

Effects of a culturally informed model of care for Aboriginal and Torres Strait Islander patients with acute coronary syndrome in a tertiary hospital in Australia: a pre-post, quasi-experimental, interventional study



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Summary

Background Aboriginal and Torres Strait Islander (Indigenous) peoples with cardiac disease in Australia have worse outcomes than non-Indigenous people with cardiac disease. We hypothesised that the implementation of a culturally informed model of care for Indigenous patients hospitalised with acute coronary syndrome (ACS) would improve their clinical outcomes.

Methods For this pre-post, quasi-experimental, interventional study, cohorts of Indigenous patients before and after the implementation of a model of care were compared. The novel, culturally informed, multidisciplinary-team model of care was a local programme of care developed to reduce morbidity and mortality from cardiac conditions among Indigenous Australians. All index admissions in the 24-month pre-implementation period (Jan 1 2013, to Dec 31, 2014) were analysed, as were all index admissions in the 12-month post-implementation period (Oct 1, 2015, to Sept 30, 2016). Comparisons were also made with non-Indigenous cohorts in the same timeframes. Admissions were excluded if the patient did not survive to hospital discharge. The study was conducted at Princess Alexandra Hospital, a tertiary hospital in metropolitan Brisbane (QLD, Australia). Data on presentation, comorbidities, investigations, treatment, and for outcomes were manually collected from a consolidated clinical information application. Mortality data were obtained from the Queensland Registry of Births, Deaths, and Marriages. The primary outcome was a composite of death, acute myocardial infarction, unplanned revascularisation, and cardiac readmission at 90 days after index admission, assessed in all patients.

Findings The Indigenous cohorts included 199 patients admitted with ACS before the model of care was implemented (85 [43%] were female and 114 [57%] were male) and 119 admitted post-implementation (62 [52%] were female and 57 [48%] were male). The non-Indigenous cohorts included 440 patients with ACS before the model of care was implemented (140 [32%] were female and 300 [68%] were male) and 467 admitted post-implementation (143 [31%] were female and 324 [69%] were male). Compared with the pre-implementation group, Indigenous patients admitted post-implementation had a significant reduction in the primary outcome (67 [34%] of 199 vs 24 [20%] of 119; hazard ratio 0.60, 95% CI 0.40–0.90; $p=0.012$), which was driven by a reduction in unplanned cardiac readmissions (64 [32%] of 199 vs 21 [18%] of 119; 0.55, 0.35–0.85; $p=0.0060$). There was no significant change in non-Indigenous patients between the pre-implementation and post-implementation timeframes in the composite endpoint at 90 days (81 [18%] of 440 vs 93 [20%] of 467; 1.08, 0.83–1.41; $p=0.54$). Pre-implementation, there was significantly more incidence of the primary outcome in Indigenous patients than non-Indigenous patients ($p<0.0001$), with no significant difference in the post-implementation period ($p=0.92$).

Interpretation Clinical outcomes for Indigenous patients admitted to a tertiary hospital in Australia improved after implementation of a culturally informed model of care, with a reduction in the disparity in incidence of primary endpoints that existed between Indigenous and non-Indigenous patients before implementation.

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Introduction

Aboriginal and Torres Strait Islander peoples are the Indigenous peoples of Australia, comprising hundreds of groups with their own languages, histories, and

cultural traditions. These cultures continue to thrive despite the ongoing effects of colonisation, systemic discrimination, and intergenerational trauma. However, health inequity (particularly in cardiovascular disease)

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Research in context

Evidence before this study

We searched PubMed from database inception to Dec 31, 2022, for studies published in English using the terms (“Aboriginal” OR “Torres Strait Islander” OR “Indigenous Australians”) AND (“acute coronary syndrome” OR “myocardial infarction”) AND (“model of care” OR “hospital admission” OR “inpatient” OR “clinical outcome”). The search returned 49 results. All original studies assessing quantitative outcomes were descriptive, detailing well established disparities in outcomes for Indigenous patients with acute coronary syndrome (ACS). One interventional study described qualitative outcomes. A review of the little available literature assessing qualitative outcomes in this area and related areas is included in our Article. Overall, there is a lack of quantitative evidence for any intervention to improve clinical outcomes for Aboriginal and Torres Strait Islander patients with ACS in the hospital setting.

Added value of this study

As far as we are aware, this is the first study to show an improvement in quantitative clinical outcomes among Aboriginal and Torres Strait Islander patients with ACS after a specific hospital-based intervention or change of practice. Furthermore, we show the power of a culturally informed model of care focused on patient education and support, which is developed and governed by community stakeholders to have an effect on clinical endpoints.

Implications of all the available evidence

Research into Aboriginal and Torres Strait Islander cardiac health and health care has long described substantial inequalities in health outcomes when compared with non-Indigenous Australians. We show that designing and implementing culturally informed, solution-focused approaches can improve both qualitative and quantitative measures.

imposes a heavy burden on the health and wellbeing of Indigenous individuals, families, and communities. As health-care workers, both Indigenous and non-Indigenous, our work is driven by the necessity of alleviating this burden in partnership with Aboriginal and Torres Strait Islander communities.

Morbidity and mortality gaps between Aboriginal and Torres Strait Islander (Indigenous) peoples and non-Indigenous Australians have been extensively reported.¹⁻³ Cardiovascular disease is responsible for 14% of the overall gap in disease burden,³ and it is the leading cause of avoidable death¹ for Indigenous Australians, who are likely to be diagnosed with ischaemic heart disease (IHD) at a younger age than non-Indigenous Australians^{2,4} and are almost twice as likely to be hospitalised for cardiac conditions.⁵ If admitted to hospital with IHD, Indigenous patients have higher mortality and readmission rates than non-Indigenous patients.^{2,6}

Despite repeated description of these disparities, progress in reducing them has been slow. In the community sector, efforts are led by Aboriginal and Torres Strait Islander Community Controlled Health Services, who deliver comprehensive and culturally safe primary health services and have a crucial leadership and advocacy role.⁷ However, effective strategies that tangibly improve health outcomes have not been widely implemented in the mainstream hospital system in Australia, despite ongoing calls to move beyond simply reporting disparities to solution-focused, Indigenous-led strategies that reduce them.^{8,9} Although some strategies to improve the care of Indigenous patients with cardiac disease in the hospital setting have been described,^{10,11} there are few publications showing improved clinical outcomes.¹² Where evidence does exist, such as in the area of reducing discharge against medical advice,^{13,14} clinical endpoints have not been evaluated.

Strategies aiming to reduce cardiovascular health inequities for Indigenous Australians could be guided by key national priorities,⁵ standards,¹⁵ and frameworks.¹⁰ They should acknowledge that differences in access to health services and the effects of cultural and historical factors contribute most heavily to the inequity.¹⁶ Furthermore, social determinants of health—including psychosocial, geographical, and economic factors—also contribute to the excess burden of cardiovascular disease on Indigenous Australians.^{1,16} These factors culminate in Indigenous peoples being less likely to receive guideline-based risk assessments and treatment for cardiovascular disease than non-Indigenous Australians^{17,18} and the true risk of Indigenous patients not being captured by risk-assessment tools due to under-representation in the data that informs them.¹⁹ Local Indigenous leadership and the prioritisation of Indigenous knowledge and practices are essential to any successful strategy.^{7,8} However, the power of such strategies to shift quantifiable clinical endpoints has not been shown in the literature to date.

In this Article, we describe a novel, culturally informed, multidisciplinary-team model of care for Indigenous patients with cardiac disease in a metropolitan tertiary hospital in Australia. We hypothesised that the implementation of this model of care would improve clinical outcomes for Indigenous patients.

Methods

Model of care

The novel, culturally informed, multidisciplinary-team model of care assessed in this pre-post, quasi-experimental, interventional study was a discrete local programme of care developed directly in response to the Australian National Better Cardiac Care for Aboriginal and Torres Strait Islander People forum, which aims to reduce morbidity and mortality from cardiac conditions

among Indigenous Australians by increasing access to services, better managing risk factors and treatment, and improving coordination of care with annual national reporting on 21 agreed measures.⁵

Aboriginal and Torres Strait Islander community groups and Indigenous community health stakeholders were involved in all aspects of the development and governance of the model of care through a reference group and steering committee, community focus groups, and formal partnerships with community organisations (appendix pp 2–3).

The model of care is a collaborative one that supports Indigenous patients in navigating the health system and transitioning between the acute and community settings. The multidisciplinary team includes clinical nurse consultants (CNCs; VB and SG), an Indigenous Hospital Liaison Officer (IHLO; SR and TK), a medical officer (WYSW and ACTN), a pharmacist, and an administrative officer. Apart from the IHLO, members of the team at the time of implementation did not identify as Aboriginal or Torres Strait Islander, although applications from Indigenous clinicians were encouraged.

All patients admitted under the cardiology and cardiothoracic surgery units at Princess Alexandra Hospital (Brisbane, QLD, Australia) who identify as Aboriginal or Torres Strait Islander are identified via the hospital's administrative database. For these Indigenous patients, in addition to standard care, regular rounding is done by the project CNC, IHLO, and pharmacist. During these rounds, the team provides family and cultural support, advocates, delivers education, and facilitates comprehensive care coordination and discharge planning. The multidisciplinary team use their broad skillset to respond flexibly to patient and family needs, providing a single point of contact for Indigenous patient support. Throughout admission and follow-up, the team support patients to navigate the hospital system, providing information on treatment, facilities, processes, and timeframes. The team employs care-coordination strategies to support the transition between hospital and community care (appendix pp 4–6). To support implementation of the model of care, improvements to hospital access and environment for Indigenous patients were also made (appendix p 7).

Study design

For this pre-post, quasi-experimental, interventional study, cohorts of Indigenous patients before implementation of the model of care were compared with cohorts of Indigenous patients after implementation. Comparisons were also made with non-Indigenous cohorts in the same timeframes. The study was conducted at Princess Alexandra Hospital, a tertiary hospital in metropolitan Brisbane with cardiology and cardiothoracic surgical units servicing the local hospital and health service area and a large referral catchment in southern Queensland. Indigenous patients are

approximately 4·0% of almost 6000 cardiac admissions annually.

The hospital information system was used to retrospectively identify all Aboriginal and Torres Strait Islander patients admitted under the cardiology or cardiac surgery units in the pre-implementation and post-implementation periods who survived to hospital discharge. All index admissions in the 24-month pre-implementation period (Jan 1, 2013, to Dec 31, 2014)—which occurred before the programme began on Oct 1, 2015, after a pre-implementation period that began on Jan 1, 2015—were analysed. All index admissions in the 12-month post-implementation period (Oct 1, 2015, to Sept 30, 2016), when the programme was fully operational and the model of care was being used, were analysed. A longer time period was not chosen for the post-implementation period to avoid confounding by general improvements in acute coronary syndrome (ACS) outcomes or the effects of external programmes on Indigenous health outcomes. Furthermore, in 2017, the hospital began phased implementation of an electronic medical record system, causing disruptions to care and major changes in workflow which could have affected results. For the same pre-implementation and post-implementation timeframes, all cardiac admissions for non-Indigenous patients who survived to hospital discharge were identified. Admissions were excluded if the patient did not survive to hospital discharge.

The reason for admission was defined as ACS if the patient presented with chest pain or equivalent symptoms and coronary artery disease was documented to be the most probable cause at the time of admission. Admission was further classified according to standard definitions²⁰ as an acute myocardial infarction (AMI), including ST-elevation myocardial infarction (STEMI) or non-ST-elevation myocardial infarction (NSTEMI), as applicable. All ACS admissions without troponin elevation were classified as possible angina.

Ethics approval was obtained from the Metro South Health Human Research Ethics Committee. This study involved data collection from pre-existing health service databases. Separate patient consent was not required.

Procedures

For each admission, data on presentation, comorbidities, investigations, and treatment were collected manually from the consolidated clinical information application of Queensland Health (Brisbane, QLD, Australia). Outcome data, including time to first unplanned cardiac readmission, recurrent AMI, and unplanned revascularisation at any Queensland Health hospital during the 12 months after discharge from the index admission, were also collected from this source. An unplanned cardiac readmission was any non-elective admission under the care of a cardiology unit or, at regional facilities without cardiology units, an admission under a medical unit with a cardiac symptom as the

See Online for appendix

	Pre-implementation (24 months)	Post-implementation (12 months)	p value
Aboriginal and Torres Strait Islander patients			
Total number of patients	199	119	..
Sex			
Female	85 (43%)	62 (52%)	0.10
Male	114 (57%)	57 (48%)	0.10
STEMI	38 (19%)	28 (24%)	0.10
NSTEMI	84 (42%)	36 (30%)	0.10
Possible angina	77 (39%)	55 (46%)	0.10
Mean age, years	54 (11-15)	53 (13-44)	0.60
Median age, years	53 (45.00–62.00)	52 (44.50–62.00)	..
Resident in LHSA	83 (42%)	57 (48%)	0.73
Smoker at admission	156 (78%)	92 (77%)	0.82
Hypertension	106 (53%)	79 (66%)	0.022
Dyslipidaemia on treatment	101 (51%)	55 (46%)	0.43
Diabetes	73 (37%)	42 (35%)	0.80
Non-Indigenous patients			
Total number of patients	440	467	..
Sex			
Female	140 (32%)	143 (31%)	0.70
Male	300 (68%)	334 (69%)	0.70
STEMI	83 (19%)	117 (25%)	0.0025
NSTEMI	159 (36%)	122 (26%)	0.0025
Possible angina	198 (45%)	228 (49%)	0.0025
Mean age, years	62 (13-68)	62 (13-05)	0.50
Median age, years	62 (51.75–71.00)	63 (53.00–72.00)	..
Resident in LHSA	307 (70%)	297 (64%)	0.049
Smoker at admission	275 (63%)	310 (66%)	0.22
Hypertension	215 (49%)	267 (57%)	0.012
Dyslipidaemia on treatment	226 (51%)	246 (53%)	0.69
Diabetes	115 (26%)	134 (29%)	0.39

Data are n (%), mean (SD), or median (IQR). LHSA=local health service area. NSTEMI=non-ST-elevation myocardial infarction. STEMI=ST-elevation myocardial infarction.

Table 1: Patient characteristics

primary presenting complaint. An unplanned revascularisation was any percutaneous coronary intervention or coronary artery bypass grafting that was done during the follow-up period but not planned at the time of the index admission. Mortality data were obtained from the Queensland Registry of Births, Deaths, and Marriages. Sex data were self reported to an administrative officer who entered them into the application. Options were “male”, “female” or “indeterminate/intersex/unspecified”. The residential addresses of patients were obtained from the consolidated clinical information application, as recorded at the time of their admission. The local health service area (LHSA) was defined by the government health department Queensland Health on the basis of suburb of residence.

To minimise bias, data were collected by investigators (DLH and GH) who were not involved in the initial project implementation or care of included patients. The

investigators who collected the data were non-Indigenous researchers.

The primary outcome was a composite of death, AMI, unplanned revascularisation, and cardiac readmission at 90 days after index admission, assessed in all patients. The secondary outcome was composite events at 12 months after index admission, assessed in all patients.

Statistical analysis

To establish an appropriate sample size of non-Indigenous patients for inclusion in this study, power analysis with power of 80% and significance of 0.05 was done in Stata version 11.2 on the basis of the hazard ratio (HR) of 0.60, which was obtained from composite endpoint data of the Indigenous group at 90 days (log-rank), and an estimated event-free survival of 0.80 for non-Indigenous patients, which was expected to be higher than the rate of 0.70 observed in Indigenous patients. This analysis yielded a minimum required sample size of 387 non-Indigenous patients with ACS in both timeframes (appendix p 8). Knowing that approximately 35% of all cardiac admissions were for ACS, 1200 different patient admissions were randomly selected from each of the non-Indigenous pre-implementation and post-implementation patient groups, yielding approximately 450 ACS admissions in each cohort (appendix p 9).

Clinical outcomes were analysed at 90 days and 12 months from discharge. Data were analysed with SPSS version 23. Investigations and interventions for AMI and possible angina were considered separately as standards of care and guideline-based medical therapy differ between these two conditions. Kaplan–Meier curves were constructed and compared with the log-rank test via SPSS version 23. χ^2 and Fisher exact tests for independence were used as applicable to test associations between categorical variables. Student's *t* test was used to compare continuous variables.

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

Results

During the 24-month pre-implementation timeframe, 310 Indigenous patients were admitted to the cardiology or cardiothoracic surgery units, with 199 admissions for ACS (85 [43%] were female and 114 [57%] were male). In the 12-month post-implementation period, 193 were admitted to the units, with 119 admissions for ACS (62 [52%] were female and 57 [48%] were male). In the pre-implementation period, 11639 non-Indigenous patients were admitted to the cardiology or cardiothoracic surgery units. Of the 1200 admissions that were randomly selected, 440 were for ACS (140 [32%] were female and 300 [68%] were male). In the post-implementation period, 5934 non-Indigenous patients were admitted to

the unit. Of the 1200 admissions that were randomly selected, 467 were for ACS (143 [31%] were female and 324 [69%] were male).

Between the pre-implementation and post-implementation periods, an increase in the proportion of ACS admissions for STEMI and possible angina were observed, with a decrease in the proportion of admissions for NSTEMI in both the Indigenous and non-Indigenous cohorts. The Indigenous patient cohort had a younger mean age and median age, a higher proportion of female patients, and a higher proportion of residence outside the LHAS than non-Indigenous groups (table 1). However, there were no significant differences in these characteristics between the pre-implementation and post-implementation groups. Indigenous patients had a higher proportion of risk factors, but there was no significant difference in proportions of smoking, dyslipidaemia, or diabetes between the pre-implementation and post-implementation periods for Indigenous and non-Indigenous patients. There were higher proportions of diagnosed hypertension in both Indigenous and non-Indigenous patients in the post-implementation cohorts than in the pre-implementation cohorts. There was no significant change in the mean length of hospital stay in the pre-implementation and post-implementation periods for Indigenous (3.65 days vs 3.82 days; $p=0.73$) or non-Indigenous (3.24 days vs 3.49 days; $p=0.33$) patients.

Before the implementation of the model of care, rates of revascularisation were significantly lower among Indigenous patients presenting with AMI than non-Indigenous patients presenting with AMI (57 [47%] of 122 vs 146 [60%] of 242; $p=0.014$). After the model of care was implemented, there was no significant difference in revascularisation rates (37 [58%] of 64 Indigenous patients vs 160 [67%] of 239 non-Indigenous patients; $p=0.13$). There was no significant change in rates of diagnostic coronary angiography for Indigenous patients (103 [84%] of 122 vs 51 [80%] of 64; $p=0.42$) and non-Indigenous patients (208 [86%] of 242 vs 207 [87%] of 239; $p=0.83$) between the two time periods. There was no significant difference in the prescription of guideline-based medical therapy for patients with AMI on discharge in either of the pre-implementation or post-implementation cohorts (appendix p 10).

Compared with the pre-implementation group, Indigenous patients admitted with ACS after programme implementation had a significant reduction in the primary outcome (67 [34%] of 199 vs 24 [20%] of 119; HR 0.60, 95% CI 0.40–0.90; $p=0.012$; figure 1). The improvement in outcomes was not statistically significant at 12 months (appendix p 11). Improvement in the composite endpoint at 90 days for Indigenous patients was driven by a statistically significant reduction in unplanned cardiac readmission (table 2). All subgroups of Indigenous patients analysed showed an absolute reduction in the composite endpoint at 90 days (appendix p 12).

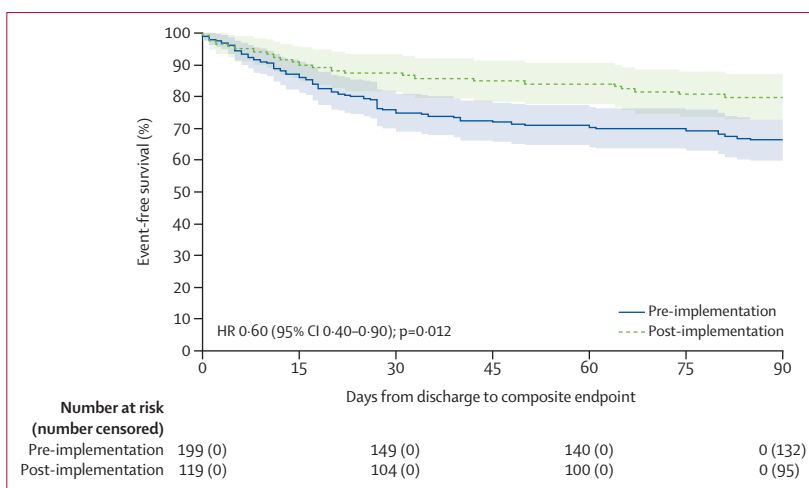


Figure 1: 90-day event-free survival for Indigenous patients admitted with acute coronary syndrome. HR=hazard ratio.

	Pre-implementation (n=199)	Post-implementation (n=119)	Hazard ratio (95% CI)	p value
Death	5 (3%)	2 (2%)	0.67 (0.13–3.39)	0.63
Acute myocardial infarction	12 (6%)	2 (2%)	0.28 (0.06–1.22)	0.069
Unplanned revascularisation	5 (3%)	1 (1%)	0.33 (0.04–2.83)	0.29
Unplanned cardiac readmission	64 (32%)	21 (18%)	0.55 (0.35–0.85)	0.0060
Composite endpoint	67 (34%)	24 (20%)	0.60 (0.40–0.90)	0.012

Data are n (%).

Table 2: 90-day outcomes for Indigenous patients admitted with acute coronary syndrome

In the non-Indigenous patient groups, there was no significant change between the pre-implementation and post-implementation timeframes in the composite endpoint at 90 days (81 [18%] of 440 vs 93 [20%] of 467; HR 1.08, 95% CI 0.83–1.41; $p=0.54$; appendix p 13) or 12 months (136 [31%] of 440 vs 155 [33%] of 467; 1.07, 0.89–1.30; $p=0.46$).

In the pre-implementation period, the composite endpoint at 90 days was significantly higher for Indigenous patients admitted with ACS than for non-Indigenous patients admitted with ACS (67 [34%] of 199 vs 81 [18%] of 440; HR 0.45, 95% CI 0.32–0.64; $p<0.0001$). After implementation of the new model of care, there was no significant difference in outcomes between Indigenous and non-Indigenous patients (24 [20%] of 119 vs 93 [20%] of 467; 0.98, 0.62–1.5; $p=0.92$; figure 2). A similar pattern was observed at 12 months (appendix p 14).

Discussion

The implementation of a culturally informed, multidisciplinary-team model of care for Indigenous patients in a tertiary hospital in Australia was associated with improved clinical outcomes. It was also associated

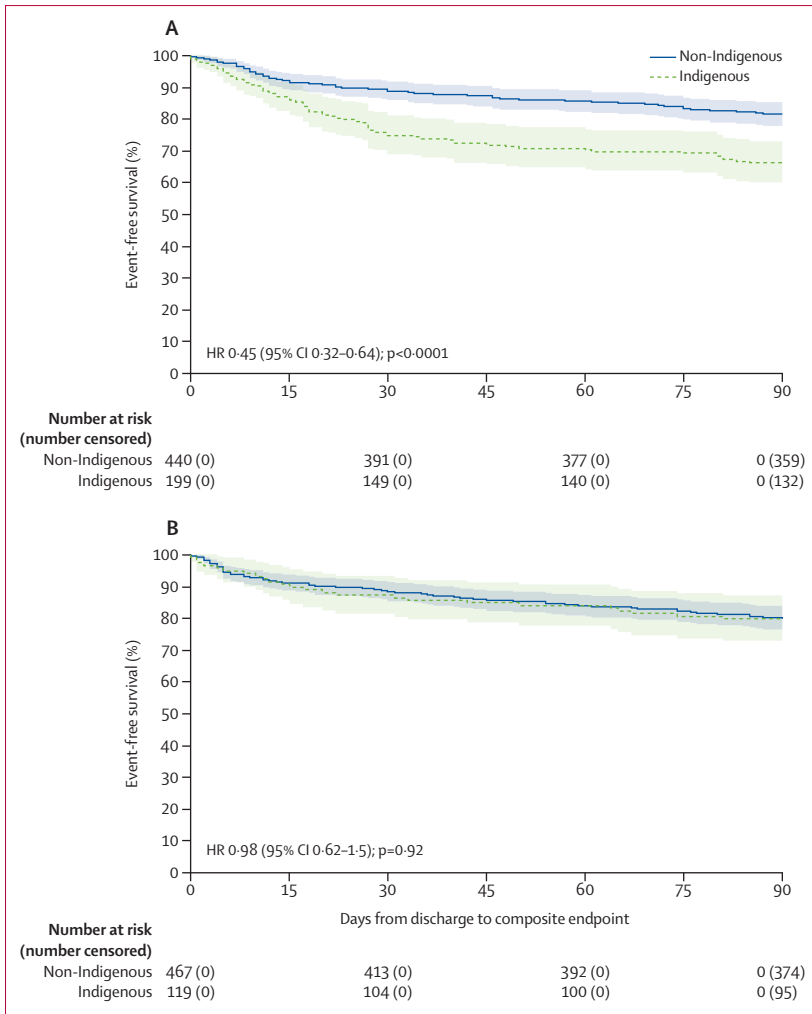


Figure 2: 90-day event-free survival pre-implementation and post-implementation for all groups
 (A) 90-day event-free survival for patients admitted with ACS before new model of care. (B) 90-day event-free survival for patients admitted with ACS after new model of care. ACS=acute coronary syndrome. HR=hazard ratio.

with a reduction in the disparity in incidence of primary endpoints that existed between Indigenous and non-Indigenous patients before implementation.

This finding was driven by a significant reduction in unplanned cardiac readmission among Indigenous patients after the model of care was implemented. Reduced readmissions not only reduce health system costs, but are likely to have socioeconomic benefits for patients, families, and communities by minimising the psychological stress, financial cost, and geographical isolation of recurrent admissions.²¹ Therefore, the endpoint of unplanned cardiac readmission could be considered a marker of quality of care and successful care transition.

Many elements of the model of care might have contributed to its success in improving clinical outcomes. Nurse-led care coordination is associated with improved outcomes in various specialties²² and multidisciplinary care-coordination teams have been

shown to reduce hospital readmissions.²³ In patients with IHD, education has been shown to improve self-management²⁴ and reduce the risk of recurrent cardiovascular events.²⁵ The teach-back method (ie, checking understanding by asking patients to state in their own words health information that has been given to them) is effective in increasing knowledge and retention of health information, reducing hospital readmission, and improving patient satisfaction.²² Indigenous patients have reported less involvement in and understanding of their hospital care than non-Indigenous patients.²¹ Therefore, more personalised, culturally informed education could result in benefits through improved symptom management, positive lifestyle modifications, and adherence with medication and treatment plans. Culturally safe communication between patients and health-care providers might also facilitate more appropriate and effective investigation and management.¹³ An example could be the increased revascularisation rates among Indigenous patients in this study after the model of care was implemented. Medication adherence could also have been improved by the continuous subsidised supply of medications provided as a bridge to the Closing the Gap scheme.²⁶ The model's focus on transitional care and community integration might have led to earlier identification of clinical deterioration.

However, given that the health inequities experienced by Indigenous (vs non-Indigenous) people in Australia cannot be attributed to any single demographic, risk factor, social determinant, or discrimination alone, we believe that the culturally informed, collaborative, multidimensional nature of this model is responsible for its success and that replicating any single aspect of the programme is unlikely to yield similar results.

The model of care was developed under the governance and guidance of local Aboriginal and Torres Strait Islander stakeholders, the steering committee provided feedback throughout implementation, and informal feedback from Aboriginal community health organisations and consumer groups was ongoing. The cultural safety of the care delivered by the multidisciplinary team is guided by the crucial position of the IHLO. However, this study did not evaluate acceptance of the model of care by Indigenous patients in a structured way. We recognise that ensuring the model is culturally safe in practice and improving patient experience are essential. A related qualitative project was done, to evaluate patient experience through patient and family interviews that were conducted by an Indigenous research officer;²⁷ this qualitative study helps to make meaning of the clinical outcomes data presented in this Article through Indigenous discourses of relationality. Nonetheless, there are limitations inherent in the non-Indigenous research paradigm used to conceptualise this study and there was only partial Indigenous governance and sovereignty over the collection and analysis of data.

The quasi-experimental design is a limitation of this study. Without randomisation, conclusions about causality cannot be made. However, randomly assigning Indigenous patients to a control group that would not receive additional, culturally informed support within the same hospital would not be ethical. There were no significant differences in patient demographics or baseline risk factors between the pre-implementation and post-implementation groups that could reasonably account for improved outcomes. Data about socioeconomic status were not available due to the retrospective nature of data collection, and we acknowledge that they would have been useful in this study.

The use of historical control groups also limits conclusions about causality because there was no control for factors that might have changed over time and affected patient outcomes. However, the improved outcomes described for Indigenous patients are unlikely to be explained by general advances in the management of ACS in the Australian health service given that there was no improvement in outcomes for non-Indigenous patients in the same timeframe. Similarly, although severity of the index admission (AMI vs possible angina) increased for Indigenous and non-Indigenous patients, improved outcomes were only seen in the Indigenous cohort. Although no directly comparable data are available, the improvements seen were generally greater than those observed among the broader Australian Indigenous population during the same time period.^{1,5,28} For example, age-standardised rates of preventable hospitalisations increased for Indigenous patients between 2013–14 and 2016–17.¹ A limitation of the non-fatal outcomes data, which were obtained from a centralised source, is that events in patients who relocated outside the state of Queensland or transitioned to care in the private health system might not have been captured.

Our results contribute to the development of an evidence-based approach in the acute hospital setting to improving health outcomes for Indigenous patients with cardiovascular disease in Australia. We showed that a dedicated, culturally informed model of care targeting access, education, and care transition can improve clinical outcomes. Developing and implementing similar models of care in other hospital settings and for other disease presentations is possible, with consideration for local knowledge and care pathways, to improve care for Aboriginal and Torres Strait Islander patients.

Contributors

DLH collected and analysed data and drafted and revised the manuscript. WYSW guided the study framework and analyses, verified the results, and provided substantial input to the manuscript. DLH and WYSW accessed and verified the data. VB was the project lead for the development of the model of care in collaboration with TK, SG, SR, SM, DP, GR, WYSW, and the steering committee. Continuous cultural guidance was provided and led by TK, SR, and DP. All authors had access to all data in the study, provided feedback on the manuscript, and had final responsibility for the decision to submit for publication.

Declaration of interests

We declare no competing interests. TK, SR, and DP are of Aboriginal or Torres Strait Islander heritage.

Data sharing

De-identified participant data will be made available for related research and analysis upon reasonable written request to the corresponding author within 12 months of the date of publication and subject to appropriate ethics approvals. Additional documents are not available.

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References

- 1 Australian Institute of Health and Welfare. Aboriginal and Torres Strait Islander Health Performance Framework—summary report 2020. 2020. <https://www.indigenoushpf.gov.au/getattachment/65fbaaf3-100c-4df5-941c-a8455922693c/2020-summary-ihpf-2.pdf> (accessed July 15, 2022).
- 2 Menzies School of Health Research. Aboriginal and Torres Strait Islander better cardiac care data linkage project. 2021. https://www.health.qld.gov.au/_data/assets/pdf_file/0032/1147991/Better-Cardiac-Care.PDF (accessed Aug 23, 2022).
- 3 Australian Institute of Health and Welfare. Australian Burden of Disease Study: impact and causes of illness and death in Aboriginal and Torres Strait Islander people 2018—summary report. 2022. <https://www.aihw.gov.au/reports/burden-of-disease/illness-death-indigenous-2018-summary/summary> (accessed July 15, 2022).
- 4 Brown A. Addressing cardiovascular inequalities among indigenous Australians. *Glob Cardiol Sci Pract* 2012; **2012**: 2.
- 5 Australian Institute of Health and Welfare. Better cardiac care measures for Aboriginal and Torres Strait Islander people: sixth national report 2021. 2021. <https://www.aihw.gov.au/reports/indigenous-australians/better-cardiac-care-measures-2021/summary> (accessed July 15, 2022).
- 6 Randall DA, Jorm LR, Lujic S, et al. Mortality after admission for acute myocardial infarction in Aboriginal and non-Aboriginal people in New South Wales, Australia: a multilevel data linkage study. *BMC Public Health* 2012; **12**: 281.
- 7 Australian Department of Health. National Aboriginal and Torres Strait Islander health plan 2021–2031. 2021. <https://www.health.gov.au/sites/default/files/documents/2022/06/national-aboriginal-and-torres-strait-islander-health-plan-2021-2031.pdf> (accessed Feb 24, 2023).
- 8 Rolleston A, Brown A. Walking an indigenous pathway: bridging the gap in cardiovascular health. *Heart Lung Circ* 2019; **28**: 823–24.
- 9 McBride KF, Rolleston A. Where are the opportunities to address system barriers preventing equitable cardiovascular outcomes for indigenous populations? *Lancet Glob Health* 2021; **9**: e1191–92.
- 10 Ilton MK, Walsh WF, Brown AD, Tideman PA, Zeitz CJ, Wilson J. A framework for overcoming disparities in management of acute coronary syndromes in the Australian Aboriginal and Torres Strait Islander population. A consensus statement from the National Heart Foundation of Australia. *Med J Aust* 2014; **200**: 639–43.
- 11 National Heart Foundation of Australia. Lighthouse Hospital Project phase 3. 2021. [https://www.heartfoundation.org.au/getmedia/6d186e11-f54c-4c85-9158-d7ac31b4a584/Lighthouse-Project-Report-\(1\).pdf](https://www.heartfoundation.org.au/getmedia/6d186e11-f54c-4c85-9158-d7ac31b4a584/Lighthouse-Project-Report-(1).pdf) (accessed Aug 23, 2022).
- 12 McGee M, Shephard L, Sugito S, et al. Mind the gap, Aboriginal and Torres Strait Islander cardiovascular health: a narrative review. *Heart Lung Circ* 2023; **32**: 136–42.
- 13 Communicate Study group. Improving communication with Aboriginal hospital inpatients: a quasi-experimental interventional study. *Med J Aust* 2020; **213**: 180–81.

- 14 Shaw C. An evidence-based approach to reducing discharge against medical advice amongst Aboriginal and Torres Strait Islander patients. 2016. https://ahha.asn.au/sites/default/files/docs/policy-issue/deeble_institute_issues_brief_no_14_shaw_an_evidence-based_approach_to_reducing_dama_1.pdf (accessed Aug 23, 2022).
- 15 Brown A, O'Shea RL, Mott K, McBride KF, Lawson T, Jennings GL. Essential service standards for equitable national cardiovascular care for Aboriginal and Torres Strait Islander people. *Heart Lung Circ* 2015; **24**: 126–41.
- 16 Australian Institute of Health and Welfare. Australia's Health 2018. 2018. <https://www.aihw.gov.au/reports/australias-health/australias-health-2018/contents/table-of-contents> (accessed Feb 24, 2023).
- 17 Peiris DP, Patel AA, Cass A, et al. Cardiovascular disease risk management for Aboriginal and Torres Strait Islander peoples in primary health care settings: findings from the Kanyini Audit. *Med J Aust* 2009; **191**: 304–09.
- 18 Randall DA, Jorm LR, Lujic S, O'Loughlin AJ, Eades SJ, Leyland AH. Disparities in revascularization rates after acute myocardial infarction between Aboriginal and non-Aboriginal people in Australia. *Circulation* 2013; **127**: 811–19.
- 19 Calabria B, Korda RJ, Lovett RW, et al. Absolute cardiovascular disease risk and lipid-lowering therapy among Aboriginal and Torres Strait Islander Australians. *Med J Aust* 2018; **209**: 35–41.
- 20 Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction (2018). *Circulation* 2018; **138**: e618–51.
- 21 Sutherland K, Hindmarsh D, Moran K, Levesque JF. Disparities in experiences and outcomes of hospital care between Aboriginal and non-Aboriginal patients in New South Wales. *Med J Aust* 2017; **207**: 17–18.
- 22 Conway A, O'Donnell C, Yates P. The effectiveness of the nurse care coordinator role on patient-reported and health service outcomes: a systematic review. *Eval Health Prof* 2019; **42**: 263–96.
- 23 Jack B, Chetty V, Anthony D, et al. A reengineered hospital discharge program to decrease hospitalization. *Ann Intern Med* 2009; **150**: 178–87.
- 24 Barnason S, White-Williams C, Rossi LP, et al. Evidence for therapeutic patient education interventions to promote cardiovascular patient self-management: a scientific statement for healthcare professionals from the American Heart Association. *Circ Cardiovasc Qual Outcomes* 2017; **10**: e000025.
- 25 Anderson L, Brown JPR, Clark AM, et al. Patient education in the management of coronary heart disease. *Cochrane Database Syst Rev* 2017; **6**: CD008895.
- 26 Mitchell S, Michael H, Highden-Smith S, et al. Culturally safe and sustainable solution for closing the gap—registered patients discharging from a tertiary public hospital. *Aust Health Rev* 2020; **44**: 200–04.
- 27 Jennings W, Egert S, Fisher C, et al. Better cardiac care—the patient experience—a qualitative study. *Int J Equity Health* 2023; **22**: 122.
- 28 Dawson LP, Burchill L, O'Brien J, et al. Differences in outcome of percutaneous coronary intervention between Indigenous and non-Indigenous people in Victoria, Australia: a multicentre, prospective, observational, cohort study. *Lancet Glob Health* 2021; **9**: e1296–304.