

**Short Title:** Whaioranga te Pā Harakeke – the effect of a Paeārahi intervention on unintentional injury and recovery from injury in older Maori

**Full Research Title:** Whaioranga te Pā Harakeke – the effect of a Paeārahi intervention on unintentional injury and wellbeing in older Maori

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# Background

## Whaioranga te Pā Harakeke

Harakeke (flax) is known to symbolise strong, cohesive whānau (families). A pā harakeke is an area where harakeke (flax) are planted together. When establishing a pā harakeke, thought is given to the choice of flax (fit for purpose), ensuring it is planted in an environment that will nurture growth, and that each plant will have room to thrive. The title of our research reflects the way our project seeks new ways to collaborate, design and work together - in the provision of iwi-led prevention and recovery for older Māori and their whānau – a whole-of-whānau approach which enhances engagement and sustainability.

Te Tiriti o Waitangi and health inequities

In the context of health, Te Titiri o Waitangi (the Treaty of Waitangi) guarantees Māori the right to: participate in their healthcare; autonomy and control; equitable health outcomes; and treatment options (including both culturally safe mainstream services, and treatment solutions designed by and for Māori).1 Treaty breaches mean that compared to non-Māori, Māori experience inequitable health outcomes, including disproportionately high rates of injury.2 For those that access current injury support services, outcome assessment shows non-Māori are better served than Māori.3 Older Māori are at potentially higher risk of being impacted by unintentional injury due to the compounding of inequities across the life course,4 earlier onset of chronic co-morbidities (e.g. cardiovascular disease/stroke),5 increased adverse outcomes from the prescription of ‘high-risk’ medicines6 and higher rates of poverty which reduces treatment options.

To add urgency to the need for Māori health equity, the Māori population is ageing at a greater rate than the general population in Aotearoa. In 2006, 23,127 Māori were aged 65 years and over, 6.8% of the total older population (65 years plus). Between 2011 and 2026, the population of older Māori is predicted to grow by 7.1%, double the growth expected for non-Māori, to 9.8% of the total older population.7 Complex comorbidities, in particular related to diabetes and cardiovascular disease, complicate injury risk and recovery. Clusters, or profiles, of conditions for Māori differ to non-Māori8 suggesting that ethnic specific understandings of disease and recovery processes are needed.

Māori octogenarians are more likely to be living in the community with high levels of disability compared with non- Māori counterparts who are more likely to reside in residential aged care facilities.9 Therefore, community driven strategies must be pursued to improve health outcomes for older Māori.

There is a significant lack of Māori responsive, and Māori-designed, health and rehabilitation services in Aotearoa New Zealand (NZ). Those that are available may be difficult to access because they are unknown to referrers/clients, may be under-resourced, and may be seen as an outlier service rather than legitimate care option that is offered.10,11

## Iwi-driven solutions

A recent NZ study, ‘Kaumātuatanga’, examined ageing Māori populations in the context of Whānau Ora approaches throughout the North Island, including Te Arawa.12 It was clear that older Māori *“aspire to be in a home of their own choosing, to be active and meaningfully engaged with their whānau, to go where they want to go, and to live active and relevant lives”.*12 The need for Māori solutions from communities, iwi, hapū and whānau was highlighted. In places where iwi and hapū were strong in their wrap-around support for older Māori, older Māori had a strong sense of wellbeing.12 There are many examples of where iwi-led solutions have led to positive outcomes for whānau Māori. Cardiovascular (CVD) outcomes were positively impacted by Nga Pou o Rongo, a co-designed and implemented kaupapa Māori lifestyle management programme using a whānau approach.13 The programme pilot improved weight, waist/hip circumference, and health related quality of life. A larger cluster trial tested the programme on CVD outcomes in 35 whānau groups (trial completed Dec 2018, NZHF grant#1648).

The most contemporary examples of iwi-led responses are to COVID-19, where the established iwi/hapū networks have enabled quick, successful responses that meet the most relevant and diverse needs of whānau.14,15 These have included iwi checkpoints (for community safety and to reduce disease transmission), the delivery of ‘hygiene’ packs (for infection control) and food packages (to meet basic needs). More recently, iwi groups and Māori health providers have led COVID-19 swabbing and vaccination initiatives to increase access and acceptability. With iwi invoking tino rangatiratanga (sovereignty) not only were they exerting their rights under Te Tiriti o Waitangi, they demonstrated the success of Māori and iwi-led solutions. These relied on already established networks, trusting relationships, local knowledge of whānau needs, and an understanding of the multiple contributors to health and wellbeing. This inclusive approach to health is often missing in mainstream health services. Furthermore, the delivery of culturally safe services are deemed essential to achieving health equity across a range of clinical contexts.16–18

Te Arawa rohe

The Te Arawa rohe (tribal area) spreads across the central and Eastern part of the North Island, falling across both Lakes and Bay of Plenty (BOP) District Health Boards (DHBs) which have a population of approximately 350,000.19 Research using ACC data showed Māori males in BOP/Lakes DHBs have neck of femur fracture (‘hip fracture’) rates 80% higher than Māori males nationally, and 50-fold higher than non-Māori male in the same region.20 This suggests older Māori in this rohe may be at more risk of significant unintentional injury associated with ageing than Māori nationally, and non-Māori within the same region.

In 2020, Te Arawa launched ‘Te Arawa 2050’,21 the strategic vision that set out iwi aspirations for the next 30 years. It involved over a year of discussions/collaborations with iwi and hapū leaders across the rohe. Central to the vision was the maintenance and strengthening of mana motuhake (autonomy) and tino rangatiratanga (sovereignty) in the context of collaborating and connecting in contemporary society. The current project draws on iwi strengths to provide both an evidence-base and an iwi-led, co-designed intervention that improves injury related outcomes for older Māori (55 years and older).

## Paeārahi (health navigator) workforce

Older Māori within the rohe of Te Arawa do not want government agencies, health or other services to determine what they can do to maintain their wellbeing.12 Within the Te Arawa rohe, health and wellbeing services are provided by paeārahi (health navigators). Paeārahi are highly skilled and connected in understanding the expectations and aspirations of older Māori in Te Arawa to enact their own rangatiratanga (to be as resilient and self-reliant as possible) and manaakitanga (care for others to take the focus off self, share knowledge, or fill whānau, hapū, marae and community roles). The paeārahi model is similar to the kai manāaki role employed in the ‘Mana Kidz’ and ‘Mana Tū’ models of care.22,23 It is an efficient, cost-effective and scalable model that does not require large infrastructure costs and can be translated into practice across a range of existing settings within the health and social sectors.22,23 Similar roles in older Indigenous populations have been utilised to improve physical functioning.24

Unregulated workforces

Paeārahi are not registered health professionals; they are Māori practitioners deeply rooted in te ao Māori, through whakapapa, wairua, karakia, and the strength they draw on from their tīpuna. The use of unregulated community healthcare workers (CHW) to deliver direct care is a sensible strategy to developing a sustainable workforce and the importance of CHWs is recognised nationally and internationally.25 There is further recognition that CHWs are of particular importance for under-served and marginalised populations.26 Part of the success of CHW roles comes from their ability to maintain a level of autonomy, utilising the unique skills they bring to case management.26

Although paeārahi roles have already been successfully implemented in the community, there is little ‘documented evidence’ of these benefits in relation to the mechanisms of how this role may support injury prevention in older Māori and support increasing their access to ACC services when injury does occur, thereby improving outcomes.27 The approach taken in our research is innovative as it aims to provide an evidence-base of how iwi-driven services, centred on Māori approaches and mātauranga Māori, can improve outcomes for older Māori who are at risk of sustaining injury, or those that do sustain injury to improve recovery. The proposed intervention responds to Māori needs in a system that is currently failing to address access to ACC services, and inequity in outcomes from injury. Increasing the evidence-base in regards to paeārahi also helps to ensure the provision of care at a consistent level, to optimise positive health outcomes, and maintain public safety.25,28

In our approach, we define ‘access’ in its widest sense, influenced by health system processes (e.g.: institutional racism, access to referrals, urban/rural distribution of services, waiting lists, availability of equipment, availability of information/resources to support informed decision-making, availability of culturally safe services that people want to access), client perspectives (e.g: previous experiences influencing ability/desire to engage, resource and support to attend appointments) and healthcare providers. The spectrum of injuries addressed in this proposal include unintentional injuries (e.g. falls, road traffic, burns, sports-related etc.), and treatment injuries. Self-inflicted injuries and intentional injuries (e.g. assault) are excluded. A major component of this project will be paeārahi working to prevent injuries, identifying when injuries may have occurred, as well as initiating management in those where injuries have already been diagnosed.

# Methodology

### Theoretical framework

Kaupapa Māori theory will be used to guide the entire research project including engagement, data collection, and analysis to situate the findings in the relevant social, political and cultural context for Māori. The study will utilise a kaupapa Māori approach which centres on mātauranga, tikanga and te reo Māori (Māori knowledge, practices and language). Kaupapa Māori theory utilises Māori methods of knowing, being and doing, aims for positive, transformative change and supports aspirational thinking.29–31 Kaupapa Māori research aims to give back power to Māori in the research process,29 has been used in other Māori health services research,13,32–35 and is seen as the best practice when undertaking research centring on Māori.36

The intervention will be developed by Māori, for Māori, will aim for positive transformative change, and privilege Māori in the research process.29,30,37 We will demonstrate these principles through the Māori project leadership and partnering with iwi (through utilisation of existing relationships) throughout the project. We will ensure that, rather than deficit discourse and victim-blaming narratives, critical reflection of the health, and more specifically ACC systems, will be included in the analysis and reporting of findings.

Māori health and research workforce development will be demonstrated throughout the research project and is further supported through those in the research team with expertise in this area. A kaupapa Māori approach will be utilised to uphold the principles of Te Tiriti o Waitangi within the research and intervention processes including the right of Māori to participate in their healthcare, the right to autonomy and control, the right of equitable health outcomes and the right to treatment options, including both culturally safe mainstream services, and treatment solutions designed by and for Māori1. We propose to enhance the paeārahi model to increase robustness relating to injury prevention, treatment and rehabilitation, and to test this model on injury and whānau-orientated outcomes.

### Hypotheses and aims

Our hypotheses are that utilisation of the paeārahi model of care for older Māori will:

1. Support client and whānau-identified injury prevention-related goal identification and attainment

2. Reduce the incidence of unintentional injuries in older Māori

3. Increase Māori older adult access to, and uptake of, ACC related services

4. Improve outcomes from injury

Study aims

To test the feasibility and effectiveness of a paeārahi-led intervention on injury prevention, treatment and rehabilitation, and ACC access for Māori older adults in the Te Arawa rohe.

### Research oversight

A research advisory group is currently being established representing organisations such as ACC, MOH, Te Arawa primary care providers, Age Concern, St John’s, rehabilitation providers, iwi representatives. These organisations will be engaged through representatives that live in/connect to the Te Arawa rohe specifically. In the case of ACC it is intended that there will also be representation from head office from someone in a key strategic role that can support the use of research findings at a more senior level (the exact person is still being negotiated with ACC who are undergoing staffing structure changes). Terms of reference including scope and meeting frequency will be co-designed. The intention is that in addition to this group being engaged throughout the project, there will be 3 stages where their input will be vital and the research team will work collaboratively with this group: at the paeārahi intervention development stage; during recruitment and intervention delivery and in the analysis and dissemination of findings to ensure uptake in health services and policy. Therefore, there will be at least three group meetings through the course of the research with electronic communication between meetings as needed.

### Multi-phase research

The currently proposed study is part of a larger project which aims to enhance the paeārahi model to increase robustness relating to injury prevention, treatment and rehabilitation, and to test this model on injury and whānau-orientated outcomes. The currently proposed study will utilise paeārahi to deliver an injury prevention and rehabilitation model for koeke in the three general practices in the Te Arawa rohe. The intervention to be tested has been co-designed through previous work with older Māori and their whānau in Te Arawa rohe, as well as other stakeholders.

Aims***:***

To implement a paeārahi-led injury prevention and rehabilitation care model for older Māori in Te Arawa rohe.

To evaluate the effectiveness of the paeārahi-led injury prevention and recovery/rehabilitation model.

Research questions***:***

1. What is the best way for paeārahi to deliver injury prevention messages and actions before injury occurs?
2. How many people engage with this service and how are they recruited?
3. What is the best way for paeārahi to incorporate ACC, and other, services in their responses to injury?
4. What resources are required to provide this service?
5. What interventions do the paeārahi make?
6. How do paeārahi change their actions and roles to incorporate injury prevention and recovery?
7. Is the intervention acceptable to participants and providers?
8. What impact did the intervention have on injury-related health access and outcomes?
9. Did clients/whānau achieve their self-identified goals?
10. Did community-level changes in injury prevention and care occur?
11. What was the cost-effectiveness of the intervention?

### Study design

Before and after prospective intervention study with baseline and post-intervention measurement of predefined outcomes. This trial design was chosen for a number of reasons:

- as the hauora practices involved in this study all work collaboratively it was felt it would be difficult to implement a comprehensive intervention in just one practice at a time

- reduced research burden by not including participants who will not receive the intervention

- the short time period for funding (two years) and the desire to train all paeārahi at the same time, which requires them to be employed and funded at the same time.

In addition, a process evaluation will be completed to explore contextual factors relating to the paeārahi-led injury prevention and rehabilitation model.

This current study protocol is reported in accordance with the SPIRIT checklist.38 After completion, the study will be reported in accordance with the CONSORT statement for non-pharmacologic treatment interventions39 as relevant to the non-randomised nature of this study, and the CONSIDER statement40 which is used to strengthen reporting of health research relevant to Indigenous populations.

## Programme Logic

This programme logic has been developed using the project objectives and the Te Pou Matakana programme logic for kaiārahi. 41 The programme logic was originally developed to understand how kaiārahi (paeārahi) function within the wider Whānau Ora programme and was suggested as a framework to inform the planning, development and evaluation of kaiārahi roles.41 The measurement of long-term outcomes detailed in Table 1. falls outside the scope of the current project, however, the alignment of the project with the long-term Whānau Ora vision is relevant to include here.

#### Table 1. Programme Logic

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Problem statement** | **Inputs** | **Outputs: activities** | **Outputs: participation** | **Short-term outcomes** | **Medium-term outcomes** | **Long-term outcomes**41 |
| Māori older adults have higher rates of injury and lower rates of ACC access than non-Māori.  There is a lack of Māori-led, community-driven injury prevention and rehabilitation interventions that use an holistic model of care. | Paeārahi trained in injury prevention/ rehabilitation  Injury prevention assessment tools  Relationships with health and social services  Research partnership  National and international literature  Hauora/Whānau Ora  assessment tools  Funding | Paeārahi deliver injury prevention/ recovery rehabilitation model | Koeke, and whānau level participation | Increased whānau knowledge and capability to prevent injuries and rehabilitate after injury  Increased whānau social and cultural capital | Increased stakeholder engagement with supporting iwi and paeārahi-led injury prevention and rehabilitation initiatives  Increased recovery and rehabilitative service use  Increased access to ACC funding and support | Whānau are living health lifestyles  Whānau are economically secure  Whānau are participating fully in society  Whānau are self-managing and empowered leaders  Whānau are cohesive and resilient  Whānau are confidently participating in Te Ao Māori |

### Participants and Recruitment

### Koeke participants

Participants will be recruited from three hauora practices: Korowai Aroha, Poutiri Trust, and Te Runanga o Ngati Pikiao Community Health by staff employed by these practices or by Te Arawa Whānau Ora Collective. Korowai Aroha, Te Runanga o Ngati Pikiao Community Health and Te Arawa Whānau Ora Collective are based in Rotorua and Poutiri Trust is based in Te Puke. The managers of each of these practices are members of our research team (named investigators).

Participants will be eligible to participate in accordance with the criteria below:

#### Inclusion criteria

* Community-dwelling Māori (self-identified) aged 55 years or older AND
* Enrolled in one of the study (hauora) practices AND

#### Exclusion criteria

* Unable to provide informed consent AND/OR
* Living in an Aged Residential Care facility

#### Recruitment and written, informed consent

Eligible people will be identified by applying a database query to the Patient Management System at a practice level. Electronic risk stratification tools embedded in practice software will be used to identify those at most risk of healthcare utilisation and, combined with clinical knowledge of practice staff, will be used to establish the order of approach for invitation to participate. The risk stratification query uses variables including age, ethnicity, general practice visits, hospitalisations, ED presentations and chronic comorbidity to calculate risk. A record of the number of eligible people excluded due to exclusion criteria will be recorded. Staff from the practice will contact eligible people through their normal means of communication to ask them if they are willing to find out more about the research. If they are interested in participating, the paeārahi will visit the potential participant, provide a Participant Information Sheet (PIS) and obtain informed, written consent (either physically or electronically) from those who wish to participate. In-person consent will be obtained in a location agreeable by the potential participant and researcher and may include the hauora practice, community centre, public place or participant’s home. If COVID-restrictions mean in-person visits are unable to take place then written, informed consent may be obtained by email; or verbal consent via phone call or online video conference. Up to ten koeke will also be interviewed post-intervention. Purposive sampling will be used to select these ten koeke interview participants.

Target recruitment numbers for the intervention study are 60 participants at Ngāti Pikiao, 120 at Korowai Aroha and 120 at Poutiri Trust allowing for a drop-out rate of 13% to give a final number of 260 participants to participate in pre and post intervention data collection. Koeke and whānau participant will count towards target recruitment numbers. Recruitment will continue until these participant numbers are achieved at each practice. Consent to take part in the study will include consent to link to participants’ health and social data to be able to examine long term outcomes.

**Sample size calculation**

Sample size calculations have not formally been prepared and numbers are instead based on the paeārahi resource available for the study. This assumes that each paeārahi FTE (7.5 FTE for 9 months in total) will support approximately 25 koeke and 15 whānau over the study period. This gives a total of 300 recruited participants.

### Whānau recruitment and consent

Participants will be able to invite whānau (family members/support people) to be present during the intervention delivery. If whānau are present during any part of the intervention, paeārahi will ask them if they would like to participate in pre- and post-intervention outcomes assessment. Koeke can also nominate whānau members to participate. Multiple whānau members could be recruited for each koeke participant.

#### Inclusion criteria

* Whānau member/support person of a consented koeke in the intervention study

#### Exclusion criteria

* Unable to provide informed consent

If they wish to participate in the research, a member of the research team will provide a Participant Information Sheet (PIS) and obtain informed, written consent (either physically or electronically) from those who wish to participate. Consent may be gained through in-person meetings or electronically. In-person consent will be obtained in a location agreeable by the potential participant and researcher and may include the hauora practice, community centre, public place or koeke/participant’s home. If in-person visits do not take place, then written, informed consent may be obtained by email; or verbal consent via phone call or online video conference. The PIS and consent form may be supplied and completed in-person, by mail, or electronically.

Whānau member’s confidence relating to injury care and ACC access knowledge will be assessed pre- and post-intervention, using a study specific questionnaire. The questions will relate to the following topics: how confident are you in supporting your whānau member in injury related care; how confident are you in supporting your whānau member to prevent injuries; how confident are you that you know how to access support for your whānau member if they have an injury?

Post-intervention, consented whānau members will be asked to complete a Hua Oranga assessment. Up to ten whānau members will also be interviewed post-intervention. Purposive sampling will be used to select these ten whānau interview participants.

### Paeārahi recruitment and consent

All paeārahi who deliver the intervention will be invited to participate in the post-intervention assessment (completion of Hua Oranga assessment and interview).

#### Paeārahi inclusion criteria

* Paeārahi employed by TAWO, Ngaiti Pikiao, Korowai Aroha or Poutiri Trust AND
* Delivered study intervention

#### Paeārahi exclusion criteria

* Unable to provide informed consent

All paeārahi who delivered the intervention will be invited to participate by a member of the research team. If paeārahi wish to participate in this, a member of the research team will provide a Participant Information Sheet (PIS) and obtain informed, written consent (either physically or electronically) from those who wish to participate. Consent may be gained through in-person meetings or electronically. In-person consent will be obtained in a location agreeable by the potential participant and researcher and may include the hauora practice, community centre, public place or koeke/participant’s home. If in-person visits do not take place, then written, informed consent may be obtained by email; or verbal consent via phone call or online video conference. The PIS and consent form may be supplied and completed in-person, by mail, or electronically. The Hua Oranga tool can be completed by physically completing on paper, or electronically. Support will be available from researchers if that is required to help people complete the assessments.

### Other Stakeholder recruitment and consent

Other stakeholders that come into contact with consented koeke through the study intervention delivery will be recruited to participate in post-intervention interviews. The types of stakeholders may include health professionals who koeke are referred to by the paeārahi as part of the intervention, or those involved in social services that support the participating koeke. Up to ten Other Stakeholders will be purposively recruited by members of the research team.

#### Other Stakeholder inclusion criteria

* Involved with health/social/support service to recruited koeke

#### Other Stakeholder exclusion criteria

* Unable to provide informed consent

If Other Stakeholders wish to participate in this, a member of the research team will provide a Participant Information Sheet (PIS) and obtain informed, written consent (either physically or electronically) from those who wish to participate. Consent may be gained through in-person meetings or electronically. In-person consent will be obtained in a location agreeable by the potential participant and researcher and may include the hauora practice, community centre, public place or koeke/participant’s home. If in-person visits do not take place, then written, informed consent may be obtained by email; or verbal consent via phone call or online video conference. The PIS and consent form may be supplied and completed in-person, by mail, or electronically. The Hua Oranga tool can be completed by physically completing on paper, or electronically. Support will be available from researchers if that is required to help people complete the assessments.

### Other recruitment and consent processes for all participant groups

Research team members will record how many phone calls are made to invite people to meet to consent, how many people agree to the follow-up meeting/phone call to be provided with the PIS and CS and how many consent to understand the response rate.

In order to establish response and completion rates, the following information will be recorded:

• how many phone calls are made to invite people to consider taking part

• how many people agree to the follow-up meeting/phone call to be provided with information about the study and an invitation to participate,

• how many consent to take part

• how many complete the study.

Participation in the study is voluntary and participants will be able to withdraw at any point in the study. Permission will be sought to take photos of participants which can be used during dissemination of the work (e.g at conferences); this aspect is optional.

## Intervention

#### Koeke injury-specific intervention

Paeārahi will deliver the intervention to koeke in their own homes (or in a mutually agreed location). Paeārahi currently have roles that support koeke and whānau to connect to other health and social services which will continue as part of usual paeārahi care. Participants will be able to invite whānau (family members/support people) to be present during the consent process and intervention delivery.

The intervention detailed below relates to the injury-specific intervention, which is a being tested in the current study.

The intervention will include the following components:

- home assessment to assess the risk of injury hazards and development of an action plan to address issues. This includes assessing for trip hazards, lighting issues, functioning smoke alarms

- teaching strength and balance exercises that can be undertaken in their own homes and which are responsive to the individual needs and capabilities

- education about injury prevention, rehabilitation and ACC access

- falls-risk assessment and basic health screening (<https://www.hqsc.govt.nz/assets/Falls/PR/LSFL-AAA-Information-poster-Jun-2018.pdf>) to identify whether referral to other health and social service providers\* is required.

\*Referral pathways are already established within the current hauora practices and would follow the same pathways that are already available. However, paeārahi will help koeke navigate these systems. Providers that are likely to be referred to include: general practitioners, Geriatric/Gerontology Nurse Specialist referral (likely initiated through GP), practice nurse, pharmacist medicine review, occupational therapist, physiotherapist, rongoā practitioners, counsellors, optometrist, podiatrist, nutritionist, community exercise programmes, social and welfare services.

The intervention will be delivered over a 12-week period with the paeārahi making at least 4 in-person/telehealth visits and weekly phone calls.

#### Paeārahi model of care and injury-specific training

Paeārahi are unregulated health workers who are members of the local community, have strong networks and connections, and utilise these to work with clients and the wider whānau to identify their needs and aspirations, support participation in core sectors such as housing, education, primary health care and employment, and link and coordinate access to specialist services. Most importantly, paeārahi are instrumental in consolidating links of whanaungatanga; strengthening and revitalising whānau connections to supports and services in a way that recognises and meets whānau needs. Paeārahi have the geographic and cultural proximity necessary to understand client and whānau situations and build relationships of trust and confidence. They take a unique approach that is responsive to the needs and circumstances of each client and whānau. Paeārahi assist whānau to set goals and encourage them to take charge in working towards them. They help whānau connect with services and advocate on their behalf to service providers. Once whānau have dealt with their immediate needs, paeārahi continue to help them build their capability to be self-managing. For many whānau, working with a paeārahi will be their first experience of a model of care which focusses on their strengths and aspirations, rather than a deficit model which focuses on their needs as perceived by others (for example, needs assessors or case workers). The aspirational rather than deficit focus empowers whānau to think long-term about their goals and draw from their strengths in planning to achieve them.

Paeārahi will be trained by research team members and other relevant trainers, to deliver injury prevention and rehabilitation interventions (‘the intervention’). The paeārahi training programme as specific to injury-related care, has been developed in response to earlier work undertaken by this research group. The training needs were identified, specifically in relation to injury prevention and rehabilitation. The training ‘module’ will be established and planned out with the intention to have this NZQA accredited by a training organisation.

ACC as an organisation offers acute and rehabilitative recovery services to people with injury. Training will include understanding ACC processes and expected level of services and timeframes. It will also provide guidance around ‘trouble shooting’ ACC processes, what to do when there is a stumbling block and understanding ACC entitlements and appeal process. It will also likely to include falls prevention training about risk factors, risk assessment, successful strategies, relevant allied health and medical/health referrals, use of community streetscape assessments. Bone health and exercise are some of the most evidence-based strategies for injury prevention in older adults and paeārahi will concentrate the best ways for knowledge transfer to whānau and koeke. The balance of personal health, environmental assessment and increased access to appropriate exercise and other health and social services will be a focus.

There will also be training to ensure paeārahi understand tikanga around access to home, providing care to koeke and whānau, and sound understanding of the concepts of tapu and noa.

#### Whānau Intervention

Whānau will have the option to sit alongside recruited koeke during the paeārahi intervention. They can do this informally, as part of the normal support network and also have the option of consenting to participate in pre- and post-intervention assessments. Whānau will be able to contact paeārahi if they have any follow up questions. This will be undertaken in a place of mutual convenience to the paeārahi and whānau participant/s and may include the home of the koeke, home of the whānau or a community centre.

## Outcomes of interest

The primary outcome of interest is the number of unintentional injury-related ACC claims 12-months pre- and post-intervention (Table 2).

The secondary outcomes include change in Whakaahua wheel scores; Hua Oranga score; strength and balance measures; 12 month pre- and post-intervention hospitalisations, emergency department visits, general practice visits, and falls; experiences and perceptions of the intervention.

Process evaluation will also occur and this is also detailed in Table 3.

#### Table 2. Outcomes of interest, measures and methods

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Outcome measure** | **Assessment tool/s** | **Data collection method (collector)** | **Source** | **Time point for data collection** | **Analytical method** |
| **Primary Outcome** | Number of unintentional injury related ACC claims | Data query using recruited koeke NHI | Electronic audit (ACC) | ACC claims database | 6-12months pre and post\*\* | Statistical analysis |
| **Secondary Outcomes** | Wellbeing | Hua Oranga | Recorded excel/database (researcher) | Koeke, whānau, paeārahi | 3-6 months post\* | Descriptive statistics |
| Wellbeing | Whakaahua wheel assessment (part of Te Pou Matakana Whānau Ora Assessment kit) | Recorded in Mahi Tahi electronic platform (paeārahi) | Koeke | Baseline and 3-6 months post | Descriptive statistics |
| Strength and balance | Timed up and go43  Short-Physical Performance Battery (SPPB) score44 | Physical assessment recorded in excel/database (paeārahi) | Koeke | Baseline and 3-6 months post | Statistical analysis |
| Fear of falling | Falls Efficacy Scale - International45 | Recorded excel/database (paeārahi) | Koeke | Baseline and 3-6 months post | Statistical analysis |
| Confidence in injury-related care and access | Study specific tool | Recorded excel/database (researcher) | Koeke, whānau | Baseline and 3-6 months post | Descriptive statistics |
| Depression | Geriatric Depression Screening Tool45Modified Hua Oranga | Recorded excel/database (paeārahi) | Koeke | Baseline and 3-6 months post | Descriptive statistics |
| Number of falls | Assessment: in the last 3 months have you had any falls  If Yes, how many?  Did you seek medical advice for a fall in the last 3 months  Have you had any injuries because of a fall in the last 3 months? | Recorded excel/database (paeārahi) | Koeke | Baseline and 3-6 months post | Descriptive statistics |
| Issues identified (injury-related and other) | Paeārahi goals/issues/actions assessment tool incl time from referral to action  Personal risk assessment including falls history, footwear, mobility, number of medications, nutrition, continence  ‘Healthy homes’ assessment tool  Environment assessment tool https://www.acc.co.nz/assets/injury-prevention/acc7771-home-safety-checklist.pdf | Recorded excel/database (paeārahi) | Koeke | Throughout intervention at each contact point | Descriptive statistics |
| Actions taken (injury-related and other) | N/A | Recorded excel/database (paeārahi) | Koeke |  | Descriptive statistics |
|  | Experiences and perceptions of the service | Qualitative interviews  Audit of above records for contacts/ referrals / services received | Audio-recorded and transcribed (researcher) | Koeke, whānau, paeārahi, other stakeholders | Post intervention | General inductive  Descriptive statistics |
| Number of unintentional injury-related primary care contacts | Data query using recruited koeke NHI | Electronic audit (researcher) | Practice management system | 6-12months pre and post\*\* | Statistical analysis |
| Number of injuries | Data query using recruited koeke NHI | Electronic audit of practice patient management system (researcher) | Practice management system | 6-12months pre and post\*\* | Statistical analysis |
| Number of unintentional injury-related hospitalisations | Data query using recruited koeke NHI | Electronic audit (MOH) | MOH - National Minimum Dataset | 6-12months pre and post\*\* | Statistical analysis |
| Number of Emergency Department presentations | Data query using recruited koeke NHI | Electronic audit (MOH) | MOH - National Minimum Dataset | 6-12months pre and post\*\* | Statistical analysis |
|  |  |  |  |  |  |
| Cost effectiveness outcomes will also be included and will be analysed based on data from other outcomes described above | | | | | |
|  | \*3-6 months post = 3-6 months after first paeārahi visit  \*\*6-12 months pre and post= 6-12 months prior to recruitment and 6-12 months post recruitment | | | | | |

### Data collection

Participants will be assigned a random, 4-digit Study ID at point of consent. Te Arawa Whānau Ora Collective (TAWO) researchers will keep a master that links NHI to Study ID.

Data will be collected from a number of sources including koeke, whānau, practice management systems and routinely collected data from national health databases. This is described in full in Table 2. Identifiable health data will be kept within secure practice management systems.

As described in the recruitment sections, approximately ten koeke, ten whānau, all paeārahi, and up to ten other stakeholders involved in the intervention through, for example, referrals (e.g occupational therapists) will be invited to participate in post-intervention interviews/focus groups/wānanga to explore their experience of the intervention.

Interview/focus group/wānanga will take place at a location convenient to the participant and interviewer, by mutual agreement and may occur in-person or online. Interviewers/facilitators will have experience in this kind of research data collection method.

Interviews/focus groups/wānanga will be audio-recorded with consent, and the recordings will be transcribed verbatim. All qualitative data will be thematically coded and entered in an NVivio (v12) software program that allows analysis of written and visual data. Hand written notes will be taken of key discussion points and will be collected for analysis.

Participants will have the opportunity to review their transcripts and request changes to be made within 2 weeks of receipt of the transcripts. Participants can request that part of their conversation is edited/removed up to 2 weeks after the interview/focus group/wānanga.

It is anticipated the interviews/focus groups wānanga will take 30-60mins to complete.

### Data analysis

Data analysis will consist of quantitative and qualitative methods and have been briefly identified in Table 2.

#### Quantitative analysis

Descriptive statistics will be used to summarise the participant characteristics and primary and secondary outcomes. Statistical testing will be done for specific outcomes. Quantitative data will be analysed using Stata or R. A full Statistical Analysis Plan will be developed prior to intervention delivery.

#### Qualitative analysis

Members of the research team (with experience in kaupapa Māori and qualitative research methods) will use a general inductive approach in thematic analysis to code the interview/focus groups/wānanga data and generate themes. It is likely that themes will be structured around the topics in the interview guide (positive aspects of the paeārahi intervention; challenges or opportunities for improvement in paeārahi model; change in confidence relating to injury prevention through intervention; paeārahi training; injury and ACC related knowledge; whānau involvement; collective outcomes from the intervention; likelihood to utilise a similar programme in the future). Once themes have been developed these will be presented back to participants via email or in hui, to seek consensus of findings.

Findings will be used to inform recommendations for further intervention model development. There is the potential that findings will be of benefit to health navigators outside the Te Arawa rohe.

## Process evaluation

In addition to the outcomes of interest, a process evaluation will be conducted which will consist of four stages.

1. **Utilisation of the programme logic**

The programme logic described above will provide the basis for the measurement model and helps identify areas in which data should be collected and how the relationships will be analysed. It is anticipated that this will involve the following areas: content of the tasks undertaken by paeārahi; quantity and content of associated formal support (allied health, ACC, primary care); and the goals and associated plans identified as part of the assessment process with the koeke and whānau.

1. **Examine programme implementation**

Using the logic model, interviews will be conducted with all paeārahi and a purposive sample of up to ten whānau. In addition, interviews will be conducted with providers of associated formal support (allied health, ACC, primary care) and informal support (NGOs). Questions will explore the degree to which the programme was implemented as it was designed. Data will be collected through interviews/focus groups/wānanga with interviewers/facilitators using a topic guide (positive aspects of the paeārahi intervention; challenges or opportunities for improvement in paeārahi model; change in confidence relating to injury prevention through intervention; paeārahi training; injury and ACC related knowledge; whānau involvement; collective outcomes from the intervention; likelihood to utilise a similar programme in the future). An iterative approach to facilitation will be taken as this has the potential to identify topics of importance that researchers have not previously identified (acknowledging the researchers’ privilege of being ‘inside’ the health system).

1. **Examine programme dosage**

This determines how much of the intervention each koeke and whānau received. Interviews with groups outlined in point two above will explore the aspects of the intervention they received (as defined by the programme logic), how much they received as well as how often. This will also be captured in the paeārahi clinical records at each point of contact.

1. **Examine programme fidelity**

This refers to the degree to which the programme followed the intended approach. What will be particularly looked for is where parts of the programme are changed, or are not delivered at all. Analysis of interviews with the groups of participants described above and the koeke interviewed will be used the basis to evaluate programme fidelity.

As this is a process evaluation, interviews in steps 2 and 4 will also explore factors that aided and hindered the achievement of the outputs. This data will inform how the programme might be improved if rolled out across other localities. It is also anticipated that this evaluation will help to support the development of a ‘best practice’ guidance on paeārahi resourcing to ensure people in these roles are adequately resourced to provide services. There is also the acknowledgement that although there will be consistent processes across all paeārahi in the study, they are working in different hauora practices, different DHBs and with different communities and therefore there may be some differences that will be described.

#### Table 3. Process evaluation outcome measures and data collection methods

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Outcome measure** | **Assessment tool/s** | **Data collection method (collector)** | **Source** | **Time point for data collection** | **Analytical method** |
| Content of the tasks undertaken by paeārahi | Paeārahi assessment form | Record of inputs by paeārahi | Paeārahi | Monthly during the intervention period for koeke and whānau | Descriptive analysis |
| Quantity and content of associated formal support (allied health, ACC, primary care) and informal support (NGOs) | Database with connectivity to paearahi records, locality records | Referrals / other communications with associated support/Institutional data: PHO/practice, locality | Paeārahi | Monthly during the intervention period for koeke and whānau | Descriptive analysis |
| The goals and associated plans identified as part of the assessment process with the koeke and whanau | Paeārahi goal setting instrument | Record of koeke and whanau goals | Koeke and whānau | Monthly during the intervention period for koeke and whānau | Descriptive analysis |
| Programme implementation, fidelity and dosage | Qualitative interviews | Audio-recorded and transcribed (researcher) | Paeārahi, koeke, whānau, providers of associated formal support (allied health, ACC, primary care) and informal support (NGOs). | At the conclusion of the intervention period for koeke and whānau | General inductive |

# Application of research findings

The findings of this intervention research will be used to inform injury care models for older Māori. The process evaluation will support further development and support understanding what aspects were delivered, how they were implemented and whether changes to proposed intervention and evaluation were required.

# Protocol changes which may be required due to potential COVID-19 impacts

This research will be undertaken in 2021 and 2022 during the COVID-19 pandemic. During the time that the research will be undertaken, the national COVID-19 vaccination programme will be underway and change in government strategy suggest that there will be COVID-19 in the community during this project. COVID-19 has the potential to disproportionately affect Māori.46,47 Iwi Māori have shown leadership in quick, flexible responses during this pandemic to support whānau and protect communities.14,48

This study may need to be adapted to manage risks of infection spread and maintain connection with participants through all alert levels. Although face-to-face engagement is preferred for intervention delivery and interviews/focus groups/wānanga, it is our intention to include the possibility of video-conferenced intervention and wānanga to ensure the research can still be conducted. Members of our team have experience with videoconferencing interviews/focus groups. Consent may also be gained electronically. There will be components, such as healthy home assessments, that may not be able to be undertaken at various levels of COVID-19 restrictions, although it is possible that paeārahi will fall under the category of essential workers, recognizing that health care must continue through the pandemic to ensure wellness is maintained. These variations from protocol would be noted in the process evaluation and the reason (i.e COVID-19 implications) would be documented.

It is possible that the paearahi will be considered essential services and there is a clear argument that during lockdown reductions in activity, and withdrawal of support services have been detrimental to older people. This will be fully discussed throughout the relevant organisations and their internal clinical and organizational governance structures.

It is the intention that the majority of the dissemination to communities will be undertaken in face-to-face hui, however, the reality of restrictions related to COVID-19 mean that alternative dissemination methods may need to be employed. If this is the case, we will communicate with communities to understand their preferences, acknowledging that Māori have demonstrated the ability to adapt tikanga in the face of the pandemic, to uphold tikanga whilst guaranteeing safety of whānau and whakapapa. Wānanga will be undertaken in person in Alert Levels 1 and 2. Dissemination hui will only take place in Alert Level 1 and 2. Researchers will ‘take their bubbles with them’ and therefore only attend hui if it is appropriate based on the alert level restrictions relevant to the area in which they usually reside. Where wānanga or dissemination hui have been planned but need to change because of Alert Level changes, the decision on how to proceed will be made with the Principal Investigator and at least one other member of the research team. The number of in-person vs virtual wānanga will be recorded.

# Data storage and security

Data storage and security is detailed more fully in the Data Management Plan. Patient-level health data will be stored on practice management software and/or secure provider/TAWO IT infrastructure. Data will have identifiable data removed prior to transfer to University of Auckland analysts. TAWO will keep a master list of Study ID and NHI data which will be retained for 5 years. Health information will be retained for a minimum of 10 years as per the Health Retention of Information regulations.

No information that identifies the individual will be collected in the quantitative survey or the wānanga/interviews; Study ID will be used to identify participants. Wānanga and interviews will be audio recorded on a hand-held device and the audio file will be transferred via secure ‘webdrop’ services. Only password protected devices will be used. A secure link will be provided to transcriptionists for access to the audio file. Transcriptionists outside the research group will sign confidentiality agreements. Transcripts will not contain information that identifies an individual. No one outside the research team will have access to information except where stipulated elsewhere in the protocol (for example the transcriptionist who signed confidentiality agreements).

# Harms

Participants will be asked to provide time and disclose information (including health-related information) and there is the potential that some of this may be sensitive in nature. Paeārahi are trained to manage these situations. Measures will be put in place to maintain confidentiality and participants will be reminded throughout the process that they only need to participate (including answering questions) to a level with which they are comfortable and that they can withdraw at any time. Any important harm, adverse outcomes of the intervention or unintended effects relating to participation in the proposed research will be reported in the final research report.

Harms from participation in exercise session and home exercise are rare. Harms potentially associated with the intervention will be recorded by contact with the paeārahi. Harm events will be reported to the paeārahi’s clinical managers, which is part of routine practice for paeārahi. Harms will be reported to the research team periodically, at the monthly team meetings during the intervention and post-intervention phases of the study.

Reports of unacceptability of the data collection aspects and tiredness of the participants will be considered by paeārahi in their usual delivery mechanisms and reported at group meetings. The intervention process is considered a live, adaptable process and will be adapted to ensure physical exhaustion and mental stress is not exacerbated and wairua will be respected and promoted throughout the delivery.

# Limitations

This is a relatively small study group and results will not be generalisable to all Māori.

The analysis involves pre and post analysis rather than a controlled trial and therefore will not be able to account for changes that may occur either within the study cohort or in the ‘environment’ (e.g. practice, policy, systems level). COVID-19 means that there may be some deviation from protocol in the way in which the planned intervention is developed however, given a process evaluation is part of this research, those deviations will be described in full and may support other researchers undertaking research during this (or future) pandemics.

# Trial registration

The trial has the Universal Trial Number (UTN): U1111-1270-3503 and will be registered with the Australian New Zealand Clinical Trials Registry (ANZCTR) once ethics approval has been received.

# Ethics

This study will only commence once ethics approval has been granted by the Health and Disability Ethics Committee, with locality approval from Lakes and Bay of Plenty (BOP) DHBs where research will take place. Research approval will be sought from all relevant governing bodies involved in the project.

Ethics and principles foundational to kaupapa Māori research29,49 will also be applied to ensure the wellbeing of participants and the appropriateness of the research to lead to positive, transformative change for Māori. These principles are:

Aroha ki te tangata - A respect for people. Demonstrated through the application of tikanga in the methodology and prioritising of Māori voices. This intervention study has been developed based on feedback from Māori communities. Outcomes that are meaningful to koeke and whānau (as understood from Phase 2 data) will be used as outcome measures for the intervention.

Kanohi kitea - Present yourself to people face to face. Face to face methods for recruitment, consent, data collection and dissemination will be prioritised. The research will utilize researchers who are already members of the communities in which the research is taking place, who whakapapa to the areas, and who will continue to be present beyond the end date of the research.

Titiro, whakarongo … korero - Look, listen … speak. The intervention is based around an holistic approach to health care. It has been informed by listening to the community and including the community in the development of the intervention. Process evaluation will mean that there are opportunities throughout intervention delivery to feedback about the intervention to understand the benefits from koeke and whānau perspectives and inform improvements for the future.

Manaaki ki te tangata - Share and host people, be generous. Koha and food will be provided to participants at dissemination hui. Participants will be provided with final reports that will have time put in to delivering information in an accessible way. Care will be taken to make people feel comfortable within the intervention space. Methods have been outlined in case of COVID-19 measures which prioritise community safety over the need for research to be undertaken.

Kia tupato - Be cautious. Participants will have multiple opportunities to confirm (or withdraw consent). Topics for discussion are being left reasonably broad and will not force people to answer questions or be involved in different intervention aspects if they do not want to. Health information will be held by their normal practices and not be supplied in an identifiable way to researchers outside the practices.

Kaua e takahia te mana o te tangata - Do not trample over the mana (honour, authority, prestige, power) of the people. Māori voices are centred in this research. Researchers from within their communities and practices will support local practices to be utilized within the research process. The research will be framed to interrogate ways in which the health system can be improved rather than deficit narratives and victim blaming. Koeke strength s will be used to support the delivery of the injury prevention and rehabilitation intervention.

Kaua e mahaki - Do not flaunt your knowledge. Koeke, whānau and other stakeholder views have been used to develop this intervention nand will be used to support further intervention development. Researchers will support the process by utilizing general knowledge of ethics processes, intervention development, analysis and findings.

These ethics have been used to guide the development of kaupapa Māori praxis.

# Dissemination and Translation of Findings

Our research team has extensive knowledge translation experience at all levels from community forums through to national and international audiences, via a full range of methods from academic and non-academic publications, reports, hui, stakeholder meetings, mainstream and Māori media and conferences.

Dissemination to communities will be led by the researchers from the communities where the research is taking place. Dissemination will involve face-to-face hui. Health providers, community members and study participants will be invited. Hui attendees and all participants will also receive a brief ‘lay summary’ of research findings. A group of participants would be invited to review this prior to wider dissemination to ensure the findings have been communicated in a meaningful and appropriate way.

JH will lead a publication plan which will be drafted at the beginning of the project and developed throughout the project. This will consist of both manuscripts for publication in peer reviewed journals and identification and development of non-academic publications targeted at health professionals and community members. To increase dissemination to the general public, JH will manage media releases with relevant team members taking lead as appropriate. Likely media outlets include: print (Spinoff, NZ Herald, Stuff), radio (e.g. Radio NZ, Te Arawa FM) and television (Te Ao Tapatahi, Te Karere, The Hui, Marae). Dissemination to other key stakeholders such as ACC, National Science Challenge - Ageing Well, injury rehabilitation and prevention sector leaders, other health practitioners, and DHBs. Dissemination with these stakeholders will support the ability to influence policy and service development. Dissemination will also be supported by the members of advisory group. Twitter/social media accounts will also be utilised to disseminate findings, which increases visibility to researcher networks nationally and internationally. Team members are also actively involved in a number of regional and national primary care/Māori health forums. Research team members will present findings at relevant conferences, including the National Kaumātua Service Providers Conference.

The costs effectiveness information will be directly reported to government partners including Pharmac (decisions about funding for treatments) and Treasury to ensure sustainable funding is achieved should the programme be found to be beneficial and cost effective.

# Funding

This research is funded by Health Research Council of NZ, ACC and National Science Challenge Ageing Well (HRC:20/1379). Funders will have no role or influence over study design, the collection, analysis and interpretation or reporting of the data.

The study sponsor (The University of Auckland) has no role in the study design; collection, management, analysis, and interpretation of data; writing of the report; and the decision to submit the report for publication.

# Study Timeline

The proposed timeline for the study is shown below (Figure 1)

**Figure 1: Timeline of study milestones**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Study Phases and Milestones** | **Month** | | | | |
|  | 9-12 | 12-15 | 15-18 | 18-21 | 21-24 |
| **Phase 3: Intervention delivery and process evaluation** |  |  |  |  |  |
| 3.1 Deliver intervention |  |  |  |  |  |
| 3.2 Process evaluation |  |  |  |  |  |
| **Phase 4: Intervention Evaluation** |  |  |  |  |  |
| 4.1 Pre and post baseline measures |  |  |  |  |  |
| 4.2 Analyse data/report findings |  |  |  |  |  |

# References

1. Waitangi Tribunal. Hauora -Report on Stage One of the Health Services and Outcomes Kaupapa Inquiry. Wai 2575. Wellington: Waitangi Tribunal; 2019.

2. Sharpe H, Accident Compensation Corporation, New Zealand, Ministry of Health. Injury-related health loss: a report from the New Zealand burden of diseases, injuries and risk factors study 2006-2016. Wellington: Ministry of Health; 2013.

3. Maclennan B, Wyeth E, Davie G, Wilson S, Derrett S. Twelve-month post-injury outcomes for Maori and non-Maori: findings from a New Zealand cohort study. Aust N Z J Public Health. 2014;38(3):227–33.

4. Marmot M, Friel S, Bell R, Houweling TA, Taylor S. Closing the gap in a generation: health equity through action on the social determinants of health. The Lancet. 2008 Nov 8;372(9650):1661–9.

5. Ministry of Health. Wai 2575 Māori Health Trends Report [Internet]. Wellington: Ministry of Health; 2019 [cited 2020 Apr 29]. Available from: https://www.health.govt.nz/publication/wai-2575-maori-health-trends-report

6. Nishtala PS, Narayan SW, Wang T, Hilmer SN. Associations of drug burden index with falls, general practitioner visits, and mortality in older people. Pharmacoepidemiology and Drug Safety. 2014;23(7):753–8.

7. Ministry of Health. Tatau Kahakura: Māori Health Chart Book 2015. 3rd ed. Wellington: Ministry of Health; 2015.

8. Teh RO, Menzies OH, Connolly MJ, Doughty RN, Wilkinson TJ, Pillai A, et al. Patterns of multi-morbidity and prediction of hospitalisation and all-cause mortality in advanced age. Age Ageing. 2018;47(2):261–8.

9. Kerse N, Lapsley H, Moyes S, Mules R. Intervals of care need: need for care and support in advanced age-LiLACS NZ. Auckland: University of Auckland; 2017 p. 29.

10. Health and Disability System Review. Health and Disability System Review - Final Report – Pūrongo Whakamutunga [Internet]. Wellington: HDSR; 2020. Available from: https://systemreview.health.govt.nz/assets/Uploads/hdsr/health-disability-system-review-final-report.pdf

11. Came H. Sites of institutional racism in public health policy making in New Zealand. Soc Sci Med. 2014;106(ut9, 8303205):214–20.

12. Allport T, Martin G, White H. Kaumātuatanga - The needs and wellbeing of older Māori. Auckland, N.Z.: Te Pou Matakana; 2018.

13. Rolleston AK, Doughty RN, Poppe K. The effect of a 12-week exercise and lifestyle management programme on cardiac risk reduction: A pilot using a kaupapa Māori philosophy. International Journal of Indigenous Health. 2017;12(1):116–30.

14. Harris M, Williams DV. Community checkpoints are an important and lawful part of NZ’s Covid response [Internet]. The Spinoff. 2020 [cited 2020 Aug 12]. Available from: https://thespinoff.co.nz/society/10-05-2020/community-checkpoints-an-important-and-lawful-part-of-nzs-covid-response/

15. Pihama L, Lipsham M. Noho Haumaru: Reflecting on Māori approaches to staying safe during Covid-19 in Aotearoa (New Zealand). Journal of Indigenous Social Development. 2020 Nov 1;9(3):92–101.

16. Reid P, Paine S-J, Curtis E, Jones R, Anderson A, Willing E, et al. Achieving health equity in Aotearoa: strengthening responsiveness to Māori in health research. 2017;130(1465):8.

17. Curtis E, Jones R, Tipene-Leach D, Walker C, Loring B, Paine S-J, et al. Why cultural safety rather than cultural competency is required to achieve health equity: a literature review and recommended definition. International Journal for Equity in Health. 2019 Dec;18(1):174.

18. Te Karu L, Bryant L, Harwood M, Arroll B. Achieving health equity in Aotearoa New Zealand: the contribution of medicines optimisation. Journal of Primary Health Care. 2018;10(1):11–5.

19. Te Pou o te Whakaaro Nui. DHB population profiles, 2019-2029: Statistics New Zealand projections 2018 update. Auckland: Te Pou o te Whakaaro Nui; 2019.

20. Thomas J. Changes in falls and fracture rates in New Zealand elderly: retrospective analysis [Masters thesis]. [Auckland]: Unitec Institute of Technology; 2016.

21. Te Arawa. Te Arawa 2050 - Te Arawa Vision. Te Arawa; 2020.

22. Selak V, Stewart T, Jiang Y, Reid J, Tane T, Carswell P, et al. Indigenous health worker support for patients with poorly controlled type 2 diabetes: study protocol for a cluster randomised controlled trial of the Mana Tū programme. BMJ Open [Internet]. 2018 Dec 1 [cited 2020 Feb 18];8(12). Available from: http://bmjopen.bmj.com/content/8/12/e019572

23. Harwood M, Tane T, Broome L, Carswell P, Selak V, Reid J, et al. Mana Tū: a whānau ora approach to type 2 diabetes. 2018;131(1485):8.

24. Lukaszyk C, Coombes J, Sherrington C, Tiedemann A, Keay L, Mackean T, et al. The Ironbark program: Implementation and impact of a community-based fall prevention pilot program for older Aboriginal and Torres Strait Islander people. Health promotion journal of Australia. 2018;29(2):189–98.

25. New Zealand Nursing Organisation. Unregulated Health Care Workers, 2011 - Position statement. Wellington; 2011.

26. Malcarney M, Pittman P, Quigley L, Horton K, Seiler N. The Changing Roles of Community Health Workers. Health Serv Res. 2017 Feb;52(Suppl 1):360–82.

27. Hayward B, Lyndon M, Villa L, Madell D, Elliot-Hohepa A, Le Comte L. My Home is My Marae: Kaupapa Maori evaluation of an approach to injury prevention. BMJ Open. 2017;7(3):e013811.

28. International Council of Nurses. ICN report 2007-2009: Health systems strengthening: Working together to achieve more. Geneva: International Council of Nurses; 2010.

29. Smith LT. Decolonising methodologies: Research and indigenous peoples. 2nd ed. London: Zed Books; 2012.

30. Curtis E. Indigenous positioning in health research: The importance of Kaupapa Māori theory-informed practice. AlterNative: An International Journal of Indigenous Peoples. 2016;12(4):396–410.

31. Pihama L. Kaupapa Māori theory: transforming theory in Aotearoa. He Pukenga Korero. 2010;9(2):5–14.

32. Rolleston AK, Cassim S, Kidd J, Lawrenson R, Keenan R, Hokowhitu B. Seeing the unseen: evidence of kaupapa Māori health interventions: AlterNative: An International Journal of Indigenous Peoples. 2020 May 25;1–8.

33. Hikaka J, Jones RG, Hughes CM, Martini N. “It is through shared conversation, that I understand” - Māori older adults’ experiences of medicines and related services in Aotearoa New Zealand. New Zealand Medical Journal. 2020;133(1516):33–46.

34. Harwood M, Tane T, Broome L, Carswell P, Selak V, Reid J, et al. Mana Tu: a whanau ora approach to type 2 diabetes. N Z Med J. 2018;131(1485):76–83.

35. Brewer KM. The complexities of designing therapy for Maori living with stroke-related communication disorders. N Z Med J. 2016;129(1435):75–82.

36. Hudson M, Milne M, Reynolds P, Russell K, Smith B. Te Ara Tika: Guidelines for Māori research ethics : A framework for researchers and ethics committee members. Auckland, N.Z.: Health Research Council of New Zealand on behalf of the Pūtaiora Writing Group; 2010.

37. Pihama L. Kaupapa Māori Theory: Transforming theory in Aotearoa. He Pukenga Korero – A Journal of Māori Studies. 2010;9(2):4–14.

38. Chan A-W, Tetzlaff JM, Altman DG, Laupacis A, Gøtzsche PC, Krleža-Jerić K, et al. SPIRIT 2013 Statement: Defining Standard Protocol Items for Clinical Trials. Ann Intern Med. 2013 Feb 5;158(3):200.

39. Boutron I, G.  Altman D, Moher D, F.  Schulz K, Ravaud P, Group\* for the CN. CONSORT Statement for Randomized Trials of Nonpharmacologic Treatments: A 2017 Update and a CONSORT Extension for Nonpharmacologic Trial Abstracts. Annals of Internal Medicine [Internet]. 2017 Jun 20 [cited 2021 Oct 13]; Available from: https://www.acpjournals.org/doi/abs/10.7326/M17-0046

40. Huria T, Palmer S, Pitama S, Beckert L, Lacey C, Ewen S, et al. Consolidated criteria for strengthening reporting of health research involving indigenous peoples: the CONSIDER statement. BMC Medical Research Methodology. 2019;19(1):173.

41. Kaiwai H. Kaiārahi work programme: Creating meaningful services for whānau. Auckland, N.Z.: Wai-Research; 2017.

42. Kingi TK, Durie M. “Hua Oranga” A Maori Measure of Mental Health Outcome. Palmerston North: Massey University; 1999 p. 79.

43. Podsiadlo D, Richardson S. The Timed “Up & Go”: A Test of Basic Functional Mobility for Frail Elderly Persons. Journal of the American Geriatrics Society. 1991;39(2):142–8.

44. Lauretani F, Ticinesi A, Gionti L, Prati B, Nouvenne A, Tana C, et al. Short-Physical Performance Battery (SPPB) score is associated with falls in older outpatients. Aging Clin Exp Res. 2019 Oct;31(10):1435–42.

45. Yardley L, Beyer N, Hauer K, Kempen G, Piot-Ziegler C, Todd C. Development and initial validation of the Falls Efficacy Scale-International (FES-I). Age and Ageing. 2005 Nov 1;34(6):614–9.

46. McLeod M, Gurney J, Harris R, Cormack D, King P. COVID‐19: we must not forget about Indigenous health and equity. Aust N Z J Public Health [Internet]. 2020 Jul 6 [cited 2020 Aug 13]; Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7361596/

47. Steyn N, Binny RN, Hannah K, Hendy S, James A, Kukutai T, et al. Estimated inequities in COVID-19 infection fatality rates by ethnicity for Aotearoa New Zealand. New Zealand Medical Journal. 2020;133(1520):28–39.

48. Dutta M, Elers C, Jayan P. Culture-Centered Processes of Community Organizing in COVID-19 Response: Notes From Kerala and Aotearoa New Zealand. Frontiers in Communication. 2020;5(62).

49. Cram F. Rangahau Māori: Tona Tika, Tona Pono. In: Research Ethics in Aotearoa. Auckland, N.Z.: Longman; 2001. p. 35–52.