BMC Health Services Research

RESEARCH

Open Access

Evaluation of the research capacity and culture within the allied health workforce in Northern New South Wales Local Health District: a cross-sectional observational study

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Abstract

Background Health professionals working in health services are uniquely placed to carry out research to improve health service provision. Improving research capacity and culture in health organisations benefits patients, health professionals, health services and society more broadly. This cross-sectional observational study aimed to evaluate the current research capacity and culture within the Allied Health workforce in the publicly funded, non-metropolitan Northern New South Wales (NNSW) Local Health District (LHD). Additionally, the study aimed to explore whether Allied Health staff have undertaken research with Aboriginal and Torres Strait Islander Peoples, and if so, whether the research was conducted in a culturally safe and responsive way.

Methods The validated Research Capacity and Culture tool was administered to the Allied Health workforce in NNSWLHD to evaluate the research capacity and culture, within and across three domains (Organisation, Team and Individual), including research involvement, perceived barriers and motivators for undertaking research, and participants' experience in conducting research with Aboriginal and Torres Strait Islander Peoples. Quantitative data were analysed descriptively, and median responses between domains were compared. Qualitative data were obtained through two open-ended questions and thematically analysed.

Results A total of 147 Allied Health professionals from 15 disciplines completed the survey. Participants reported low-to-moderate levels of skills and success across all three domains. Most participants were not currently involved in research. Motivators for undertaking research included encouragement by managers, research mentoring, and a problem identified that needs changing, whilst barriers were lack of time, other work roles take priority, lack of suitable backfill, and staff shortages. Few participants reported having ever contributed to a research project involving Aboriginal and Torres Strait Islander Peoples.

Conclusions Research capacity building strategies within Allied Health in NNSWLHD should utilise a "whole of system" approach, including research career pathways, funding, backfill, mentoring, opportunities to upskill in research writing and develop skills to conduct research in a culturally safe and responsive way. Supporting Aboriginal

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and Torres Strait Islander clinicians to build research capacity can shape the health research agenda, inform health policies, support evidence-led clinical care, and in turn, the well-being of Aboriginal and Torres Strait Islander People.

Keywords Health service research, Aboriginal health research, Clinician research, Allied health research, Organisation culture, Research capacity, Research culture

Background

There is a growing interest in strategies to enhance health professionals research capacity globally [1–4]. The Strategic Review of Health and Medical Research published in Australia in 2013 recommended that research is embedded into the health system and that there should be a focus on training, supporting, and retaining a high-quality research workforce to drive continuous improvement [5]. More recently, the Australian Academy of Health and Medical Sciences extended this concept, stating that research and innovation are core functions in transforming health systems. A key pillar of realising this is a research-capable and enabled workforce, which emphasizes the critical importance of research capacity building [6, 7]. Research capacity building is defined as "*a process of individual and institutional development which leads to higher levels of skills and greater ability to perform useful research*" [8], or "*a process of developing sustainable abilities and skills enabling individuals and organisations to perform high quality research*" [9].

Health professionals working in health services are uniquely placed to carry out research to improve health service provision often resulting in benefits for patients, clinicians, healthcare organisations and society [5, 10]. Furthermore, a systematic review published in 2016 found that higher levels of research activity in healthcare organisations were positively associated with increased organisational efficiency, improved staff satisfaction, reduced staff turnover, improved patient satisfaction, and decreased patient mortality rates [11]. Despite the evidence for the various benefits of research engagement and Allied Health professionals reporting that they are motivated and interested in conducting research [12–15], research engagement and culture remain limited within the workforce due to various barriers [4]. Barriers include heavy clinical and administrative workloads, lack of time and suitable backfill, staff turn-over and low staffing levels, lack of organisational infrastructure and funding, lack of own research skills and knowledge, low support from managers and colleagues, and the impact that engaging in research could have on work-life balance [16–19]. A number of these barriers were further exacerbated by the COVID-19 pandemic [20].

To build research capacity and support a positive research culture and the uptake of evidence into clinical practice, there is a need to measure the research capacity and culture across three levels: the Organisation,Team and Individual [9]. The Research Capacity and Culture (RCC) tool was specifically developed for this purpose and has been validated in an Australian healthcare context with data from Allied Health professionals, demonstrating strong internal consistency and high test-retest reliability [9]. Several studies have used the RCC tool to evaluate the research capacity and culture of Allied Health professionals in Australia [9, 16, 17, 21–28].

Allied Health professionals are university educated and should use research and evidence-based guidelines to inform their clinical practice and decision making [29]. Allied Health professionals develop basic research skills during their academic training; however, it is unclear how these skills are fostered once they are in the workforce [30]. Several studies have explored and compared the perceptions of research capacity and culture in metropolitan and non-metropolitan areas in New South Wales (NSW), Queensland and Victoria [24, 27, 31]. Results indicated that participants from metropolitan locations had significantly higher perceptions of research capacity and culture across all three domains when compared with non-metropolitan settings [31]. Research skills are vital in non-metropolitan areas to develop and test innovative solutions directly relevant to the local context, with the aim of addressing the disparity of health behaviours and outcomes between metropolitan and non-metropolitan areas [32]. In Northern NSW Local Health District (NNSWLHD), the commencement of the first Conjoint Allied Health Academic Researcher in early 2023, offered a unique and timely opportunity to evaluate the current research capacity and culture within Allied Health in this regional health service.

According to the 2021 population census, 3.2% of Australia's population and 3.4% of the NSW population identify as Aboriginal and/or Torres Strait Islander [33]. NNSWLHD has a higher proportion of people who identify as Aboriginal and/or Torres Strait Islander (5.2%) [33]. *Empowering Aboriginal health together* is one of the five key strategic priorities for NNSWLHD. Health systems and models of care in Australia have been designed for the dominant society and were not contextualised for Aboriginal and Torres Strait Islander Peoples [34]. Aboriginal and Torres Strait Islander leadership, community and individual empowerment are a priority for ensuring there is culturally relevant development, implementation and evaluation of health system structures and service delivery [34]. Cultural safety and responsiveness are vital in delivering health services to people from all backgrounds and are essential in the context of

the unacceptably poor health outcomes experienced by Aboriginal and Torres Strait Islander Peoples [35].

Aboriginal and Torres Strait Islander Peoples are the most researched peoples in the world with their health, wellbeing and experiences being a research focus in various settings [36, 37]. Despite this, Aboriginal and Torres Strait Islander Peoples and communities have received very little perceived benefit [36]. Research "on" Aboriginal and Torres Strait Islander Peoples has a chequered history, with research being poorly designed, non-collaborative, and based on cultural and social engineering theories, such as eugenics and social Darwinism, or coming from a place of paternalism [38–41]. The ongoing concerns regarding First Nations populations being over-researched without receiving tangible health benefits has led to the development of national documents guiding research with Aboriginal and Torres Strait Islander Peoples, which highlight that researchers must work in partnership with communities to develop research based on community needs and expectations [36, 37, 42, 43].

Research with Aboriginal and Torres Strait Islander Peoples should be conducted in accordance with the National Health and Medical Research Council (NHMRC) '*Ethical conduct in research with Aboriginal and Torres Strait Islander Peoples and communities: guidelines for researchers and stakeholders*' (2018). According to the Guidelines, "*ethical research with Aboriginal and Torres Strait Islander Peoples and communities should improve the way all researchers work with Aboriginal and Torres Strait Islander Peoples and communities, develop and/ or strengthen research capabilities of Aboriginal and Torres Strait Islander Peoples and their communities, and enhance the rights of Aboriginal and Torres Strait Islander Peoples as researchers, research partners, collaborators and participants in research*" (Pg 1). The guidelines define six core values: spirit and integrity, cultural continuity, equity, reciprocity, respect, and responsibility for conducting research with Aboriginal and Torres Strait Islander Peoples and communities [37]. Despite almost five decades of advocacy to improve research practices including the development of the national guidelines, there has been limited improvement, with Aboriginal and Torres Strait Islander communities continuing to have negative experiences of research [44]. The Lowitja Institute, an Aboriginal and Torres Strait Islander community-controlled research institute was established in 2010, becoming the national leader in Aboriginal and Torres Strait Islander research [45]. Community-controlled organisations and institutes support and oversee responsive research practices, uphold ethical principles, and privilege the implementation of high quality, ethical research to improve the lives of Aboriginal and Torres Strait Islander People, promoting a more inclusive and collaborative research landscape [46, 47].

Methods

The aims of this study were to evaluate the current research capacity and culture within the Allied Health workforce in the NNSWLHD, and to explore whether Allied Health staff have undertaken research with Aboriginal and Torres Strait Islander Peoples, and if so, was the research conducted in a culturally safe and responsive way. This study was designed as a cross-sectional observational study. Ethical approval was obtained from the North Coast NSW Human Research Ethics Committee (HREC): reference 2023/ETH01030.

NNSWLHD is a publicly funded, non-metropolitan LHD located in northeastern NSW, Australia, which includes 12 hospitals and multi-purpose services, and 21 community health centres and other facilities. NNSWLHD covers an area of 20,732 square kilometres and an estimated population of 311,177 people according to the 2021 census [33]. There is no one definition of Allied Health, however, in Australia, Allied Health professionals are considered health professionals who are not nurses, midwives, doctors or dentists [48]. The Allied Health workforce in NSW Health falls within the scope of responsibilities of the Allied Health portfolio of the Workforce Planning and Development Branch [49].

The Allied Health workforce within NSW Health is a diverse group, encompassing 23 distinct professions. As of 31 March 2023, data from the NNSWLHD Workforce Directorate showed that the Allied Health workforce included 880 staff: 161 casual employees or contractors, 416 part-time employees, and 303 full-time employees. Of the 23 Allied Health professions recognised by NSW Health, only 15 were identified by the NNSWLHD Workforce Directorate. The recruitment method and survey were developed to specifically seek responses from all Allied Health professionals and Allied Health Assistants employed by NNSWLHD. Allied Health professionals working in non-Allied Health roles (e.g., management roles, health promotion roles) were also invited to participate in the study. Students, professionals who were not registered Allied Health professionals, Allied Health professionals who are not current employees of NNSWLHD, and non-Allied Health professionals, including medical and nursing staff, were excluded.

Survey tool

A survey consisting of the validated RCC tool was administered via the Research Electronic Data capture (REDCap) application hosted at NNSWLHD; a secure, web-based platform designed to support data capture for research studies [50]. The survey tool included 12

demographic questions, 55 questions on the research capacity and culture across three domains: Organisation (20 questions), Team (20 questions) and Individual (15 questions), three questions about research involvement, and 18 questions each about the perceived barriers and motivators for undertaking research [9]. Most questions used a 10-point Likert scale format where 1 is the lowest possible level of skill or success, and 10 is the highest possible level of skill of success, with an additional option of 'unsure'. One free text box was added for participants to include any additional comments they had regarding research in NNSWLHD. Finally, participants' experience in conducting research with Aboriginal and Torres Strait Islander Peoples, and the cultural safety and responsiveness of this research, was explored via four multiple choice questions and one open ended question developed by an Aboriginal researcher and member of the research team (KLM) informed by *Murru Minya*, a recent large-scale national study which examined the implementation of ethical processes in Aboriginal and Torres Strait Islander health research [51]. Prior to conducting the survey, support to include these questions was obtained from the Aboriginal Health Leadership team within the NNSWLHD. The survey tool is provided in Supplemental File 1.

Procedures

The survey was made available for seven weeks from 24 July 2023. It took ~ 15 to 20 min to complete and was widely promoted across the Allied Health professions using dedicated, staged communication strategies, including two emails to Allied Health managers at various levels across the LHD, two all staff email broadcasts, an article in the NNSWLHD magazine, an advertisement through the NNSWLHD intranet, and a screensaver on NNSWLHD computers. Additionally, an incentive, in the form of a prize-draw of one $300 gift voucher to Frankie4 Shoes, Bared Footwear or Birkenstock Australia (winner's choice), was used to promote participation in the survey under the auspices of a Free Lottery in full compliance with NSW Fair Trading requirements (https://www.fairtrading.nsw.gov.au/community-gaming/lotteries).

Upon accessing the survey, potential participants were invited to read an electronic participant information sheet (preamble) and to provide voluntary informed consent to participate by ticking 'agree' on a consent question, and completing the survey (i.e., submission of a survey implied consent). Allied Health staff were reassured that participation or non-participation in the study had no effect on their relationships or standing within NNSWLHD. Participants responses were confidential, with any potentially identifiable information such as email addresses provided for the prize-draw or to receive a summary of results, stored separately from survey responses and accessed only by the principal investigator.

Quantitative data analysis

Consistent with previous studies, scores for the research skill or success questions across the three domains (Individual, Team, and Organisation), which used a 1 to 10 rating scale, were further categorised as "low" (< 4), "moderate" (≥ 4 and < 7), or "high" (≥ 7) [17, 21]. Data were analysed descriptively by calculating the median and interquartile range (IQR) for each Likert-scale item. The number of responses (N), and their percentage (%) of total, by category for each transformed (categorised) Likert-scale variable by domain were also calculated. A Skillings-Mack test was performed to compare median responses between domains with post-hoc Wilcoxon signed-rank tests used to determine which domains were significantly different from each other following a significant omnibus test [19, 52, 53]. To support this analysis, the mean score and 95% confidence interval (CI) for each domain were calculated and represent the average of the mean scores across the items of each domain (i.e. the mean scores across the items of each domain for each respondent were calculated and the average of these means across all respondents represents the reported mean score).

Questions about research involvement were analysed descriptively as total number of responses (N), and their percentage (%) of total, for each response level. Questions on the perceived barriers to and motivators for research, which were also measured on a Likert-scale ranging from 1 to 10, were analysed descriptively by calculating the median and interquartile range and as number of responses (N), and the percentage (%) of total, when categorised "low" (< 4), "moderate" (≥ 4 and < 7), or "high" (≥ 7).

Qualitative data analysis

In the spirit of self-reflexivity and embracing the importance of relationality, qualitative data analysis was completed by KLM, a proud Ngadjuri woman with ancestral connections to Bundjalung Nation and Peramangk Country and the Director of the Aboriginal and Torres Strait Islander Initiative at the Burnet Institute; and KM, a non-Indigenous researcher and Allied Health professional, working as the Conjoint Allied Health Academic Researcher between NNSWLHD and Bond University.

Two authors (KLM & KM) completed an initial thematic analysis including independent analysis followed by discussions until agreement was reached on preliminary themes using an inductive approach which directly draws codes, categories, or themes from the data [54]. From this analysis, key themes emerged, and representative quotes were identified to illustrate and exemplify

the themes described. Members of the research team met to discuss and triangulate the themes to verify their trustworthiness, accuracy, and consistency [55, 56]. The interpretation of findings was informed by the authors expertise, experiences, cultural lens, and familiarity with the study site. The authors recognise the importance of stating our positionality to counter scholarly practices that often ignore place, belonging and identity, including the associated power relations [57].

Results

A total of 197 Allied Health professionals accessed the survey during the data collection period. Of them, one did not consent to participate, 12 did not meet the inclusion criteria, 17 provided consent but did not answer any questions, 20 only answered the demographic questions, and 129 completed the entire survey. In total, data from 147 were available for analysis, which represents 17% of the estimated total Allied Health workforce within NNSWLHD.

As shown in Table 1, occupational therapists ($n = 37$; 25.2%), physiotherapists ($n = 27$; 18.4%), social workers ($n = 19$; 12.9%), and speech pathologists ($n = 16$; 10.9%) accounted for the majority of participants. Most participants were female ($n = 116$; 78.9%), aged 35–44 years ($n = 49$; 33.3%) or 45–54 years ($n = 38$; 25.9%), and did not identify as Aboriginal and/or Torres Strait Islander ($n = 140$; 95.2%). Most participants had completed a Bachelor degree ($n = 49$; 33.3%), with 37.4% also having completed a coursework Masters ($n = 41$; 27.9%), research Masters ($n = 9$; 6.1%) or Doctoral degree ($n = 5$; 3.4%). Almost 11% of participants ($n = 16$) reported being currently enrolled in higher degree study (HDR) or research professional development, primarily in Doctoral or Masters degrees ($n = 11$). Participants had a range of experience levels, with over 60% having worked in their Allied Health profession for 10 years to less than 20 years ($n = 39$; 26.5%) or more than 20 years ($n = 56$; 38.1%).

As shown in Table 2, most participants were currently working in clinical roles ($n = 118$; 80.3%) in hospital-based adult or paediatric ($n = 78$; 39.8%) or community-based adult physical ($n = 63$; 32.1%) service areas. Respondents were mainly in full-time permanent ($n = 67$; 45.6%) or part-time permanent ($n = 55$; 37.4%) positions and most were on a current pay increment of $87,493 to $113,342 ($n = 76$; 51.7%). Finally, most participants had been employed in NNSWLHD for two years to less than five years ($n = 35$; 23.8%) or 10 years to less than 20 years ($n = 35$; 23.8%).

For the research skill or success questions, on average, participants reported low-to-moderate levels across all three domains, with the highest scores in the Organisation domain and the lowest scores in the Team domain. None of the items in the Organisation, Team or Individual domains were evaluated as being of high success or skill level. The Skillings-Mack omnibus test indicated significant differences in median scores between domains ($P = 0.015$). Pairwise post-hoc Wilcoxon Signed-Rank tests demonstrated that median scores were significantly higher in both Individual ($P = 0.001$) and Organisation ($P = 0.015$) domains compared to the Team domain. Median scores were not significantly different between Individual and Organisation domains ($P = 0.134$).

As shown in Table 3, participants perceived NNSWLHD's research strengths to include providing access to literature searching and article retrieval, promoting clinical practice based on evidence, and requiring ethics approval for research activities. Contrastingly, the lowest rated items in the Organisation domain included ensuring staff career pathways are available in research, providing funds, equipment, or administrative support for research, providing software programs for analysing research data, and having mechanisms to monitor research quality.

As illustrated in Table 4, the two most highly rated items in the Team domain were being provided opportunities to get involved in research and having applied for external funding for research. Almost half of the items (9/20; 45%) were assessed as 'low' in the Team domain including supporting the peer-reviewed publication of research, having team leaders that support research, providing funds, equipment, or administrative support for research, supporting a multi-disciplinary approach to research, providing software to support research activities, supporting staff research training, doing team level planning for research development, having consumer involvement in research activities or planning, and supporting applications for research scholarships or degrees.

As shown in Table 5, participants considered themselves as individuals to have the highest skill or success levels in finding relevant literature, critically reviewing the literature, integrating research findings into practice, and collecting data such as surveys or interviews. In contrast, they considered themselves to be least skilled at securing research funding, submitting an ethics application, writing for publication in peer-reviewed journals, providing advice to less experienced researchers, and writing a research protocol.

Few respondents ($n = 15$; 10.2%) considered research activities to be part of their role description, with the bulk of this group ($n = 11$), however, identifying that no specific provisions were made for them to conduct research. Of those that did note specific provisions, these were restricted to access to software, research supervision/mentoring, dedicated time for research, access to research funds, training, and library access. Most participants ($n = 80$; 54.5%) reported that they were not currently involved in research and a further 16 participants

Table 1 Demographics of participants ($n = 147$)

Characteristic	Response	*N* (%)
Allied health profession	Allied health assistant	6 (4.1)
	Counsellor	1 (0.7)
	Dietitian or nutritionist	11 (7.5)
	Diversional therapist	1 (0.7)
	Exercise physiologist	4 (2.7)
	Occupational therapist	37 (25.2)
	Pharmacist	5 (3.4)
	Physiotherapist	27 (18.4)
	Podiatrist	1 (0.7)
	Psychologist	5 (3.4)
	Radiation therapist	1 (0.7)
	Radiographer	8 (5.4)
	Social worker	19 (12.9)
	Sonographer	2 (1.4)
	Speech pathologist	1 (10.9)
	Other	3 (2.0)
Gender	Male or man	30 (20.4)
	Female or woman	116 (78.9)
	Prefer not to say	1 (0.7)
Age	18–24 years	3 (2.0)
	25–34 years	31 (21.1)
	35–44 years	49 (33.3)
	45–54 years	38 (25.9)
	55–64 years	24 (16.3)
	65–74 years	2 (1.4)
Aboriginal and Torres Strait Islander origin	No	140 (95.2)
	Yes, Aboriginal	4 (2.7)
	Yes, Torres Strait Islander	0 (0.0)
	Yes, both Aboriginal and Torres Strait Islander	1 (0.7)
	Prefer not to disclose	2 (1.4)
Education	Certificate I-IV	6 (4.1)
	Diploma, Advanced diploma, Associate degree	3 (2.0)
	Bachelor degree	49 (33.3)
	Bachelor degree (honours), Graduate diploma or certificate	34 (23.1)
	Masters degree (coursework)	41 (27.9)
	Masters degree (research)	9 (6.1)
	Doctoral degree	5 (3.4)
Current enrolment in higher degree study or research professional development	Yes	16 (10.9)
	No	131 (89.1)
Years working in Allied Health profession	Less than 1 year	5 (3.4)
	1 year to less than 2 years	7 (4.8)
	2 years to less than 5 years	19 (12.9)
	5 years to less than 10 years	21 (14.3)
	10 years to less than 20 years	39 (26.5)
	More than 20 years	56 (38.1)

(10.9%) reported they had not completed a research activity in the past 12 months. Of the remaining participants, the most common research activities they were involved in over the past 12 months were collecting data using surveys or interviews ($n = 28$; 19%), writing a research report, presentation, or paper for publication ($n = 15$; 10.2%), co-authoring a paper for publication ($n = 12$; 8.2%), analysing qualitative research data ($n = 11$, 7.5%), submitting an ethics or quality activity application ($n = 10$, 6.8%), or analysing quantitative research data ($n = 10$, 6.8%). Further information is provided in Supplemental Table 1.

As illustrated in Table 6, the three individual motivators commonly reported as being most important for

Table 2 Participant employment characteristics ($n = 147$)

Characteristic	Response	*N* (%)
Current service area ($n = 195$)	Hospital-based adult or paediatric	78 (39.8)
	Hospital-based mental health	8 (4.1)
	Community-based adult physical	63 (32.1)
	Community-based paediatric	23 (11.7)
	Community-based mental health	16 (8.2)
	Other	8 (4.1)
Years employed in NNSWLHD	Less than 1 year	18 (12.2)
	1 year to less than 2 years	12 (8.2)
	2 years to less than 5 years	35 (23.8)
	5 years to less than 10 years	29 (19.7)
	10 years to less than 20 years	35 (23.8)
	More than 20 years	18 (12.2)
Current employment status	Full-time permanent	67 (45.6)
	Full-time temporary	9 (6.1)
	Part-time permanent	55 (37.4)
	Part-time temporary	11 (7.5)
	Casual	5 (3.4)
Current role or position	Clinical position	118 (80.3)
	Project role	7 (4.8)
	Management	17 (11.6)
	Other	5 (3.4)
Current pay increment	$87,492 and below	33 (22.4)
	$87,493 - $113,342	76 (51.7)
	$113,343- $151,608	35 (23.8)
	$151,609 and above	3 (2.0)

undertaking research were research being encouraged by managers, mentors available to supervise, and a problem identified that needs changing. Participants evaluated all motivators (18/18; 100%) as being of high importance. The four commonly reported individual barriers to undertaking research included lack of time for doing research, other work roles take priority, lack of suitable backfill, and staff shortages (see Table 7). Of the 18 barriers, participants assessed 13 (72%) as being of high importance, with the remaining barriers assessed as being of moderate importance.

A small number of participants ($n = 22/147$; 15%) provided additional comments regarding research in NNSWLHD in a free text box. Inductive coding of responses led to the development of five key themes: (1) competing priorities, (2) research capacity, (3) support (4) interest in building research capacity, and (5) desire for discipline specific information (Table 8).

Within the first theme, competing priorities, participants described the high workloads, the requirement to prioritise their clinical work, staff shortages, and lack of backfill as barriers to engaging in research. The theme of research capacity encompassed participants perceived lack of research capacity or understanding of how to progress from working in a clinical role to undertaking research. One participant mentioned that they felt that research was advertised and promoted to staff who already had research capacity and skills. Within the

Table 3 Organisation domain results of the RCC tool ($n = 147$)

Item	Median (IQR)	Distribution of responses *N* (%)			*N* (%) unsure
		Low	Moderate	High	
Supports staff research training	5 (4)	40 (31.7)	68 (54.0)	18 (14.3)	21 (14.3)
Provides funds, equipment, or administrative support for research	3 (3)	67 (57.3)	44 (37.6)	6 (5.1)	30 (20.4)
Has a plan or policy for research development	4 (4)	49 (44.1)	48 (43.2)	14 (12.6)	36 (24.5)
Provides access to literature search and article retrieval	7 (5)	24 (17.9)	49 (36.6)	61 (45.5)	13 (8.8)
Has senior managers who support research	5 (4)	35 (28.0)	61 (48.8)	29 (23.2)	22 (15.0)
Ensures staff career pathways are available in research	3 (3)	73 (60.3)	40 (33.1)	8 (6.6)	26 (17.7)
Ensures organisation planning is guided by evidence	5 (5)	40 (30.1)	59 (44.4)	34 (25.6)	14 (9.5)
Has consumers involved in research	4 (3)	53 (45.3)	52 (44.4)	12 (10.3)	30 (20.4)
Accesses external funding for research	4 (3)	43 (41.0)	53 (50.5)	9 (8.6)	42 (28.6)
Promotes clinical practice based on evidence	7 (3)	19 (13.5)	70 (49.6)	52 (36.9)	6 (4.1)
Encourages research activities relevant to practice	5 (5)	50 (39.4)	57 (44.9)	20 (15.7)	20 (13.6)
Provides software programs for analysing research data	3 (3)	67 (60.4)	33 (29.7)	11 (9.9)	36 (24.5)
Has mechanisms to monitor research quality	3 (3)	52 (50.5)	42 (40.8)	9 (8.7)	44 (29.9)
Provides experts accessible for research advice	5 (3)	43 (36.8)	54 (46.2)	20 (17.1)	30 (20.4)
Supports a multi-disciplinary approach to research	4 (4)	52 (41.9)	56 (45.2)	16 (12.9)	23 (15.6)
Has regular forums or bulletins to present research findings	4 (4)	54 (42.9)	50 (39.7)	22 (17.5)	21 (14.3)
Engages external partners (e.g., universities) in research	5 (3)	38 (30.6)	65 (52.4)	21 (16.9)	23 (15.6)
Supports applications for research scholarships or degrees	5 (4)	47 (40.5)	56 (48.3)	13 (11.2)	31 (21.1)
Supports the peer-reviewed publication of research	4 (4)	45 (39.1)	51 (44.3)	19 (16.5)	32 (21.8)
Requires ethics approval for research activities	7 (4)	22 (19.0)	45 (38.8)	49 (42.2)	31 (21.1)
Mean score (95% CI)	4.5 (4.1–4.9)	-	-	-	-

Note: Median scores of ≥ 7 = high skill/ success, ≥ 4 to < 7 = moderate skill/ success, < 4 = low skill/success

Table 4 Team domain results of the RCC tool ($n = 147$)

Item	Median (IQR)	Distribution of responses *N* (%)			*N* (%) unsure
		Low	Moderate	High	
Supports staff research training	3 (4)	65 (57.0)	37 (32.5)	12 (10.5)	33 (22.4)
Provides funds, equipment, or administrative support for research	3 (4)	66 (57.9)	40 (35.1)	8 (7.0)	33 (22.4)
Does team level planning for research development	3 (4)	61 (51.7)	42 (35.6)	15 (12.7)	29 (19.7)
Ensures staff involvement in developing that plan	4 (5)	50 (42.0)	47 (39.5)	22 (18.5)	28 (19.0)
Has team leaders that support research	3 (4)	67 (55.4)	37 (30.6)	17 (14.0)	26 (17.7)
Provides opportunities to get involved in research	6 (3)	27 (22.0)	66 (53.7)	30 (24.4)	24 (16.3)
Does planning that is guided by evidence	4 (4)	56 (48.7)	44 (38.3)	15 (13.0)	32 (21.8)
Has consumer involvement in research activities or planning	3 (4)	57 (54.8)	38 (36.5)	9 (8.7)	43 (29.3)
Has applied for external funding for research	5 (6)	36 (30.3)	35 (29.4)	48 (40.3)	28 (19.0)
Provides access to literature searching and article retrieval	4 (4)	48 (41.7)	43 (37.4)	24 (20.9)	32 (21.8)
Conducts research activities relevant to practice	4 (5)	44 (41.5)	39 (36.8)	23 (21.7)	41 (27.9)
Supports applications for research scholarships or degrees	3 (4)	55 (51.9)	41 (38.7)	10 (9.4)	41 (27.9)
Has mechanisms to monitor research quality	4 (4)	53 (47.7)	40 (36.0)	18 (16.2)	36 (24.5)
Provides experts accessible for research advice	4 (4)	51 (45.5)	45 (40.2)	16 (14.3)	35 (23.8)
Disseminates research results at research forums or seminars	4 (4)	53 (46.9)	42 (37.2)	18 (15.9)	34 (23.1)
Supports a multi-disciplinary approach to research	3 (4)	66 (57.4)	37 (32.2)	12 (10.4)	32 (21.8)
Has incentives and support for mentoring activities	4 (4)	54 (48.2)	41 (36.6)	17 (15.2)	35 (23.8)
Has external partners (e.g., universities) engaged in research	4 (4)	49 (45.4)	43 (39.8)	16 (14.8)	39 (26.5)
Supports the peer-reviewed publication of research	2 (4)	66 (62.9)	32 (30.5)	7 (6.7)	42 (28.6)
Provides software to support research activities	3 (4)	65 (57.0)	37 (32.5)	12 (10.5)	33 (22.4)
Mean score (95% CI)	3.9 (3.4–4.3)				

Note: Median scores of ≥ 7 = high skill/ success, ≥ 4 to < 7 = moderate skill/ success, < 4 = low skill/success

Table 5 Individual domain results of the RCC tool ($n = 147$)

Item	Median (IQR)	Distribution of responses *N* (%)			*N* (%) unsure
		Low	Moderate	High	
Finding relevant literature	7 (2)	6 (4.9)	57 (46.3)	60 (48.8)	24 (16.3)
Critically reviewing the literature	7 (3)	15 (12.1)	68 (54.8)	41 (33.1)	23 (15.6)
Using a computer referencing system, such as EndNote	5 (6)	48 (39.0)	43 (35.0)	32 (26.0)	24 (16.3)
Writing a research protocol	3 (4)	62 (51.2)	43 (35.5)	16 (13.2)	26 (17.7)
Securing research funding	2 (4)	78 (64.5)	38 (31.4)	5 (4.1)	26 (17.7)
Submitting an ethics application	3 (4)	74 (61.2)	39 (32.2)	8 (6.6)	26 (17.7)
Designing questionnaires	5 (4)	46 (37.4)	59 (48.0)	18 (14.6)	24 (16.3)
Collecting data, such as surveys, interviews	6 (4)	32 (26.4)	64 (52.9)	25 (20.7)	26 (17.7)
Using computer data management systems	4 (4)	53 (43.4)	51 (41.8)	18 (14.8)	25 (17.0)
Analysing qualitative research data	4 (4)	51 (42.5)	52 (43.3)	17 (14.2)	27 (18.4)
Analysing quantitative research data	5 (4)	53 (43.4)	55 (45.1)	14 (11.5)	25 (17.0)
Writing a research report	5 (5)	55 (45.5)	46 (38.0)	20 (16.5)	26 (17.7)
Writing for publication in peer-reviewed journals	3 (5)	69 (56.6)	40 (32.8)	13 (10.7)	25 (17.0)
Integrating research findings into practice	6 (6)	34 (27.9)	56 (45.9)	32 (26.2)	25 (17.0)
Providing advice to less experienced researchers	3 (5)	69 (56.6)	40 (32.8)	13 (10.7)	25 (17.0)
Mean score (95% CI)	4.5 (4.1–4.8)				

Note: Median scores of ≥ 7 = high skill/ success, ≥ 4 to < 7 = moderate skill/ success, < 4 = low skill/success

theme of support, participants described feeling that they were not supported to engage in research by their supervisors, by the higher-level managers, or through their position descriptions. Some participants described completing higher degree research or research professional development in their own time and/or at their own cost with little to no support from their managers, including an example of a participant not being approved for study leave for six consecutive years to complete their Doctor of Philosophy (PhD) studies. Despite the perception that research is not well supported or prioritised within the LHD, participants expressed interest and initiative in participating in research, developing their research capacity, and to gain further research skills or qualifications. Within the final theme, desire for discipline specific information, some participants expressed interest

Table 6 Individual motivators for undertaking research (*n* = 147)

Item	Median (IQR)	Distribution of responses			*N* (%) unsure
		Low	Moderate	High	
To develop skills	8 (3)	6 (5.0)	46 (38.3)	68 (56.7)	27 (18.4)
Career advancement	7 (2)	13 (10.8)	58 (48.3)	49 (40.8)	27 (18.4)
Increased job satisfaction	8 (2)	7 (5.9)	50 (42.0)	62 (52.1)	28 (19.0)
Study or research scholarships available	7 (3)	17 (14.5)	49 (41.9)	51 (43.6)	30 (20.4)
Dedicated time for research	8 (3)	10 (8.3)	37 (30.8)	73 (60.8)	27 (18.4)
Research written into role description	7 (3)	16 (13.4)	58 (48.7)	45 (37.8)	28 (19.0)
Colleagues doing research	7 (2)	10 (8.4)	60 (50.4)	49 (41.2)	28 (19.0)
Mentors available to supervise	9 (3)	8 (6.7)	30 (25.2)	81 (68.1)	28 (19.0)
Research encouraged by managers	9 (3)	6 (5.1)	24 (20.3)	88 (74.6)	29 (19.7)
Grant funds	8 (3)	12 (10.3)	31 (26.5)	74 (63.2)	30 (20.4)
Link to universities	8 (2)	9 (7.6)	34 (28.8)	75 (63.6)	29 (19.7)
Forms part of postgraduate study	8 (4)	19 (16.5)	38 (33.0)	58 (50.4)	32 (21.8)
Opportunities to participate at my own level	8 (2)	6 (5.1)	35 (29.9)	76 (65.0)	30 (20.4)
Problem identified that needs changing	9 (3)	4 (3.4)	31 (26.1)	84 (70.6)	28 (19.0)
Desire to prove a theory or hunch	7.5 (4)	16 (13.6)	43 (36.4)	59 (50.0)	29 (19.7)
To keep the brain stimulated	8 (3)	9 (7.6)	36 (30.3)	74 (62.2)	28 (19.0)
Increased credibility	8 (4)	11 (9.2)	45 (37.8)	63 (52.9)	28 (19.0)
Team building	8 (3)	10 (8.4)	42 (35.3)	67 (56.3)	28 (19.0)

Note: Median scores of ≥ 7 = high importance, ≥ 4 to < 7 = moderate importance, < 4 = low importance

Table 7 Individual barriers to doing research (*n* = 147)

Item	Median (IQR)	Distribution of responses			*N* (%) unsure
		Low	Moderate	High	
Lack of time for doing research	10 (2)	7 (6.1)	10 (8.7)	98 (85.2)	32 (21.8)
Lack of suitable backfill	9 (2)	9 (7.9)	16 (14.0)	89 (78.1)	33 (22.4)
Other work roles take priority	10 (1)	4 (3.5)	13 (11.4)	97 (85.1)	33 (22.4)
Lack of funds for research	8 (3)	8 (7.3)	33 (30.0)	69 (62.7)	37 (25.2)
Lack of support from management	8 (4)	11 (9.6)	45 (39.5)	58 (50.9)	33 (22.4)
Lack of access to equipment for research	8 (3)	10 (9.3)	41 (38.0)	57 (52.8)	39 (26.5)
Lack of software for research	8 (4)	9 (8.4)	41 (38.3)	57 (53.3)	40 (27.2)
Isolation	7 (4)	16 (14.4)	42 (37.8)	53 (47.7)	36 (24.5)
Different experience levels of team members	6 (3)	18 (15.9)	54 (47.8)	41 (36.3)	34 (23.1)
Lack of library or internet access	4 (6)	52 (45.6)	38 (33.3)	24 (21.1)	33 (22.4)
Not interested in research	4 (5)	49 (43.4)	42 (37.2)	22 (19.5)	34 (23.1)
Other personal commitments	7 (4)	16 (14.4)	41 (36.9)	54 (48.6)	36 (24.5)
Desire for work-life balance	8 (3)	12 (10.5)	39 (34.2)	63 (55.3)	33 (22.4)
Lack of a co-ordinated approach to research	8 (3)	8 (7.3)	41 (37.3)	61 (55.5)	37 (25.2)
Lack of skills for research	7 (4)	21 (18.8)	42 (37.5)	49 (43.8)	35 (23.8)
Intimated by research language	5 (5)	39 (34.5)	41 (36.3)	33 (29.2)	34 (23.1)
Intimidated by fear of getting it wrong	5 (5)	37 (32.5)	46 (40.4)	31 (27.2)	33 (22.4)
Staff shortages	9 (3)	10 (8.9)	20 (17.9)	82 (73.2)	35 (23.8)

Note: Median scores of ≥ 7 = high importance, ≥ 4 to < 7 = moderate importance, < 4 = low importance

in receiving information about research opportunities or training that was specifically tailored to their discipline, rather than receiving information provided to all staff or Allied Health staff more broadly.

As illustrated in Table 9, most participants (*n* = 111; 75.5%) reported having not ever contributed to a research project involving Aboriginal and Torres Strait Islander Peoples. As a result, almost all participants had not engaged Aboriginal and Torres Strait Islander researchers in their projects or employed Aboriginal and Torres Strait Islander project team members. When conditioned on responding "yes" to having contributed to research involving Aboriginal Peoples (*n* = 13) and asked if they usually conduct research in partnership with the Aboriginal and Torres Strait Islander community where they are based, few participants noted that they always (*n* = 1, 7.7%) or sometimes (*n* = 3, 23.1%) conduct research in partnership with Aboriginal and Torres Strait Islander

Table 8 Themes and representative quotes from participants regarding research in NNSWLHD

Theme	Example quote
Competing priorities	*There is no time to do any other work except clinical priorities - this is the BIGGEST barrier and lack of access - I am interested in research but would not have a CLUE where to start… I could ask this question if I had the time.* [Participant 1: Occupational Therapist] *Time and backfill are the biggest barriers. Staffing does not currently allow for meeting clinical priorities, mandatory training requirements or quality improvement, let alone research despite a strong interest and motivation.* [Participant 2: Dietitian or Nutritionist] *Genuinely not enough time in the day to just read journal articles and keep on top of clinical load. [*Participant 3: Occupational Therapist]
Research capacity	*Research seems to be well advertised and promoted, however the step between not doing research and doing it is illusive. It difficult to know how, when, or why to take the first step. Seems to be people who are already doing research then do more, and that it is not suitable for people who haven't done any research in the past*. [Participant 4: Occupational Therapist] *Just not sure where to start at an "entry level" to research.* [Participant 5: Occupational Therapist]
Support	*Support individuals who are willing to complete research/ relevant higher education. I wasn't even approved for study days, competed my whole external degree in my own time, which has benefitted my service but given no credit for this from my workplace.* [Participant 6: Speech Pathologist] *Current higher-level management unsupportive of initiative.* [Participant 7: Physiotherapist] *Research doesn't appear well supported within position descriptions.* [Participant 8: Psychologist]
Interest in building research capacity	*We have no research within our department. I am doing my own through an online university to learn the skills at my own cost.* [Participant 9: Sonographer] *I would be very interested in participating in research.* [Participant 10: Occupational Therapist]
Desire for discipline specific information	*There are major differences in experience, understanding, skills/training, [and] emphasis on research among Allied Health professionals. Post-grad psychology degrees include significant emphasis on dedicated subjects in research methods and research projects i.e., thesis. Lumping all Allied Health in together is hence problematic.* [Participant 11: Psychologist]

communities, with most ($n=5$, 38.5%) first consulting with Aboriginal and Torres Strait Islander communities at the idea generation and conception stage.

A few participants ($n=27/147$; 18%) responded to the free text question which asked what they did to ensure cultural safety when conducting research with Aboriginal Peoples. Inductive coding of responses led to the development of three key themes: (1) lack of experience, (2) interest in learning more, and (3) need for further education (Table 10).

Three participant responses (two identified as non-Indigenous and one selected 'prefer not to say') indicate an understanding of how to ensure cultural safety when

Table 9 Contributions to research involving Aboriginal and Torres Strait Islander Peoples

Have you ever contributed to a research project as an investigator where any of the following applies?	***N* (%)**
The experience of Aboriginal Peoples is an explicit focus of all or part of the research	4 (2.7)
Data collection is explicitly directed at Aboriginal Peoples	2 (1.4)
Aboriginal Peoples, as a group, are to be examined in the results	4 (2.7)
The information has an impact on one or more Aboriginal communities	3 (2.0)
Aboriginal health funds are a source of funding	0 (0.0)
No	111 (75.5)
Do you usually engage Aboriginal researchers in your projects or employ Aboriginal project team members? *	
Yes	3 (23.1)
No	3 (23.1)
Missing	7 (53.8)
Do you usually conduct research in partnership with the Aboriginal community where you are based? *	
Never	2 (15.4)
Sometimes	3 (23.1)
Often	0 (0.0)
Always	1 (7.7)
Missing	7 (53.8)
At what stage do you usually first consult with Aboriginal communities? *	
Idea generation and conception	5 (38.5)
During the funding application process	0 (0.0)
Once funding has been allocated but before beginning the ethics application process	0 (0.0)
During the ethics application process	0 (0.0)
After receiving ethics approval	0 (0.0)
I don't consult Aboriginal and Torres Strait Islander communities	1 (7.7)
Missing	7 (53.8)

*Responses to these questions conditioned on those that responded "yes" to having contributed to research involving Aboriginal Peoples ($n=13$)

Table 10 Themes and representative quotes from participants regarding ensuring cultural safety when conducting research with Aboriginal and Torres Strait Islander Peoples

Theme	Example quote
Lack of experience	"*This opportunity is not presented to me within the NNSWLHD. I am interested and would happily be involved in this type of research if the opportunity was presented and supported by management.*" [Participant 12: Occupational Therapist]
Interest in learning more	"*Sadly, little more than mandatory cultural sensitivity training. Would be interested in getting more involved.*" [Participant 2: Dietitian or Nutritionist]
Need for further education	*"The area policy is treat everyone as equal."* [Participant 13: Physiotherapist] *"Identification of differences in terms, exploration of themes and brainstorming ideas."* [Participant 14: Social Worker]

undertaking research involving Aboriginal and Torres Strait Islander Peoples:

> *Educate self on cultural safety practices within research, Indigenous methodology, co-design research. Work with other Aboriginal researchers. Connected with Lowitja Institute. Contact local Aboriginal Medical Services re: research ideas. [Participant 13: Physiotherapist]*
> *Engaged with Aboriginal Health Workers at the idea phase and gained ethics approval from an appropriate organisation. [Participant 14: Pharmacist]*
> *Our team has links to community elders, [a] local GP [in] Aboriginal health, [and the] Aboriginal Liaison Officer. [Participant 15: Occupational Therapist]*

Discussion

This study evaluated the current research capacity and culture within the Allied Health workforce in the NNSWLHD and explored whether Allied Health staff have undertaken research with Aboriginal and Torres Strait Islander Peoples, including what steps were taken to ensure the research was conducted in a culturally safe and responsive way. Participants reported low-to-moderate levels of skills and success across all three domains, with the lowest scores in the Team domain. Notably, none of the items in the three domains were evaluated as being of high success or skill level. Most participants were not currently involved in research, and almost all participants noted that research activities are not part of their role description. Motivators for undertaking research were research being encouraged by managers, mentors available to supervise, and a problem identified that needs changing, whilst barriers to undertaking research were lack of time for doing research, other work roles take priority, lack of suitable backfill, and staff shortages. Few participants reported having ever contributed to a research project involving Aboriginal and Torres Strait Islander Peoples.

This study indicates that the Allied Health workforce in NNSWLHD evaluate their Teams research skills and success as being significantly lower than their Individual research skills or the Organisations capacity for research. This is inconsistent with findings from previous research, with most studies identifying a trend of lower scores in the Individual domain when compared to the Team and Organisation domains [9, 17, 19, 21, 22, 24–27, 58]. Conversely, research conducted in Western Sydney LHD found that the Allied Health workforce scored the Individual domain highest, followed by the Organisation and Team domains [59], and a study comparing research capacity across metropolitan and non-metropolitan LHDs in NSW found that clinicians and managers in non-metropolitan LHDs scored the Individual domain highest and the Team domain lowest [31]. Finally, a study of the Allied Health workforce in a regional health service in Victoria reported higher scores in the Organisation domain than in the Team and Individual domains [60]. The lowest scoring items in the Teams domain were focused on support for research ('supports peer-reviewed publication of research', 'team leader support of research', 'team level planning for research development', 'supports staff research training', 'support applications for research scholarships or degrees', 'supports a multidisciplinary approach to research', and 'has consumer involvement in research'), and research infrastructure (software, funding, equipment or administrative support). This suggests a perceived poor research culture within Allied Health teams with limited opportunities or support for research.

In the Individual domain, three of the highest rated items were 'finding relevant literature', 'critically reviewing the literature' and 'integrating research findings into practice' which could be viewed as essential skills of being an evidence-based practitioner. This is consistent with findings from other studies of research capacity within Allied Health [9, 19, 21, 27, 58]. Previous research has found that Allied Health professionals generally report feeling more interested and confident in finding and critically reviewing the literature than in planning, conducting and reporting research projects [12, 13, 19]. Allied Health professionals may feel more confident in their evidence-based practice skills due to a focus on developing these skills in university degrees [19]. Interestingly, self-reporting of evidence-based practice skills can be biased with respondents tending to overestimate their performance [61–63].

Two items within the Organisation domain and four items within the Team domain had a high proportion (41–44%) of 'unsure' scores. A previous study of the research capacity and culture within Allied Health in Gold Coast Health had similar findings, reporting a high proportion of 'unsure' responses in the Organisation domain (up to 47.2%) and Team domain (up to 39.4%) [19]. These findings suggest there may be a need to bolster the mechanisms to monitor research quality beyond the annual progress or final reports considered by ethics committees, and to enhance communication and awareness of research conducted in health services. It also reflects the limited activity in applying for external research funding, although this is not surprising given the challenges clinicians face in building competitive track records while maintaining sizeable clinical workloads.

Engagement in research activities in the Allied Health workforce in NNSWLHD was limited, with the participants who reported being involved in research in the past 12 months primarily engaging in early phase research activities, such as collecting data using surveys

or interviews, or submitting an ethics or quality activity application. Very few participants reported involvement in later phase research activities such as data analysis, writing for publication, or mentoring less experienced clinicians in research. These results are similar to those reported in previous single discipline and multidisciplinary studies in Allied Health [24, 25, 58, 64]. A systematic review of 15 studies exploring the research culture in Allied Health published in 2016 found that a lack of research skills were identified as a barrier across all Allied Health professions, particularly in the later phases of research, with individuals reporting a lack of skills or confidence in their own skills [4]. Potential reasons for this lack of research skills in Allied Health include limited opportunities to undertake projects that develop research skills in university training, and a lack of organisational capacity to undertake individual skill development to improve research skills [4].

Very few participants (10%) considered research activities to be part of their role description, with the majority noting that no specific provisions were made for them to conduct research. Similarly, a study evaluating the research capacity in Allied Health, Nursing and Medicine across metropolitan and non-metropolitan LHDs in NSW published in 2022 found that 27.7% of clinicians in non-metropolitan LHDs were currently engaged in research activities, and 22% had research in their position descriptions [31]. Conversely, a study published in 2020 exploring the research capacity and culture in Western Sydney LHD, found that 46.8% of Allied Health clinicians had research in their role description, but did not report on engagement in research [59].

The barriers for undertaking research reported in this study are consistent with previous reports, including lack of time, other work roles take priority, lack of suitable backfill, staff shortages, limited funding for research, lack of support from management, lack of access to equipment and software for research, no coordinated approach to research, and a desire for work-life balance [4, 16, 19, 22, 30, 65]. Interestingly, individual barriers such as lack of skills for research, not being interested in research, or feeling intimidated by research language or fear of getting it wrong were rated as less important than the structural barriers within the LHD. This finding is supported by previous research, with barriers for Allied Health professionals to undertake research more likely to be extrinsic or organisational barriers such as lack of time and heavy clinical workloads [16, 21, 22, 25, 59]. All 18 motivators explored in this study were assessed as being of high importance, with the three most reported motivators being: 'research encouraged by managers', 'mentors available to supervise', and a 'problem identified that needs changing'. Previous research in Allied Health has identified a 'desire to develop skills', a 'problem identified that needs changing', and 'an interest in improving job satisfaction' as the main motivators for individuals to undertake research [21, 22, 25, 26, 59]. Improving research culture and capacity requires a range of strategies that motivate health professionals and address the barriers to engaging in research [16], with motivators more strongly associated with increased research activity [26]. Intrinsic factors such as a strong interest in research, an opportunity to develop skills or improve job satisfaction, or to address an aspect of practice that could be improved, are more likely to motivate Allied Health professionals to engage in research [26].

The five key themes developed through qualitative data analysis provided further support for the quantitative findings, with participants describing high workloads, staff shortages, lack of backfill, and the need to prioritise clinical work over research. Participants expressed a lack of understanding of how to move from working in a clinical role to undertaking research, indicating a need for additional opportunities to engage in research, research training opportunities, and mentoring of less experienced researchers. Team leaders support of research was scored as low with open-ended responses providing further support of this, including participants describing a lack of support to engage in research by their supervisors, the higher-level managers, or within their position descriptions. This resulted in some participants completing higher degree research or research professional development in their own time and/or at their own cost with little to no support from their managers. Despite the perception that research is not well supported or prioritised within Allied Health at the LHD, participants expressed interest and initiative in participating in research, developing their research capacity, and gaining further research skills or qualifications. The LHD should capitalise on the Allied Health workforce's intrinsic motivation to undertake research as research opportunities have been shown to improve job satisfaction and drive service improvement and change [26, 66].

Most study participants reported having never contributed to a research project involving Aboriginal and Torres Strait Islander Peoples or communities with three key themes developed including lack of experience, interest in learning more, and need for further education. These findings reflect a lack of broader research opportunities for the Allied Health workforce and indicate that staff are interested in undertaking research more generally, and with Aboriginal and Torres Strait Islander Peoples in a culturally safe and responsive manner. Few participants demonstrated an understanding of how to ensure cultural safety when undertaking research involving Aboriginal and Torres Strait Islander Peoples. Research which impacts Aboriginal and Torres Strait Islander Peoples must be conducted in a culturally

safe and responsive manner which privileges Aboriginal and Torres Strait Islander voices, via authentic partnerships with communities, should ideally be place-based, and should be led and/or co-designed by Aboriginal and Torres Strait Islander Peoples or communities [67–69]. When non-Indigenous researchers undertake research with Aboriginal and Torres Strait Islander Peoples, they need to reflect on their own cultural identity, power, and privilege, demonstrate cultural humility, and be aware of any biases shaped by dominant ways of knowing and engage in ongoing critical reflection [68, 70–72]. Finally, it is critical to support Aboriginal and Torres Strait Islander clinicians to build research capacity to shape the health research agenda, inform health policies, support evidence-led clinical care, and in turn, the well-being of Aboriginal and Torres Strait Islander People [73].

Future directions

Various opportunities to improve the research capacity and culture within Allied Health in NNSWLHD were identified which consider the local context to account for the current strengths and weaknesses across the three domains [60]. NNSWLHD should develop opportunities to support individuals to upskill in research processes, including integrating mentoring as a component of research education to support the reinforcement of knowledge gained [74–76]. Research education should be a key component of any strategy to build research capacity [77]. Research capacity building strategies should be multifaceted as education alone will not address time constraints, demanding clinical workloads, workforce shortages, lack of organisational support and funding, poor research culture, and inadequate research knowledge and skills [4, 77–79].

Future strategies should focus on "a whole of system" approach to research capacity building such as research software, backfill or funding for undertaking research, a culture supportive of research, and research career pathways; mentoring for less experienced researchers; and opportunities to upskill individuals in writing ethics applications, protocols, publications and applying for research funding. Organisations should consider how information about research infrastructure, initiatives, and training is disseminated to increase clinicians' awareness, understanding, and uptake of the available resources and supports [19]. NNSWLHD should develop communication strategies to disseminate information about research infrastructure, initiatives, and training. Additionally, team leaders and managers should be encouraged and supported to lead by example through using and contributing to research, should be receptive to clinicians undertaking research, and should advocate for research opportunities for their staff [80].

Funding for backfill to enable clinicians to take time away from their clinical caseload and focus on research is an important strategy to increase research capacity and culture [65, 81]. Furthermore, research funding and fellowships, particularly for novice or junior researchers, should be made available [65, 82]. Collaborations between healthcare organisations and academia may enable access to additional funding opportunities, academic support, and could facilitate the delivery of training to build research capacity and culture within healthcare organisations [31, 65].

This study highlighted the need for NNSWLHD to develop training and mentoring opportunities for Allied Health staff to learn how to ensure cultural safety when undertaking research involving Aboriginal and Torres Strait Islander Peoples. Finally, Aboriginal and Torres Strait Islander clinicians should be supported to build research capacity to improve the well-being of Aboriginal and Torres Strait Islander Peoples in the region through influencing the health research agenda and local policies, and supporting the delivery of evidence-based care.

Strengths and limitations

Utilising the RCC tool, a validated instrument to evaluate research capacity and culture, within the Allied Health workforce is a strength of this study. Additionally, utilising several recruitment strategies including reminders over the seven-week data collection period was a strength. The disciplines with the highest response rates were occupational therapy, physiotherapy, social work and speech pathology, and the largest workforces within Allied Health were similar: social work, physiotherapy, radiography, and occupational therapy.

One of the limitations of this study was the low response rate, with an estimated 17% of the Allied Health workforce within NNSWLHD providing complete data for analysis. Previous studies which utilised the RCC tool to evaluate the research capacity and culture had response rates of 7% to 31% [19, 28, 59]. Possible reasons for this are: (1) the version of the RCC tool used in this study contained 112 questions and is time consuming to administer, (2) participants reported having limited time to engage in any activities beyond their clinical workload, and (3) the survey was administered within the same time period as the NSW Health wide 'People Matter' employee survey which may have resulted in survey fatigue. Allied Health managers were asked to forward the recruitment email to their staff and encourage their participation, however, it is unclear whether this occurred across all disciplines. Utilising study champions across NNSWLHD may have improved response rates.

Another potential limitation of this study was the high percentage of 'unsure' responses across various items, particularly in the Organisation (up to 44%) and the

Team domains (up to 42%). However, this is consistent with findings from previous research, including Matus et al. [19] who reported up to 47.2% in the Organisation domain and up to 47.2% in the Team domain, and Friesen and Comino [17] who reported up to 54.6% and 60.8% unsure responses in the Organisation and Teams domains respectively. The high proportion of 'unsure' responses may be due to survey fatigue resulting from the huge number of survey items or may reflect the Allied Health workforce's lack of awareness of research initiatives, processes and opportunities [19]. Finally, the voluntary nature of the survey may have resulted in self-selection bias whereby more Allied Health professionals interested in research completed the survey. This may limit generalisability to Allied Health professionals within the LHD who are not engaged or interested in research.

Conclusion

This study identified several key factors associated with the research capacity and culture within the NNSWLHD Allied Health workforce. A tailored, "whole of system" research capacity building strategy to address local motivators, barriers, and priorities within the NNSWLHD will be developed and implemented utilising the findings of this study. Supporting the Allied Health workforce to develop research capacity could improve health service provision which may result in benefits for patients, clinicians, theorganisation and the community. Additionally, opportunities to engage in research and improve research capacity and culture could improve organisational efficiency, staff satisfaction, reduce staff turnover, improve patient satisfaction, and decrease patient mortality rates. Finally, the delivery of specific research capacity building strategies for Allied Health staff engaging with Aboriginal and Torres Strait Islander participants or researchers may support the development and conduct of culturally safe and responsive research. Future research should explore the development and evaluation of a shortened version of the RCC tool to improve usability and response rates.

Abbreviations

CI	Confidence interval
HREC	Human Research Ethics Committee
IQR	Interquartile Range
LHD	Local Health District
N	Number
NHMRC	National Health and Medical Research Council
NNSWLHD	Northern New South Wales Local Health District
NSW	New South Wales
PhD	Doctor of Philosophy
RCC	Research Capacity and Culture tool
REDCap	Research Electronic Data capture

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-025-13833-z.

Supplementary Material 1

Acknowledgements

The authors would like to acknowledge this manuscript has been written on the unceded sovereign lands of the Yuggera and Turrbal Peoples, the Kombumerri People, and the Wijabul Wiabul Peoples of the Bundjalung Nations of Australia. We pay genuine respect to their Elders, past and present and to the First Nations Peoples of all Countries whose lands are significant. The authors would like to acknowledge the busy Allied Health professionals who participated in the study, the Allied Health managers within NNSWLHD for encouraging their teams to participate in this study, and the Aboriginal Health Leadership team at NNSWLHD for their guidance and support of the project. We would also like to acknowledge Professor Vicki Flood for her expertise and assistance in conceptualising and designing the study.

Author contributions

All authors conceptualized and designed the project. KM, AS, and KLM completed the protocol and developed an online version of the survey tool. AS led the quantitative data analysis, and KM and KLM completed the qualitative data analysis. All authors contributed to data interpretation. KM drafted the manuscript, and AS, CMW, GRC, and KLM revised the manuscript. All authors contributed to data interpretation. All authors read and approved the final manuscript and agree to be accountable for all aspects of the work.

Funding

The authors received no financial support for the research or authorship of this article. Researcher time was provided 'in kind' by Bond University, the Burnet Institute, the University of Sydney, and NNSWLHD.

Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was reviewed and approved by the North Coast NSW Human Research Ethics Committee (HREC): reference 2023/ETH01030. Upon accessing the survey, potential participants were invited to read an electronic participant information sheet (preamble) and to provide voluntary informed consent to participate by ticking 'agree' on a consent question, and completing the survey (i.e., submission of a survey implies consent). Allied Health staff were reassured that participation or non-participation in this study would have no effect on their relationships or standing within NNSWLHD.

Consent for publication

Consent for publication is not required as the data is deidentified. Participants were reassured that they would not be identified in any publications or reports generated as a result of this research prior to providing voluntary informed consent.

Competing interests

The authors declare no competing interests.

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Received: 9 August 2024 / Accepted: 27 November 2025
Published online: 13 December 2025

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Publisher's note

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