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Addressing Social and Cultural Determinants of Health for Aboriginal and Torres Strait Islander People in Chronic Disease Programs: A Scoping Review

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ABSTRACT

Objective: This research aimed to assess, synthesise and analyse the evidence to understand whether chronic disease programmes for Aboriginal and Torres Strait Islander peoples address social and cultural health determinants and what strategies are being used to achieve them.

Methods: A systematic search was conducted in Medline, Scopus, ProQuest and Web of Science to identify studies between 1 January 2002 and 31 December 2022 using combinations of subject headings and keywords related to 'Aboriginal and Torres Strait Islander people' and 'chronic disease'. Data were synthesised using descriptive analysis.

Results: This review identified that chronic disease programmes focusing on Aboriginal and Torres Strait Islander people did not adequately address social and cultural determinants with adequate scope and depth. Cultural determinants were more frequently addressed, although there was a distinct reliance on Aboriginal and Torres Strait Islander Health Workers/Practitioners to meet cultural needs.

Conclusions: This research highlights an unmet need to address the social and cultural determinants of health, thereby meeting the holistic needs of Aboriginal and Torres Strait Islander people.

Implications for Public Health: Flexible funding for chronic disease programmes, frameworks to guide the design and implementation and reporting standards for research are essential to addressing social and cultural determinants.

1 | Background

Globally, research has demonstrated the importance of addressing social and cultural factors to improve the health and well-being of Indigenous communities [1, 2]. For Indigenous people, health extends beyond physical well-being to encompass 'the social, emotional and cultural well-being of the whole Community' [3]. This holistic definition implies a need for health programs that consider and address social and cultural determinants of health as part of their core business.

Chronic diseases are a major health burden to Aboriginal and Torres Strait Islander people, accounting for approximately 80% of the difference in life expectancy between Aboriginal and Torres Strait Islander people and non-Indigenous people [4]. In 2018–2019, 46% of Aboriginal and Torres Strait Islander people

had at least one chronic condition [5]. Although there has been some improvement in chronic disease-attributable mortality, Aboriginal and Torres Strait Islander people still experience a high burden of chronic disease due to structural disadvantages [6]. The drivers of this inequity are intertwined and include intergenerational trauma, racism, poverty, lack of access to culturally appropriate healthcare, inaccessibility of nutritious food choices, easy availability of unhealthy and ultra-processed foods and colonial actions that impact Aboriginal and Torres Strait Islander people's lives in multiple ways [7–9]. This disparity is even more pronounced in remote Australia, where communities are further marginalised by distance and poverty. Evidence shows that one-third (35%) of the health gap between Aboriginal and Torres Strait Islander people and other Australians is attributed to social inequity and another 35% of the gap remains unexplained [10], which could be related to cultural determinants that result in poorer health and well-being outcomes. The effects of colonisation and intergenerational trauma contribute to socioeconomic disadvantage for Aboriginal and Torres Strait Islander people, which, in turn, is strongly correlated with exposure to chronic disease risk factors such as smoking, obesity, alcohol misuse and high blood pressure [11] and can have proximal or distant influences on health and well-being conditions. Unfortunately, the prevailing deficit narrative around Indigenous health means that health programmes are often focused on fixing 'problems' rather than understanding, assessing and addressing the holistic needs of Aboriginal and Torres Strait Islander people [8].

Previous research shows that social, cultural and economic protective factors can promote positive health and development among Aboriginal and Torres Strait Islander communities [12, 13]. National plans and policies, including the National Agreement on Closing the Gap 2020 [14] and the National Aboriginal and Torres Strait Islander Health Plan 2021–2031 [15], have clearly highlighted the importance of addressing social and cultural determinants of health. The National Aboriginal Community Controlled Health Organisation (NACCHO) Core Services and Outcomes Framework also highlights the need to act on social and cultural determinants to improve the health and well-being of Aboriginal and Torres Strait Islander people [16]. However, it is unclear whether these national commitments to addressing social and cultural determinants are matched in chronic disease program delivery. In this context, a scoping review provides a mechanism to comprehensively understand and summarise the existing evidence and identify evidence gaps for future policy and practice implications. This research aimed to assess, synthesise and analyse the evidence to understand whether chronic disease programs for Aboriginal and Torres Strait Islander people's address social and cultural health determinants and what strategies are being used to achieve them.

Appendix A presents operational definitions of chronic conditions and their risk factors, as well as social and cultural determinants of health.

2 | Methods

This scoping review followed the guidelines and criteria set out by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [17] and a PRISMA extension for scoping reviews (PRISMA-ScR) was completed (Appendix B).

2.1 | Author's Positionality

J.C., a Gumbaynggir woman, holds several years of experience in improving health inequalities and outcomes for Aboriginal and Torres Strait Islander people and communities through research that utilises Indigenous Knowledges (knowing, being and doing) and methodologies. PM is a non-Indigenous medical student at the Australian National University College of Science and Medicine. UNY is an Indigenous researcher (Madhesi/Tharu, Nepal) who holds over 4 years of research experience in improving Aboriginal and Torres Strait Islander health and well-being. RW and KD are non-Indigenous practising general practitioners and hold experience working in Aboriginal and Torres Strait Islander health.

The review applied the methodological framework for scoping reviews proposed by Arksey and O'Malley [18] and later revised by Levac [19]: (i) identifying the research question, (ii) identifying relevant studies, (iii) study selection, (iv) charting the data, (v) collating, summarising and reporting the results and (vi) consulting with key stakeholders.

2.2 | Stage 1: Identifying the Research Question

A preliminary research question was identified based on the literature review, which was refined following the discussion within the team and engagement of *Thiitu Tharrmay Aboriginal and Torres Strait Islander Reference Group* members (referred to hereafter as the Thiitu Tharrmay Reference Group) at Yardhura Walani, the Australian National University [20]. Thiitu Tharrmay Reference Group members are Aboriginal and Torres Strait Islander peoples who are consumers or providers of healthcare, with knowledge and/or experience with research and health policy. Thiitu Tharrmay Reference Group members' advice on the appropriate conduct of research, including ensuring that the research, dissemination and policy agenda reflect Aboriginal and Torres Strait Islander community priorities and values.

Research questions presented at Thiitu Tharrmay Reference Group are below:

1. Have chronic disease programmes addressed socio-cultural determinants of health to improve the holistic well-being of Aboriginal and Torres Strait Islander people?
2. What are the approaches for addressing socio-cultural determinants of health in chronic disease programmes developed for Aboriginal and Torres Strait Islander people?

2.3 | Stage 2: Identifying Relevant Studies

A systematic search was conducted using four electronic databases: Medline, Scopus, ProQuest and Web of Science, to identify studies between 1 January 2002 and 31 December 2022. This time frame was chosen to ensure that contemporary examples relevant to current practice would be identified. The

search was performed using combinations of subject headings and keywords outlined in Appendix C. Additionally, citation tracking was performed using the reference lists of included articles.

2.4 | Stage 3: Study Selection

The search results were imported to EndNote before being transferred to the Covidence platform [21]. Using Covidence, duplicates were removed and screening was done by the first lead author. Two review team members assessed 10% of the articles to refine the study selection criteria. The articles that met eligibility criteria were downloaded as full texts for a comprehensive full-text assessment. Disagreements between reviewers were resolved through open team discussion to reach a consensus.

2.4.1 | Inclusion and Exclusion Criteria

Studies published between 1 January 2002 and 31 December 2022 were included if they described a chronic disease programme and included Aboriginal and Torres Strait Islander people living with chronic conditions or living with risk factors for chronic conditions. Table 1 presents the inclusion and exclusion criteria.

2.4.1.1 | Charting the Data. The first author extracted data that included general information (authors, publication year, location), study characteristics (study design, sample demographics, sample size), program characteristics (condition targeted, details of the program including social or cultural determinants of health that were addressed) and outcome measures. The outcome measures included anthropomorphic measures of health (weight, BMI, waist circumference, blood pressure, triglycerides, HDL, LDL and total cholesterol, HbA1c and fasting glucose), social and emotional well-being (e.g., psychological distress, depressive symptoms) and self-management behaviours. The corresponding author checked data extraction for 20% of the included articles and discrepancies were resolved through team discussion. Additionally, authors of all included studies were approached for additional details if required to complete data extraction.

TABLE 1 | Inclusion and exclusion criteria.

Inclusion	Exclusion
Quantitative studies (quasi-experimental study, randomised controlled trial, pre–post etc.) describing a chronic condition intervention	Publications that do not describe a chronic condition intervention
Participants are Aboriginal or Torres Strait Islander people	Studies conducted focusing on Indigenous communities other than in Australia
Study with mixed participants (participants from Aboriginal and Torres Strait Islander communities and non-Indigenous Australians) and provided disaggregated results for Aboriginal and Torres Strait Islander participants	Commentaries, editorials, non-experimental studies, opinion or perspective articles
Published in English language	Articles not published in English
	Demographics included participants under 18-year-old

2.4.1.2 | Collating, Summarising and Reporting the Results. The extracted data were summarised using a descriptive synthesis process based on the recommendations of the Joanna Briggs Institute Reviewer's Manual [22]. Data synthesis also involved responses from authors of included studies who were invited to comment with regard to their consideration of social and cultural determinants of health in their programmes. The quality of the included studies was assessed using the Aboriginal and Torres Strait Islander Quality Appraisal Tool [23]. The tool was chosen to reflect the research focus on cultural and social determinants of health because it prioritises Indigenous epistemologies, values and principles of ethical research.

2.4.1.3 | Consulting With Key Stakeholders. The study findings were presented to members of *Thiitu Tharrmay Aboriginal and Torres Strait Islander Reference Group* members. Two review team members (one representing the Aboriginal and Torres Strait Islander community and another an international Indigenous researcher) reviewed and validated the interpretations of the data. Two non-Indigenous practising general practitioners with significant experience working with Aboriginal and Torres Strait Islander communities also contributed to interpreting the data.

3 | Results

Initial searching identified 795 potentially relevant studies. Following duplicate removal, 514 studies underwent title and abstract screening and 61 were included for a full-text review. Only 17 studies met the inclusion criteria after a full-text review, as shown in the PRISMA diagram (Figure 1).

3.1 | Study Characteristics

Study characteristics are summarised in Appendix D, with 17 research studies representing 15 unique programs. Two of the studies related to the *Work It Out* chronic condition self-management program [24, 25] and two related to the *Voices United for Harmony* singing program [26, 27]. All studies were specifically designed for Aboriginal and Torres Strait Islander people. Four studies were randomised controlled trials [28–31], three were longitudinal [32–34] and the remainder were quasi-experimental [24–27, 35–40]. In six studies, the chronic disease program was focused on more than one health condition, for example, kidney disease and cardiovascular disease or addressed chronic disease risk factors more generally [28, 33, 34, 36, 38, 39]. Three studies targeted Type 2 diabetes [32, 34, 35], four targeted cardiovascular disease [33, 36–38] and five addressed social and emotional well-being [26, 27, 30, 31, 40].

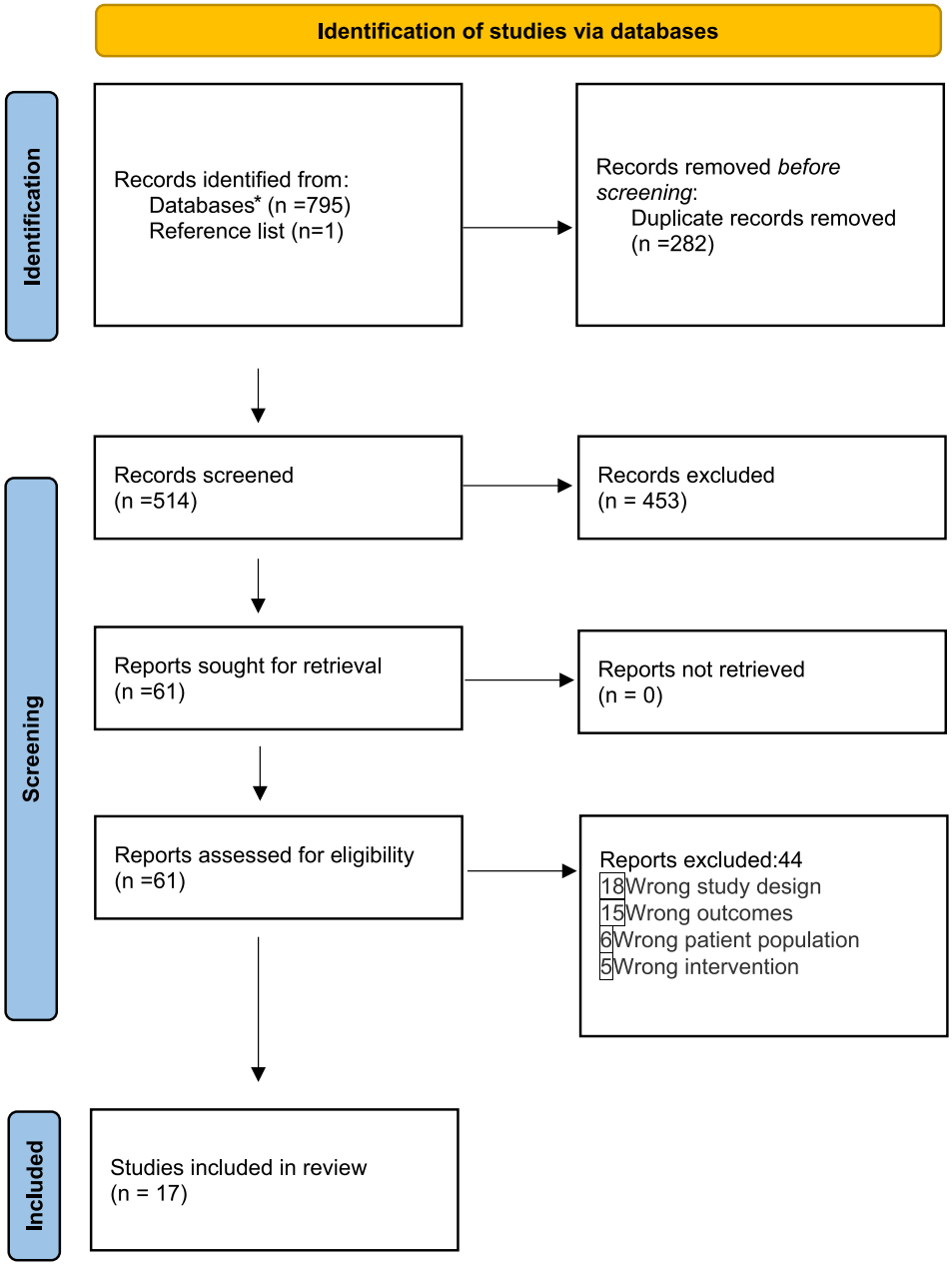

FIGURE 1 | PRISMA 2020 flow diagram. *Source:* Page et al. [17]. * denotes demotes results from four database: Medline, Scopus, ProQuest and Web of Science.

Five of the 17 studies were from Queensland [24–27, 34], four from the Northern Territory [29, 30, 32, 38] and one from NSW [39]. Almost half of the programs (8/17) had a duration of 12 weeks or less [24, 25, 28, 30, 31, 36, 37, 40], with a further seven running for 6–12 months [26, 27, 29, 33–35, 39] and two occurring over 3 years [32, 38].

3.2 | Cultural Quality Appraisal

Quality appraisal was undertaken using the Aboriginal and Torres Strait Islander Quality Appraisal Tool [23]. Details have been provided in Appendix E. Three-quarters of the studies met the criteria for benefit to the participants and the Aboriginal and Torres Strait Islander communities (Criteria 12). Over 68% of studies had inclusive community consultation (Criteria 2) and Aboriginal and Torres Strait Islander governance (Criteria 4) and 63% of studies respected local community protocols (Criteria 5) and demonstrated capacity building to Aboriginal and Torres Strait Islander people (Criteria 13). Less than half of the studies responded to a priority determined by the community (Criteria 1), had Aboriginal and Torres Strait Islander research leadership (Criteria 3), were guided by an Indigenous research paradigm (Criteria 9) or provided everyone involved in the research opportunities to learn from each other (Criteria 14). A majority of studies took a strengths-based approach to the research (Criteria 10), while few studies (< 20%) reported on the translation of findings into sustainable policy or practice (Criteria 11). Aboriginal and Torres Strait Islander peoples' agency over intellectual property and research materials was poor, as less than

20% of studies ensured community control over the collection and management of research materials (Criteria 8) or right of access to existing intellectual and cultural property and negotiated agreements with Aboriginal and Torres Strait Islander peoples' (Criteria 6 and 7).

3.3 | Social Determinants of Health

Of the 15 unique chronic disease programs, only four addressed social determinants of health, all by addressing 'Access to healthcare' (Table 2). Two programs [36, 37] provided free transport services to individuals who would otherwise be unable to attend. A third program [39] was a customised healthy lifestyle coaching service for Aboriginal and Torres Strait Islander people delivered via telephone. Modifications included three additional coaching sessions as well as an increased number of follow-up attempts before discharge. Flexibility in the program delivery setting increased access to healthcare in one study [29], where participants received a motivational interviewing program in a location that suited them, for example, at home, in the clinic or while receiving dialysis.

Nine authors of the included studies responded to requests for further comment with regard to their consideration of social and cultural determinants of health [26, 27, 29, 30, 32, 33, 36, 37, 39]. This additional information provided rich context and illustrative examples which were not evident in publications. One author described the ways in which social determinants of health were addressed at the level of individuals rather than by the programme at large:

> One participant with type 2 diabetes, when asked about his blood sugar levels, revealed that he hadn't been checking them regularly. When asked why not, it became apparent that he'd run out of monitoring sticks and couldn't afford to buy replacements. [Subsequently] they were arranged through the program.

> A second participant wasn't taking part in the walking group and when asked about this revealed that he felt shame because he didn't have any shoes to walk in. [Community nurse] organised a box of second-hand shoes through the WA marathon club and the 'non-walking participant' received a pair and was a regular walker thereafter. (A. Maiorana, personal communication, 5 May 2023)

These anecdotes illustrate that contextual barriers to engagement are diverse and highlight the need for flexibility in program delivery.

3.4 | Cultural Determinants of Health

Cultural determinants of health were much more frequently considered, with 12 of the 17 studies addressing some aspect of cultural determinants of health (Table 3) [24–31, 35–37, 39].

The cultural determinants of health that were addressed by the studies in this review were *Family, kinship and community, Indigenous beliefs and knowledge, Connection to country, Indigenous language* and *Self-determination and leadership*. None of the studies addressed *Cultural expression and continuity*. Two studies with mixed cohorts (not exclusively Aboriginal and/or Torres Strait Islander people) did not report any approaches to addressing social or cultural determinants of health in their chronic disease programmes [34, 40].

Aboriginal and Torres Strait Islander Health Workers (AHWs) were commonly employed to support the cultural needs of Aboriginal and Torres Strait Islander people, with over half (6/12) studies that addressed cultural determinants utilising AHWs [24, 25, 30, 35, 36, 39]. In studies that utilised AHWs for participant recruitment, their involvement was classified under 'Family, kinship and community', whereas when AHWs were involved in the actual delivery of the program, their contribution was categorised as 'Self-determination and leadership' (subcategory: *cultural safety*).

Flexible delivery of chronic disease programs was another way in which some studies addressed cultural determinants of health. One program was delivered remotely [31], which enabled participants to remain on Country while accessing the program. In two studies, flexibility in the timing of service delivery was an important approach that allowed Aboriginal and Torres Strait Islander people to participate in cultural or family events and obligations [24, 37].

3.5 | Outcomes

Four of the 17 studies addressed both social and cultural determinants of health [29, 36, 37, 39]. Of these studies, three reported on anthropometric measures of health and found statistically significant reductions in waist circumference and BMI [36, 37, 39]. One programme targeted end-stage kidney disease and found no impact on social and emotional well-being [29].

Eight studies related to six programmes implemented initiatives that addressed cultural determinants of health only [24–28, 30, 31, 35]. Four studies showed significant improvements across anthropomorphic measures [24, 25, 28, 35], two showed social and emotional well-being improvement [27, 30, 31], two showed improved self-management behaviours [25, 35] One study found significant improvement in the 6-min walk test (6MWT) for participants suffering from numerous social and emotional well-being conditions [25] and another found no improvement in social and emotional well-being outcomes [26].

4 | Discussion

This scoping review provides a synthesis of existing evidence to inform policy, research and practice on social and cultural determinants in chronic disease programs for Aboriginal and Torres Strait Islander people. We found that chronic disease programs for Aboriginal and Torres Strait Islander people did not adequately address social determinants of health. There is a wide range of non-biomedical factors that affect health outcomes

TABLE 2 | Social and cultural determinants of health in chronic disease programs.

Year, authors	Chronic disease targeted	Description of program	Which social determinants of health were addressed and how?	Which cultural determinants of health were addressed and how?	Outcomes
2004 Bailie et al.	Type 2 diabetes	Implementation of a multifaceted trial, including transfer of purchasing and planning responsibility to local health boards, the development and dissemination of clinical guidelines supported by electronic registers, recall and reminder systems and associated staff training and audit and feedback.	N/A	N/A	No statistically significant changes to: • Blood pressure • Proportion of patients who achieved target blood pressure • Mean HbA1c • Proportion of patients who achieved 'controlled glycaemia' (HbA1c < 8%) Statistically significant: • Proportion of patients who achieved 'target glycaemia' (HbA1c < 7%) increasing from 19% at baseline to 32% at the end of year 3
2008 Battersby et al.	Type 2 diabetes	Self-management assessment, goal setting and care planning delivered by an AHW. In conjunction with the AHW and GP, the patient developed a 12-month plan which included medical monitoring, preventative appointments, self-management education and self-management goals. The AHW assisted the patient to access the aforementioned services over subsequent months.	N/A	Self-determination and leadership: Program delivered by AHW, consultation with local elders throughout the development phase of the program.	No statistically significant changes in mean blood pressure. Statistically significant: • Reduction in mean HbA1c levels from baseline (8.74) to 12 months after treatment (8.09). • Improvement in self-management scores in 5/6 domains of the Diabetes Assessment Form
2012 Canuto et al.	Chronic disease risk factors	The Aboriginal and Torres Strait Islander Women's Fitness Program ran for 12 weeks. It involved group exercise classes, incidental activity and walking, nutrition workshops and positive reinforcement and encouragement.	N/A	Self-determination and leadership: the program was guided by an advisory committee of local Aboriginal and Torres Strait Islander women, the program employed female fitness instructors and nutritionists.	No statistically significant changes from baseline to immediately post-program in: • Blood pressure • Fasting glucose • HbA1c • Total cholesterol • Triglyceride concentrations • LDL cholesterol • HDL cholesterol Statistically significant: • Weight loss of 1.65 kg from baseline to immediately post program • Reduction in BMI of 0.66 kg/m^2 from baseline to immediately post program

(Continues)

TABLE 2 | (Continued)

Year, authors	Chronic disease targeted	Description of program	Which social determinants of health were addressed and how?	Which cultural determinants of health were addressed and how?	Outcomes
2007 Chan et al.	Cardiovascular risk factors	Community-based education program (details of frequency and duration not provided) including self-monitoring of fasting plasma glucose (for participants with T2DM) and self-monitoring of physical activity with pedometers.	N/A	N/A	No statistically significant changes to: • BMI • Systolic blood pressure • Fasting plasma glucose • LDL cholesterol Statistically significant worsening of: • HDL cholesterol, reduction of 0.09 mmol/L • HbA1c, increase of 0.31% Statistically significant improvements: • Reduction in waist circumference of 3.1 cm • Reduction in diastolic BP of 4.6 mmHg • Reduction in mean arterial BP of 4.2 mmHg • Reduction in total cholesterol of 0.26 mmol/L • Reduction in triglyceride levels of 0.18 mmol/L
2014 Davey, M.; Moore, W.; Walters, J.	Cardiovascular or pulmonary disease	Rehabilitation program consisting of two exercise sessions and one education session per week over 8 weeks.	Access to healthcare: transport provided to people who could otherwise not attend.	Family, kinship and community: recruitment via AHWs, AHWs used knowledge of their community to 'deliberately recruit People who would have the active support and be supportive, of at least one other participant in that particular group'. Self-determination and leadership: data collection was completed by physio or exercise physiologist in conjunction with an AHW, the program was designed and established by the Tasmanian Aboriginal Centre (an ACCHO).	No statistically significant changes to: • The physical functioning and physical role functioning domains of the SF36 (quality of life) Statistically significant: • Weight loss of 0.8 kg • Reduction in weight circumference of 3.6 cm • Reduction in BMI of 0.3 kg/m^2 • Improvements in 6/8 domains of the SF36 (quality of life)
2013 Dimer et al.	Cardiovascular disease	Heart health cardiac rehabilitation program comprised of an exercise prescription (aim of 150 min moderate physical activity per week).	Access to healthcare: transport provided to people who could otherwise not attend.	Family, kinship and community: mid-week session as per community preference reducing the likelihood of conflict with family obligations, funerals or cultural events. Indigenous beliefs and knowledge: Education sessions employed the process of 'yarning' which 'encouraged meaningful conversation in a relaxed and open manner'. Self-determination and leadership: Consultation with Aboriginal focus groups to ensure the program 'met their needs and expectations', program implemented by an ACCHO.	No statistically significant changes to: • Weight Statistically significant: • Reduction in waist circumference of 4.3 cm • Reduction in bmi of 0.7 kg/m^2 • Reduction in systolic bp of 15 mmhg • Reduction in diastolic bp of 6 mmhg

(Continues)

TABLE 2 | (Continued)

Year, authors	Chronic disease targeted	Description of program	Which social determinants of health were addressed and how?	Which cultural determinants of health were addressed and how?	Outcomes
2021 Dingwall et al.	End-stage kidney disease	Face-to-face semi-structured interview using motivational interviewing principles and the Aboriginal and Islander Mental Health Initiative (AIMhi) Stay Strong app. Up to four sessions of approximately 20 min with a follow up call or text.	Access to healthcare: Assessment and treatment sessions occurred at a place that was identified by the participant as most comfortable for them, e.g., outdoors, at the clinic, while receiving dialysis or at their accommodation.	Indigenous language: resources translated into 11 NT First Nations languages, interpreters available.	No statistically significant changes to: • Psychological distress • Depressive symptoms • Quality of life
2003 Hoy	Kidney disease and cardiovascular disease	Medical management of individuals centring around the use of perindopril, a long-acting angiotensin converting enzyme inhibitor. Use of calcium channel blockers and diuretics as needed to achieve blood pressure goals. The program also included health education and 'attempts to control blood glucose levels and lipids where needed'.	N/A	N/A	Statistically significant changes from baseline to 3- year follow-up in: • Systolic blood pressure, reduction of 13.2 mmHg • Diastolic blood pressure, reduction of 6.8 mmHg
2019 Hu et al.	Chronic disease risk factors	12 week program, two or more sessions per week of 45 min 'yarning' (education) session followed by a 1 h exercise program with exercise physiologist or physiotherapist.	N/A	Family, kinship and community: flexible entry and exits points to program permitted participants to be absent from several sessions due to responsibilities with family and community then return to program at later time Self-determination and leadership: AHW or other Aboriginal or Torres Strait Islander staff member working with exercise physiologist at each session, comprehensive consultation with Indigenous community in program development phase and ongoing guidance sought during implementation.	No statistically significant changes to: • BMI • Weight Statistically significant: • Reduction in waist circumference of 1.79 cm

(Continues)

TABLE 2 | (Continued)

Year, authors	Chronic disease targeted	Description of program	Which social determinants of health were addressed and how?	Which cultural determinants of health were addressed and how?	Outcomes
2017 Mills et al.	Cardiovascular disease	12 week program, two or more sessions per week of 45 min 'yarning' (education) session followed by a 1 h exercise program with exercise physiologist or physiotherapist.	N/A	Family, kinship and community: flexible entry and exits points to program permitted participants to be absent from several sessions due to responsibilities with family and community then return to program at later time Self-determination and leadership: AHW or other Aboriginal or Torres Strait Islander staff member working with exercise physiologist at each session, comprehensive consultation with Indigenous community in program development phase and ongoing guidance sought during implementation.	No statistically significant changes to: • Weight • Diastolic BP • Waist circumference Statistically significant changes to: • Distance walked in the 6MWT • Systolic BP
2009 Nagel et al.	Chronic mental illness	Motivational care planning: Two 1 h sessions of motivational therapy, ultilising problem-solving and self-management principles.	N/A	Family, kinship and community: carers were engaged in treatment sessions, family was involved in goal setting, carers were incorporated into 'family map' in step one of intervention. Self-determination and leadership: Treatment delivered by psychiatrist in conjunction with Aboriginal research officer and where possible a local AHW.	No statistically significant changes to: • Self-management Statistically significant changes to: • Psychological distress • Severity of mental health disorder
2022 Ogloff et al.	Mental health	Group therapy intervention with content including topics such as understanding and managing triggering and stressful experiences, thoughts, emotions and behaviours and the biopsychosocial model of health.	N/A	N/A	No statistically significant changes to: • Psychological distress

(Continues)

TABLE 2 | (Continued)

Year, authors	Chronic disease targeted	Description of program	Which social determinants of health were addressed and how?	Which cultural determinants of health were addressed and how?	Outcomes
2017 Quinn et al.	Lifestyle-based chronic disease risk factors	Thirteen phone call coaching sessions that aim to support positive changes to healthy eating, physical activity, alcohol intake and achieving or maintaining a healthy weight.	Access to healthcare: The 'Enhanced Aboriginal Program' of the Get Healthy Service included three additional phone calls which were 'educational sessions with content focused on prevention of diabetes where appropriate'. The modified service also includes two additional call attempts (total five) before withdrawing the participant from the service.	Family, kinship and community: referral pathway through the ACCHOs with AHW Self-determination and leadership: annual cultural competency training for coaches, educational resources provided were culturally specific using 'straightforward language and strong Aboriginal visuals and colours', an online database enabled coaches to refer participants to Aboriginal-specific health services and programs for issues outside the scope of the intervention, comprehensive community consultation in development of program.	Statistically significant: • Reduction in weight of 3.3 kg • Reduction in waist circumference of 6.2 cm • Reduction in BMI of 0.8 kg/m^2
2015 Ski et al.	Coronary heart disease Type 2 diabetes	An average of five telephone coaching sessions over 6 months which involved goal setting and action plan development to reduce risk factors. Phone calls were supplemented with information provided in mailouts.	N/A	N/A	No statistically significant changes to: • Fasting glucose (CHD group) • Systolic BP (CHD group) • HDL (T2DM group) Statistically significant: • Reduction in total cholesterol (0.56 mmol/L for CHD group, 0.47 mmol/L for T2DM group) • Reduction in triglycerides (0.33 mmol/L for CHD and T2DM group) • Increase in HDL of (0.06 mmol/L for CHD group, 0.04 mmol/L for T2DM group) • Reduction in LDL (0.61 mmol/L for CHD group, 0.42 mmol/L for T2DM group) • Reduction in HbA1c (0.43% for CHD group, 0.7% for T2DM group) • Reduction in systolic BP of 2 mmHg for T2DM group • Reduction in diastolic BP (1.2 mmHg in CHD group and 1.4 mmHg for T2DM group) • Reduction in weight (1.1 kg for CHD group and 1 kg in T2Dm group) • Reduction in BMI (0.3 kg/m^2 in CHD group and 0.4 kg/m^2 in T2DM group)
2013 Sun, J.; Buys, N.	Mental health (social and emotional well-being)	Two-hour group singing classes held weekly for 12 months. Included warm-up exercises of body, breathing techniques, tension release and singing.	N/A	Self-determination and leadership: each group-singing activity session was organised by a Community Controlled Health Service Aboriginal community member	No statistically significant changes to: • Social and emotional well-being

(Continues)

TABLE 2 | (Continued)

Year, authors	Chronic disease targeted	Description of program	Which social determinants of health were addressed and how?	Which cultural determinants of health were addressed and how?	Outcomes
2016 Sun, J.; Buys, N.	Mental health (social and emotional well-being)	Two-hour group singing classes held weekly for 12 months. Included warm-up exercises of body, breathing techniques, tension release and singing.	N/A	Self-determination and leadership: each group-singing activity session was organised by a Community Controlled Health Service Aboriginal community member	Statistically significant: • Reduction in psychological distress
2017 Tighe et al.	Mental health (suicide prevention)	Use of Ibobbly app to decrease frequency and intensity of suicidal thoughts. Three self-paced modules focussing on identifying and defusing thoughts, emotional regulation and identifying values.	N/A	Connection to country: intervention could be delivered remotely Indigenous beliefs and knowledge: gender-matched audio on app. Self-determination and leadership: extensive community consultation in development of app.	No statistically significant changes to: • Suicidal ideation Statistically significant: • Reduction in psychological distress • Reduction in depression scores

for Aboriginal and Torres Strait Islander people, including racism, employment, education, income, access to clinical or non-clinical services, food security and housing [41]. These factors were almost entirely overlooked by programs included in this review. Few programs ($n = 4$) addressed social determinants of health; those that did all achieved this by improving access to healthcare for the duration of each program. Providing transport and flexible service delivery are important enablers that increase access to healthcare for Aboriginal and Torres Strait Islander people [42]. However, this focus is relatively narrow given the breadth of social determinants contributing to chronic disease risk, including being unable to afford medications, not having access to healthy foods and living in overcrowded housing [43]. This is supported by findings from a recent rapid review that identified the need to address social and cultural determinants of health in chronic disease programs for Aboriginal and Torres Strait Islander communities [44].

Policymakers and implementers in Australia have long been aware of the need to address social determinants of health in public health programmes, including those that focus on chronic disease [45]. However, the multifactorial causal pathways, the long lag time between social factors and health effects and the complexity of coordinating multiple stakeholders all present significant barriers to designing and implementing effective programmes to address social determinants of health [46]. These issues are also relevant to funding bodies, where funding decisions may be predicated on time-bound outcomes and may be siloed to focus directly on biomedical considerations [47]. To overcome barriers to addressing social determinants of health, we call for: (a) the development of a comprehensive framework to guide the incorporation of social and cultural determinants of health into chronic disease programmes and (b) flexible, needs-based funding mechanisms for chronic disease programmes.

Development of best practice guidance for researchers, implementers and practitioners would set a minimum standard for the extent to which social and cultural determinants of health are incorporated into chronic disease programs. This would ensure that community consultation on these holistic needs is meaningfully enacted. Increasing flexible funding mechanisms for primary healthcare initiatives would support a multisectoral approach to chronic disease that could address the wider social determinants of health for Aboriginal and Torres Strait Islander communities. Moreover, we call for considering and explicitly addressing social and cultural determinants of health in research priority setting by communities, researchers and funding bodies. Emerging evidence from different settings highlights the burgeoning interest and significance of social prescription programs for addressing social determinants of health through connections to community and primary health care services and supports [48, 49]. Designing and implementing social prescription programs for Aboriginal and Torres Strait Islander people with chronic conditions should consider contextual factors and holistic approaches that address social, emotional, spiritual and cultural determinants of their health and well-being.

Cultural determinants of health are increasingly being prioritised in chronic disease programmes, though there remains scope to diversify and strengthen the strategies being used to address them. Although a range of strategies to address cultural

TABLE 3 | Categorising cultural determinants of health.

Cultural determinant of health addressed	Relevant subcategories	Examples
Self-determination and leadership	Cultural safety	Involvement of AHWs [32], female program facilitators for women's exercise program [35], cultural competency training [30]
	Self-determination and well-being	Comprehensive community consultation prior to commencement of program [32]
Connection to country	Living on country	Remotely delivered healthcare services [39], flexibility to complete program in different physical settings (e.g., outdoors, at accommodation, in clinic) [37]
Family, kinship and community	Community	AHWs community knowledge and connections used in the recruitment of participants [30]
	Family and kinship	Involving family members and carers in goal setting [38]
Indigenous language	Impacts of language on health	Providing education resources in Indigenous languages, offering translators [37]
Indigenous beliefs and knowledge	Knowledge transmission and continuity	Education sessions provided through yarning rather than more formal didactic teaching [36]

determinants of health was identified in this review, most programmes only incorporated cultural determinants from one or two of the six domains identified by *Mayi Kuwayu*, the National Study of Aboriginal and Torres Strait Islander Wellbeing study [50] and none of the programmes addressed *cultural expression and continuity*. This review identified that AHWs are being heavily utilised as key knowledge holders in this space to address cultural determinants of health. This included their capacity as community liaisons (linking patients to programs) and as supporters of culturally safe practice (being in attendance during the implementation of programs). Certainly, AHWs have a crucial role in meeting the cultural needs of patients, though this is coupled with professional and community obligations, which may contribute to high rates of staff turnover, burnout and fatigue [51]. In order to relieve the burden placed on this workforce and promote well-being, cultural determinants must be embedded into all aspects of a programme, such as by providing Indigenous language resources, adopting Indigenous communication methods, facilitating community leadership of healthcare initiatives and promoting cultural traditions and knowledge [29, 37, 52, 53].

Evidence from Aboriginal and Torres Strait Islander communities in Australia and Indigenous people globally indicates that adopting strategies to promote cultural determinants of health in chronic disease programmes results in high programme acceptability and positive patient-reported outcome measures [54]. The perception that cultural determinants of health were addressed in a superficial or narrowly focused manner may have been compounded by the limited descriptions provided by researchers in the included studies. It is unclear whether this failure in reporting reflects a failure to implement appropriately thoughtful and thorough programmes or simply a failure to adequately describe what occurred. The latter is particularly regrettable as it fails to strengthen the causal relationship between cultural determinants and improvements in well-being [53]. If research is going to improve chronic disease outcomes for Aboriginal and Torres Strait Islander people, it is essential that not only are cultural determinants of health addressed, but that these features of chronic disease programmes are also clearly reported upon in order to facilitate their adoption at a policy level.

In contrast to the relatively narrowly defined chronic disease programmes identified through this search strategy, the Aboriginal Community Controlled Health (ACCHO) sector routinely delivers comprehensive services that include chronic disease components. The holistic model of care of ACCHOs means that services may not be disaggregated by disease endpoints and recognised in this review. For example, a recent analysis of 67 ACCHO annual reports demonstrates the services address a wide range of unmet social and cultural determinants such as education, housing, family support, drug and alcohol services, empowerment and promote building social capital through advocacy—much of which is likely to include care for people with chronic disease [55]. Other specific examples include the Central Australian Aboriginal Congress's community-controlled model of comprehensive primary health care delivering people-centred care in line with universal health coverage strategies embedding multidisciplinary work, cultural safety principles, community participation, health promotion and prevention activities and advocacy intersectoral collaboration required for pursuing the goal of health equity [55, 56]. This reflects the Core Services and Outcomes Framework developed by NACCHO [16]. This integrated, disease agnostic approach is overseen by community boards and governance, increasing the likelihood of culturally safe care delivery. The findings of this review suggest that focused chronic disease initiatives have limited engagement in social and cultural determinants of health. This suggests that the delivery of more integrated models through ACCHO services may be a more culturally safe and sustainable approach to holistic chronic disease care [55].

Quality appraisal undertaken as part of this review revealed that few (4/17) studies scored above 10 out of 14, where priority

determined by the community was quite low, despite many reporting that community consultation had been undertaken. Only 30% or less of the studies met the following criteria: addressing existing intellectual and cultural property (Criteria 6 and 7) and ensuring Aboriginal and Torres Strait Islander people's control over collecting and managing research materials (Criteria 8). This highlights the need for conducting high-quality studies that privilege Aboriginal and Torres Strait Islander people's ways of knowing, being and doing. This should include ongoing work to support ACCHO services to tell their own stories through research and evaluation [57, 58].

4.1 | Strengths and Limitations

The strengths of this review include the engagement of *Thiitu Tharrmay Aboriginal and Torres Strait Islander Reference Group* members in this research and the use of the Aboriginal and Torres Strait Islander Quality Appraisal Tool. Limitations include potential publication bias as program reports, grey literature and policy guidelines were omitted from our inclusion criteria. The search was limited to specific databases and key search terms (a selective list and not exhaustive), which inherently limits the scope of the search and introduces the possibility that relevant studies outside these parameters were overlooked. This likely includes fully integrated services with chronic disease components delivered by ACCHOs. We acknowledge that this list does not include risk factors.

5 | Conclusion

Our findings highlight the need to address social and cultural determinants of health to improve chronic disease health outcomes for Aboriginal and Torres Strait Islander people. This will be achieved by developing frameworks to ensure programmes address social and cultural determinants of health and creating flexible funding mechanisms to increase cross-sector partnerships in healthcare initiatives. Furthermore, approaches to addressing cultural determinants of health must be diversified to maximise the health benefits associated with culturally safe care.

Author Contributions

U.N.Y. conceptualised the study. P.M. was responsible for data extraction. P.M., U.N.Y. and R.W. analysed the data and interpreted the findings. P.M. wrote the first draft of the paper. All co-authors made critical revisions of the manuscript and approved the final version of the manuscript.

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Ethics Statement

This review involves secondary data, exempting us from ethics approval.

Consent

Consent was obtained from the study authors to include their viewpoints.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that supports the findings of this study are available in the appendix of this article.

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Appendix A

Operational Definitions of Key Concepts.

Chronic conditions were defined as the 10 major chronic condition groups reported on by the Australian Institute of Health and Welfare (arthritis, asthma, back pain, cancer, cardiovascular disease, chronic obstructive pulmonary disease, diabetes, chronic kidney disease, mental health conditions and osteoporosis) [59], as well as liver disease, chronic otitis media and rheumatic heart disease, which are conditions that disproportionately affect Aboriginal and Torres Strait Islander people.

Risk factors for chronic conditions are defined by the Australian Institute of Health and Welfare as specific risks with strong evidence of direct association with chronic diseases. These include behavioural risk factors (tobacco smoking, insufficient physical activity, excessive alcohol consumption and dietary risks) and body states (obesity, high blood pressure and abnormal blood lipids). We acknowledge that this list does not include risk factors for which evidence is suggestive or which are indirect to chronic disease [60].

Social determinants of health are the non-medical factors that result in avoidable health inequities [61]. Social determinants of health include income, employment status, education, housing and basic amenities, food security, early childhood development and access to health care.

Cultural determinants of health relate to how Aboriginal and Torres Strait Islander cultures interact directly and indirectly with health and well-being and were categorised as per the domains identified by *Mayi Kuwayu*, the National Study of Aboriginal and Torres Strait Islander Wellbeing study [50]. The domains included Connection to country, Indigenous beliefs and knowledge, Indigenous language, Family, kinship and community, Cultural expression and continuity and Self-determination and leadership.

Appendix B

See Table B1

TABLE B1 | Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) checklist.

Section	item	PRISMA-ScR checklist item	Reported on page #
Title			
Title	1	Identify the report as a scoping review.	Page 1
Abstract			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results and conclusions that relate to the review questions and objectives.	Page 1
Introduction			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Page 2
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts and context) or other relevant key elements used to conceptualise the review questions and/or objectives.	Page 2/3
Methods			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	Web address: Enhancing Chronic Disease Care | ANU National Centre for Epidemiology and Population Health
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language and publication status) and provide a rationale.	Page 4
Information sources[a]	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Page 3
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Page 3
Selection of sources of evidence[b]	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Page 3 and 4
Data charting process[c]	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	Page 4
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Page 4
Critical appraisal of individual sources of evidence[d]	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Page 4
Synthesis of results	13	Describe the methods of handling and summarising the data that were charted.	Page 4
Results			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Page 4
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Page 5

(Continues)

TABLE B1 | (Continued)

Section	item	PRISMA-ScR checklist item	Reported on page #
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Page 5
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Page 6
Synthesis of results	18	Summarise and/or present the charting results as they relate to the review questions and objectives.	Pages 5–7
Discussion			
Summary of evidence	19	Summarise the main results (including an overview of concepts, themes and types of evidence available), link to the review questions and objectives and consider the relevance to key groups.	Pages 7–9
Limitations	20	Discuss the limitations of the scoping review process.	Page 10
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Page 10
Funding			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	No funding

Abbreviations: JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
[a]Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms and Web sites.
[b]A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
[c]The frameworks by Arksey and O'Malley [6] and Levac and colleagues [7] and the JBI guidance [4, 5] refer to the process of data extraction in a scoping review as data charting.
[d]The process of systematically examining research evidence to assess its validity, results and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of 'risk of bias' (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion and policy document).
Source: Tricco et al. [62].

Appendix C

Search Terms

Search terms

#1 Chronic disease: 'Chronic disease' OR 'cardiovascular disease' OR 'diabetes' OR 'Type 2 diabetes' OR 'Chronic obstructive pulmonary disease (COPD)' OR 'Respiratory difficulties' OR 'Lung disease' OR 'Back pain' OR 'Rheumatoid arthritis' OR 'Liver disease' OR 'Kidney disease' OR 'Arthritis' OR 'Heart disease' OR 'Chronic kidney disease' OR 'Mental health' OR 'Depression' OR 'Psychiatric disorders' OR 'Anxiety' OR 'Asthma', 'hypertension' OR 'Blood pressure' OR 'Osteoporosis' OR 'Cancer' OR 'Chronic condition' OR 'Otitis media'

AND

#2 Intervention: 'Self-Management' OR 'Patient Education' OR 'Health Education' OR 'Health program' OR 'Health Service' OR 'Health Care Management' OR 'targeted health behaviour' OR 'prevention' OR 'chronic disease self-management' OR 'community health service' or 'primary health' OR 'Integrated Team Care' OR 'Integrated Program' OR 'Comprehensive Self-management program' OR 'Comprehensive Self-management intervention' OR 'Integrated Illness Management' OR 'Collaborative Care' OR 'Wellness Program' OR 'Well-being Program' OR 'Well-being Intervention' OR 'Physical Health Program' OR 'Physical health intervention' OR 'Mental Health Program' OR 'Mental Health intervention' OR 'community health program'

AND

#3 'Aboriginal' OR 'Aboriginal and Torres Strait Islander' OR 'Indigenous' OR 'First Nation'

AND

#4 'Australia*'

Appendix D

See Table D1

TABLE D1 | Study characteristics.

Year, authors	Study design (RCT, longitudinal study, quasi-experimental trial, implementation research design)	Chronic disease targeted	Demographics (percentage of cohort identifying as Indigenous)	Sample size (Indigenous participants)	Duration of intervention	Location
2004, Bailie et al.	Longitudinal study	Type 2 diabetes	100	137	3 years	Tiwi Islands and Katherine West region (NT)
2008, Battersby et al.	Quasi-experimental trial	Type 2 diabetes	100	60	12 months	Eyre Peninsula (SA)
2012, Canuto et al.	Randomised controlled trial	Chronic disease risk factors	100	100	12 weeks	Adelaide metropolitan area (SA)
2007, Chan et al.	Longitudinal study	Cardiovascular risk factors	100	101	6 months	North Stradbroke Island and Redland Bay (QLD)
2014, Davey, M., et al.	Quasi-experimental trial	Cardiovascular or pulmonary disease	100	92	8 weeks	Hobart and Launceston (TAS)
2013, Dimer et al.	Quasi-experimental trial	Cardiovascular disease	100	28	8 weeks	Perth (WA)
2021, Dingwall et al.	Single blind randomised controlled trial	End-stage kidney disease	100	156	6 months	Alice Springs and Darwin (NT)
2003, Hoy et al.	Quasi-experimental trial	Kidney disease and cardiovascular disease	100	267	3 years	Tiwi Islands (NT)
2019, Hu et al.	Quasi-experimental trial	Chronic disease risk factors	100	406	12 weeks	Southeast and central QLD
2017, Mills et al.	Quasi-experimental trial	Cardiovascular disease	100	315	12 weeks	Southeast and central QLD
2009, Nagel et al.	Randomised controlled trial	Chronic mental illness	100	49	2–6 weeks	Three remote island communities (NT)
2022, Ogloff et al.	Quasi-experimental trial	Mental health	24	43	3 weeks	Port Phillip Prison (VIC)
2017, Quinn et al.	Quasi-experimental trial	Lifestyle based chronic disease risk factors	100	32	6 months	NSW (remote delivery)
2015, Ski et al.	Longitudinal study	Coronary heart disease Type 2 diabetes	CHD cohort: 6 Diabetes cohort: 5	145	6 months	QLD (remote delivery)
2013, Sun, J. et al.	Quasi-experimental trial	Mental health (social and emotional well-being)	100	45	12 months	Southeast QLD
2016, Sun, J. et al.	Quasi-experimental trial	Mental health (social and emotional well-being)	100	108	12 months	Southeast QLD
2017, Tighe et al.	Randomised controlled trial	Mental health (suicide prevention)	100	61	6 weeks	Kimberly region (WA)

Appendix E

See Table E1

TABLE E1 | Aboriginal and Torres Strait Islander Quality Appraisal Tool.

Year	First author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Total
2004	Bailie	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
2008	Battersby	1	1	1	1	1	1	1	0	0	1	1	1	1	1	12
2012	Canuto	0	1	1[a]	1	1	0	0	0	0	0	0	1	1	0	6
2007	Chan	1[a]	1[a]	0	1[a]	0	0	0	0	0	0	0	1	1	0	5
2014	Davey	1	1	1	1	1	0	0	1	0	1	1	1	1	1	11
2013	Dimer	0	1	1	0	1	0	0	0	1	1	0	1	0	1	7
2021	Dingwall	0	1	0	0	1	0	0	0	1	1	0	0	0	0	4
2003	Hoy	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
2019	Hu	1[a]	1[a]	0	1[a]	1	0	1[a]	1[a]	1	1	0	1	1	1[a]	11
2017	Mills	1	1	1	1	1	0	1	1	1	1	0	1	1	1	12
2009	Nagel	0	1	1	1	1	0	0	0	1	0	0	1	1	1	8
2022	Ogloff	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
2017	Quinn	0	1	0	1	1	0	0	0	1	1	1	1	0	1	8
2015	Ski	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	Sun	0	0	0	1	0	0	0	0	1	0	0	1	1[a]	0	4
2016	Sun	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
2017	Tighe	1	1	0	1	1	0	0	0	0	1	0	1	1	0	7

Note: Answer 1 for yes or partially for each question, Answer 0 for no or unclear for each question.
[a]Noted in Supporting Information (e.g., protocol papers, correspondence with authors).