



## Review

# The impact of physical activity and sport on social outcomes among Aboriginal and Torres Strait Islander people: A systematic scoping review



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## ABSTRACT

**Objectives:** To identify and describe existing evidence of the impact of sport and physical activity programs on social outcomes among Aboriginal and Torres Strait Islander people.

**Design:** Systematic scoping review.

**Methods:** Nine scientific databases (MEDLINE, Scopus, SPORTSDiscus, PsycINFO, Informit, Database of Abstracts of Reviews of Effects (DARE), The Cochrane Library, The Campbell Library, ProQuest Dissertations and Theses) and grey literature were systematically searched for programs or activities that target Aboriginal and Torres Strait Islander people and use physical activity and sport participation to improve one or more of six social and community outcomes of: (i) education; (ii) employment; (iii) culture; (iv) social and emotional wellbeing; (v) life skills; (vi) crime reduction.

**Results:** Of the 1160 studies identified, 20 met the inclusion criteria and were published between 2003 and 2018. Most studies reported positive findings across multiple, broad outcomes of education (N = 11), employment (N = 1), culture (N = 9), social and emotional wellbeing (N = 12), life skills (N = 5) and crime reduction (N = 5). Some evidence was found for increased school attendance and improved self-esteem resulting from physical activity and sport participation as well as enhanced aspects of culture, such as cultural connections, connectedness, values and identity.

**Conclusions:** There is some evidence of benefit across the six social outcomes from physical activity and sport programs. This promotes their continuation and development, although critical appraisal of their methods is needed to better quantify benefits, as well as the generation of new evidence across indicators where gaps currently exist, particularly for employment and crime reduction outcomes.

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## Practical implications

- This review summarises evidence of the impact of sport and physical activity programs on social outcomes among an important population group: Aboriginal and Torres Strait Islander Australians.

- Programs may improve educational and social and emotional wellbeing outcomes which supports the inclusion of these components in future program design.
- Currently, there is less evidence to support the impact of programs on employment outcomes. Future programs could be designed to maximise these outcomes.

## 1. Introduction

Aboriginal Australians and Torres Strait Islanders are the two groups of Indigenous people of Australia and are approximately 3.3% of the total Australian population.<sup>1</sup> Over the past

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200 years following colonization, Aboriginal and Torres Strait Islander Australians have experienced intergenerational trauma related to colonization and subsequent dispossession, poor treatment, exploitation and cultural fragmentation, similar to other Indigenous peoples worldwide.<sup>2</sup> This has led to health and social inequalities such as gaps in life expectancy, education and employment.<sup>3</sup> However, drawing on strengths and positive aspects of Aboriginal and Torres Strait Islander culture and resources is considered an appropriate standpoint through which to improve disparities.<sup>4</sup> The health benefits of physical activity are clear<sup>5</sup> and can be particularly beneficial for population groups where disparities exist, including Aboriginal and Torres Strait Islander people. Systematic reviews have demonstrated the impact of physical activity on a range of chronic disease indicators in this population group, typically markers of an individual's health such as reduced weight and blood pressure, improved fitness and biomarkers such as blood glucose.<sup>6,7</sup> Beyond individual physical health outcomes, there is support for the positive impact of physical activity on wider social outcomes, including education attainment,<sup>8</sup> crime prevention<sup>9</sup> and mental health in mainstream populations.<sup>10</sup> Social and emotional wellbeing is a mental health term commonly described by Aboriginal and Torres Strait Islander people and refers to how the social, emotional, spiritual, and cultural wellbeing of a person.<sup>4</sup> Sport is a key form of physical activity<sup>11</sup> and programs encouraging sport participation have been a recommended means of improving social outcomes for Aboriginal and Torres Strait Islander people<sup>12,13</sup> and contributing equity in education, employment and other indicators.<sup>3</sup> Elite sporting achievements by Aboriginal and Torres Strait Islander people have been documented<sup>14,15</sup> and often assumed to apply to all Indigenous people and sport has been promoted as a broad panacea for a number of social issues.<sup>16</sup> Almost a third of 110 physical activity and sport programs for Aboriginal and Torres Strait Islander people identified in a previous review aimed to improve broader social outcomes, such as education and employment and crime reduction.<sup>17</sup> Measurements of outcomes

and impacts tend to be via indirect or proxy measures, such as improved attendance and retention at school, or reduced ambulance and police call-outs.<sup>18</sup> Without empirical evidence, the direct benefits of such programs should be considered prudently. A scoping review provides a framework to map the key concepts and evidence, summarize and disseminate existing research findings and identify gaps in the existing research.<sup>19</sup> We aimed to conduct a systematic scoping review of the evidence for the impact of physical activity and sport on social outcomes among Aboriginal and Torres Strait Islander Australians.

## 2. Methods

This review follows scoping review methodology<sup>19</sup> and is reported using the PRISMA statement for systematic reviews.<sup>20</sup> The full review protocol has been reported separately.<sup>21</sup> The search was conducted between September and December 2018. Nine databases (MEDLINE, Scopus, SPORTSDiscus, PsycINFO, Informit, the Database of Abstracts of Reviews of Effects (DARE), The Cochrane Library, The Campbell Library, ProQuest Dissertations) were searched for published articles. Grey literature and websites were searched for additional articles and further information on relevant database articles. Studies were included if most participants were Aboriginal and/or Torres Strait Islander people living in Australia, or if results for Aboriginal and Torres Strait Islander participants are provided separately. Eligible studies had a primary or secondary aim to improve one of the six main outcome measures through physical activity and sport programs. The six measures were defined as those that use physical activity and sport as a tool to improve social and community outcomes<sup>17</sup> of: (i) education; (ii) employment; (iii) culture; (iv) social and emotional wellbeing; (v) life skills; (vi) crime reduction. All study types; qualitative, quantitative, economic and mixed methods studies were considered for inclusion. Data from two thirds of the included studies were extracted by the first author and cross checked by the second

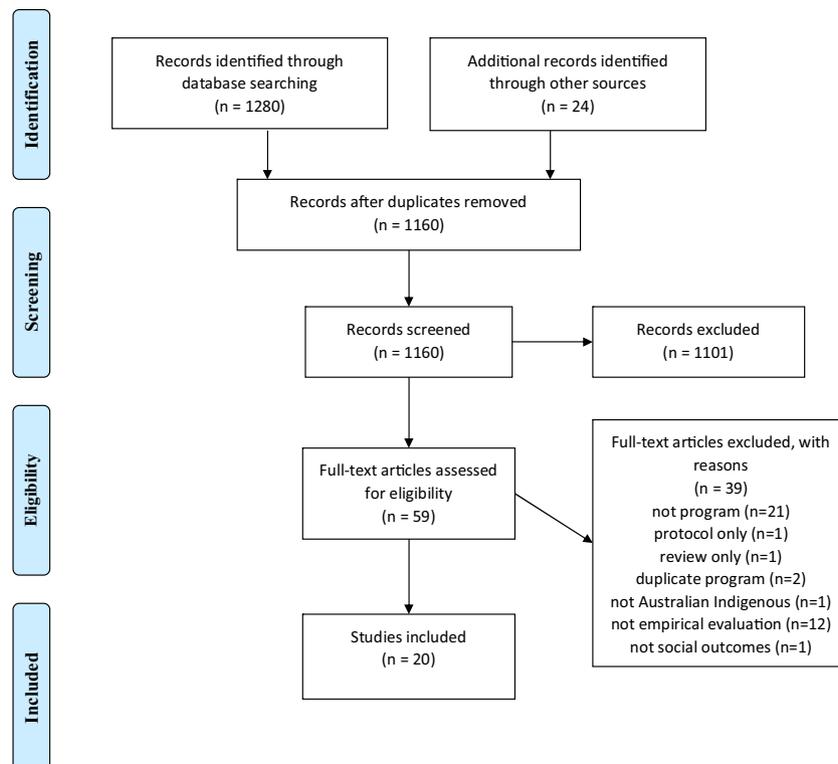


Fig. 1. PRISMA flowchart for the scoping review process.

author and the remaining third of studies were extracted by the second author and cross-checked by the first author.

### 3. Results

Our search identified 20 studies that met the inclusion criteria.<sup>22–40</sup> A PRISMA flow chart of the search is presented in Fig. 1. Studies were published between 2003 and 2018 with the majority (16/20) published since 2010. Table 1 displays the program characteristics of the included studies. Sixteen programs that reported the time period during which they operated were currently operational, the remaining four programs did not report this information.<sup>29,30,32,37</sup> The longest running program had existed since the 1970s.<sup>31</sup> One program operated nationally throughout Australia<sup>41</sup> and one operated in New South Wales, Victoria, Queensland and South Australia.<sup>30</sup> Five further programs operated in the Northern Territory,<sup>23,27,28,35,37</sup> five in Queensland,<sup>24–26,34,39</sup> four in Western Australia,<sup>22,33,38</sup> two in New South Wales,<sup>29,30,36</sup> one in South Australia<sup>40</sup> and one in Victoria.<sup>31</sup> Almost all programs occurred in a community (N=9; 45%)<sup>22–24,26,28,30,31,35,36</sup> or school (N=8; 40%)<sup>25,27,32–34,38,40,41</sup> setting. One program was implemented in a school and community (N=1; 5%)<sup>29</sup> and one in a school and university (N=1; 5%)<sup>39</sup> setting with the remaining program occurring in a corrective services setting.<sup>37</sup> Programs took place in urban (N=8; 40%),<sup>22,25,29,31,33,34,38</sup> regional (N=4; 20%)<sup>30,36,37,39</sup> and remote (N=6; 30%)<sup>23,24,26–28,35</sup> areas, respectively with one program occurring across urban, regional and remote areas<sup>41</sup> and one in urban and regional areas.<sup>40</sup> Programs focused on increasing physical activity participation through a range of sports and activities<sup>27–29,31–33,35,36,38,39,41</sup> or a participation in a specific sport or activity, such as the Australian Football League (AFL),<sup>23,24,37,40</sup> running,<sup>26</sup> surfing,<sup>30</sup> Traditional Indigenous Games (TIG)<sup>25,34</sup> and Zumba.<sup>22</sup> Specific program activities and operations including sports camps, tournaments and academies as well as weekly sport and physical activity sessions and academic, classroom-based components. Programs typically aimed to use these activities to achieve the social outcomes examined. Seven programs were delivered by multiple different organisations (Indigenous and non-Indigenous)<sup>26–28,30,39–41</sup> or by Indigenous community controlled organisations (N=4; 20%),<sup>25,29,31,36</sup> government, including schools (N=5; 25%),<sup>22,32–35</sup> non-government organisations (NGOs) (N=2; 10%)<sup>37,38</sup> and sport governing bodies (N=2; 10%).<sup>23,24</sup> One program was described and evaluated in two separate studies that differed in terms of their methods, participants, outcomes and other study characteristics.<sup>27,28</sup> Table 2 displays the evaluation characteristics of the included studies. Study aims typically examined the effectiveness or impact of specific programs. Six studies used mixed methodologies<sup>23,26,33,35,40,41</sup>; four studies used quantitative methodologies only<sup>25,29,34,39</sup> and ten studies used only qualitative methodologies.<sup>22,24,27,28,30–32,36–38</sup> Three studies used community participatory research approaches.<sup>22,29,38</sup> Indigenous or Indigenous research methods were used in two studies; yarning (chatting or talking); Dadirri (reflective listening)<sup>22,36</sup> and ganma theory,<sup>28</sup> a Yolngu term meaning 'both ways'. The 20 studies comprised 2500 participants; study samples sizes were provided by all but one of the studies. Sample sizes ranged from six<sup>37</sup> to 1296 participants<sup>41</sup> and the majority (14/20; 70%) included male and female participants. Ten studies examined outcomes among programs participants,<sup>22,25,29,31,32,34–37,39</sup> nine studies examined outcomes among both program participants and stakeholders such as program staff<sup>23,24,26–28,30,38,40,41</sup> and one study had stakeholder participants only.<sup>33</sup> Five programs reported a component of cultural capacity building<sup>23,26,30,33,36</sup> in either program operations, such as employing Aboriginal and Torres Strait Islander staff to deliver the program, or evaluation, such as training

local Aboriginal and Torres Strait Islander research assistants to conduct data collection. Most studies examined multiple social outcomes<sup>23,24,27,28,30–33,35,37,38,40</sup> and eight studies examined only one social outcome.<sup>22,25,26,29,34,36,39,41</sup> Findings across the six social outcomes are summarised below.

### 4. Education

Eleven studies reported education and related outcomes. School attendance improved in the AFL Cape York<sup>24</sup> the AFL NT<sup>23</sup> the Aboriginal Power Cup,<sup>40</sup> the role model program in central Australia<sup>27,28</sup> and the surf programs.<sup>30</sup> A moderate improvement in attendance was reported by the Sporting Chance program,<sup>41</sup> however, an Arnhem Land program found no improvements in school attendance.<sup>35</sup> The role model program in central Australia also had a positive impact on educational development and engagement with students not in school occurred.<sup>28,27</sup> There was a moderate positive impact of academies in the Sporting Chance program, achievement, retention and parental/community involvement<sup>41</sup> and the Swan Nyungar Sports Education Program found increases in student retention and achievement rates as well as program enrolment.<sup>33</sup> The Indigenous Youth Sports Program showed increases in student knowledge and awareness of higher education opportunities pre-post intervention<sup>39</sup> and the Girls Academy program helped to prepare for success beyond school.<sup>38</sup> Education related outcomes of program value, student enjoyment and a sense of achievement were also reported in the Aboriginal Power Cup evaluation.<sup>40</sup>

### 5. Employment

One study examined employment; 95% of participants and stakeholders considered that the AFL NT program helps players to be involved in paid work or training.<sup>23</sup>

### 6. Culture

Nine studies examined culture through a diverse range of outcomes, measured predominantly through qualitative methodologies such as interviews with participants and stakeholders. Two evaluations of a role model program in central Australia found a positive influence on cultural health and understanding and community connections.<sup>27,28</sup> The Aboriginal Power Cup was reported to facilitate a culturally relevant curriculum.<sup>40</sup> Fitzroy Stars club interviewees described social and community connection as an important way to strengthen and maintain their cultural values and identity.<sup>31</sup> A school sport program evaluation observed enablement of children to positively express their Aboriginal identity.<sup>32</sup> The surf programs were reported to provide a way people to (re)connect with country and unite community members to reinforce and pass on aspects of culture.<sup>30</sup> A TIG evaluation found no quantitative improvement in cultural connectedness.<sup>34</sup> There was some improvement in respect for elders and culture reported in an Arnhem land program.<sup>35</sup> Family event attendance occurred in the Swan Nyungar program; viability and success was described as depending on incorporation of students' families and culture.<sup>33</sup>

### 7. Social and emotional wellbeing

Twelve studies examined social and emotional wellbeing, the majority through qualitative, self-report measures. The Girls Academy program and surfing programs described increases self-reported in confidence and self-esteem<sup>38,30</sup>; increases in self-esteem were also self-reported in a school sport program<sup>32</sup> and the

**Table 1**  
Included studies – program characteristics.

Reference (Author, date)	Operating years	Program name (where given) and aims	State/ Territory Area Setting	Main delivery organizations	Indigenous capacity building
Andrews (2013)	2011 – unknown	Health and Wellbeing Program Improve physical activity and nutrition knowledge, behaviour and attitudes and a “Zumba” class as an alternative program	WA Urban Community	North Metropolitan Health Service	Not stated
Colmar Brunton (2012)	2007 – present	AFL Remote Regional Development Program Engage community members in a structured AFL Program, including senior and junior teams	NT Remote Community	AFL NT	Local researchers recruited and trained to conduct data collection
Dinan Thompson et al. (2008)	1997 – present	Kickstart program Encourage school attendance, refrain from substance abuse, bullying and violence and AFL skill development	QLD Remote Community	AFL Cape York	Not stated
Fredericks et al. (2016)	2010 – present	Dead or deadly program Comprehensive, holistic healthy lifestyle program where women participate in personalized health and wellbeing programs, group exercise, health education and camps	NSW Regional Community	Waminda South Coast Women's Health and Welfare Aboriginal Corporation	Program led by Indigenous staff; evaluation led by Indigenous researcher
Gallant et al. (2015)	Unknown	Provide meaningful physical activity to occupy inmates' time and to develop stronger links with the community through participation in an organized AFL competition.	NT Regional Prison	NGO (unstated)	Not stated
Hayhurst et al. (2016)	2004 – present	Girls Academy Program Create a supportive environment and programs to help Indigenous young women achieve their full potential	WA Urban School	NGO: Role Models and Leaders Australia (RMLA)	Not stated
Kickett-Tucker (2008)	Unknown	A school sport program comprising intra school sport, inter school sport and/or physical education	WA Urban School	School	Not stated
Kiran & Knights (2010)	2007	Traditional Indigenous Games (TIG) Program Teaching children TIG, which were played weekly over 3 months, with the aid of a TIG resource kit.	QLD Urban School	Schools	Not stated
Lee et al. (2008)	2003 – 2005 (possibly longer)	A range of training, recreational and cultural activities, including sporting activities, to strengthen local authority and culture, and provide diversionary activities	NT Remote Community	Youth Development Unit	Not stated
Lonsdale et al. (2011)	2007 – present	Sporting Chance Program Sports Academies for secondary school students; and Education Engagement Strategies (EES) for primary and secondary students. Academies use sport and recreational activities to engage Indigenous students in school	All Urban, regional, remote School	Specific academy providers	Not stated
Macgregor et al. (2015)	2011 – present	Indigenous Youth Sports Program Use health, sports, cultural and educational activities to develop aspirations and build confidence amongst Indigenous school students to raise awareness of career and study options and to become familiar with university through a 3-5 day camp	QLD Regional School, University	Inala Community Health Service, Central Queensland University	Not stated
Macniven et al. (2018)	2014 – present	Indigenous Marathon Foundation Use running and local role models to promote healthy lifestyles in Indigenous communities through supporting 18-30 year olds to undertake a marathon and lead community running groups	QLD Remote Community	NGO: Indigenous Marathon Foundation local volunteers	IMP runners & community members supported to undertake courses in health, fitness and running coaching Not stated
Malseed et al. (2014)	2010 – present	Deadly Choices program Deliver a seven-week health education program Traditional Indigenous games were included as activities. Sessions were facilitated by young Indigenous healthy lifestyle workers, considered to be role models to the children.	QLD Urban School	The Institute for Urban Indigenous Health	Not stated

Table 1 (Continued)

Reference (Author, date)	Operating years	Program name (where given) and aims	State/ Territory Area Setting	Main delivery organizations	Indigenous capacity building
Peralta et al. (2014)	Unknown	Community and school sport program (SCP) Encourage improved educational outcomes for Indigenous students using sport with lessons that focus on life skills, physical activity promotion, developing sport skills, cultural understanding and career and workplace knowledge	NSW Urban School, community	Indigenous community organisation	Not stated
Peralta et al. (2016)	1995 – present	Three times a year, for one week, external mentors provide inspiration, encouragement and support for students at school, through sport and recreation activities and nutrition education and to strengthen school and community partnerships	NT Remote School, community	Schools, Aboriginal controlled community organisation	Not stated
Peralta et al. (2018)	1995 – present	Three times a year, for one week, external mentors provide inspiration, encouragement and support for students at school, through sport and recreation activities and nutrition education and to strengthen school and community partnerships	NT Remote School, community	Schools, Aboriginal controlled community organisation	Not stated
Rynne & Rossi (2012)	Unknown	Surfing programs Different programs at the five different sites including weekly two hour (term time) programs, weekend 1.5 hour lessons 3–4 times/year and a carnival, Indigenous state surf titles	NSW, VIC, QLD, SA Regional Community	Surfing Australia, local government, Aboriginal organisations	Community members supported to undertake coaching courses
Simons (2003)	2002 – present	Swan Nyungar Sports Education Program Deliver a school program with fitness, AFL, netball, Noongar language and culture as key components as well as student attendance in all other key curriculum subjects.	WA Urban School	School	School staff capacity building to undertake relevant qualifications
Stewart et al. (2014)	2008 – present	Aboriginal Power Cup A nine-a-side AFL tournament and a range of other activities such as workshops on leadership, health, career pathways and Indigenous culture. Students must have good school attendance and participate in the entire school curriculum to play in the football tournament.	SA Urban, regional School	SA Attorney-General's Department, Port Adelaide Football Club, SA Aboriginal Sports Training Academy	Program organisers advise community members of the program as opposed to active involvement in the design
Thorpe et al (2014)	1970s – present	Fitzroy Stars Football and Netball Club Create a diversionary strategy for Aboriginal youth through sport and to provide a safe place for people to get together and participate	VIC Urban Community	Fitzroy Stars Football and Netball Club	Not stated

Australian Football League: AFL; Non-Government Organization: NGO; New South Wales: NSW; Queensland: QLD; South Australia: SA; Tasmania: TAS; Victoria: VIC; Western Australia: WA; Australian Capital Territory: ACT; Northern Territory: NT.

central Australia role models program where feelings of wellbeing and pride were also described in this program evaluation.<sup>27,28</sup> The Deadly Choices evaluation found, through quantitative participant self-report that the intervention group showed significantly more confidence than the control group to prevent chronic disease.<sup>25</sup> Social connections and Aboriginal community networks in the Fitzroy Stars club<sup>31</sup> were considered to be complex and strong; social reasons for participation were given equal importance as individual health reasons and the club was perceived to help reduce stress and build self-confidence and self-esteem. The Dead or deadly program delivered social and emotional wellbeing support and improvements, strengthening of community, support networks, increased resilience and self-esteem, also measured through self-report.<sup>36</sup> Several inmates stated that the prison program helped reduce stress and anxiety and increase happiness and self-esteem.<sup>37</sup> The meaning of a Health and Wellbeing program among adult participants related to prolonging life and

improving social and emotional factors. Motivation for attending the program was dominated by social benefits and there were self-reported increases in socialisation and the ability to cope with stress.<sup>22</sup> The Arnhem Land program found no change in youth apprehensions and resilience attributable to the program was unclear.<sup>35</sup> The Indigenous Marathon Foundation evaluation found changing social norms to adopt healthy lifestyles occurred and social support to encourage physical activity was considered important.<sup>26</sup>

## 8. Life skills

Five studies examined life skills. No significant quantitative changes in students' life skills were found in the School and Community Program.<sup>29</sup> The Kickstart program described improvement in attitudes and lifestyle choices<sup>24</sup> and the Girls Academy program was reported to help learn citizenship, self-care and

**Table 2**  
Included studies - evaluation characteristics.

Reference (Author, date)	Study aims	Design & methodology	Social outcome(s)	Outcome measures	Participant details: Number (N); Gender; Age	Findings
Andrews (2013)	Evaluate a health and wellbeing program	Qualitative: Participatory action research photovoice	Social and emotional wellbeing	Wellbeing	N = 13 M, F 25-75 years	The meaning of health and wellbeing for participants related to prolonging life and social and emotional factors. Motivation for attending the program was dominated by social benefits. There were increases in socialisation and the ability to cope with stress
Colmar Brunton (2012)	Examine the effectiveness of the remote AFL program	Mixed methods: qualitative semi-structured interviews; quantitative report card	Crime, education, employment	School attendance, training and employment, community safety and violence	N = 128 (104 community members, 24 service providers) M, F ≥18 years	86% agreed program improves school attendance and/or training; 95% agreed program helps players to be involved in paid work or training. Effect on community safety and violence is unclear
Dinan Thompson et al. (2008)	Investigate effectiveness of the program in enhancing lifeskills	Qualitative; Document analysis and focus groups	Education, Life skills	School attendance, respect, social and moral values	N = 60 (38 students, 3 parents, 12 teachers, 7 stakeholders) M, F ≤16 years (boys); ≤13 years (girls)	Improvements in education, attitudes and lifestyle choices, despite mixed meanings surrounding the interpretation of "life skills"
Fredericks et al. (2016)	Examines the effects of the Dead or Deadly program	Indigenist research framework. Qualitative: semi-structured interviews, yarning, Dadirri	Social and emotional wellbeing	Social and emotional wellbeing	30 F 16 years and over	Program delivers social and emotional wellbeing support and improvements, strengthening of community, building support networks, increasing resilience and self-esteem
Gallant et al. (2015)	Investigate the role of a prison sport and recreation program in enacting social change	Qualitative: interviews	Social and emotional wellbeing, crime	Stress, anxiety, happiness, self-esteem, inmate management	6 M 18 years and over	Only one participant perceived improvement in mental health; several stated that the program helped to reduce stress and anxiety and increased happiness and self-esteem. All inmates believed that the program was a diversion from their current environment.
Hayhurst et al. (2016)	Examine the effects of a Girls Academy program that included sports	Participatory action research including interviews, photovoice, sharing circles	Education, social and emotional wellbeing, lifeskills	Education, life skills, self esteem	12; 9 participants, 3 program staff F 15-17 years; adult stakeholders	Program viewed as a way to improve confidence and self-esteem to learn citizenship, self-care and healthy living; hygiene and health; self-reliance and fundraising; and how to prepare for 'success', such as future employment in mainstream organizations and industries
Kickett-Tucker (2008)	Examine whether positive social interactions in sport will contribute positively to the Aboriginal identity	Qualitative: Ethnography (students); semi-structured interviews (stakeholders)	Culture, Social and emotional wellbeing	Identity, self-esteem	29 (9 students; 20 stakeholders (Aboriginal and non-Aboriginal)) M, F 11-12 years	Aboriginal children's interactions in sport enabled them to positively express their Aboriginal identity. Non-Aboriginal peers contributed positively to Aboriginal student's self-esteem through positive feedback during sport and social interactions were purposeful for making friends, acceptance and respect.
Kiran & Knights (2010)	Evaluate a Traditional Indigenous Games (TIG) program	Cluster RCT: Student questionnaire pre and post program; Facilitator questionnaire	Culture	Cultural connections	167 M, F 9-12 years	No statistically significant improvement in cultural connectedness

Table 2 (Continued)

Reference (Author, date)	Study aims	Design & methodology	Social outcome(s)	Outcome measures	Participant details: Number (N); Gender; Age	Findings
Lee et al. (2008)	Examines the role, methods and effectiveness of a community-driven youth initiative	Mixed methods: Interviews; coordinator diary; corporate documents; school attendance; pre-post program	Social and emotional wellbeing, education, crime, culture	Substance misuse, resilience, cultural connection, school attendance; youth apprehension	73 stakeholder; unknown student numbers M, F Students: 5 - 16 years; adult stakeholders	Increased youth training and recreational opportunities, no changes in school attendance or youth apprehensions, some improvement in improve respect for elders and culture reported, substance use change and resilience attributable to the program unclear
Lonsdale et al. (2011)	Encourage improved educational outcomes using sport and recreation activities	Mixed methods: qualitative individual project provider interviews; quantitative questionnaire and review of education data, site visits	Education	Student attendance and learning improvement	1296 (1012 students; 194 teachers; 68 principals; 22 project providers) M, F Students: 9-18 years; Stakeholders: 18 years and over	Program is having a moderate (positive) impact on students in relation to attendance, engagement, achievement, retention and parental/community involvement. Insufficient evidence to show a clear link between Academy or EES participation and improved academic outcomes
Macgregor et al. (2015)	Evaluate the Indigenous Youth Sports Program at Central Queensland University	Quantitative: pre-post questionnaire	Education	Knowledge and awareness of higher education opportunities	174 pre-program and 204 post-program M, F 10 - 15 years	Increased student knowledge and awareness of higher education opportunities
Macniven et al. (2018)	Examine perceptions of the health and community impact of Indigenous Marathon Foundation & Deadly Runners programs	Multimethod: qualitative semi-structured interviews; quantitative questionnaire	Social and emotional wellbeing	Social support, wellbeing	122; 62 Indigenous runners, 42 non-Indigenous)18 stakeholders(14 Indigenous; 4 non-Indigenous) M, F 18 years and over	Changing social norms to adopt healthy lifestyles occurred, importance of social support to encourage physical activity. Non-indigenous runners reported running for mental wellbeing (compared to Indigenous runners; $p = 0.006$ )
Malseed et al. (2014)	Investigate effectiveness of the program in improving chronic disease knowledge, attitudes, self-efficacy and behaviours.	Quantitative: non-randomised controlled trial; pre and post intervention questionnaires	Social and emotional wellbeing	Self-efficacy regarding leadership, chronic disease and risk factors and risk factors	65; 49 intervention group, 16 control group M, F 11-18 years	Intervention group was significantly more confident than control group in preventing chronic disease ( $P = 0.005$ ) but not for leadership confidence compared with the control group participants
Peralta et al. (2014)	Investigated program effects on life skills and physical activity levels within program sessions	Quantitative 24-item Life Skills Questionnaire; qualitative focus groups; community-based participatory research approach	Life skills	Life skills	24; 18 students, 6 stakeholders M, F 11-16 years	No change in life skills ( $p = 0.93$ )
Peralta et al. (2016)	Explore the influence of a sport-based youth mentoring program in one community	Qualitative; semi-structured and focus group interviews using a Ganma framework	Education, social and emotional wellbeing, culture	Knowledge, educational engagement, social and cultural well-being	24; 11 students; 13 stakeholders M, F 8 to 18 years (students); adult stakeholders	Positive influence on youth educational and social development as well as cultural health needs of the community through improved school attendance, increased knowledge of sports and activities and feelings of wellbeing and pride
Peralta et al. (2018)	Explore the influence of a sport-based youth mentoring program in three communities	Community-based participatory research, case study design: stakeholder, mentor and student interviews; student artworks	Education, social and emotional wellbeing, culture, life skills	Self-esteem, self-confidence, school attendance, life skills	126; 55 students; 71 stakeholders M, F Students: not reported; adult stakeholders	Program builds relationships and broadens skills and exposure; supports school activities; increases students' self-esteem and aspirations, school attendance and engagement with students not in school, community connections and cultural understanding

Table 2 (Continued)

Reference (Author, date)	Study aims	Design & methodology	Social outcome(s)	Outcome measures	Participant details: Number (N); Gender; Age	Findings
Rynne & Rossi (2012)	Investigate how surfing contributed to the lives of the Indigenous people who engaged with selected surfing programs	Qualitative; field notes, photographs, video footage, participant observation, document analyses, semi-structured interviews	Culture, education, social and emotional wellbeing, crime	School attendance, connection to culture, diversionary activity provision, self-esteem, confidence	98 (39 surfing participants, 24 program providers and community members) M, F 15–25 years (surfing participants), adult program providers and community members	Programs provided a way to (re)connect with country, foster connections between participants and program providers, form bonds with other Indigenous children and unite community members to reinforce and pass on aspects of culture. Participants also developed psycho-social skills related to confidence, self-esteem, empathy, maturity and independence. There was increased school attendance and some degree of diversionary activity
Simons (2003)	Present a case study in facilitating culturally sensitive social inclusion in an educational and social context	Mixed methods: qualitative; staff interview; quantitative; family event attendance	Culture, education	Culturally sensitive social inclusion, student retention and achievement, family attendance	8 stakeholders and school staff M & F 18 years and over	Increases in student retention and achievement rates, family event attendance and program enrolment occurred but program viability and success depends on incorporation of students' families and culture
Stewart et al. (2014)	Enhance Indigenous students' commitment to conventional activities (school, careers, sports) and therefore assist them to develop a 'stake in conformity'	Mixed method: quantitative attendance data; qualitative semi-structured interviews, observation, document analysis	Education, culture, crime	School attendance, retention rates, cultural curriculum	33 (8 teachers, 20 students, 2 parents, 3 volunteers) M Students <18 years; adult stakeholders	Schools running the program had overall average attendance rates of over 75%. Unclear if the program is achieving concrete school performance/engagement improvements. Qualitative data from program organisers, participants, teachers and other community members showed that the program is valued, facilitates culturally relevant curriculum, students enjoy participating and it gives them a sense of achievement.
Thorpe et al. (2014)	Understand the impact of an Aboriginal community sporting team	Qualitative: interviews and focus groups	Social and emotional wellbeing, culture	Social, emotional and physical wellbeing, culture	14 M 18 years and over	Social connections were considered complex and Aboriginal community networks in sports settings considered strong. Social reasons for participation were given equal importance as individual health reasons where social and community connection was an important way to strengthen and maintain cultural values and identity. Club perceived to help reduce stress and build self-confidence and self-esteem

healthy living; hygiene and health; self-reliance and fundraising.<sup>38</sup> Surf program participants self-reported development of empathy, maturity and independence.<sup>30</sup> The central Australia role models program was reported to build relationships and broaden skills.<sup>27</sup>

## 9. Crime

Five studies examined crime reduction, both community crime prevention and inmate management. The six participants of the prison sport and recreation program believed that it was an effective diversion from their current environment.<sup>37</sup> The effect of the AFL Remote Regional Development program on community safety and violence was unclear.<sup>23</sup> The Aboriginal Power Cup<sup>40</sup> is an early intervention crime prevention program with school engagement outcomes that are described in the education section above. A degree of diversionary activity was also reported in the surf programs.<sup>30</sup> Attribution of substance use change to the Arnhem Land program was unclear.<sup>35</sup>

## 10. Discussion

This scoping review found some evidence of benefit for Aboriginal and Torres Strait Islander Australians from physical activity and sport programs across six social outcomes and among adults and children. The synthesis of existing literature provides insight into areas where further evidence would be beneficial. The 20 included studies varied widely in terms of their methodologies, sample sizes and findings. All studies reported findings suggesting programs or interventions are effective ways to increase physical activity and sport participation.<sup>42</sup> Some positive findings were evident across education, employment and life skill outcomes although only one program examined employment outcomes and verification via employment status data was not provided to support the self-report data. Several studies reported increased school attendance, however, the impact of programs on educational attainment was unclear. Increased attainment is a longer-term measure that may be unable to determine at present, given the relatively short operational periods of the educational programs to date. A relationship between physical activity and subsequent educational attainment has been demonstrated in other populations<sup>8</sup> although overall evidence is inconclusive and no significant association was found between physical activity and engagement in study in a large, national cross-sectional study of Indigenous young people.<sup>43</sup> Longer term evaluation of programs is required to determine their ultimate effect on desired long-term outcomes such as educational attainment and future employment. Encouraging findings of the impact of physical activity and sport on culture were reported in the majority of the nine studies that examined this outcome. These studies examined a range of specific outcomes relating to culture; multiple studies found evidence for improved identity and community connections or reconnection to culture. The parliamentary inquiry also found sport and culture to be linked through promoting reconciliation, and evidence for a reciprocal relationship between sport and culture.<sup>13</sup> Another government resource found support for improvements in connection to culture from sport and recreation programs for Aboriginal and Torres Strait Islander Australians and such activities can have strong links with traditional culture through activities like hunting.<sup>18</sup> We suggest that achieving cultural outcomes through physical activity and sport programs that are delivered in culturally meaningful ways could make an important contributions to improving challenges faced by Aboriginal and Torres Strait Islander Australians that have resulted from past poor treatment and the denigration of culture.<sup>2</sup> The results of this review support such a strengths-based approach. Many of

the programs examining social and emotional wellbeing reported increases in confidence and self-esteem, among both adults and children. While these studies typically used qualitative methods, which may have been subject to reporting bias, the findings of these studies are consistent with previous literature. Physical activity can achieve improvements in self-esteem among children and adolescents, at least in the short term<sup>10</sup> but evidence among adults is less clear. A cross sectional study of Aboriginal adolescents in NSW found an association between physical activity and feeling confident although the finding was not significant after statistical adjustment.<sup>44</sup> Positive links between physical activity and sport program participation and social and community involvement of adults were also found. This is an encouraging finding as a previous cross-sectional study found low levels of social and community connections among Aboriginal adults, which were associated with lower physical activity levels.<sup>45</sup> Some of the programs that aimed to prevent crime or reduce reoffending were found to have provided diversionary activities. While this is welcome, given that sport has been a recommended way to reduce the high rates of incarceration among Aboriginal and Torres Strait Islander Australians<sup>12</sup> and a recent parliamentary inquiry found support for sport contributing to safe communities<sup>13</sup> further research is needed as findings from the five studies that examined this outcome were inconclusive. We chose the six social outcomes a priori, based on their previous identification in a review of sport and physical activity program characteristics,<sup>17</sup> our knowledge of the existing literature and Indigenous knowledge standpoints. These defined outcomes provided some positive evidence, but the broad nature of the outcomes and limiting aspects of the six outcomes deserve further reflection. For example, the AFL Cape York study found improvement in attitudes and lifestyle choices of Aboriginal and Torres Strait Islander youth, despite mixed meanings surrounding the interpretation of life skills.<sup>24</sup> Physical activity participation was also described as a diversionary tactic to reduce boredom and vulnerability to drug use and violence but no data on these outcomes was presented.<sup>24</sup> Additionally, some of the six outcomes may overlap, such as education and life skills as well as culture and social and emotional wellbeing.<sup>46</sup> Substantial challenges remain in accurately measuring these six social outcomes and other broader outcomes that may exist in real world settings. We support previous recommendations to measure the impact of sport through assessing a number of indicators, including school attendance and different types of anti-social behaviour, as well as crime rates, that were also captured in this review.<sup>47</sup> As well, we support further future measurement of the cultural and social and emotional wellbeing aspects relevant to sport.

In summary, and drawing on the findings across these six social outcomes, we have several recommendations for future program practice and evaluation. The findings also provide guidance for future physical activity and sport programs to address social outcomes among Aboriginal and Torres Strait Islander people. Given the large known number (N=110) of physical activity and sport programs in existence,<sup>17</sup> and the relatively small number of programs with efficacy evidence covered by this review, further investigation of social outcomes should be conducted in longitudinal evaluation studies of existing programs that have not undergone comprehensive assessment to date. There is also potential to build more capacity building and Indigenous research methodologies into future research in this area. Only five programs reported a component of capacity building among Aboriginal and Torres Strait Islander people in program delivery and evaluation. Only three studies used Indigenous research methodologies although a further four studies included community participatory research approaches which are deemed appropriate decolonising methodologies.<sup>48</sup> We support the participation and leadership of Indigenous people in program operation and evaluation roles

and the recent parliamentary inquiry has also recommended the acknowledgement and development of Indigenous participation in sport support roles such as coaches and health workers.<sup>13</sup> Indigenous led research using culturally appropriate methods is an important way to decolonise research methodologies in order to achieve benefits from future research for people and communities.<sup>48</sup> Strengths of this study include the use of a systematic scoping review methodology,<sup>19</sup> which allowed for a broad range of relevant, heterogeneous studies to be included. However, a limitation of this methodology is that it does not include an assessment of study quality and therefore may overestimate the conclusions due to the limited ability to examine the bias. In this scoping review, the veracity of the data and quality of methodology in supporting the study claims have not been questioned, however these are important considerations. We recommend future research to examine the quality of these studies to further advance the knowledge regarding the impact of physical activity and sport programs on social outcomes among for Aboriginal and Torres Strait Islander people. Further insight could be drawn from literature exploring similar outcomes among Indigenous populations internationally.

## 11. Conclusion

This review identifies, for the first time, the characteristics of studies that examined the impact of physical activity and sport among Aboriginal and Torres Strait Islander Australians. We found some evidence of benefit across each of the six social outcomes arising from physical activity and sport programs, particularly educational and social and emotional wellbeing outcomes. These findings promote their continuation, but further appraisal is needed to better quantify their benefit, as well as generate new evidence across outcomes and indicators where gaps currently exist.

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