia, including community Elders, teachers, child health nurses, remote area nurses, Aboriginal health workers, and all the children who participated.

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The International Electronic Journal of Rural and Remote Health Research, Education Practice and Policy



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