



## The social and emotional benefits of yoga for Aboriginal Australian children: a pilot case series study

Dr van Bockxmeer J, McNamara K, Dr Green J (2015)

Corresponding author: John van Bockxmeer, Hedland Health Campus,  
24 Colebatch Way, South Hedland 6722, fax: 08 9174 1036, email: john@fairgame.org.au

### Suggested citation

Dr van Bockxmeer J, McNamara K, Dr Green J (2015) The social and emotional benefits of yoga for Aboriginal Australian children: a pilot case series study. *Australian Indigenous HealthBulletin* 15(4).

## Abstract

**Objective:** To determine whether a 6 week local language yoga program improved social and emotional wellbeing in a pilot group of Australian Aboriginal children in remote Western Australia.

**Methods:** A case series study of all Year 3 and 4 students of Derby District High School, Western Australia with data collected between October-December 2013. Students participated in a 6-week *Wellness Walkabout Program* utilising yoga poses incorporated into culturally relevant storytelling sessions. Six local language versions represent major regional West Australian Indigenous language groups. The program was devised by the Fair Game Charity in 2012. Sessions were run once a week and incorporated into the students' structured teaching program. The Strengths and Difficulties (SDQ) total difficulties and subtest scores (Teacher Questionnaire) were measured pre- and post-intervention to compare social and emotional outcomes.

**Results:** 24 Aboriginal children (9 female: 8 male) aged between 7-8 years completed the program. 17/24 (71%) had pre- and post-intervention SDQs completed. Mean total SDQ scores decreased significantly following the completion of the program (-1.94; 95%CI -3.64,-0.24;  $p=0.028$ ), with conduct problems significantly reduced (difference -1.47; 95%CI -0.22,-0.72;  $p=0.001$ ).

**Conclusions:** The *Wellness Walkabout Yoga Program* resulted in improved social and emotional wellbeing in a pilot group of Aboriginal children in remote Western Australia

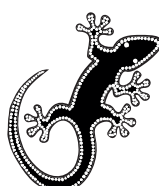
**Implications:** The *Wellness Walkabout Yoga Program* is a culturally appropriate program which could be implemented into the school curriculum throughout remote Australia. The authors are planning a larger case-control study over several geographical locations to further explore the positive influence of yoga on psychosocial outcomes.

**Keywords** – Yoga\*, Australia, Aboriginal, Indigenous, Children, Stress, Well-being, Psychosocial outcome, Behavioural difficulties, Emotional difficulties, Pilot Project\*, Pilot Study\*, Life change events\*, Stressful events\*, Health\*

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Core funding  
is provided by the  
Australian Government  
Department of Health



Australian Indigenous  
HealthInfoNet



## Introduction

Exposure to adverse life events and chronic stress during childhood are known to have a negative impact on the development of behaviour, social and emotional well-being, physical health and educational outcomes (1,2,3,4,5). Research indicates that people of Aboriginal origin experience higher rates of stress compared with the broader Australian population (8). This may be partly explained by ongoing socio-economic disadvantage, exclusion, and long-term effects of European colonisation and subsequent intergenerational trauma (6-8). The Western Australian Aboriginal Child Health Survey (WAACHS) (2005) found that 71% of Aboriginal children had been exposed to at least three significant life stressors. Almost one quarter (24%) of these children were at high risk of clinically significant emotional or behavioural difficulties (8). Urban Indigenous children who have had significant life stressors were more likely to have behavioural problems ( $p < 0.001$ ) and a history of ear ( $p < 0.001$ ) and skin infections ( $p = 0.003$ ) (8,9,10).

Yoga, an ancient discipline originating from India, metaphorically depicts the human body as various poses using strength, physical and psychological awareness. A recent systematic review supports the belief that yoga may improve physical and mental health through a down-regulation of the sympathetic nervous system and reduction in biochemical markers of inflammation and systemic blood pressure (10,11). Research suggests that yoga may help in reducing anxiety, and protect against mental health issues in adolescents and is superior to other relaxation techniques (12, 13, 14, 15).

Research has suggested that yoga has a positive influence on the psychosocial outcomes of children including an improved overall ability to concentrate and focus, increased emotional balance and reduced feelings of helplessness and aggression (16, 17, 18). Paediatric studies have found higher levels of cardiovascular fitness and lean muscle mass, a decreased blood pressure response to a cold pressor test and improved motor performance in children aged 9-13 who participate in yoga (17).

The primary aim of this pilot research was to explore the impact of yoga on the social and emotional wellbeing of Aboriginal children. Our pilot study involved the use of the *Wellness Walkabout program*, a local language yoga program that utilises a series of yoga poses incorporated into culturally relevant story-telling sessions. A secondary aim of the study was to determine whether the *Wellness Walkabout program* would be an appropriate tool for use with a young Aboriginal population. We hypothesised that the *Wellness Walkabout* would be an effective tool for improving social and emotional outcomes in Aboriginal children and engaging this population in physical activity. By conducting this study we hope to provide an insight into whether this program could be adopted more widely by schools and health care providers across remote Australia.

## Method

### Participants

24 Aboriginal children aged 7-8 years in Year 3 and 4 from the remote Western Australian town of Derby were recruited to take part in the study held between 28<sup>th</sup> October and 2<sup>nd</sup> December 2013. Given the difficulties in conducting research in remote communities, the number of participants recruited related to an achievable and manageable yoga class size. Participants were all permanent residents of the West Kimberley. All children were invited to participate regardless of their Aboriginal status, however only data from children with Aboriginal status is included in our analysis. Informed consent was obtained from the children's parents and guardians by Author 1, who also ran the yoga sessions. All participants were students from the Derby District High School, a key stakeholder in this project.

### Measure

In order to assess social and emotional outcomes we used the Strengths and Difficulties Questionnaire (SDQ), a commonly used measure in our target age group. The SDQ assesses five areas of adjustment: Emotional Symptoms, Pro-Social Behaviour, Peer Problems, Hyperactivity, and Conduct Problems. Participants were given a number of statements and asked to rate whether they were 'Not True', 'Somewhat True', or 'Certainly True'. Due to age there was no self-report version of the SDQ for participants aged 5-10 years and the participants' teacher filled out the educator version referring to the child. The SDQ has been shown to be a highly valid and reliable tool for assessing the aforementioned constructs in children aged 4-17 years and has been used in Indigenous populations. The teacher and Aboriginal Education Assistant completing the SDQ concluded the measure was culturally appropriate and did not need to be adapted for effective reporting.

### Protocol

Author 1 coached participants through The *Wellness Walkabout* exercises before lunch break every Tuesday for six weeks. Sessions were integrated into the structured teaching program at the Derby District High School. The story is taught using a freestanding flipbook utilising local language that was used in front of the class during all the sessions. The flipbook is illustrated and has a range of photographs that are used to demonstrate the poses for participants. There are six versions of the flipbook representing major regional West Australian language groups. The *Wellness Walkabout* was produced with the assistance of a grant provided by the Department of Sport and Recreation in 2012 and has since been successfully enjoyed by thousands of children.

The *Wellness Walkabout* story describes an Indigenous boy walking through the outback. During this story he meets friendly animals along the way who inspire him to perform yoga movements. An example of the *Wellness Walkabout* program is included below in Figure 1.

Figure 1: Example of the *Wellness Walkabout* Flip Book



Prior to session commencement, a class teacher and Aboriginal Education Assistant completed the baseline SDQ for all enrolled participants with completed consent forms. At the conclusion of the sessions the same staff completed a repeat SDQ and data was entered into SPSS for analysis. This project was approved by the Western Australian Aboriginal Health Ethics Committee in October 2013.

## Results

### Group characteristics

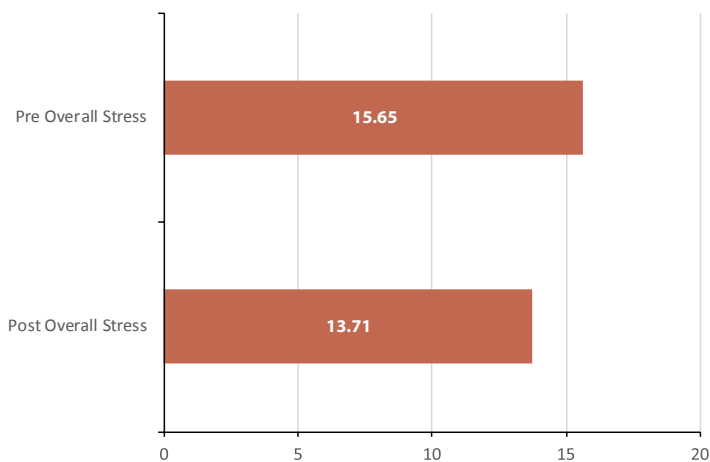
24 children enrolled and completed the *Wellness Walkabout* Yoga sessions during the study period. Of these, 17/24 (71%) (9 female; 8 male) had pre and post questionnaires and thus useable data. All participants were Aboriginal and aged either 7 or 8 years. While a control group was identified and recruited, difficulties in attendance

rates and a discrepancy in the reporting of SDQs by teaching staff resulted in data corruption. As a result this comparison group was not included in the final analysis.

### Primary results

Pre-yoga mean total SDQ scores for the participant group were classified in the 'Slightly Raised' range (12 -15) reflecting the possibility of clinically relevant psychosocial problems. Following the *Wellness Walkabout* program, mean total SDQ scores were found to decrease significantly over the course of the study (difference -1.94; 95%CI -3.64,-0.24; p=0.028).

Figure 2. Mean total SDQ score pre- and post- *Wellness Walkabout* sessions



Scores for each index of the SDQ are presented in Table 1. Teachers rated hyperactivity as being the most problematic issue, with emotional problems rated as least problematic. Of the index scores, only conduct problems were seen to significantly reduce over the course of the program (difference -1.47; 95%CI -0.22,-0.72; p=0.001).

Table 1. Mean SDQ Index scores pre and post the program

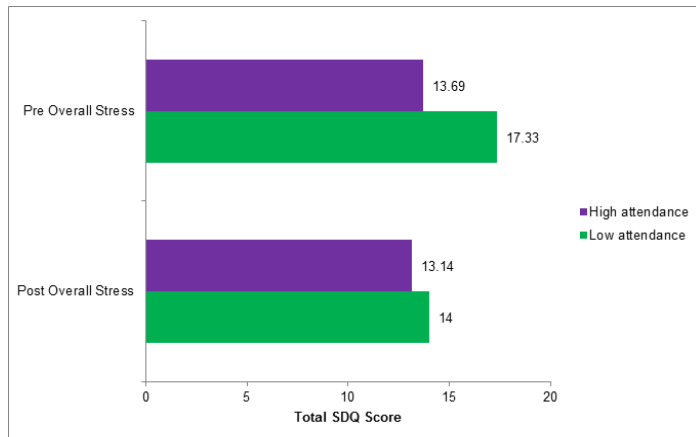
	Pre-yoga mean (SD)	Post-yoga mean (SD)	Difference (95% CI)	P value
<b>Emotional Symptoms</b>	1.47 (1.62)	1.71 (1.36)	0.23 (-0.26, 0.73)	0.33
<b>Conduct Problems</b>	4.12 (3.16)	2.65 (2.52)	-1.47 (-2.22, -0.72)	0.001*
<b>Hyperactivity Score</b>	8.12 (2.34)	7.82 (1.94)	-0.29 (-1.20, 0.61)	0.50
<b>Peer problem score</b>	1.94 (1.78)	1.53 (1.58)	-0.41 (-0.86, 0.04)	0.07

Note: A higher score indicates more of a perceived problem; \*indicates significant p value (<0.05).

The number of *Wellness Walkabout* sessions attended was also factored into the analysis to see if increased attendance resulted in greater improvement of SDQ scores. Figure 4 shows mean SDQ scores, before and after the intervention for those who had high attendance at yoga (> = 5 sessions) and those who had low attendance (< = 4 sessions). Due to low numbers further statistical

analysis was not undertaken between the attendance groups. However it is noted that those who attended less yoga had higher mean SDQ scores, indicating more likelihood of problems than those who had a high attendance rate.

**Figure 4. Mean scores of high and low attendance groups pre and post-yoga program.**



## Discussion

The results of our pilot study results indicate that the *Wellness Walkabout program* is a suitable classroom tool for use with Aboriginal Australian children and appears culturally appropriate for use in this age group. There were statistically significant teacher-rated improvements in overall stress and conduct problems over the course of the program. Trends in all but one index on the SDQ indicated that the use of yoga may lead to reductions in social and emotional problems in Aboriginal children. Small participant numbers restricted statistical analysis between differences in attendance.

Anecdotal comments from teaching staff regarding the value of the sessions and positive benefits on concentration, attitudes to class work and flexibility highlighted the subjective value of the program.

It is important to note that the cohort assessed in our study had slightly raised (12-15) pre-SDQ scores that reflect an increased chance of clinically relevant psychosocial issues. This is consistent with research that indicates that Aboriginal children experience higher rates of stressful life events and psychosocial risk. This pilot study reinforces the need for easily accessible methods and tools that can improve the psychosocial outcomes of Aboriginal children.

Limited reliable data exists on the psychological effects of yoga on the paediatric population. Recent systematic reviews of 34 paediatric research projects examining yoga do not provide sufficient data to identify patterns or the effectiveness of yoga for specific paediatric populations (16, 17). Unlike the *Wellness Walkabout*, most studies lack specific standardised interventions (12). Our results are congruent with the current body of evidence which suggests that there are some improvements in the conduct

of paediatric yoga participants, immediately following the completion of a yoga course.

### Strengths

This study was the first to specifically explore the use of yoga in an Aboriginal population. The use of the *Wellness Walkabout program* is unique given it was developed for use with this population. The program was created in conjunction with Aboriginal linguists and health professionals ensuring the physical poses and narrative were appropriate for the classroom. This culturally relevant program encourages school engagement and is a useful and simple tool for staff to complement the school curriculum. Seven remote teachers have been trained in the delivery of the *Wellness Walkabout* and more than thirty flipbooks have been distributed to schools across six language areas of Western Australia.

## Limitations

The primary limitation of this study was the lack of a control group. While a comparison group of children was identified, issues with data collection resulted in the incorrect administration of the SDQ. By including a control group the authors would have been able to further examine whether any reductions in participant stress was likely to be specifically due to yoga rather than external or confounding factors. Certain demographic, socioeconomic and psychosocial data was not collected on participants in this pilot study but will be included in future research to further reduce confounding. In this pilot study low participant numbers (as a result of school enrolments) was an anticipated limitation. This meant that meaningful sub-analysis between genders and attendance rates was not possible. The use of the standard version of the SDQ was approved by WAAHEC and by teaching staff. The use of a version which has been extensively validated for use in this population would have been preferred but was unavailable.

### Generalisability

Due to the specific nature of our research, our findings are limited to Aboriginal Australian children. We feel that our findings are relevant for the broader regional and remote Australian Aboriginal population who are known to be at high risk of clinically significant emotional or behavioural difficulties (6,7,8,9).

### Future Research

We feel it would be beneficial to explore the social and emotional benefits of yoga for remote Indigenous children with a study involving a larger cohort with a matched control group. Future research should utilise the *Wellness Walkabout program* across a variety of geographical locations to ascertain its applicability for other communities.

## Conclusion

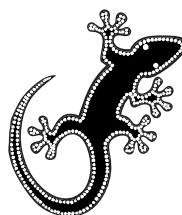
Aboriginal children experience higher rates of stress compared with the broader population. This is known to have a negative impact on the development of behaviour, social-emotional wellbeing, physical health and educational outcomes. Our pilot case series study demonstrated a statistically significant reduction in the mean total SDQ score and conduct problems subset score following the completion of a culturally appropriate *Wellness Walkabout yoga program* in 24 remote Aboriginal children aged 7-8 years. We plan to continue this research with a larger case-control study over several geographical locations to further explore the positive influences of yoga on psychosocial outcomes.

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**Director** Professor Neil Drew  
**Address** Australian Indigenous *HealthInfoNet*  
Edith Cowan University  
2 Bradford Street  
Mount Lawley, WA 6050  
**Telephone** (08) 9370 6336  
**Facsimile** (08) 9370 6022  
**Email** [healthbulletin@ecu.edu.au](mailto:healthbulletin@ecu.edu.au)  
**Web** [www.healthbulletin.org.au](http://www.healthbulletin.org.au)

Core funding  
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