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REVIEW **Open Access**

What influences the implementation of health checks in the prevention and early detection of chronic diseases among Aboriginal and Torres Strait Islander people in Australian primary health care? Findings from an evidence mapping review

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Abstract

Background Chronic disease is the leading cause of morbidity and mortality among Aboriginal and Torres Strait Islander peoples in Australia. A comprehensive health assessment is available as an annual health check (HC) to Aboriginal and Torres Strait Islander peoples through the Medicare Benefits Schedule in primary health care settings. This review aims to systematically identify contextual and mechanistic factors that contribute to the success or failure of implementing effective HCs in the prevention and early detection of chronic diseases among Aboriginal and Torres Strait Islander people in Australian primary health care (PHC).

Methods We systematically searched for peer-reviewed and grey literature, including policy reports, theses, and guidelines, between 1 November 1999 and 30 June 2023, using a combination of keywords and subject headings related to "health checks", "chronic disease", and "Aboriginal and Torres Islander peoples" in seven databases. The extracted data were summarized using a content analysis approach, applying strength-based approaches.

Results In total, 16 peer-reviewed articles and five grey literature that met the inclusion criteria were used for evidence synthesis that identified several contextual and mechanistic factors that influenced the implementation of HCs. Barriers included resource constraints driven by complexities in administrative, workforce and policy domains that significantly impeded the implementation of HCs. Within PHC, physical space constraints, competing demands and a focus on acute care over preventive measures hindered HC implementation. In addition, inconsistent identification of Aboriginal and Torres Strait Islander status, negative attitudes of PHC staff towards HC efficacy and patients' fear of stigma or confidentiality breaches were barriers. Patients reported HCs as failing to address holistic health needs.

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To improve HC implementation, enablers included strong clinical leadership, recruitment of culturally competent non-Indigenous and Aboriginal and Torres Strait Islander staff, Indigenous partnership and community engagement and incentives for participation. Effective electronic records, transport provision and flexible scheduling also increased accessibility.

Conclusions Our findings suggest that future implementation research must adopt a more comprehensive and holistic approach across different models of PHC, with clearly identified contextual and mechanistic factors linked to people-reported and service outcomes, to guide the implementation and evaluation of HCs. While undertaking future research, it is crucial to implement policy and practice reforms as identified in this review to create a culturally safe service at the PHC level required to drive the uptake of quality HCs that aligns with community priorities and aspirations for the prevention and early detection of chronic diseases.

Keywords Aboriginal and Torres Strait Islander people, Chronic disease, Early detection, Primary health care, Policy and practice, Preventive health

Background

Health disparities and chronic disease among Aboriginal and Torres Strait Islander people: In Australia, Aboriginal and Torres Strait Islander people face significant differences in health and wellbeing outcomes compared with non-Indigenous people. These differences are driven by the ongoing impact of colonization, experiences of intergenerational trauma, systemic racism, unequal opportunities in housing, employment, income and systemic exclusion from appropriate health and social care services [1, 2]. These all are recognized determinants in the early development and progression of chronic disease. Data indicate some improvement in disparities related to some conditions (diabetes, cardiovascular and kidney disease) since 2006. However, overall, the Australian healthcare system has failed to address the fact that Aboriginal and Torres Strait Islander people continue to experience the early onset of chronic, non-communicable disease at a younger age and greater morbidity and poorer quality of life compared with non-Indigenous people [3].

HCs and their role in PHC: Development of Aboriginal and Torres Strait Island Health Assessments (commonly called "health checks" [HCs]) was led by the community controlled sector as a mechanism to address chronic disease [4]. HC and follow-up item numbers have been progressively introduced under Australia's universal health insurance scheme, the Medicare Benefits Schedule (MBS), since 1999 [4].This initiative aims to provide a systematic and comprehensive assessment of health and wellbeing needs and to proactively identify opportunities for health promotion, early detection of conditions and support chronic disease management in primary health care (PHC) settings [5]. In addition, upon completion of HCs, clinicians can refer patients for MBS-subsidized follow-up services with Aboriginal and Torres Strait Islander health practitioners/health workers (A&TSIHP/Ws), primary care nurses and allied health services, including physiotherapists, diabetes educators, podiatrists, psychologists and dieticians [6].

Effectiveness of HCs: Available evidence on the effectiveness of HCs indicates mixed health outcomes. International evidence focusing on non-Indigenous communities demonstrates that HCs increase the diagnosis of new risk factors and chronic diseases. When conducted in PHC settings, they are associated with improved immediate health outcomes, such as body mass index, total cholesterol and blood pressure, with small beneficial effects on self-reported health [7, 8]. Emerging research from Australia supports these findings, suggesting that HCs can help in identifying risk factors, diagnosing chronic conditions and promoting healthy behaviour change among Aboriginal and Torres Strait Islander people [9–12].

Implementation of HCs in Australia: Update of HCs varies over time and among different demographic groups. In 2019, 29% of Aboriginal and Torres Strait Islander people had completed a HC, update dipped during the coronavirus disease 2019 (COVID-19) response and has now neared a return to baseline, with 28% of eligible people claiming HC item numbers in 2023 [4]. Uptake is higher among older people (42% of people > 65 years received a HC) and women. However, relatively low overall utilization suggests that potential benefits of HC may not have been fully realized, given the range of implementation barriers. These include low motivation and negative attitudes regarding the efficacy of HCs among staff, competing acute care priorities, unclear roles of practice staff, inadequate response to health issues identified in the HCs (follow-up), insufficient cultural safety training (the issue of the content/quality of training) and a lack of patient-centered care within PHC [9, 13, 14]. A recent scoping review [12] found community barriers included perceived shame among individuals, short consultation time, culturally insensitive/intrusive questions and lack of accessible health services. The limitations of the previous review [12] were: (i) the use of limited search terms, (ii) not primarily focusing on chronic disease or primary health care, and (iii) the framework was not applied to thoroughly understand the contextual and mechanistic factors for the implementation of HCs. Hence, gaining a deeper understanding of the factors contributing to the implementation of HCs at the PHC level is imperative.

Methodology shift and rationale for the current review approach: In this context, we initially planned a realist review to explore the causal mechanisms influencing HC implementation using the context–mechanism–outcome framework [15]. However, the included studies lacked the necessary detail to identify context, mechanism, and outcome configurations to complete a realist evaluation, which rendered the realist methodology unsuitable. Consequently, we aligned our research question and methodology with an evidence mapping review, a systematic approach well-suited to explore the implementation of HCs through PHC as it clarifies settings, contexts and mechanisms and identifies evidence gaps with rigour and transparency [16]. This review aims to systematically identify contextual and mechanistic factors that contribute to the success or failure of implementing effective HCs in the prevention and early detection of chronic diseases among Aboriginal and Torres Strait Islander people in Australian PHC.

Operational definitions: Table 1 presents operational definitions of key terminologies used in this paper.

Methods

This evidence mapping review followed the reporting guidelines and criteria outlined in the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) and PRISMA extension for Scoping Reviews (PRISMA-SCR) checklist [17]. The review involved the following phases: (i) Engagement and research governance, (ii) Development of a search strategy, (iii) Screening of studies and appraisal, and (iv) Data extraction and evidence synthesis.

Phase 1: Engagement and research governance

Key knowledge holders were consulted at the outset of this project and invited to join the authorship team. This includes representatives from peak bodies, including the Royal Australian College of General Practitioners (RACGP) Aboriginal and Torres Strait Islander Health Faculty, the National Aboriginal Community Controlled Health Organisation (NACCHO) and several Australian academic institutions. An initiation discussion was hosted by *Yardhura Walani*, the National Centre for Aboriginal and Torres Strait Islander Wellbeing Research, at the Australian National University (ANU). Aboriginal and Torres Strait Islander researchers, along with the *Thiitu Tharrmay Aboriginal and Torres Strait Islander Reference Group* (referred to hereafter as the Thiitu Tharrmay Reference Group) at ANU, provided guidance throughout the review process, with a commitment to valuing Indigenous viewpoints.

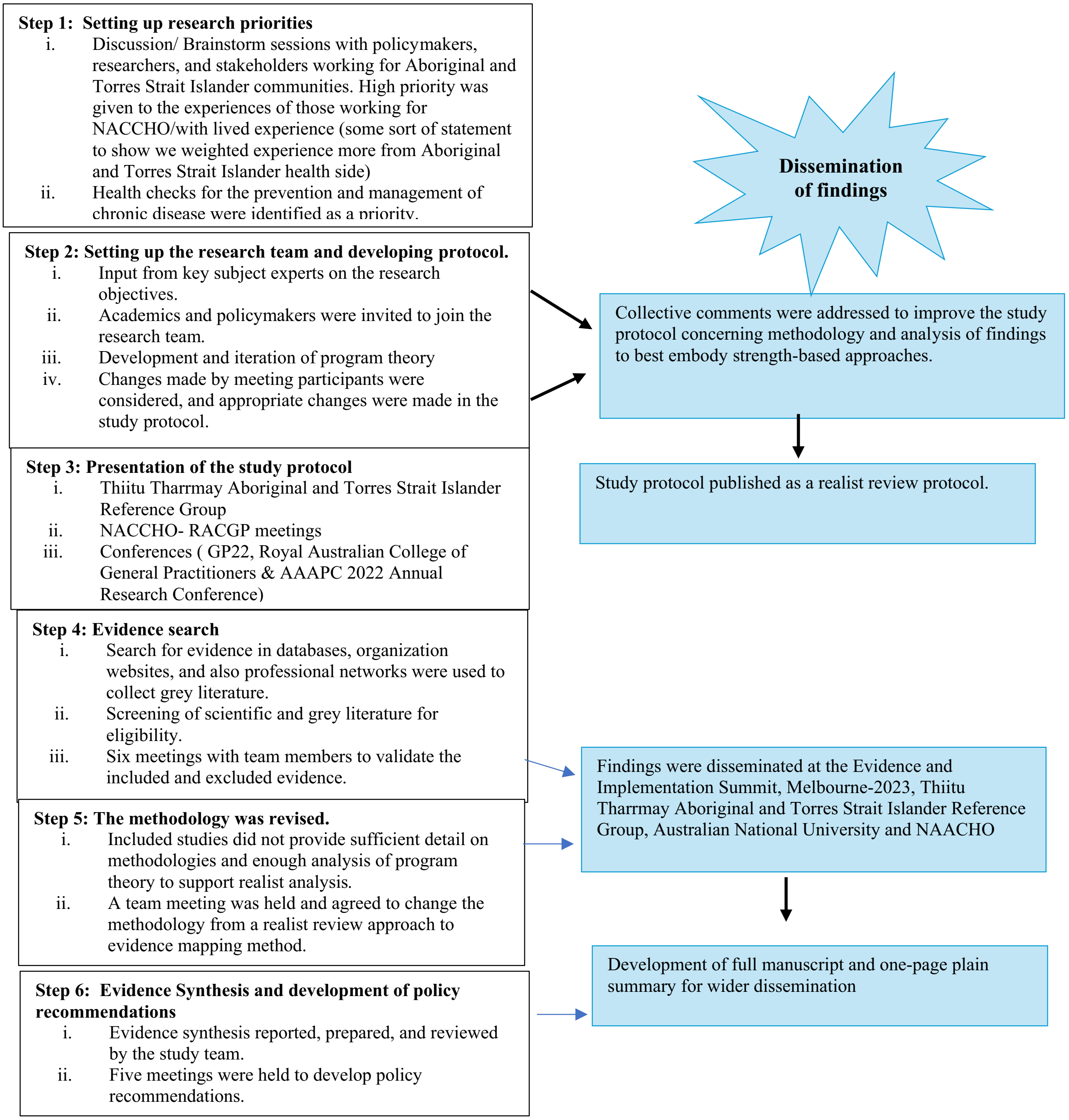
Table 1 Operational definitions of the key terminology used in this research work

Health checks	A health check is defined as the systematic and comprehensive assessment of an individual's physical, psychological and social wellbeing with an aim to identify undiagnosed conditions and risk factors in the PHC setting. This aligns with a definition from the Medicare Benefits Schedule for MBS item 715 and the preamble of the Aboriginal and Torres Strait Islander Health Check templates developed by the National Aboriginal Community Controlled Health Organisation (NACCHO) and Royal Australian College of General Practitioners (RACGP). These checks included the use of standardized assessment tools, such as the Australian Diabetes Risk Assessment Tool or the Australian Cardiovascular Risk Assessment Calculator. Isolated screening programmes (i.e. blood pressure measurements or echocardiography screening for rheumatic heart disease) are excluded, as those were not connected to the primary care setting (such as isolated school-based programmes, community health assessments or occupational assessments).
Chronic disease	Australian Institute of Health and Welfare reports 10 chronic condition groups (arthritis, mental health conditions, asthma, cancer, cardiovascular disease, chronic obstructive pulmonary disease, diabetes, chronic kidney disease, back pain and osteoporosis). In addition to these, our chronic diseases also included conditions such as liver disease, chronic otitis media and rheumatic heart disease, which disproportionately affect Aboriginal and Torres Strait Islander people.
Mechanistic factors	Mechanistic factors are any specified intervention strategies, rather than the logic of an intervention, but are linked to the collaboration, participation, partnership or service delivery management processes of/between subjects involved in the delivery of HCs at the PHC level.
Contextual factors	Constellation of setting-related or external unique factors influencing HCs implementation at the PHC level.
PHC delivery	In this context, primary care is delivered by a range of providers, including Aboriginal Community Controlled Health Organisations, which are governed by a local board, Aboriginal Medical Services run by state and territory governments, and private primary care services (sometimes referred to as mainstream providers).
Enablers	Enablers are any external or internal factors that promote/facilitate or enable the uptake of HC across PHC contexts, as recognized by consumers or other stakeholders with provided theoretical explanations.
Barriers	Barriers are any internal or external factors that impede the delivery or uptake of HCs across PHC contexts identified by consumers or other stakeholders under consideration

Stakeholder engagement was at the heart of this review and is reflected in authorship by key knowledge holders, including Aboriginal and Torres Strait Islander individuals ($n = 5$), researchers ($n = 14$), policy influencers $n = 4$) and PHC professionals ($n = 5$), where some have overlapping roles, to provide context-specific input, validate interpretations and incorporate their lived experiences into the synthesized evidence. Throughout the review process, both in-person and online consultations were conducted. Figure 1 depicts the steps for the engagement of sector stakeholders and academics.

Phase 2: Development of a search strategy

In this phase, a comprehensive literature review of existing published articles and grey literature, including policy reports and briefs, student theses and guidelines, was



Step 1: Setting up research priorities

- i. Discussion/ Brainstorm sessions with policymakers, researchers, and stakeholders working for Aboriginal and Torres Strait Islander communities. High priority was given to the experiences of those working for NACCHO/with lived experience (some sort of statement to show we weighted experience more from Aboriginal and Torres Strait Islander health side)
- ii. Health checks for the prevention and management of chronic disease were identified as a priority.

Step 2: Setting up the research team and developing protocol.

- i. Input from key subject experts on the research objectives.
- ii. Academics and policymakers were invited to join the research team.
- iii. Development and iteration of program theory
- iv. Changes made by meeting participants were considered, and appropriate changes were made in the study protocol.

Step 3: Presentation of the study protocol

- i. Thiitu Tharrmay Aboriginal and Torres Strait Islander Reference Group
- ii. NACCHO- RACGP meetings
- iii. Conferences (GP22, Royal Australian College of General Practitioners & AAAPC 2022 Annual Research Conference)

Step 4: Evidence search

- i. Search for evidence in databases, organization websites, and also professional networks were used to collect grey literature.
- ii. Screening of scientific and grey literature for eligibility.
- iii. Six meetings with team members to validate the included and excluded evidence.

Step 5: The methodology was revised.

- i. Included studies did not provide sufficient detail on methodologies and enough analysis of program theory to support realist analysis.
- ii. A team meeting was held and agreed to change the methodology from a realist review approach to evidence mapping method.

Step 6: Evidence Synthesis and development of policy recommendations

- i. Evidence synthesis reported, prepared, and reviewed by the study team.
- ii. Five meetings were held to develop policy recommendations.

Collective comments were addressed to improve the study protocol concerning methodology and analysis of findings to best embody strength-based approaches.

Study protocol published as a realist review protocol.

Findings were disseminated at the Evidence and Implementation Summit, Melbourne-2023, Thiitu Tharrmay Aboriginal and Torres Strait Islander Reference Group, Australian National University and NACCHO

Development of full manuscript and one-page plain summary for wider dissemination

Fig. 1 Steps for the engagement of sector stakeholders and academics during the review process conducted to develop a programme theory with context–mechanism–outcomes (CMOs) hypotheses, in line with our original intention of conducting a realist review [15]. The programme theory underwent iterations with input from the *Thiitu Tharrmay Reference Group* and research team members, including the peak body representatives. This refined programme theory guided the development of the search strategy and key search terms, which were later reviewed by the librarian and research team members. The search covered multiple databases, including PubMed/MEDLINE, Web of Science, CINAHL, EMBASE, the Australian Analysis and Policy Observatory database, Trove and Australia's National Institute for Aboriginal and Torres Strait Islander Health Research, which were chosen on the basis of convenience.

We sought studies published between 1 November 1999 and 30 June 2023, aligning with the introduction of Medicare-funded Indigenous-specific HCs in November 1999. Although we were seeking studies from 1 November 1999 to 30 June 2023, no studies before 2005 or after 2019 met our criteria. The search was performed using a combination of keywords and subject headings related to "health checks", "chronic disease", and "Aboriginal and Torres Islander peoples", along with Boolean operators "OR" and "AND". The complete list of keywords/subject headings used for the search in different databases is published elsewhere [15].

Phase 3: Screening of studies and appraisal

All search results were imported into the citation manager, EndNote 20, subsequently uploaded to the Covidence platform for duplicate removal and underwent independent title, abstract and full-text screening by two team members (U.N.Y. and M.S.). Table 2 provides a comprehensive overview of the inclusion and exclusion criteria applied during the screening process. For validation, 10% of the included and excluded articles underwent independent assessment by three team members (U.N.Y., J.A. and R.W.). Three team members independently evaluated full-text articles meeting inclusion criteria (U.N.Y., M.S. and S.T.), and any discrepancies were resolved through team discussions to reach a consensus. The quality appraisal for the included studies was conducted using the 14-item Aboriginal and Torres Strait Islander Quality Appraisal Tool [18], which prioritizes the epistemology (knowing), ontology (being), axiology (doing) and ethical research governance of Aboriginal and Torres Strait Islander peoples. This tool is primarily designed to appraise the quality of studies in a systematic review process that involves Aboriginal and Torres Strait Islander peoples, families and communities as research participants in Australia. Two Indigenous researchers (with one Aboriginal and Torres Strait Islander researcher experienced in conducting Aboriginal and Torres Strait Islander health research) and one non-Indigenous researcher appraised the quality of the included articles and answered with an answer "yes", "partially", "no", or "unsure".

Table 2 Inclusion and exclusion criteria

Inclusion criteria	Relevant studies (no restriction on study design)
	✓ Reports the uptake or implementation of health checks at PHC settings ✓ Reports the barriers and enablers for implementation of health checks ✓ Reports activities and initiatives started by practitioners or healthcare workers to improve utilization of health checks ✓ Relates to perspectives of practitioners, people or managers with regard to opportunities and challenges in the implementation of health checks ✓ Relates to the description of people's experience of interacting with practitioners or healthcare workers for health checks ✓ Describes the implementation of practices or practitioner-initiated initiatives to promote utilization of health checks ✓ Describes people-centered health outcomes about health check implementation for early detection and prevention of chronic disease ✓ Describes opportunities created to engage people in utilization (including follow-up and referrals) of health checks ✓ Describes quality improvement, shared decision-making and relationships with practitioners/healthcare workers with regard to health checks
Exclusion	✓ Studies that focused solely on chronic disease management ✓ Studies focused on describing patients, healthcare providers and managers experience with chronic disease management rather than implementing health checks ✓ Studies that do not report strategies and initiatives targeted towards health check implementation ✓ Studies that are not focused on primary health care settings

Phase 4: Data extraction and evidence synthesis

A Microsoft Excel sheet for data extraction was developed following a literature review, input from team members and guidance from the *Reference Group*. The data extraction sheet included study characteristics and study findings (contextual and mechanistic enablers and barriers; Appendix I and II). We omitted the extracted data for the phenomena of data interpretation on policy and practice action taken over the period . The data extracted from peer-reviewed articles and grey literature were triangulated and summarized using a conventional content analysis approach [19, 20], which allowed key themes and sub-themes to be identified from the data, and applying strength-based approaches [21]. In this context, content analysis was chosen to link the results to the context of their use in which they were produced, for making replicable and valid inferences from texts (or other meaningful matter) [22]. This research applied manifest analysis as the choice of analysis method where the researchers described the phenomenon in the way the literature has reported, stayed very close to the text, and used the words themselves [23].

The data analysis process involved four stages [23]: (i) decontextualization: involves open coding and explaining code (U.N.Y., S.T., V.S. and M.S.); (ii) recontextualization: involves rereading the original text alongside the final list of codes (U.N.Y., S.T., J.A., V.S. and K.A.D.); (iii) categorization: involves the arrangement of homogeneous codes into sub-themes and themes with critical discussion and agreement from co-investigators (U.N.Y., S.T., J.A., R.W., B.H., M.B., K.F. and K.A.D.); and (iv) compilation: involves the presentation of sub-themes and themes, and cross-checking by co-investigators if interpretation makes sense, if new findings correspond to the literature and whether or not the result is reasonable and logical (all investigators). This systematic approach helped reduce researchers' introduced bias in the data analysis phase, ultimately generating trustworthy findings.

Results

Study selection and characteristics

The details of the search process and study screening are presented in the PRISMA diagram (Fig. 2). Briefly, the literature search yielded 16 peer-reviewed articles and five sources of grey literature that met the inclusion criteria and were included. The peer-reviewed articles included clinical audits, cluster randomized controlled trials, and cross-sectional and qualitative studies. Grey literature included reports from peak bodies, such as NACCHO and RACGP, and student reports. The service delivery models of included studies encompassed Aboriginal Community Controlled Health Organisations (ACCHOs), government-run Aboriginal Medical Services and private general practices. Most studies reported on the direct experiences of Aboriginal and Torres Strait Islander people, and several reported experiences of service providers.

Quality appraisal results: The articles included varied quality, as measured by the 14-item Aboriginal and Torres Strait Islander Quality Appraisal tool (Appendix III). Overall, 10 included studies met the priority determined by the community (criterion 1), and 9 met criteria addressing community consultation and engagement (criterion 2). While most studies ($n=9$) reported Indigenous leadership within the research team (criterion 3),

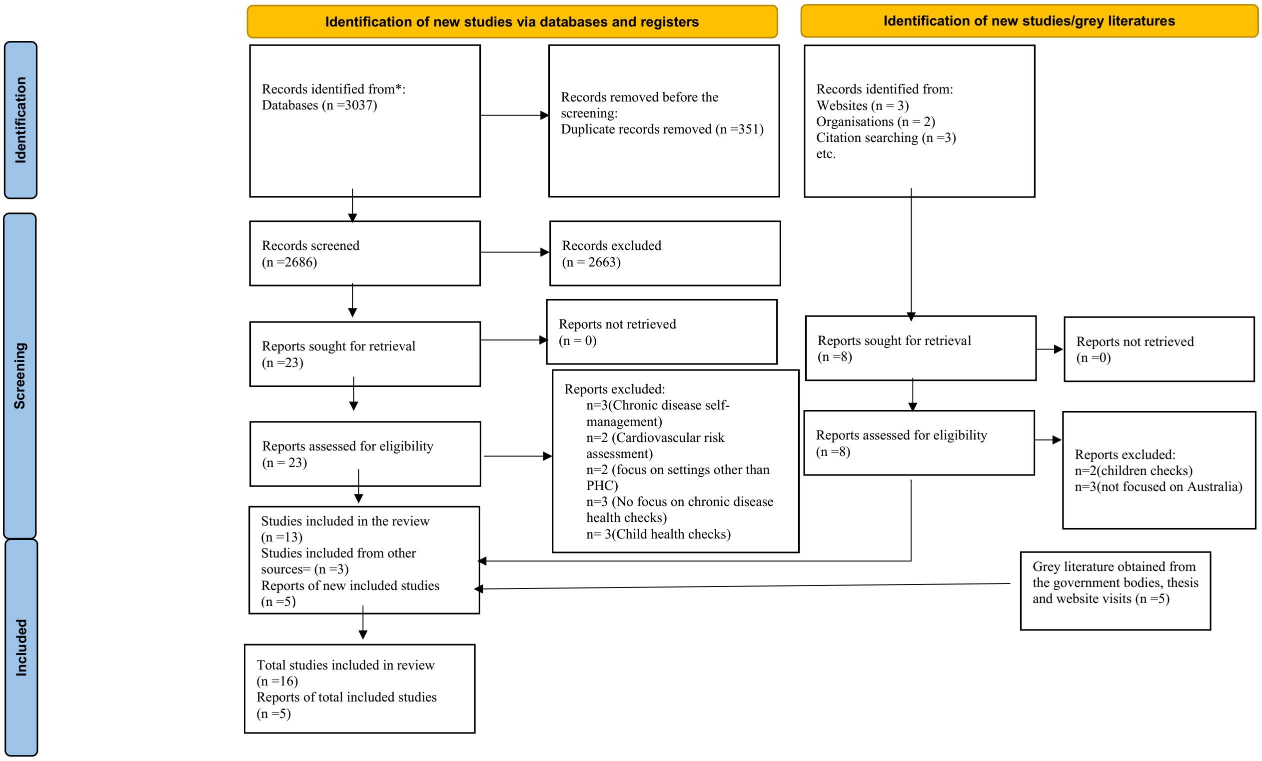


Fig. 2 PRISMA 2020 flow diagram

only a few studies demonstrated Aboriginal and Torres Strait Islander governance in research (criterion 4), met the criteria for community protocols (criterion 5), and showed Aboriginal and Torres Strait Islander people had control over collection and management of research materials (criterion 8). None of the studies addressed existing intellectual and cultural property (criteria 6 and 7). Half of the included studies used an Indigenous research paradigm (criterion 9) and used strength-based approaches and acknowledging practices that have harmed Aboriginal and Torres Strait Islander communities (criterion 10). While all studies applied translation of findings into sustainable changes (criterion 11), only four demonstrated capacity strengthening for Aboriginal and Torres Strait Islander people (criterion 13). Overall, over half of the studies met the following criteria: benefiting the participants and Aboriginal and Torres Strait Islander communities (criterion 12), and giving researchers opportunities to learn from each other (criterion 14) and from the Aboriginal and Torres Strait Islander Quality Appraisal Tool. Overall, the quality of the included studies was not satisfactory.

Synthesized evidence

Synthesized evidence from the included studies is presented under two major themes: contextual and mechanistic factors related to the success and failure of the implementation of HCs, with subsequent sub-themes based on the CMO framework developed by our team for a realist review. Figure 3 presents contextual and mechanistic factors to the success or failure of implementing HCs in PHC in the form of a fishbone (Ishikawa) diagram. The fishbone diagram effectively displays factors related to the effect, i.e. HC implementation. Fishbone diagrams have been applied in Aboriginal and Torres Strait Islander health research as an intuitive approach that has some resonance with Indigenous worldviews [24].

Contextual factors related to the success and failure of implementation of HCs

A. Policy and health system

(i) *Adequate primary health care infrastructure to deliver HCs*: Several studies emphasize the importance of adequate resources, including staff, supplies, physical space (including non-clinical areas for community-based staff) and dedicated funding, as enabling factors for PHC service providers to deliver HCs [25–31]. For instance, DiGiacomo et al. noted that a large multipurpose room with partitions to designate clinical stations and planning within a government-funded Aboriginal Medical Service (AMS) facilitated provision of HCs [26]. An illustrative example is dedicated funding to support a partnership between government

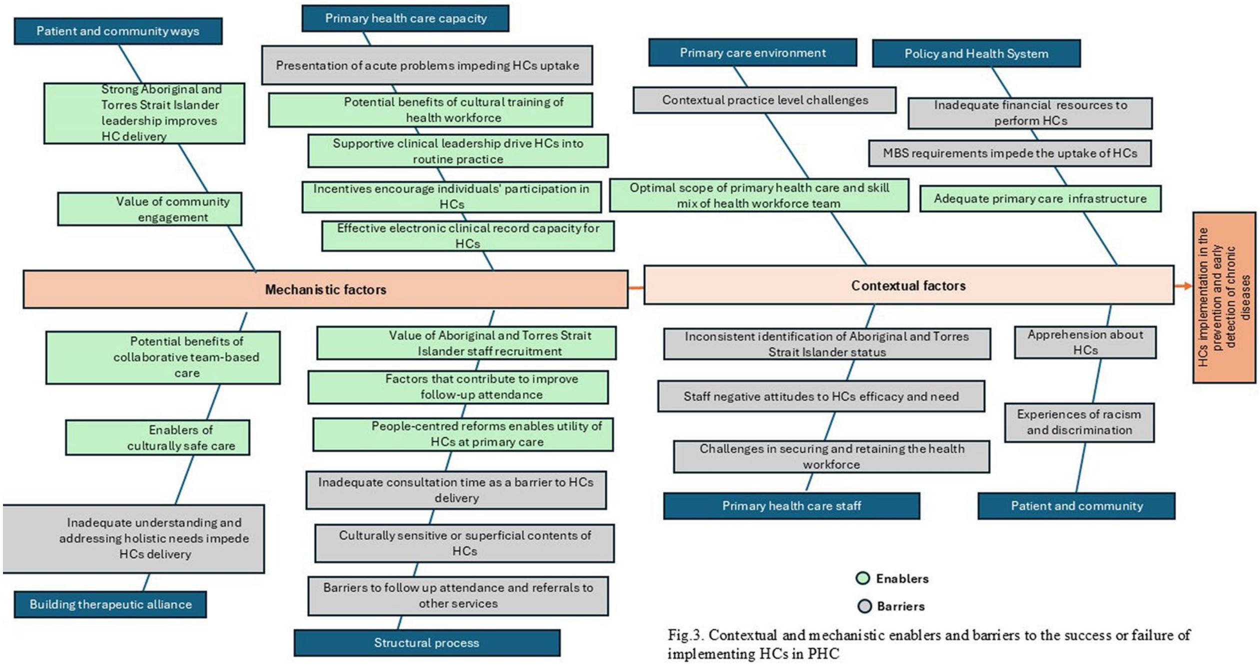


Fig. 3 Contextual and mechanistic enablers and barriers to the success or failure of implementing HCs in PHC

health services (hospitals), community health services and a community-controlled health service [29]. This collaboration significantly enhanced the capacity of PHC services to conduct HCs, leading to a substantial increase in HC uptake among the eligible population from 13% to 61% [29] over a 6-year period.

(ii) *Inadequate financial resources to perform HCs*: Insufficient financial resources and incentives for staff were identified as a barrier to completing HCs [26, 31, 32]. At the systems level, one study [28] reported challenges in developing staff performance tools to incentivize staff to increase the delivery of HCs in different contexts and others reflected on the dynamic changes in MBS rebates for HCs [29]. It was also noted that the role of Aboriginal and Torres Strait Islander health practitioners and workers in delivering HCs has not been properly recognized and adequately remunerated [33]. Another study highlighted shortfalls in the strategy of increasing MBS rebates to incentivize the provision of HCs, as it would not specifically benefit individual practitioners who were salaried in remote Indigenous health services [32]. Although it was noted that some PHC services focused on health assessment targets for financial reasons rather than potential health benefits [31].

(iii) *MBS requirements impede uptake of HCs*: Three studies emphasized the need to simplify the MBS billing process to enhance HC uptake [34–36]. One study highlighted that general practitioners (GPs) found the MBS 715 item number descriptor "complicated and laborious", leading to a reluctance to bill for HCs [36]. Another study revealed a misconception among practice staff, including doctors, about HC Medicare requirements – for example, believing that HCs could only be completed after reviewing blood test results. This misconception impacted HC initiation and completion [37]. In some settings, Aboriginal health workers were ineligible to bill for relevant MBS follow-up services [31]. It was also reported that follow-up items were frequently billed as standard consultations instead of Indigenous-specific MBS items, obscuring the monitoring of follow-up using MBS items [31]. Liaw et al.'s intervention in private general practice settings, focusing on upskilling practices and enhanced staff awareness of MBS items, ultimately increased the capacity of PHC staff to support Aboriginal and Torres Strait Islander patients that resulted in an increased number of HCs [34].

B. Primary health care environment

(i) *Contextual practice level challenges to deliver HCs*: The studies identified various barriers, including space constraints, medical equipment shortages, competing clinical demands and the remoteness of some PHC [26, 28, 29, 37]. Some primary health care settings were also noted to lack client-centered services (in terms of cultural safety and value of services) crucial for completing HCs [25, 35, 37]. Overall, addressing preventive health activities, such as HCs, was perceived as a lower priority compared with acute care and chronic disease management of established conditions [28, 30, 32, 34, 38]. A study by Jennings et al. reported the lack of a system-wide approach in AMS for delivering HCs, emphasizing the need for clinic-specific systems to embed HCs for routine practice [37].

(ii) *Optimal scope of primary health care and skill mix of health workforce team*: Implementing visual identification on charts for clients awaiting HCs and specifying each staff member's responsibilities for particular components of the health check was proposed as a solution to prevent missed opportunities [37]. For example, in this study, it was reported that the clients who presented to PHC for HCs were neither identified nor had any communication with clinical staff members during the waiting period for HCs. Suggested improvements included a "one-stop shop" website summarizing Aboriginal and Torres Strait Islander health intervention information relevant for GPs, workshops focused on HCs implementation and more direct support, such as providing one-to-one practice visits [33]. Service-level strategies, such as reinforcing the administration workforce, reviewing workflows and implementing policy changes to support teamwork through clarified roles and expanded scope of practice, have facilitated collaborative team care essential for completing HCs [28]. In addition, developing training programmes, workshops or tools with a practical focus on applied changes in clinical practice was a suggested mechanism to enhance practice-level capacity from the perspectives of clinicians [35].

C. Primary health care staff

(i) *Challenges with securing and retaining the health workforce to deliver HCs*: Recruitment and retention of healthcare staff and staff turnover were reported as significant barriers to HC delivery [28, 31, 35, 38–40]. However, studies in this review provided few explanations for the underlying reasons for workforce turnover.

(ii) *Inconsistent identification of Aboriginal and Torres Strait Islander status*: Many studies conducted in mainstream practices reported low rates of routine identification of Aboriginal and Torres Strait Islander status [30, 34–37], which was linked to workforce apprehension about the fear of offending by asking the identifying question and a lack of understanding of the benefits of identifying an Indigenous status [30, 34–36]. There was a widespread gap in asking and recording Aboriginal and Torres Strait Islander status in primary care, creating a barrier to offering HCs to eligible people.

(iii) *Staff negative attitudes to HC efficacy and need*: Several studies identified staff support and attitudes within mainstream practices and AMS as key barriers to the implementation of HCs [34, 35, 37]. Some mainstream practitioners believed in treating everyone the same, not supporting an Indigenous-specific approach to delivering HCs [34]. Many mainstream practice staff were unaware of the impacts of colonization on health behaviour and trust in mainstream services [34]. Kehoe's study revealed that some GPs and practice staff thought HCs were driven by a bureaucratic desire for MBS items, questioning their clinical benefit to patients [35]. ACCHO GPs felt constrained by the MBS item descriptor and believed they could not adjust them to fit patient priorities [37]. Similar concerns were raised in the NACCHO RACGP roundtable, where one point of feedback characterized the risk of HCs becoming tick-box exercises done "to" patients with no benefit, although mechanisms for these issues were not expounded [33]. A few studies also highlighted limited information on HC benefits among practice staff [36, 41].

D. Patient and community

(i) *Apprehension about HCs*: Fear of stigmatization and confidentiality breaches hindered people from seeking HCs [30, 37], including the concern of government departments having unnecessary access to personal information [37]. As an example, a community member expressed these fears, stating, "I felt like it was [Department of Communities] … asking some of those questions, 'how many people living in your house?'… that's not too bad, it's starting to get a little bit invasive but, 'does the mother drink, does the father drink?', 'how much do they drink?'… What're we trying to achieve?" This highlights the enduring impact of colonization and racism as barriers to trust in services and information sharing. Harris et al. documented that negative health service feedback on social media, such as Facebook, had a detrimental impact on the uptake of HCs at the PHC level [41]. Strategies identified in the literature to help mitigate this apprehension included empowering Aboriginal and Torres Strait Islander individuals to seek information about the purpose and benefits of HCs, developing an understanding of the process and ensuring the availability of services through follow-up appointments, and avenues for addressing questions afterwards [30, 41, 42]. Some studies reported individual perceptions of visiting PHC only when sick [30, 37, 42] and highlighted feelings of shame associated with visiting a doctor [30, 42].

(ii) *Experiences of racism and discrimination in uptake of HCs*: Two studies explored how experiences of racism and discrimination, particularly with police and social services, affect people's trust in PHC generally, which may also impact the uptake of HCs [30, 42]. Two studies noted instances of racist attitudes among health service staff, which were associated with behaviours such as rudeness, misinterpretation and a failure to address community priorities [31, 43]. An Australian Department of Health report identified past traumatic experiences, discrimination and stereotyping based on ethnicity in PHC settings as barriers to HC uptake among Aboriginal and Torres Strait Islander communities [30]. In addition, one study reported that a healthcare practice displayed intolerance towards the behaviour of Aboriginal and Torres Strait Islander children, underscoring systemic racism in health services, which may also act as a barrier to utilizing HCs [25].

Mechanistic factors related to success and failure of implementation of HCs

A. Primary health care capacity

(i) *Potential benefits of cultural training of health workforce to deliver HCs*: Many studies demonstrate that cultural training programmes aid non-Indigenous health providers in expanding their knowledge of Aboriginal and Torres Strait Islander history and culture, reflecting on unconscious biases, understanding the importance of families and their guardianship roles, and discussing ways to be more culturally aware in consultations [25, 26, 29, 30, 34, 35, 37, 39]. ACCHOs staff reported a lack of confidence in discussing lifestyle behaviours and social issues, and in particular, female Aboriginal health workers (AHWs) were hesitant to address smoking and alcohol issues with males and Elders from other Indigenous cultural groups [37]. The programme "Ways of Thinking, Ways of Doing" yielded mixed results, with pilot findings of enhanced cultural competence resulted in patients feeling more comfortable attending HCs and sharing sensitive health information [34], while the 5-year intervention revealed no increase in the cultural quotient levels of staff [39].

(ii) *Supportive clinical leadership drives HCs into routine practice*: The need for strong clinical leadership to drive increased uptake of HCs was emphasized in three studies [31, 32, 37]. According to Jennings et al. [22], effective local clinical leadership, coupled with good communication, was crucial for developing clinic-specific systems that integrate HCs into routine practice (within busy workplaces) and addressing low staff motivation to complete HCs [37]. In this study, a nurse highlighted the significant challenges in conducting HCs, stating, "… that no one's got together, and we don't have a system" [37]. In a quality improvement intervention in community health centres in the Northern Territory, good clinical leadership played a key role in enhancing preventive care, including HCs, and securing new resources for its delivery [32].

(iii) *Incentives encourage individual participation in HCs*: Multiple studies have recommended offering incentives for people receiving HCs, such as shirts, providing vouchers for grocery hampers with healthy foods, and raffling bikes, as an effective strategy to encourage people to undergo HCs [31, 32, 44]. However, contrasting findings from the 2019 NACCHO RACGP roundtable documented that patient incentives may increase the number of HCs but cannot be linked to any impact on the quality of HCs [33].

(iv) *Presentation of acute problems impeding HCs uptake*: People often prioritize acute problems when seeking primary care, making it challenging to opportunistically engage in HCs owing to the busy clinical schedule for GPs and competing patient priorities [26, 31]. Jennings et al. observed variations in how clinics address this, with some preferring to address the presenting complaint/acute problem initially and defer the HCs to a follow-up appointment [37]. Others heavily relied on walk-in consultations, conducting opportunistic HCs, as planned long appointments were often poorly attended [37]. Bailie et al. attributed a lack of HC appointments to a shortage of service providers, including GPs, practice nurses, allied health professionals and A&TSIHP/Ws [31].

(v) *Effective electronic clinical record capacity for HCs*: Electronic clinical record systems, though not extensively studied in peer-reviewed literature, played a central role in the grey literature, highlighting the advantages of computerized HC systems [34, 35, 40]. One 2013 study identified the clinical limitations of paper-based HCs, such as legibility issues, non-standardized responses, extra administrative work linked to manual scanning of HCs into patients' medical records and paper consumption [40]. In contrast, digital comprehensive electronic HC templates exhibited higher completion rates for HCs [45] and enhanced patient involvement in shared decision-making, and patient-centred management of conditions [46]. Spurling et al. noted that the benefits of the computerized template, such as constrained answers and a self-populating problem list, outweighed the challenges of implementing a new IT system [40]. These early findings emphasized the importance of digital HC, but in the current context, its use is widespread and of limited relevance for current-day implementation.

B. Structural process

(i) *Value of Aboriginal and Torres Strait Islander staff recruitment in HCs delivery*: Several studies emphasized the importance of Aboriginal and Torres Strait Islander staff in clinical and non-clinical roles for effective delivery of HCs

[25, 29, 31]. Recruitment of A&TSIHP/Ws with clear roles and responsibilities improves clinical decision-making at PHC in relation to HC delivery [25, 26, 29, 37, 41]. Aboriginal and Torres Strait Islander people described higher care satisfaction when support was provided by A&TSIHP/Ws [30]. Accessing health services (and hence the opportunity to participate in HCs) is often influenced by the availability of community-controlled services and/or of Aboriginal and Torres Strait Islander staff in PHC [30]. In addition, the presence of A&TSIHP/Ws in services builds community trust in HCs [41].

(ii) *Potential benefits of collaborative team-based care for HCs delivery*: Two studies have underscored the effectiveness of collaborative team-based care as a potential solution for delivering HCs [30, 39]. DiGiacomo et al. proposed several strategies to address time constraints, such as having AHWs and nurses initiate HCs using a health station model, designating specific days for completion, and assigning one GP to focus on patients without a regular GP [26]. Schutze et al. emphasized the pivotal role of nurses in HCs, highlighting that nurse initiation of the HCs in mainstream practices reduces GP perception of required time [36]. Some studies advocate for conducting high-quality HCs through a team-based approach, which includes the active participation of Aboriginal and Torres Strait Islander individuals and their families [26, 33, 41, 42]. In addition, fostering a supportive team culture within PHC is crucial for retaining the healthcare workforce to deliver HCs [28, 29].

(iii) *Inadequate consultation time as a barrier to HCs delivery*: Multiple studies highlight the time it takes to complete HCs as a significant barrier [26, 31, 37, 41, 42]. In one study [37], an Aboriginal nurse stated that "with Indigenous people…you don't keep them for a long time…otherwise they'll just get up and go out…". This time barrier is magnified for clients with complex health needs or after a lengthy waiting room period [37]. Staff suggested an ideal health check timeframe of approximately 30 min with AHWs and another 30 min with the doctor [37]. Discussions in the NACCHO RACGP roundtable highlighted that adequate time is crucial and the components of a HC may span multiple consultations [33]. The time-intensive nature often hinders mainstream services from offering HCs unless pre-booked and confirmed [26]. In addition, three studies identified GP time constraints as a barrier to collaborative team-based care, crucial for the effective uptake of HCs [26, 30, 39].

(iv) *Culturally insensitive or superficial contents of HCs impede HCs utilization*: Two studies noted that certain sections of HC templates were problematic, potentially harming the patient–provider therapeutic alliance [37, 46]. Another study highlighted that HCs did not adequately cover the view of health and the social world of Aboriginal and Torres Strait Islander people, perceiving HCs as measuring health in a compartmentalized, disease-focused manner [42]. In this study, participants described HCs content as "superficial and did not get to the heart of peoples' health problems" and expressed it was unlikely to "paint a really honest picture of where my health's at" or help doctors explore issues of identity, when patients have spiritual, family and connection to country related concerns [42].

(v) *People-centred reforms enable utility of HCs at primary care*: Enablers for HC accessibility in PHC, emphasized in six studies [26, 28, 29, 36, 37, 41], included transportation support [26, 29, 31, 41] and a flexible scheduling system (including walk-in consultations and opportunistic HCs) [29, 37]. Drivers for seeking HCs at PHC included dedicated HC days, designated staff (especially A&TSIHP/Ws), staff confidence and community awareness [26, 37], and highlighted the benefits of holding dedicated health screening days that fostered multidisciplinary learning, collaboration with external health professionals and enhancing awareness among government-run AMS staff [26]. PHC-level initiatives enhancing health check accessibility included Deadly Choices promotion activities, real-time feedback through social media and services offered beyond regular working hours, allowing people to attend services without taking time off work [41, 44]. It was identified that a positive approach emphasizing self-esteem, self-efficacy and community education on the benefits of participating in HCs, aligning with the community strengths-based approach, enhances HC promotion [37]. Another study recommended implementing action plans and discussing system assessments and clinical audit findings at the PHC level improve HCs utilization [32].

(vi) *Factors contributing to improved HCs follow-up attendance*: The effectiveness of HCs hinges on responding and addressing health priorities and needs. This includes reminders of follow-up activities through phone calls and messages, and a robust feedback mechanism on the experience of a HC with timely and extensive input from the community [30, 32, 33, 37, 40, 41]. Factors contributing to enhanced follow-up services include robust referral relationships, a structured platform for staff support in follow-up activities, transport assistance for patients to attend follow-up appointments, integration of patient feedback, meticulous record-keeping and a patient-friendly service environment [29, 34, 39, 41]. Studies recognized that partnership-enabled service integration, shared electronic health records and cohesive teamwork across health service staff were crucial for improving follow-up care [26, 29, 36]. This collaborative approach is exemplified by arranging and supporting referrals to allied health referral, including mental health, weight management, exercise physiology, dental, dietetics, optometry, audiology, alcohol and drug services, specialists and smoking cessation initiatives [26, 38, 41, 43].

(vii) *Barriers to follow-up attendance and referrals to other services*: Multiple studies identified low follow-up attendance rates and referrals to other services, with some papers correlating this to the absence of patient navigators or designated health workers who could assist with referral coordination and follow-up care [28, 30, 38, 39, 43], with Dutton et al. reporting rates of attendance to follow-up as low as 55% and 40% [38]. In a study by Bailie et al. barriers included GP reluctance to refer, presuming that patients would not adhere to follow-up referrals, negative patient experiences with follow-up appointments, limited general practice capacity for follow-up, and unawareness about reasons for referrals [31]. It noted a lack of established systems to organize and bill for follow-up. The Australian Department of Health report highlighted that insufficiently standardized and digitized paperwork for GPs to refer patients to allied health services is time-consuming and hinders trust building, and the complexity of arranging follow-up MBS items and associated costs is a key barrier [30]. Agostino et al. proposed that creating demand among patients for appropriate follow-up after HCs through health awareness initiatives could be an effective strategy [46]. In addition, issues such as long waiting times for non-allied health services, and/or lack of allied health service providers, were identified as barriers [29, 37, 43]. Studies also reported lower rates of referral to non-clinical services (related to education, employment and housing) and social and emotional wellbeing, with unclear descriptions of the types of services to which patients were referred or linked [26, 28, 30, 34, 35, 37, 39, 41, 42]. Some studies noted a lack of referral options and emphasized the need for multidisciplinary comprehensive PHC with the provision of navigators or social workers to support individuals in navigating services and referrals to appropriate community resources [28, 37, 42]. Enabling access to non-clinical services is crucial for supporting communities in addressing socio-cultural determinants of health outcomes, including education, employment, housing and grief [42].

C. Building therapeutic alliances

(i) *Inadequate understanding and addressing holistic needs impede HCs delivery*: Within the patient–provider partnership, it is crucial for clinicians to address holistic health, which includes social, emotional and physical wellbeing, not just physical health [29, 39, 41–44]. However, one study highlighted that discussing holistic needs would require increased time and, therefore, may lead to increased out-of-pocket costs for patients, especially in urban areas [30]. Despite this, many studies did not specify how clinicians addressed these needs. One study emphasized that mental health is inseparable from physical, spiritual and cultural health, highlighting the importance of healthcare providers having a comprehensive understanding of patients' holistic needs [41].

(ii) *Enablers of culturally safe care for HCs delivery*: Culturally appropriate care is essential in healthcare, especially for Aboriginal and Torres Strait Islander peoples, as it fosters a mutually respectful relationship between providers and patients while addressing racism and the legacy of colonization [29, 34, 41, 44]. Shared consultations led by A&TSIHP/Ws from an AMS and external clinicians have proven effective in implementing culturally appropriate initiatives, especially in improving communication between non-Indigenous health professionals and patients [26]. Enablers of culturally safe healthcare include creating clinical and waiting spaces that incorporate appropriate cultural signifiers, potentially including Indigenous radio stations, cultural items or flags [25, 26]. Providing culturally relevant materials, such as story booklets and Indigenous-designed graphics, images and voices, was identified as an enabler of culturally safe care [26, 34, 35, 37, 40]. In some remote communities, access to traditional healers and smoking ceremonies for clinic rooms enhance the cultural acceptance of HCs [29]. Engaging local Elders in social media health messaging and adopting a yarning-style conversational approach with humour and visual aids, with a focus on self-esteem and positive influences, are effective strategies for HC delivery [30, 37].

D. Patient and community ways

(i) *Value of community engagement to HCs uptake*: Community events and strong connections with Aboriginal and Torres Strait Islander communities were key to the uptake of HCs across mainstream, ACCHOs and government-run services [25, 26, 28, 31, 39, 42–44]. For instance, during a HC screening day initiative at a government-run AMS, the involvement of Aboriginal and Torres Strait Islander health workers and community engagement through peer leaders was identified as an important strategy [26]. Similarly, some studies reported that active community engagement also facilitated regular information exchange with communities and stakeholders, thereby incorporating their feedback into HC programme development [26, 29, 39, 41, 44]. Community engagement approaches included outreach events supporting events such as the NAIDOC (National Aboriginal and Islander Day Observance Committee) Week, and facilitating local rugby league teams through sponsorships to encourage HCs [25].

(ii) *Strong Aboriginal and Torres Strait Islander leadership improves HCs delivery*: Aboriginal and Torres Strait Islander leadership and governance structures, along with partnerships between service providers and community-controlled organizations, have enabled the focus of services to shift from reactive acute care to proactive, comprehensive PHC models, improving HC delivery [25, 26, 29, 34, 39, 41]. For example, partnership initiatives among health practitioners could effectively enhance staff capacity, foster teamwork and facilitate collaborations between AMS and non-AMS health services [26]. It was also identified that strong community leadership is essential for maximizing the benefits of policy changes and increased funding, ultimately improving practice and health service delivery, including HC provisions [29].

Discussion

Findings of this review have the potential to underpin the development of a programme theory to guide the implementation and evaluation of HCs. Our findings have several policy and practice implications that should be considered in the implementation of HCs to improve the uptake and quality of routine HCs by Aboriginal and Torres Strait Islander people in Australian PHC.

Adequate investment in primary health care infrastructure has emerged as a fundamental determinant. Addressing contextual factors, such as space constraints, equipment shortages and competing clinical demands, is critical for embedding HCs into routine practice. Previous evidence has documented various obstacles to accessing PHC services, including inadequate infrastructure, insufficient funding and inflexibility in funding arrangements to care for people holistically [47, 48]. Numerous papers have cited poor affordability, availability and appropriateness of services/resources as impeding factors to access chronic disease care, including HC utilization in Australia [43, 48, 49]. Conversely, enablers identified by other studies have also emphasized the importance of strong clinical leadership, physically welcoming spaces, adequate primary health care workforce, provision of transport and adequate time to time to build trusting relationships with communities [48, 50, 51].

The impact of workforce recruitment, retention and effective training was found to affect the implementation of HCs, aligning with pre-existing evidence [48, 52]. Evidence from this review clearly highlights the value of employing A&TSIHP/Ws, resulting in significant HC buy-in and greater satisfaction from the community. However, it was found that their role has not been properly recognized and adequately remunerated. Evidence shows that retention of Aboriginal and Torres Strait Islander health professionals can help overcome key cultural and communication barriers and can improve the cultural competency of the non-Indigenous health workforce [48, 53, 54]. However, given that a large proportion of the health workforce is non-Indigenous, it is crucial to build their cultural competence, provide job security and adequate remuneration, continue appropriate training about the value of HCs for Aboriginal and Torres Strait Islander people and eliminate misconceptions about MBS requirements. [51] This review also identified the need to improve understanding of correct billing processes for MBS items, along with clarity on responsibilities for initiating and conducting aspects of HCs among clinic staff (which is consistent with national and international evidence) [55, 56]. We hypothesize that this may be related to limited hands-on training or awareness of the potential for HCs to support health and wellbeing and prevent disease, concerns about the MBS billing process and time pressure. These findings suggest that without increasing investment in strengthening primary care infrastructure with competent clinic staff in the MBS billing process and provision of compensation for clinicians for their time to address holistic preventive healthcare, it is likely that HCs as a tool focused on closing the gap for Aboriginal and Torres Strait Islander health and wellbeing outcomes may not be achieved.

There is significant evidence that Aboriginal and Torres Strait Islander people experience racism, including while accessing PHC for preventive healthcare and chronic disease services, including HCs, highlighting the effect of racism and discrimination on health service use and its detrimental impacts on the health and wellbeing of Aboriginal and Torres Strait Islander people [1, 48, 57]. Therefore, it is crucial to train health care professionals in culturally safe approaches to improve the quality of HCs, for example, reflecting on unconscious biases and efforts to acknowledge and address colonial history and intergenerational trauma, systemic racism, understanding family, cultural and social obligations of Aboriginal and Torres Strait Islander people, as well as acknowledging barriers for health-seeking behaviour among Aboriginal and Torres Strait Islander people due to experiences of racial discrimination in PHC. Notably, cultural competency training for primary care staff to deliver culturally safe services was a feature of included studies, though there was little discussion of the measurable impact of cultural competency training on patient-reported outcomes. A stand-alone cultural competency training with a limited focus on racism and white privilege without systemic and organizational changes is likely insufficient to improve people-reported outcomes. Future studies should use uniform terminology and definitions for cultural safety [58] concerning Aboriginal and Torres Strait Islander people. Using uniform definitions of cultural safety in policy documents and strategic plans will guide the implementation and evaluation of cultural safety initiatives empirically and theoretically. Importantly, along with training and developing a culturally safe environment to deliver people-centered care, it is crucial to provide regular mentoring to staff in the workplace and measure workforce cultural safe and respectful practice using validated tools with self-reflexive elements and regular service user satisfaction surveys together with outcome measurements. This will allow for the building of the evidence base on culturally safe interventions that impact people's reported outcomes.

Addressing holistic needs at the PHC level is crucial to improving Aboriginal and Torres Strait Islander health and wellbeing. In line with our findings, many previous studies have identified that the focus of PHC is on biomedical aspects of health with insufficient attention to the broader context of people's lives, including addressing the broader social, cultural and environmental determinants of health [48, 49, 59]. Several studies have identified limited cultural competency of non-Indigenous health care providers to understand and address the holistic needs of Aboriginal and Torres Strait Islander people. In addition, our research identified a lack of tools to assess holistic needs, time constraints during consultations and uncertainty among staff about non-clinical services to refer/link patients to. This highlights the need to explore the best approach to address holistic needs within consultations and ways to incorporate holistic health items onto HC templates whilst facilitating time efficiency to make such consultations feasible. A key barrier in building trust was the cultural acceptability of the contents of HCs. Our findings mirrored those of Usher et al., which reported feelings of shame and intrusiveness associated with the social history questions asked in HCs [12]. Conducting Aboriginal and Torres Strait Islander-led reforms of HC templates/questionnaires is vital in ensuring they are fit for practice.

Dedicated health check days, designated staff (especially A&TSIHP/Ws), flexible services and the implementation of real-time feedback from social media were identified as enablers for the utilization of HCs. These features supported service users to balance priorities, including accessibility of HCs outside of work hours. Partnership-enabled service integration shared electronic health records and cohesive teamwork across health services staff were identified as crucial for improving follow-up care. However, investment in systems development for the effective use of clinical information systems was not described explicitly in the included studies of this review. Emerging evidence shows that investment in improving internet access, in-house information technology (IT) support and automated systems for follow-up care can enable coordinated access to multidisciplinary chronic disease care [48].

While a few studies identified specific health promotion activities, the majority did not present clear information on local health promotion initiatives designed to empower and encourage Aboriginal and Torres Strait Islander peoples to undertake HCs. This is consistent with other findings, which state that very few health promotion initiatives are designed specifically for the Aboriginal and Torres Strait Islander 715 HCs [60]. Currently, PHC funding is largely focused on clinical care, whereas health promotion initiatives are less of a priority or have been left out. A report from NACCHO has identified a AU$ 4.4 billion funding deficit, which highlights another obstacle to improving the health and wellbeing of Aboriginal and Torres Strait Islander people. Previous research has shown that a relatively small number of government bodies and non-government organizations play a role in health promotion activities with fragmented funding [61]. Evidence shows that every dollar invested in health promotion and prevention can save $ 14 [62], but the direct funding from the government to support PHC to deliver health promotion initiatives to meet the Aboriginal and Torres Strait Islander people's needs is insufficient. However, ACCHOs and some AMS are the leading entities providing community-driven health promotion initiatives for HCs with Indigenous Australian Health Programme resources or other independent funding. It is crucial that health promotion activities for HC delivery should be shaped and informed by trust and value-based partnerships with local communities (that include Elders, community leaders and diverse service users) and socio-culturally tailored communication techniques by applying culturally appropriate health promotion principles [63]. This will allow the local community to map and recognize existing community assets (local Indigenous knowledge, local communication pathways and social connectedness) and co-design local health promotion initiatives responsive to context to address the whole person's and community's needs at the right time, in the right place and with the right team expertise [64]. Furthermore, the prerequisites for health and wellbeing cannot be ensured by the health sector sufficiently. Therefore, a coordinated effort is needed from all sectors – government, public and private. Therefore, exploring opportunities to develop place-based health promotion initiatives for HCs is crucial.

Effective engagement of Aboriginal and Torres Strait Islander communities and their leadership is integral to improving access to chronic disease care at primary care services [48, 65]. This review found that involving local Elders, Aboriginal and Torres Strait Islander leadership and governance structures, partnerships and collaborations between PHC services and community-based organizations improved the foundation of trust for delivering HCs. However, the specific engagement strategies or theoretical frameworks guiding the partnership between PHC and Aboriginal and Torres Strait Islander communities remains unclear in most included studies.

Policy and practice recommendations: This review identified a number of policy and practice recommendations in six key domains (Table 3). Recommendations focus on pragmatic approaches to meaningfully improve the experience of HCs and embed them in enabling health system architecture. This pragmatic synthesis of recommendations draws on findings from this review, our recent policy-focused rapid review [48] and perspectives of the authorship team, including Aboriginal and Torres Strait Islander and non-Indigenous policymakers, practitioners and researchers. Collectively, the recommendations prioritize the delivery of culturally safe HCs developed and delivered by Aboriginal and Torres Strait Islander people and peak bodies. Implementing this approach provides a pathway for improving the quantity and quality of HCs, and ensures the health system is accountable for their robust delivery.

The policy and practice recommendations identified in this research reinforce the need to address all domains of the National Aboriginal and Community Controlled Health Organisations' (NACCHO) Core Services and Outcomes Framework [64]. This Framework emphasizes four domains that need to be fully funded to support high quality primary care. While we have made several recommendations related to Clinical Services, other recommendations span the remaining three domains of Governance, Health Promotion, Community Empowerment and Policy and Partnerships [64], were developed to improve the health and wellbeing of Aboriginal and Torres Strait Islander people.

Strengths and limitations

Strengths of the present review include: (i) importantly, Aboriginal and Torres Strait Islander people reside in different geographical locations within Australia, are from diverse cultures, have unique knowledge systems and beliefs, and possess invaluable traditional knowledge that contributes to the implementation of HCs at the PHC level. The findings generated in this study are data from research conducted around Australia in both mainstream general practice and Aboriginal-specific services. Areas included Western Australia, Northern Territory, Queensland, South Australia, New South Wales, Victoria, Australian Capital Territory and Australia-wide or multiple states, as well as territories in rural, remote and regional settings. These study findings have the potential to inform implementation research with the involvement of various stakeholders such as health service managers, policymakers and community members aimed at developing and

Table 3 Policy and practice recommendations for implementing effective HCs in the prevention and early detection of chronic diseases among Aboriginal and Torres Strait Islander people in Australian PHC

Recommendations to improve health checks (HCs) quality and effectiveness	How can it be achieved?	Policy recommendations		Practice recommendations
		Funding priorities	Specific policy recommendations	
1. Ensure HC content is evidence based and culturally safe				
a. Maintain support to review components and content of HCs	(i) Continue to support expert groups through national processes led by NACCHO and RACGP to provide guidance about delivering high-quality HCs [66]. In addition, support local adaptation of HC templates to local community needs through working with communities to receive and apply feedback on templates	•	•	•
2. Facilitate optimal HC integration into workflow and clinical records				
a. Incorporate novel functionalities into the platform where the HC template is embedded	(i) Progress integration of chronic disease risk calculators into clinical software in conjunction with software developers, peak bodies and clinical services (ii) Practice recall and reminder systems are used effectively to support follow-up of health needs identified in the HCs		•	•
b. Maintain support for integration of digital HCs	(i) Support piloting and use of digital HCs (with space for local customization to ensure maximum impact), which PHC or GP providers can add to their local software for HC delivery [67]		•	•
c. Simplify MBS item descriptor and associated notes to support better evidence-based patient-centered care	(i) Continue to support the Medicare Benefits Schedule Review Advisory Committee to consider how MBS recognizes and remunerates flexible service (in terms of the flexibility of the person who delivers services) delivery for HCs for Aboriginal and Torres Strait Islander people [68]	•		
3. Ensuring HCs are delivered within a robust primary care system				
a. Create a welcoming and culturally safe environment	(i) Enhance welcoming environments and waiting areas; potentially including healthy snacks, tea/coffee, Aboriginal and Torres Strait Islander flags, arts and crafts to build trust and facilitate engagement with PHC	•		•
	(ii) Ensure cultural competency is a core element in staff recruitment, professional development review and other education/training opportunities		•	•
	(iii) Implement patient-reported experience measures (PREMs) tools to measure patient experience and culturally safe care		•	•
	(iv) Use of HCs promotional materials such as posters and pamphlets in practice waiting/consultation rooms demonstrating Aboriginal and Torres Strait Islander people's positive experience with HCs, HCs benefits and the conditions that make it useful			•
b. Development of a shared decision-making tool	(i) Convene an expert group to develop a shared decision-making tool focusing on the assessment of holistic needs, patient priorities for HCs and a plan for healthcare following a HC	•	•	

Table 3 (continued)

Recommendations to improve health checks (HCs) quality and effectiveness	How can it be achieved?	Policy recommendations		Practice recommendations
		Funding priorities	Specific policy recommendations	
c. Strengthen workflow and workforce stability	(i) Maximize the benefits of digital reforms by supporting broadband connectivity, especially in remote settings and IT human resources support			•
	(ii) Invest in the professional growth and capacity of A&TSIHP/Ws to deliver HCs	•		•
	(iii) Recognize and appropriately remunerate A&TSIHWs for their contribution to improving the health outcomes of their communities in line with the National Aboriginal and = Torres Strait Islander Health Workforce Strategic Framework and Implementation Plan 2021–2031 [69]	•		
	(iv) Implement recommendations of the Medicare Task Force to support multidisciplinary teams within the full scope of their practice	•		
d. Ensure integration of primary care, social care and care partnerships to an optimum level	(i) Support team-based primary care, which recognizes the scope of GPs, nurses, ATSIHP/Ws and other allied health professionals		•	•
	(ii) Support referral pathways to various culturally safe clinical and non-clinical services including transport, housing, NDIS, employment, etc. [70]	•		•
	(iii) Supporting Primary Health Networks (PHNs), ACCHOs and other stakeholders to provide visibility of non-clinical services. This may include developing a directory of evidence-based information and links to available non-clinical services	•		•
	(iv) Recognize the role of families, carers and communities and ensure they are included in models of care delivery	•		•
e. Address health equity and disparities	(i) Provide flexible, needs-based, funding support to ACCHOs to support community-led innovative models of care for HCs	•		•
	(ii) Support or provide transport services for service users to attend primary care in settings where physical access is a barrier to care		•	•
	(iii) Implement a reform to access and affordability of allied health services available for the Aboriginal and Torres Strait Islander people		•	
	(iv) Ensure that MBS rebates for HCs reflect the complexity and comprehensiveness of a culturally and clinically safe HC			

Table 3 (continued)

Recommendations to improve health checks (HCs) quality and effectiveness	How can it be achieved?	Policy recommendations		Practice recommendations
		Funding priorities	Specific policy recommendations	
f. Address time constraints	(i) Appointments are long enough to complete comprehensive HCs	•	•	•
	(ii) Delineate the role of nursing staff or another allied health workforce in delivering HCs at mainstream services to address issues of consultation time			
	(iii) Support flexibility in consultation times (including extended opening hours and walk-in services wherever possible) and formats to foster genuine relationships between service providers and service users		•	•
4. Workforce training to ensure the safe delivery of HCs				
a. Promote standardized CPD-accredited Aboriginal and Torres Strait Islander culture awareness and safety training	(i) Promote subsidized standardized CPD-accredited Aboriginal and Torres Strait Islander culture awareness and safety training to GPs, general practice staff, primary health care staff and other health care providers	•	•	•
b. Development of standardized MBS (715 and allied health referrals) training	(i) Involve NAATSIHWP, NACCHO, RACGP and other key stakeholders to develop training material on MBS billing requirements, billing processes and the role of all GPs, nurses and Aboriginal and Torres Strait Islander health workers in the delivery of high-quality HCs	•	•	•
c. Develop a cross-cultural learning platform	(i) Support local collaborations for mainstream, AMS and ACCHOS staff. This will allow healthcare providers to strengthen their knowledge and improve their HC delivery practices	•	•	•
5. Community engagement and health promotion activities for HC delivery				
a. Strengthen Indigenous clinical leadership	(i) Set up clear roles, responsibilities and boundaries of senior managerial positions			•
	(ii) Supporting formal system for responding to staff conflicts and needs			•
b. Strengthen health promotion activities	(i) Resource ongoing local health promotion programmes for increasing quality HC uptake by Aboriginal and Torres Strait Islander communities	•		
	(ii) Link health check initiative with locally available health promotion programmes for chronic disease	•	•	•
c. Enable and strengthen the place-based partnership model	(i) Enabling local community ownership and control in the PHC service delivery system in line with social and cultural dynamics and norms	•		•
	(ii) Ensure consumers, communities, service providers and peak bodies are regularly engaged to identify the best practices and gaps to improve HC delivery effectively			•

Table 3 (continued)

Recommendations to improve health checks (HCs) quality and effectiveness	How can it be achieved?	Policy recommendations		Practice recommendations
		Funding priorities	Specific policy recommendations	
6. Future research on the implementation of HCs				
Implementation research	(i) Conduct high-quality research to understand the best practices for improving the delivery and follow-up care tracking of HCs at Aboriginal community-controlled health services, Aboriginal Medical Services, general practices and other primary care services	•		
	(ii) Co-develop and implement HC delivery with a clear programme theory and evaluation approach	•		
	(iii) Develop an evidence-based decision-making tool to drive the delivery of high-quality implementation of HCs	•		
	(iv) Identify place-based health promotion strategies for HC delivery	•		
	(v) Explore the benefits of providing aligned services, such as housing, Centrelink, legal services, etc., at PHC locations so that patients can meet their social determinants' needs	•		
	(vi) Conduct research on the implementation of HCs across a large number of communities to identify the aspects of contexts in which HCs are provided that enable or impede their success. Key factors may include cultural safety, community relationships, trust and engagement	•		

testing programme theory for HC implementation across the whole of the country; (ii) synthesis of contemporary evidence across a diverse range of papers, including peer-reviewed publications and grey literature employing both quantitative and qualitative methods; (iii) studies being critically appraised using a reputable tool to ensure quality and highlighting key systemic issues, such as a failure to acknowledge and credit Aboriginal and Torres Strait Islander peoples; (iv) inclusion of articles/reports comprising of participants from locations and service types across the country in regional, rural and remote settings. This may enable a level of generalizability of findings to Aboriginal and Torres Strait Islander populations in Australia; and (v) research findings and recommendations articulated experiences and viewpoints of Aboriginal and Torres Strait Islander peoples, researchers, clinicians and government departments from multiple angles through conference presentations and meetings with various key stakeholders that ensures the robustness of evidence generated for translational policy recommendations.

Likewise, limitations include: (i) there were limited patient/community reported measures, both experiences and outcomes, which restricts the generalizability of findings to Aboriginal and Torres Strait Islander populations living in different geographical locations; (ii) the quality of included studies were not satisfactory from the Indigenous viewpoint, so low-quality studies may have reporting or interpretation biases that may have an impact on policy and practical implications for future research; (iii) included studies lacked the necessary detail about what context-specific mechanisms lead to particular outcomes, posing a challenge to comprehensive understanding the effectiveness of HCs based on extracted empirical data; therefore, it is likely that the impact of some barriers and enablers might no longer reflect current practices and/or that other new and/or emerging priorities are not present in this review, so the research conclusion should be interpreted with caution; and (iv) the perspectives of health service managers, policymakers and funders are not represented in this research. These limitations might affect the overall findings, which would be beneficial in terms of implications for research and policy and further research. Despite these limitations, the state of synthesized knowledge and recommendations are up to date and applicable to plan health system or service changes to drive the uptake of HCs in ACCHOs, government-run AMS and mainstream primary care services.

Conclusion

Our research identified a range of contextual and mechanistic factors that contribute to the success or failure of implementing effective HCs in the prevention and early detection of chronic diseases among Aboriginal and Torres Strait Islander people in Australian PHC. This research identified the need to implement and evaluate a range of policy and practice recommendations to address policy, health service administration and workforce-level issues (including recruitment and retention of culturally competent non-Indigenous and Aboriginal and Torres Strait Islander staff) that significantly impede the implementation of HCs. It is also necessary for PHC services to train staff to identify and address the holistic needs of people along with biomedical aspects of health to improve the update of HCs. This study strongly suggests the need for health promotion initiatives with strong clinical and non-clinical Indigenous leadership, community engagement, and incentives for participation to encourage regular updates of HCs. Overall, future implementation research must develop a programme theory that adopts a more comprehensive and holistic approach across different models of PHC and considers the contextual factors and people-reported outcomes that influence the implementation of HCs to accurately assess HC effectiveness on health service improvement and people-reported outcomes.

Abbreviations

ACCHO	Aboriginal Community Controlled Health Organisations
A&TSIHP/Ws	Aboriginal and Torres Strait Islander Health Practitioners/Workers
AMS	Aboriginal Medical Service
AHW	Aboriginal Health Worker
GP	General Practitioner
HC/s	Health Check/s
PHC	Primary Health Care
CMOs	Context–Mechanism–Outcomes
MBS	Medicare Benefits Schedule
NACCHO	National Aboriginal Community Controlled Health Organisation
RACGP	Royal Australian College of General Practitioners
NAATSIHWP	National Association of Aboriginal and Torres Strait Islander Health Workers and Practitioners
PRISMA	Preferred Reporting Items for Systematic Review and Meta-Analyses
PRISMA-SCR	PRISMA extension for Scoping Reviews
PREMs	Patient-Reported Experience Measures

Supplementary Information

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Additional file 1.

Additional file 2.

Additional file 3.

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Author contributions

U.N.Y., J.A. and K.A.D. conceived and designed the study. U.N.Y., M.S. and S.T. extracted the data. U.N.Y. and S.T. drafted the manuscript. All authors reviewed the manuscript and contributed to improve its scientific richness. All authors read and approved the final draft of the paper.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

1. Kairuz CA, Casanelia LM, Bennett-Brook K, Coombes J, Yadav UN. Impact of racism and discrimination on physical and mental health among Aboriginal and Torres Strait Islander peoples living in Australia: a systematic scoping review. BMC Pub Health. 2021;21(1):1302.
2. Thurber KA, Brinckley MM, Jones R, Evans O, Nichols K, Priest N, et al. Population-level contribution of interpersonal discrimination to psychological distress among Australian Aboriginal and Torres Strait Islander adults, and to Indigenous-non-Indigenous inequities: cross-sectional analysis of a community-controlled First Nations cohort study. Lancet. 2022;400(10368):2084–94.
3. Australian Institute of Health and Welfare. Aboriginal and Torres Strait IslanderHealth performance framework 2020 summary report. cat. No. IHPF 2. Canberra: AIHW, 2020.
4. Australian Institute of Health and Welfare (AIHW). Health checks and follow-ups for Aboriginal and Torres Strait Islander people: Australian Government; 2024. www.aihw.gov.au/reports/indigenous-australians/indigenous-health-checks-follow-ups/contents/timeline-of-major-developments-in-health-check-imp. Accessed 10 Feb 2025.
5. RACGP NACCHO Aboriginal and Torres Strait Islander Health. Useful high-quality MBS item 715 health checks for Aboriginal and Torres Strait Islander people. 2019.
6. Services Australia. Medicare Benefits Schedule. In: Australian Government
7. Si S, Moss JR, Sullivan TR, Newton SS, Stocks NP. Effectiveness of general practice-based health checks: a systematic review and meta-analysis. Br J Gen Pract. 2014;64(618):e47-53.
8. Krogsbøll LT, Jørgensen KJ, Larsen CG, Gøtzsche PC. General health checks in adults for reducing morbidity and mortality from disease: Cochrane systematic review and meta-analysis. BMJ Br Med J. 2012;345: e7191.
9. Schütze H, Pulver LJ, Harris M. The uptake of Aboriginal and Torres Strait Islander health assessments fails to improve in some areas. Aust Fam Physician. 2016;45(6):415–20.
10. Spurling GKP, Hayman NE, Cooney AL. Adult health checks for Indigenous Australians: the first year's experience from the Inala Indigenous Health Service. Med J Aust. 2009;190(10):562–4.
11. Arnold LW, Hoy WE, Sharma SK, Wang Z. The association between HbA1c and cardiovascular disease markers in a remote Indigenous Australian community with and without diagnosed diabetes. J Diabetes Res. 2016;2016:5342304.
12. Usher K, Jackson D, Kabir H, Jones R, Miller J, Peake R, et al. Preventative health assessments and indigenous people of Australia: a scoping review. Front Pub Health. 2023;11:1168568.
13. Dutton T, Stevens W, Newman J. Health assessments for Indigenous Australians at Orange Aboriginal Medical Service: health problems identified and subsequent follow up. Aust J Prim Health. 2016;22(3):233–8.
14. Li J-L. Cultural barriers lead to inequitable healthcare access for aboriginal Australians and Torres Strait Islanders. Chin Nurs Res. 2017;4(4):207–10.
15. Yadav UN, Smith M, Agostino J, Sinka V, Williamson L, Wyber R, et al. Understanding the implementation of health checks in the prevention and early detection of chronic diseases among Aboriginal and Torres Strait Islander people in Australia: a realist review protocol. BMJ Open. 2023;13(6): e071234.
16. Campbell F, Tricco AC, Munn Z, Pollock D, Saran A, Sutton A, et al. Correction: Mapping reviews, scoping reviews, and evidence and gap maps (EGMs): the same but different— the "Big Picture" review family. Syst Rev. 2023;12(1):61.
17. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021;372: n71.
18. Harfield S, Pearson O, Morey K, Kite E, Canuto K, Glover K, et al. Assessing the quality of health research from an Indigenous perspective: the Aboriginal and Torres Strait Islander quality appraisal tool. BMC Med Res Methodol. 2020;20(1):79.
19. Vaismoradi M, Turunen H, Bondas T. Content analysis and thematic analysis: implications for conducting a qualitative descriptive study. Nurs Health Sci. 2013;15(3):398–405.
20. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. Qual Health Res. 2005;15(9):1277–88.
21. Martin K, Mirraboopa B. Ways of knowing, being and doing: a theoretical framework and methods for Indigenous and indigenist re-search. J Aust Stud. 2003;27(76):203–14.
22. Krippendorff K. Content analysis : an introduction to its methodology. 4th ed. Los Angeles: SAGE Publications, Inc.; 2019.
23. Bengtsson M. How to plan and perform a qualitative study using content analysis. NursingPlus Open. 2016;2:8–14.
24. Majoni SW, Dole K, Hughes JT, Pain C. Review of current pathways to wait-listing for kidney transplantation for Aboriginal and Torres Strait Islander peoples with end-stage kidney disease in the Top End of Northern Australia. Aust Health Rev. 2021;45(2):185–93.

25. Hayman NE, White NE, Spurling GK. Improving Indigenous patients' access to mainstream health services: the Inala experience [Paper in: Indigenous Health]. Med J Aust. 2009;190(10):604–6.
26. DiGiacomo M, Abbott P, Davison J, Moore L, Davidson PM. Facilitating uptake of Aboriginal adult health checks through community engagement and health promotion. Qual Prim Care. 2010;18(1):57–64.
27. Calver J, Wiltshire A, Holman CDAJ, Hunter E, Garfield C, Rosman DL. Does health assessment improve health outcomes in Indigenous people? An RCT with 13 years of follow-up. Aust N Z J Public Health. 2005;29(2):107–11.
28. Panaretto KS, Gardner KL, Button S, Carson A, Schibasaki R, Wason G, et al. Prevention and management of chronic disease in Aboriginal and Islander Community Controlled Health Services in Queensland: a quality improvement study assessing change in selected clinical performance indicators over time in a cohort of services. BMJ Open. 2013. https://doi.org/10.1136/bmjopen-2012-002083.
29. Reeve C, Humphreys J, Wakerman J, Carter M, Carroll V, Reeve D. Strengthening primary health care: achieving health gains in a remote region of Australia. Med J Aust. 2015;202(9):483–7.
30. Department of Health. Increasing uptake of health checks. Canberra: 2021.
31. Bailie J, Schierhout GH, Kelaher MA, Laycock AF, Percival NA, O'Donoghue LR, et al. Follow-up of Indigenous-specific health assessments – a socioecological analysis. Med J Aust. 2014;200(11):653–7.
32. Si D, Bailie RS, Dowden M, O'Donoghue L, Connors C, Robinson GW, et al. Delivery of preventive health services to Indigenous adults: response to a systems-oriented primary care quality improvement intervention. Med J Aust. 2007;187(8):453–7.
33. NACCHO RACGP roundtable. NACCHO RACGP roundtable. 2019. https://www.racgp.org.au/FSDEDEV/media/documents/Clinical%20Resources/Guidelines/Executive-Summary-NACCHO-RACGP-Roundtable-May-2019.pdf. Accessed 25 July 2023.
34. Liaw S-T, Hasan I, Wade V, Canalese R, Kelaher M, Lau P, et al. Improving cultural respect to improve Aboriginal health in general practice: a multi-methods and multi-perspective pragmatic study. Aust Fam Phys. 2015;44(6):387–92.
35. Kehoe H, Lovett RW. Aboriginal and Torres Strait Islander health assessments: barriers to improving uptake. Aust Fam Phys. 2008;37(12):1033–8.
36. Schutze H, Pulver LJ, Harris M. The uptake of Aboriginal and Torres Strait Islander health assessments fails to improve in some areas. Aust Fam Phys. 2016;45(6):415–20.
37. Jennings W, Spurling GK, Askew DA. Yarning about health checks: barriers and enablers in an urban Aboriginal medical service. Aust J Prim Health. 2014;20(2):151–7.
38. Dutton T, Stevens W, Newman J. Health assessments for Indigenous Australians at Orange Aboriginal Medical Service: health problems identified and subsequent follow up. Aust J Prim Health. 2016;22(3):233–8. https://doi.org/10.1071/py14120.
39. Liaw ST, Wade V, Furler JS, Hasan I, Lau P, Kelaher M, et al. Cultural respect in general practice: a cluster randomised controlled trial. Med J Aust. 2019;210(6):263–8.
40. Spurling GKP, Askew DA, Schluter PJ, Hayman NE. Implementing computerised Aboriginal and Torres Strait Islander health checks in primary care for clinical care and research: a process evaluation. BMC Med Inf Decis Mak. 2013;13(1):108.
41. Harriss LR, Kyle M, Connolly K, Murgha E, Bulmer M, Miller D, et al. Screening for depression in young Indigenous people: building on a unique community initiative. Aust J Prim Health. 2018;24(4):343.
42. Spurling GK, Bond CJ, Schluter PJ, Kirk CI, Askew DA. "I'm not sure it paints an honest picture of where my health's at" – identifying community health and research priorities based on health assessments within an Aboriginal and Torres Strait Islander community: a qualitative study. Aust J Prim Health. 2017;23(6):549–53.
43. Spurling GKP, Hayman NE, Cooney AL. Adult health checks for Indigenous Indigenous Health service [Paper in: Indigenous Health]. Med J Aust. 2009;190(10):562–4.
44. Malseed C. Deadly Choices Health Promotion Initiative Evaluation Report. 2013. www.lowitja.org.au/wp-content/uploads/migrate/Deadly-Choices-Evaluation-Report-v2.pdf. Accessed 27 July 2023.
45. NACCHO–RACGP. 2021 NACCHO-RACGP Partnership Project Aboriginal and Torres Strait Islander health checks: results from testing in health services and general practices. NACCHO, 2021.
46. Agostino J, Butler D, Douglas K, Jenkins LO, Skewes K, Phillips C, et al. Evidence on how Aboriginal and Torres Strait Islander health assessments can be enhanced to support best practice cardiovascular disease risk assessment and management. Report to the Australian Government Department of Health, 2018.
47. Gibson O, Lisy K, Davy C, Aromataris E, Kite E, Lockwood C, et al. Enablers and barriers to the implementation of primary health care interventions for Indigenous people with chronic diseases: a systematic review. Implement Sci. 2015;10:71.
48. Yadav UN, Davis JM, Bennett-Brook K, Coombes J, Wyber R, Pearson O. A rapid review to inform the policy and practice for the implementation of chronic disease prevention and management programs for Aboriginal and Torres Strait Islander people in primary care. Health Res Policy Syst. 2024;22(1):34.
49. Markwick A, Ansari Z, Sullivan M, Parsons L, McNeil J. Inequalities in the social determinants of health of Aboriginal and Torres Strait Islander People: a cross-sectional population-based study in the Australian state of Victoria. Int J Equity Health. 2014;13(1):91.
50. Davy C, Kite E, Sivak L, Brown A, Ahmat T, Brahim G, et al. Towards the development of a wellbeing model for aboriginal and Torres Strait islander peoples living with chronic disease. BMC Health Serv Res. 2017;17(1):659.
51. Jongen C, McCalman J, Campbell S, Fagan R. Working well: strategies to strengthen the workforce of the Indigenous primary healthcare sector. BMC Health Serv Res. 2019;19(1):910.
52. Aboriginal and Torres Strait Islander Health Workforce Working Group. National Aboriginal and Torres Strait Islander Health Workforce Strategic Framework 2016–2023. Australian Health Ministers' Advisory Council, 2017.
53. Lai GC, Taylor EV, Haigh MM, Thompson SC. Factors affecting the retention of indigenous Australians in the health workforce: a systematic review. Int J Environ Res Public Health. 2018;15(5):914.
54. McCalman J, Campbell S, Jongen C, Langham E, Pearson K, Fagan R, et al. Working well: a systematic scoping review of the Indigenous primary healthcare workforce development literature. BMC Health Serv Res. 2019;19(1):767.
55. Gottlieb JD, Shapiro AH, Dunn A. The complexity of billing and paying for physician care. Health Aff. 2018;37(4):619–26.
56. Improving your understanding of the MBS. RACGP Events Calendar. 2022.
57. Kendall S, Lighton S, Sherwood J, Baldry E, Sullivan EA. Incarcerated aboriginal women's experiences of accessing healthcare and the limitations of the "equal treatment" principle. Int J Equity Health. 2020;19(1):48.
58. Australian Health Practioner Regulatory Agency & National Boards. National Scheme's Aboriginal and Torres Strait Islander Health and Cultural Safety Strategy 2020–2025. https://www.ahpra.gov.au/About-Ahpra/Aboriginal-and-Torres-Strait-Islander-Health-Strategy/health-and-cultural-safety-strategy.aspx. Accessed 10 Feb 2025.
59. Andermann A, Collaboration C. Taking action on the social determinants of health in clinical practice: a framework for health professionals. CMAJ. 2016;188(17–18):E474–83.
60. Sinka V, Lopez-Vargas P, Tong A, Dickson M, Kerr M, Sheerin N, et al. Chronic disease prevention programs offered by Aboriginal community controlled health services in New South Wales, Australia. Aust N Z J Pub Health. 2021;45(1):59–64.
61. Harris A, Mortimer D. Funding illness prevention and health promotion in Australia: a way forward. Aust N Z Health Policy. 2009;6(1):25. https://doi.org/10.1186/1743-8462-6-25.
62. Masters R, Anwar E, Collins B, Cookson R, Capewell S. Return on investment of public health interventions: a systematic review (1979). J Epidemiol Community Health. 2017;71(8):827–34.
63. Demaio A, Drysdale M, de Courten M. Appropriate health promotion for Australian Aboriginal and Torres Strait Islander communities: crucial for closing the gap. Glob Health Promot. 2012;19(2):58–62.
64. .National Aboriginal Community Controlled Health Organisation. Core Services and Outcomes Framework: The Model of Aboriginal and Torres Strait Islander Community-Controlled Comprehensive Primary Health Care. In: National Aboriginal Community Controlled Health Organisation, editor. Canberra, ACT 2021.

65. Durey A, McEvoy S, Swift-Otero V, Taylor K, Katzenellenbogen J, Bessarab D. Improving healthcare for Aboriginal Australians through effective engagement between community and health services. BMC Health Serv Res. 2016;16:224. https://doi.org/10.1186/s12913-016-1497-0.
66. National Aboriginal Community Controlled Health Organisation and The Royal Australian College of General Practitioners. National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people. 3rd edn. East Melbourne, Vic: RACGP, 2018.
67. RACGP-CSIRO-NACCHO Collaboration—Smart HealthChecks. 2024. https://www.racgp.org.au/FSDEDEV/media/documents/Faculties/ATSI/Communique-RACGP-CSIRO-NACCHO-collaboration-2021.pdf. Accessed 28 July 2023.
68. Australian Government Department of Health and Aged Care. Medicare Benefits Schedule Review Advisory Committee—Terms of reference. 2024 Available from: Medicare Benefits Schedule Review Advisory Committee—Terms of reference | . www.health.gov.au/resources/publications/medicare-benefits-schedule-review-advisory-committee-terms-of-reference?language=en. Accessed 8 Aug 2023.
69. Australian Government Department of Health and Aged Care. National Aboriginal and Torres Strait Islander Health Workforce Strategic Framework and Implementation Plan 2021–2031.2022. www.health.gov.au/resources/publications/national-aboriginal-and-torres-strait-islander-health-workforce-strategic-framework-and-implementation-plan-2021-2031?language=en. Accessed 10 Aug 2024.
70. Yadav UN, Wyber R, Cornforth F, Lovett RW. Social prescribing another stolen Indigenous concept? Med J Aust. 2024;221:346–346.

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