PERCEPTIONS OF TE RONGOĀ KĀKĀRIKI

Green Prescription health service among Māori in the Waikato and Ngāti Tūwharetoa rohe

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Abstract

Why Māori participation is low in the national Te Rongoā Kākāriki: Green Prescription (GRx) programme is not well understood. A modified GRx programme included in Te Wai o Rona: Diabetes Prevention Strategy, a community-based Māori diabetes prevention trial, took place in the Waikato and Ngāti Tūwharetoa rohe for adult Māori between 2004 and 2006. The aim of this study was to explore with those involved what they perceived would encourage Māori to participate in the GRx. Sixty kanohi-ki-te-kanohi interviews undertaken with participants at high risk of type 2 diabetes and heart disease (n = 27) and their whānau (n = 9), Māori community health workers (n = 14), and health professionals (n = 10) revealed five themes of importance for Māori participation in the GRx: i) purpose, ii) low awareness, iii) preference for kanohi-ki-te-kanohi interactions, iv) Māori community health worker credibility, and v) strong network ties. A mixed-methods randomised trial is recommended to compare kanohi-ki-te-kanohi and waea modes of delivery for GRx among adult Māori.

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Keywords

Te Rongoā Kākāriki, Green Prescription, physical activity, Māori, kanohi-ki-te-kanohi/face-to-face, waea/telephone

Introduction

The driving force behind this paper was to understand Māori perceptions of the national Te Rongoā Kākāriki: Green Prescription (GRx) health service (Johnson & Wood, 2015; Pringle, 2008) and identify better ways in which to increase participation of Māori adults newly diagnosed with type 2 diabetes mellitus (T2DM) in this health service. The Aotearoa New Zealand GRx health service was adapted from a British lifestyle intervention trial (Jones, Harris, Waller, & Coggins, 2005) designed to increase physical activity and consumption of nutritious foods to optimise health and well-being. The GRx health service is available for people living with medical conditions that are potentially physically limiting or health threatening (e.g., diabetes, heart disease and obesity) (Johnson & Wood, 2015; Pringle, 2008).

International randomised controlled trials of lifestyle interventions in other populations (e.g., American, Finnish, Indian and Chinese) have shown that enhanced physical activity and dietary change can prevent or delay the onset of T2DM among those with impaired glucose tolerance (IGT) (Baker, Simpson, Lloyd, Bauman, & Fiatarone-Singh, 2011; Gillies et al., 2007; Knowler, Barrett-Connor, & Fowler, 2002; Tuomilehto & Lindstrom, 2003). In the trials, intensive face-to-face support was associated with significant reductions in diabetes incidence (Baker et al., 2011). Similar approaches in Aotearoa New Zealand with Māori and Pacific communities have reported that working in partnership improves reach and engagement with those most at risk (Simmons & Voyle, 2003; Voyle & Simmons, 1999).

Retrospectively, it was considered important to analyse and report on these 10-year-old data as part of the rationale for finding better ways of engaging Māori participants in the GRx health service; the subject of a recently completed doctoral thesis (Williams, 2014). In 2005 the typical GRx referral process was initiated by a general practitioner (GP) and/or a practice nurse prescribing a safe level of physical activity for their patient. The prescription (or script) was then faxed to a Regional Sports Trust and the patient assigned to a GRx kaiwhakahaere within 7 to 10 working days. The GRx kaiwhakahaere provided, via telephone contact, one-on-one support and encouragement. Areas covered included goal setting, how to become more physically active at home and work, suggestions for activities available in the patient's community and how to choose and portion nutritious foods. Ongoing telephone contact was dependent on need, but occurred at least once a month for three months. Evaluation of the GRx programme amongst New Zealand Europeans showed that telephone delivery of the programme was associated with self-reported increases in duration and level of physical activity (Carr, 2001; Elley, Kerse, Arroll, & Robinson, 2003, 2004; Kerse, Elley, Robinson, & Arroll, 2005).

In partnership with the Ministry of Health, a number of modified GRx health services/programmes have been offered in diverse areas of New Zealand (e.g., by Waitakere, Manukau City and Christchurch providers). A common factor has been the referral process. Modifications have involved the inclusion of group activities, food workshops and/or physical fitness sessions instead of individual or telephone support.

In general, few Māori, compared with New Zealand Europeans, participate in national physical activity initiatives and associated

research (Hillary Commission, 1998; Martin, 2003; Murphy, McAuley, Bell, & McLay, 2003) and the GRx programme is no exception (Baxter, 2002; Kāhui Tautoko Limited, 2005; Van Aalst & Daly, 2004). Thus, historically, developing models and effective engagement with Māori has been a challenge. The inclusion of group activity programmes with a focus on Māori recruitment and adherence (Hillary Commission, 1998; Kāhui Tautoko Limited, 2005) has shown some success. Having a GRx educator or advisor responsive to the cultural needs of Māori is thought to be more effective, particularly through face-to-face contact (Hudson, Milne, Reynolds, Russell, & Smith, 2008; Mane, 2009; Smith, 1999). The main aim of such an approach is to ensure participants—in particular, Māori—become and feel more comfortable with the person in contact with them. This applies not only to those prescribed an intervention, but also for evaluation of health promotion projects aimed at increasing community participation in activities that promote physical activity and healthier food choices (McLean et al., 2009; Simmons, Rush, & Crook, 2008; Tipene-Leach et al., 2004; Wilcox et al., 2006). At the very least, service and programme support staff and researchers need to recognise the needs, values, te reo and customs of Māori (Bishop & Glynn, 1999; Hudson et al., 2008, 2010; Smith, 1999, 2012). Within the Aotearoa New Zealand setting, the application of these principles demonstrates a commitment to Te Tiriti o Waitangi (Durie, 1998; Kingi, 2007; Orange, 1987). This paradigm is about strengthening a perspective that encapsulates the value of shared knowledge through reciprocal partnerships in physical activity and food health promotion. Key outcomes that would demonstrate the effectiveness of the GRx programme would be increased participation of Māori and, subsequently, healthier Māori physical activity and food patterns.

Te Wai o Rona: Diabetes Prevention Strategy

Te Wai o Rona: Diabetes Prevention Strategy (DPS) was a clustered (by geographical area of residence) randomised controlled trial. It was the result of a partnership (Table 1) between researchers, funders, health services and Māori in the Waikato and Ngāti Tūwharetoa rohe in response to a Ministry of Health request for a randomised control trial for a national DPS that would target priority population groups. The primary focus of the DPS was to reduce new cases of T2DM by 35% over three years through lifestyle change among Māori adults in the Waikato region (Simmons et al., 2008). The

TABLE 1 Partnerships within Te Wai o Rona: Diabetes Prevention Strategy

Funders	Iwi/Māori providers	District health boards	Academic
Health Research Council, New Zealand	Waikato-Tainui Ngāti Tūwharetoa	Waikato District Health Board	Auckland University Waikato Clinical School
		Lakes District Health Board (southern regions)	Auckland University of Technology Wintec Polytechnic
Sport and Recreation New Zealand (Pharmac)	Iwi/Māori health providers	Iwi Māori Council Kaitiaki Roopu (governance group)	Te Wai o Rona: DPS academic team studies: • Mapping • GRx programme
Sport Waikato Green Prescription kaiwhakahaere	Māori community health workers	Te Wai o Rona: DPS operations team	Potential recipients

Note. DPS = Diabetes Prevention Strategy; GRx = Green Prescription.

strategy commenced in 2004 and was to include several components: i) one-on-one coaching by a Māori community health worker (MCHW), ii) a specially developed GRx approach for those at higher risk of cardiac events, and iii) community action to promote local groups to support physical activity changes and healthy eating choices. This trial did not continue after the three years due to funding reasons (Simmons & Rush, 2010). The aim of this evaluative study was to explore, with those who had been involved with the modified GRx within Te Wai o Rona: DPS, what they perceived would encourage Māori to participate in the GRx, and, based on these perceptions, make recommendations for how engagement and participation of Māori in the national GRx health services may be improved.

Methods

The place of the GRx programme within Te Wai o Rona: Diabetes Prevention Strategy

The research design, recruitment, development and piloting of the one-on-one intervention through MCHWs in the Te Wai o Rona: DPS has been described elsewhere (Simmons et al., 2008). Only participants residing in the intervention area with either newly diagnosed T2DM and/or IGT, and/or possible risk related to exercise were sent a letter (copied to their GP) advising that they should ask to be referred by their GP to the GRx programme.

GPs were informed of the process extensively through local primary health organisations, both before and throughout the trial. A subsidy was provided so that GPs with low fees were paid in full for the participant visit, while GPs with higher fees were levied minor part charges. The standard GRx process of faxing the referral to Sport Waikato was followed and referrals passed on to the identified Te Wai o Rona: DPS Sport Waikato GRx kaiwhakahaere rather than the mainstream GRx support team. Furthermore, rather than a telephone follow-up, the Te Wai o Rona: DPS GRx kaiwhakahaere arranged a one-on-one face-to-face interview to negotiate and support the way forward to improve participants' physical activity and healthier food consumption. After this meeting, those without new diabetes (i.e., IGT or limited ability to undertake physical activity [LAUPA]) were transferred to the local MCHW whose role it was to engage, encourage and support physical activity and healthier food consumption patterns over the next 18 months alongside other components of Te Wai o Rona: DPS. A comparison of features in Te Wai o Rona: DPS GRx with the national GRx programme is shown in Table 2. Further, the relationships of recruitment, referral and transfer processes of participants and key informants in the research are shown in Figure 1.

Evaluation method

Only 202 of the 815 participants who met the criteria to receive a DPS GRx referral letter were telephoned, and of these, 27 agreed to a face-to-face interview; 9 whānau were also included in these interviews. Twenty-four selected key informants (MCHWs and health professionals) responsible for the referral, planning and delivery of the GRx programme were also interviewed. The interviews, conducted by telephone and face-to-face, were designed to explore in depth the behaviour, attitudes and motivation of those involved with the modified GRx programme. The interview schedules were developed to identify i) the overall understanding amongst participants and key informants of the national GRx programme, ii) the overall understanding amongst participants and key informants of the modified national GRx programme within Te Wai o Rona: DPS, and iii) whether the latter GRx programme increased programme participation and the level of regular exercise or activity and healthier food consumption.

Ethics approval for the DPS to conduct one-on-one and focus group interviews and to audio-tape these sessions was provided by the Northern Regional Ethics Committee (NTY/07/12/137).

All interviews—kanohi-ki-te-kanohi and telephone—were conducted by the same person (MHW) between 2005 and 2006. All interviewees declined to have their interview recorded but verified the interview notes with the researcher at the conclusion of the interview.

Telephone interviews of GRx participants (n = 202) ranged from 30 to 60 minutes and included, in addition to the questions, introductions that covered the researcher's whakapapa and an explanation about the research. Typically, GRx participants were contacted via home phone. Kanohi-ki-te-kanohi interviews of the participants (n = 27) along with their whānau support (n = 9), MCHWs (n = 14)

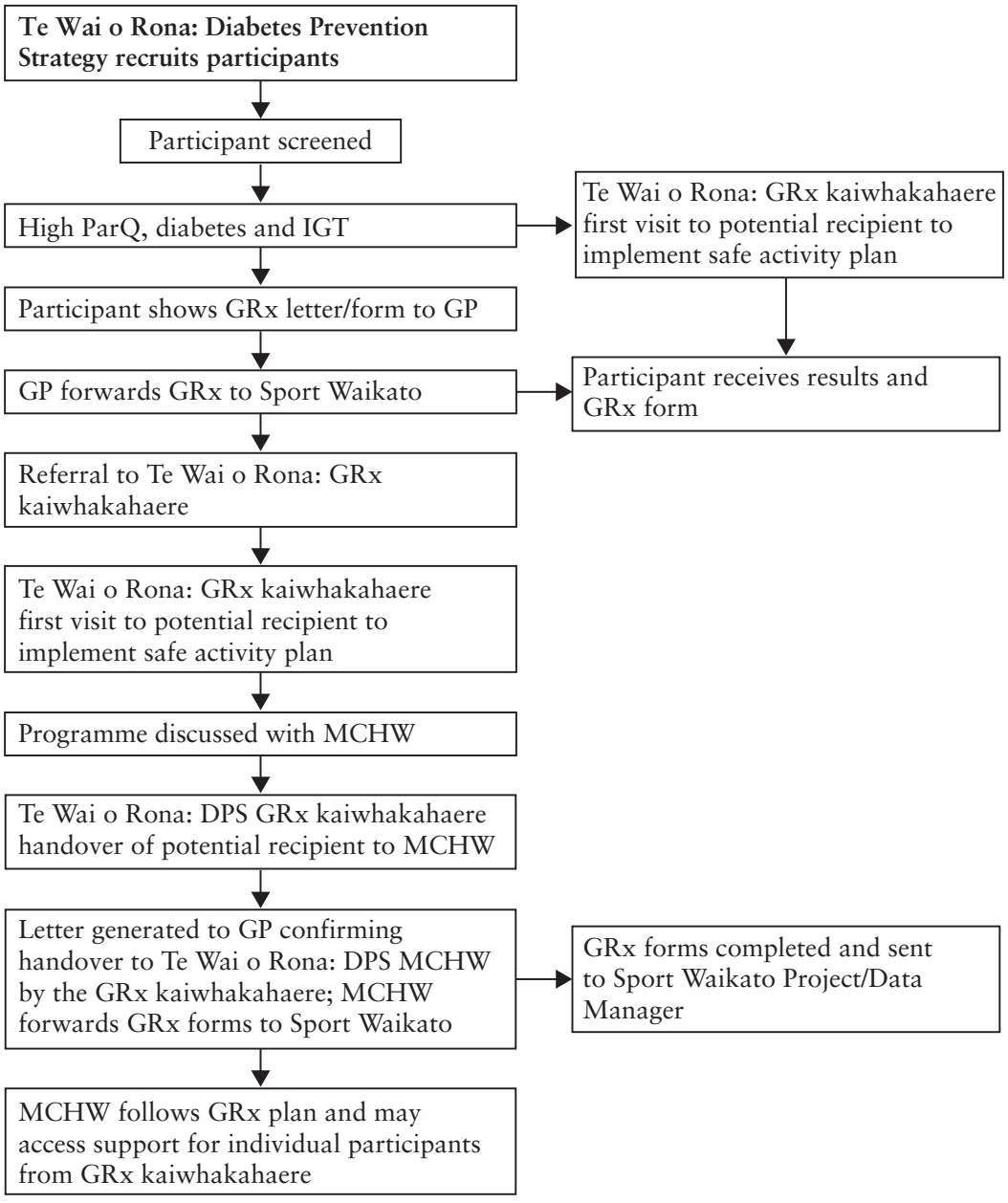

FIGURE 1 Recruitment, referral and transfer of participants

Note. DPS = Diabetes Prevention Strategy; GP = general practitioner; GRx = Green Prescription; IGT = impaired glucose tolerance; MCHW = Māori community health worker; ParQ = physical activity readiness questionnaire.

TABLE 2 Comparison of features of Te Wai o Rona: Diabetes Prevention Strategy with the national Green Prescription programme as provided in 2005

Te Wai o Rona: Diabetes Prevention Strategy	National Green Prescription model
Tailored to those at high cardiovascular risk	Tailored to those at high cardiovascular risk
Referral from general practitioner	Referral from general practitioner
18-month intervention period	3-month intervention period (maximum)
Māori individual/whānau targeted	Generic population targeted
Kanohi-ki-te-kanohi support	Telephone support
Initial contact: Te Wai o Rona: DPS GRx kaiwhakahaere employed by Sport Waikato	Sport Waikato patient kaiwhakahaere
Ongoing contact: Māori community health worker provides intensive support	
Feedback to general practitioner	Feedback to general practitioner (necessary repeat referral available)

Note. DPS = Diabetes Prevention Strategy; GRx = Green Prescription.

and health professionals (n = 10) took place at the homes and/or workplaces of participants. These interviews ranged from 60 to 120 minutes. Implementation of Māori protocols (e.g., karakia, sharing of kai, and whakawhanaungatanga) were offered and/or adhered to at the request of the participants and health professionals prior to and/or upon arrival at the interview setting. Summaries of the interview were given to the participant, the MCHW and a health professional at the end of their interview. For those who requested an opportunity to review their summary, a self-addressed pre-paid envelope was provided to enable their feedback to be returned to the researcher.

The research aim and questions were addressed using descriptive interpretative design and tools (Tong, Sainsbury, & Craig, 2007) underpinned by an inquiry approach informed by general inductive theory (Thomas, 2006). This type of analysis approach adds value because it can produce trustworthy and meaningful findings by following a systematic set of procedures (Kerse et al., 2004). Interpretation of the interview notes was an iterative and reflective process undertaken by the researcher. As the data were collected (from Māori GRx kaiwhakahaere, Sport Waikato GRx team leaders and GPs and/or practice nurses), Excel spreadsheets were used to code and sort responses into themes subjectively determined by the researcher during the process of transcription. Further iterative readings of the transcripts were undertaken, underpinned by the general inductive theory approach, to develop the key themes (Thomas, 2006). The final themes derived allowed for selection of quotes from the recipients and health workers to highlight their perceptions, context and understanding of the GRx programme.

Results

Telephone interview responses for those to be eventually referred to MCHWs

Of the 202 participants telephoned, 119 (59%) (55/94 [59%] new diabetes and 64/108 [59%] with IGT or LAUPA) reported that they already engaged in some physical activities—in particular, walking, gardening and house cleaning. There was no significant difference in the proportion of GRx participants who were already engaged in some form of physical activity based on time of diagnosis (i.e., existing condition versus newly diagnosed condition).

A total of 45 of the 55 (82%) newly diagnosed diabetes participants reported that they had received a Te Wai o Rona: DPS results letter and that their GP had explained the details. Of these people, 15 (33%) reported that they were prescribed a GRx, all of whom stated that they had found the GRx to be useful. For those who were not prescribed a GRx the main reasons were that GPs provided advice about lifestyle changes instead (e.g., physical activity [*n* = 24] and food [*n* = 7]) and, in some instances, were prescribed medication (e.g., metformin [*n* = 4]).

Of those with IGT or LAUPA, 58 of 64 (91%) reported that they had seen their GP—however,

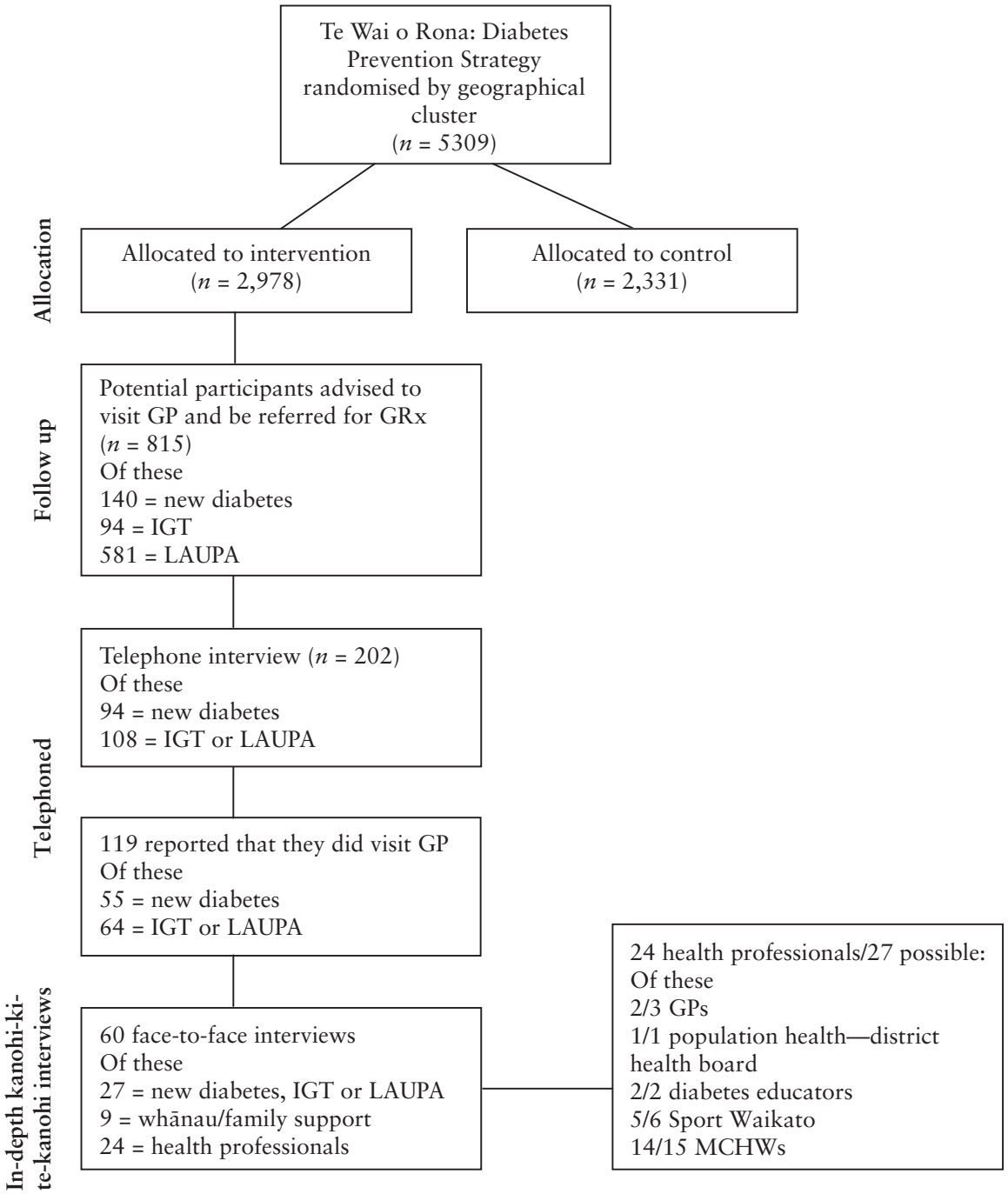

FIGURE 2 Flow of identification of participants, whānau and health professionals through each interview stage

Note. GP = general practitioner; GRx = Green Prescription; IGT = impaired glucose tolerance; LAUPA = limited ability to uptake physical activity; MCHW = Māori community health worker.

only 3 (5%) were actually referred for a GRx in this study. Twenty reported that their GP explained their Te Wai o Rona: DPS results letter, 16 received repeat tests to screen for diabetes, and 11 were given advice about different food types to help prevent diabetes. Of the 64 interviewed, 48 (75%) agreed to future one-on-one or group contact for in-depth interviews (Figure 2).

Kanohi-ki-te-kanohi responses

Sixty kanohi-ki-te-kanohi interviews were undertaken with participants (n = 27), whānau (n = 9), MCHWs (n = 14) and health professionals (n = 10). Of those interviewed, 50 (83%) reported that they were of Māori ethnicity, and 34 (67%) spoke of their connections to the local intervention area belonging to the iwi of Waikato-Tainui and/or Ngāti Tūwharetoa (Table 3). All health professionals interviewed (n = 10) reported that they had either developed or worked with the participants eligible in the current study and the standard national GRx programme, while all but one of the health professionals reported understanding the Te Wai o Rona: DPS GRx intervention. All MCHWs also reported that they were unfamiliar with the national GRx programme—in particular, the role of the regional Te Wai o Rona: DPS GRx kaiwhakahaere. This response was explained by their understanding that they too had received training, and provided and delivered safe physical activity and nutritious food options to recipients in their assigned geographical area. Hence they could not understand the difference between the roles of the Te Wai o Rona: DPS GRx kaiwhakahaere and the MCHWs because the support, advice and outcomes were similar. This confusion and lack of understanding was also highlighted by 24 (88%) of the 27 Te Wai o Rona: DPS participants who reported that they thought the GRx process was the delivery of the 12 Te Wai o Rona: DPS physical activity and food messages delivered by the MCHWs.

Key themes

From the interviews, five themes for Māori were identified: i) the purpose of Te Wai o Rona: DPS, ii) low awareness of the national GRx programme, iii) a preference for face-to-face communication, iv) MCHW local credibility, and v) strong family/social network relationships. These are described in more detail below.

THEME 1: THE PURPOSE OF TE WAI O RONA: DIABETES PREVENTION STRATEGY IS IMPORTANT

All respondents commented on the importance of the Te Wai o Rona: DPS programme tailored to prevent/delay T2DM in Māori, as highlighted in the following quotes.

> Te Wai o Rona: DPS is an awesome idea, an exciting research and is needed given that type 2 diabetes is at epidemic proportions within the Māori population. (Female health professional)

> The kaupapa of this research is good because it is about helping you and our people to prevent

TABLE 3 The number of in-depth interviews with recipients self-identified as Māori, and affiliated to Waikato-Tainui or Ngāti Tūwharetoa iwi

Recipients	Female	Male	Māori	Iwi affiliations
Health professionals	5	5	4/10 (40%)	2/10 (20%)
Māori community health workers	13	1	14/14 (100%)	13/14 (93%)
Participants with new diabetes, IGT or LAUPA	15	12	24/27 (89%)	19/27 (70%)

Note. IGT = impaired glucose tolerance; LAUPA = limited ability to uptake physical activity.

> diabetes by doing physical activity and making healthier food choices. (Female participant)

> Overall, I think the Te Wai o Rona: DPS is a fabulous service and what I like best is the inclusion of whakapapa and meeting people in the research, it brings you closer together—the pumanawa or feeling your heart is good. (Female participant)

Responsibilities of GPs were perceived as important for implementing approaches to increase Māori participation in this GRx model as illustrated in the following quote.

> I think it is important or critical that GPs are aware of Te Wai o Rona: DPS so that when we (GPs) get patients asking questions about Te Wai o Rona: DPS GRx we can give them valid/accurate information. (Male health professional)

Some participants reported their disappointment in Te Wai o Rona: DPS ending:

> This project has been choice for me, my husband, my whānau and our people . . . I believe that the information about physical activity and diet should be carried on. I am sorry that it (Te Wai o Rona: DPS) is closing, we should have had it years ago. (Female participant)

THEME 2: LOW AWARENESS OF THE GRx PROGRAMMES

All participants and MCHWs revealed a lack of knowledge about the national GRx programme. Respondents repeatedly made statements to this effect; for example:

> I do not know anything about the GRx programmes, and this is why I have not participated in, or know of any GRx models. (Female participant)

Although health professionals were familiar with the national GRx programme, two health professionals were less familiar with the modified GRx Te Wai o Rona: DPS. The following quotes highlight these points.

> The national GRx is designed to promote physical activity and healthy lifestyle changes for those living with medical conditions that prevent patients from positive lifestyle changes. (Female health professional)

> We refer many of our patients to the national GRx programme, I was not aware of the Te Wai o Rona: DPS. (Male health professional)

As a means to increase Māori participation in the GRx programme, some health professionals suggested the importance of encouraging patients to participate in the GRx programmes; for example:

> General practitioners who have a good relationship and are supportive of our patients may help patients to participate. (Male health professional)

THEME 3: PREFERENCE FOR FACE-TO-FACE COMMUNICATION

All respondents reported that the delivery of the GRx programme should be with face-to-face contact to ensure participants contribute and feel safe when working with the support team. The following quotes represent such ideas.

> Face-to-face allows the support person and patient to develop trust and/or rapport with each other and this can improve participation in physical activity. (Female health professional)

> Meeting the support person and/or you [MHW] at home helps me to speak more freely and is a better way to build rapport and/or trust with me. (Female participant)

The next quote demonstrates the importance of both guiding and showing participants how to exercise safely and to document their progress to motivate engagement in the GRx programme:

> I have found it important to show our people how to do things, such as fill in the weight diary, walk with them and also encourage them to do kapa haka. More kanohi-ki-te-kanohi contact is needed. (Female MCHW)

Further, several health professionals and participants identified the telephone approach as a key barrier for engaging Māori in the GRx programmes, as illustrated in the following quotes.

> Māori did not take the calls seriously. (Male health professional)

> It is difficult for Māori to trust or open up to someone they cannot see. (Female health professional)

> When you are speaking to someone over the telephone it feels empty—there is no wairua in it, you know, no sense of connection. (Male participant)

THEME 4: MĀORI COMMUNITY HEALTH WORKER LOCAL CREDIBILITY IS IMPORTANT

Several participants commented that knowing and seeing the MCHW in the community was important, as identified in the following quotes.

> I liked the relationships developed between the MCHW and me as I thought they were natural, nice and pleasant people with a good wairua. (Female participant)

> The involvement of the MCHW has helped me to monitor my nutrition intake and physical activity uptake and also helped to motivate me with the booklet steps and setting small achievable goals. (Male participant)

Moreover, MCHWs acknowledged the importance of a face seen in the community:

> I think it is important to be seen out in the community because our whānau are quick to tell you that you only want to see them when you want something. I do not have this problem. (Female MCHW)

THEME 5: WHAKAWHANAUNGATANGA: STRONG FAMILY/SOCIAL RELATIONSHIPS ARE HELPFUL TO ESTABLISH AND MAINTAIN PARTICIPATION IN THE GRx PROGRAMME

A number of participants reported an appreciation for the research facilitators taking time to communicate with them through establishing a connection through family or social relationships (i.e., whakawhanaungatanga). This is evident in the following quotes.

> I believe that whakapapa and whanaungatanga are important to help reduce barriers. You [researcher] and our MCHW have a lovely wairua and this helped me to feel comfortable in the interview. (Female participant)

> We do not have time over the telephone to do whakawhanaungatanga like you telling me which family you belong to and then telling me more about you and our people's connections. For us, Māori, this process is important. (Male participant)

Establishing relationships through whakapapa or belonging to a community group in common, such as a sports club, was also described by MCHWs and health professionals as important:

> Whakawhanaungatanga is what I do first . . . I tell them where I am from . . . what I do in the community or work . . . They [the participants] tell me they feel comfortable knowing that they know me and that I also know a little bit about diabetes. (Female MCHW)

Discussion

Health professionals, MCHWs, and the GRx participants and their whānau shared their understanding of the GRx programme in relation to Māori. The preference for how (delivery mode), who (the credibility of the MCHW) and the importance of network ties within the kaupapa of the GRx were common factors highlighted in the interviews.

Te Wai o Rona: DPS GRx participants and their whānau said that they did not understand the purpose of the GRx. Overall these respondents perceived the kaupapa of Te Wai o Rona: DPS (to prevent and/or delay diabetes) to be very important for Māori, but did not link this to the prescription that they had received. Furthermore, these participants', MCHWs' and two health professionals' knowledge and awareness (understanding) about both the national GRx programme and the GRx programme in Te Wai o Rona: DPS was limited. However, though most of the health professionals said that they were familiar with the national GRx programme, this did not result in effective referral of Māori in this study to the GRx kaiwhakahaere at Sport Waikato. This is consistent with reports of the GRx programme to the Ministry of Health (Pringle, 2008). Pringle highlights lack of participation of Māori in the national GRx health service and recommends this could be increased by focusing effort and resources to improve Māori, and some health professionals', knowledge and awareness of the GRx programmes. This knowledge and awareness would also help overcome participants' confusion with the delivery of physical activity and healthy food support by MCHWs with those of the modified GRx programme. Face-to-face communication, local credibility and strong family/social network relationships of the MCHW and/or kaiwhakahaere were identified as equally important for raising knowledge and engagement of Māori. These concepts, which are of paramount importance with Māori—in particular, when being counselled and/or interviewed—are not new (Milne, 2005; Ministry of Social Development, 2004; Smith, 1999). Moreover, Pringle (2008) recommends research into delivery of the standard national three-month GRx by telephone compared with a face-to-face alternative and the need to assess the benefits for Māori of increasing physical activity and healthier food advice.

Strengths of this work are the contribution from Māori participants to reinforce and increase understanding of why they were not prescribed or engaging with the modified GRx service that was recommended. It is also a strength that those interviewed represented a number of the groups involved in the delivery and receipt of the GRx. However, only two GPs provided responses, and it may also be argued that the sample was not necessarily representative of Māori, as they had volunteered to take part in this research. Further, this exploratory and baseline study was designed to provide a snapshot of the acceptability of face-to-face approaches, but we can see that a more detailed evaluation may assist with identifying why and how this approach would be more effective. Hence, while this research has provided context, the small numbers interviewed and the narrow time frame mean the generalisability of the findings is limited.

Further investigation is warranted to explore how to establish a common link, maintain engagement, and provide useful information, as well as how to be responsive to the current context of the lifestyle of participants. More investigation is also needed to establish principles around establishing the preferred time of contact, the content of the ongoing contact (e.g., support alone vs ongoing information/advice), the referral to/linkage with activity groups and the utility/principles behind such groups.

Similarly, investigation is required as to the impact of longer intervention periods (i.e., more than three months) on healthier physical activity and food patterns—that is, measuring how helpful a face-to-face approach is, in

both commencing and maintaining new physical activity and food choice patterns that are known to reduce the risk for, and improve the clinical outcomes of, T2DM (Gillies et al., 2007). A number of physical activity and food programmes within clinical trials have incorporated face-to-face contact with different ethnic groups and this has been one component of an effective strategy for reduction of the incidence of T2DM (Baker et al., 2011). All these trials have delivered the intervention for one year or more and had a face-to-face component. The Diabetes Prevention Program in the United States (Diabetes Prevention Program Research Group, 2004) showed the risk of diabetes was reduced by 58% among their participants with a one-year intervention. That study reported outcomes for White American, Native American, Asian and Hispanic people. Those of Hispanic, Asian and Native American descent typically met their long-term activity goals, while White Americans met their initial weight loss goal and their overall activities increased with age (Knowler et al., 2002). These results led to further intensive/face-to-face trials with the aim of reducing T2DM among indigenous groups of peoples, specifically with their country of origin (Gillies et al., 2007). An example is the Finnish Diabetes Prevention Study (Lindstrom et al., 2003; Tuomilehto & Lindstrom, 2003). In the Finnish study, long-term (six years) beneficial changes in physical activity, diet, and clinical and biochemical parameters reduced diabetes risk by 58% in their intervention group compared with their control group. A further clinical trial in Japan that focused only on Japanese men with IGT showed a reduction in waist circumference was just as reliable as weight reduction (Kosaka, Noda, & Kuzuya, 2005). The key results of these clinical trials showed the usefulness of reducing diabetes incidence through a reduction in waist circumference and weight among a number of ethnic groups. Further, a systematic review of physical activity interventions in primary care with adults confirmed increased physical activity and cost utility similar to funded pharmaceutical interventions (Garrett et al., 2011).

Role of general practitioners in GRx

An unexpected but very important finding was that the majority of GPs had previously referred some of their patients to the national GRx programme, but did not prescribe GRx to most of the participants identified in Te Wai o Rona: DPS. This was surprising given the breadth and depth of prior communication with GPs, and the receipt of a copy of the personal letter sent to the potential recipient. There was a suggestion from those participants with heart conditions that their GP advised that they should take a cautious approach to increased participation in physical activity, but the reason for the GRx process is the prescription of safe activity. The fact that only 33% of those with new diabetes were referred, even when administrative processes and out-of-pocket expense costs had been removed, suggests that passive approaches to improving referral rates may not work. A clear understanding of barriers to referral for GPs is required to find ways to increase referral rates for those most likely to benefit—in particular, for individuals diagnosed with IGT and LAUPA—to prevent and/or delay medical conditions such as diabetes and heart disease. Beyond the trial setting, awareness campaigns among GPs may be helpful (e.g., including case studies that clearly show benefit). Similarly, inclusion of systematic alerts within patient management software may also assist with follow-through of patients through primary care services (Gabbay, Khan, & Peterson, 2005; Joshy & Simmons, 2006; Lawrenson, Gibbons, Joshy, & Choi, 2009). Other options are to train practice nurses or employ lifestyle coaches to undertake the coaching within a practice so that having a relationship with the coach (whakawhanaungatanga), rather than just the GP, is part of the process. These issues are also of importance when Māori are being counselled and/or interviewed (Milne,

2005; Ministry of Social Development, 2004; Pringle, 2008). Identification of the following would also impact on the reach of the service to Māori who would benefit most: i) what present referral process(es) is/are relevant, ii) how GPs determine patients are of Māori descent, iii) how hospital diabetes services (i.e., nurses and practitioners) can be a part of the referral process for GRx given the large and increasing volume of Māori accessing these services.

Future directions

Te Wai o Rona: DPS was just beginning to establish the required groups and networks, but was terminated before this work could be completed. The lead author is currently undertaking a mixed-methods randomised trial among Māori diagnosed with diabetes to compare the impact and process of kanohi-ki-te-kanohi with waea contact on uptake of physical activity and healthy food consumption support.

Conclusion

We conclude that Māori cultural approaches, such as whanaungatanga through kanohi-ki-te-kanohi contact in the Te Wai o Rona: DPS GRx programme, may result in enhanced and increased physical activity and healthy food consumption for Māori identified as most at risk and therefore benefiting the most from the delivery of a GRx and similar interventions. Approaches to increase referral for GRx from GPs require further development.

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Glossary

Aotearoa	land of the long white cloud (literal meaning)/New Zealand
iwi	people or tribe
kai	food; to eat
kaitiaki	guardians or advisors
kaiwhakahaere	facilitator/support person
kanohi-ki-te-kanohi	face-to-face
kapa haka	group performing arts or culture display
karakia	incantation/prayers
kaupapa	rationale
pumanawa	heart—a feeling that your heart is good or you are a good person
rohe	region/territory/area
te reo	language (referring to Māori language)
Te Rongoā Kākāriki	Green Prescription (GRx)
Te Tiriti o Waitangi	the Treaty of Waitangi
waea	telephone
wairua	soul/spirit

whakapapa	genealogy/family background
whakawhanaungatanga	strengthening family/social relationships
whānau	family/extended family
whanaungatanga	relationships

References

Baker, M., Simpson, K., Lloyd, B., Bauman, A. E., & Fiatarone-Singh, M. A. (2011). Behavioural strategies in diabetes prevention programs: A systematic review of randomized controlled trials. *Diabetes Research and Clincial Practice*, *91*, 1–12. doi:10.1016/j.diabres.2010.06.030

Baxter, J. (2002). *Barriers in health care for Maori with known diabetes: A literature review and summary of issues*. Wellington, New Zealand: New Zealand Working Group on Diabetes.

Bishop, R., & Glynn, T. (Eds.). (1999). *Culture counts: Changing power relations in education* (1st ed.). Palmerston North, New Zealand: Dunmore Press.

Carr, H. (2001). *Green Prescription: Physical activity and health. The benefits of physical activity on minimising the risk of disease and reducing disease morbidity and mortality*. Wellington, New Zealand: Hillary Commission for Sport, Fitness and Leisure.

Diabetes Prevention Program Research Group. (2004). Achieving weight and activity goals among diabetes program lifestyle. *Obesity Research*, *12*(9), 1426–1434.

Durie, M. H. (Ed.). (1998). *Te mana, te kawanatanga: The politics of Maori self-determination* (1st ed.). Auckland, New Zealand: Oxford University Press.

Elley, C. R., Kerse, N., Arroll, B., & Robinson, E. (2003). Effectiveness of counselling patients on physical activity in general practice: Cluster randomised controlled trial. *British Medical Journal*, *326*(7393), 793–796. doi:10.1136/bmj.326.7393.793

Elley, C. R., Kerse, N., Arroll, B., & Robinson, E. (2004). Cost effectiveness of physical activity counselling in general practice. *New Zealand Medical Journal*, *117*(1207), 1–15.

Gabbay, R. A., Khan, L., & Peterson, K. L. (2005). Critical features for a successful implementation of a diabetes registry [Review]. *Diabetes Technology & Therapeutics*, *7*(6), 958–967. doi:10.1089/dia.2005.7.958

Garrett, S., Elley, C. R., Rose, S. B., O'Dea, D., Lawton, B. A., & Dowell, A. C. (2011). Are physical activity interventions in primary care and the community cost-effective? A systematic review of the evidence. *British Journal of General Practice*, *61*(584), e125–133. doi:10.3399/bjgp11X561249

Gillies, C. L., Abrams, K. R., Lambert, P. C., Cooper,

N. J., Sutton, A. J., Hsu, R. T., & Khunti, K. (2007). Pharmacological and lifestyle interventions to prevent or delay type 2 diabetes in people with impaired glucose tolerance: Systematic review and meta-analysis. *British Medical Journal*, *334*(7588), 299. doi:10.1136/bmj.39063.689375.55

Hillary Commission. (1998). *More people, more active more often*. Wellington, New Zealand: Sport and Recreation New Zealand.

Hudson, M., Milne, M., Reynolds, P., Russell, K., & Smith, B. (2008). *Te Ara Tika: Guidelines for Māori research ethics—A framework for researchers and ethics committees*. Auckland, New Zealand: Health Research Council.

Hudson, M., Milne, M., Reynolds, P., Russell, K., & Smith, B. (2010). *Te Ara Tika: Guidelines for researchers on health research involving Māori*. Auckland, New Zealand: Health Research Council. Retrieved from http://www.hrc.govt.nz/news-and-publications/publications/maori

Johnson, M., & Wood, A. (2015). *Green Prescription patient survey 2015 report*. Wellington, New Zealand: Ministry of Health. Retrieved from http://www.health.govt.nz/our-work/preventative-health-wellness/physical-activity/green-prescriptions/green-prescription-research/green-prescription-patient-survey

Jones, F., Harris, P., Waller, H., & Coggins, A. (2005). Adherence to an exercise prescription scheme: The role of expectations, self-efficacy, stage of change and psychological well-being. *British Journal of Health Psychology*, *10*(3), 359–378. doi:10.1348/135910704X24798

Joshy, G., & Simmons, D. (2006). Diabetes information systems: A rapidly emerging support for diabetes surveillance and care. *Diabetes Technology & Therapeutics*, *8*(5), 587–597. doi:10.1089/dia.2006.8.587

Kāhui Tautoko Limited. (2005). *Literature review: He oranga poutama*. Wellington, New Zealand: Ministry of Health.

Kerse, N., Elley, C. R., Robinson, E., & Arroll, B. (2005). Is physical activity counseling effective for older people? A cluster randomized, controlled trial in primary care. *Journal of the American Geriatric Society*, *53*(11), 1951–1956. doi:10.1111/j.1532-5415.2005.00466.x

Kerse, N., Thomas, D. R., Neuwelt, P., Crampton, P., Dixon, R., & Dyall, L. (2004). *Consumers' views and experiences of primary health care in New Zealand: A snapshot*. Wellington, New Zealand: Ministry of Health.

Kingi, T. R. (2007). Treaty of Waitangi: A framework for Maori health devlopment. *New Zealand Journal of Occupational Therapy*, *54*(1), 4–10.

Knowler, W. C., Barrett-Connor, E., & Fowler, S. E. (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin: The diabetes prevention program research group. *New England Journal of Medicine*, *346*, 393–403.

Kosaka, K., Noda, M., & Kuzuya, T. (2005). Prevention of type 2 diabetes by lifestyle intervention: A Japanese trial in IGT males. *Diabetes Research Clinical Practice*, *67*, 152–162.

Lawrenson, R. A., Gibbons, V., Joshy, G., & Choi, P. (2009). Are there disparities in care in people with diabetes? A review of care provided in general practice. *Journal of Primary Health Care*, *1*(3), 177–183.

Lindstrom, J., Louheranta, A., Mannelin, M., Rastas, M., Salminen, V., Eriksson, J., . . . Tuomilehto, J. (2003). The Finnish Diabetes Prevention Study (DPS): Lifestyle intervention and 3-year results on diet and physical activity. *Diabetes Care*, *26*(12), 3230–3236.

Mane, J. (2009). Kaupapa Māori: A community approach. *MAI Review*, *3*(1), 1–9.

Martin, J. (2003). *Evaluating Green Prescription from a health promotion perspective*. Wellington, New Zealand: Wellington School of Medicine and Health Sciences.

McLean, R. M., Hoek, J., Buckley, S., Croxson, B., Cumming, J., Ehau, T. H., . . . Schofield, G. M. (2009). Healthy Eating—Healthy Action: Evaluating New Zealand's obesity prevention strategy. *Bio Med Central Public Health*, *9*(1), 452. doi:10.1186/1471-2458-9-452

Milne, M. (2005). *Maori perspectives on kaupapa Maori and psychology: A discussion document*. Wellington, New Zealand: New Zealand Psychologists Board.

Ministry of Social Development. (2004). *Nga ara tohutohu tangahau Maori: Guidelines for research and evaluation with Maori*. Wellington, New Zealand: Author.

Murphy, E., McAuley, K. A., Bell, D., & McLay, R. T. (2003). A new approach to design and implement a lifestyle intervention programme to prevent type 2 diabetes in New Zealand Maori. *Asia Pacific Clinical Nutrition Journal*, *12*(4), 419–422.

Orange, C. (Ed.). (1987). *The Treaty of Waitangi*. Wellington, New Zealand: Bridget Williams Books.

Pringle, R. (2008). *Health and physical activity promotion: A qualitative examination of the effect of receiving a Green Prescription (GRx)*. Hamilton, New Zealand: Wilf Malcolm Insititute of Educational Research.

Simmons, D., & Rush, E. (2010). Whatever happened to Te Wai o Rona: Diabetes Prevention Strategy? *Diabetes* (March), 12–13.

Simmons, D., Rush, E., & Crook, N. (2008). Development and piloting of a community health worker-based intervention for the prevention of diabetes among New Zealand Maori in Te Wai o Rona: Diabetes Prevention Strategy. *Public Health Nutrition Journal*, *11*(12), 1318–1325. doi:10.1017/S1368980008002711

Simmons, D., & Voyle, J. A. (2003). Reaching hard-to-reach, high risk populations: Piloting a health promotion diabetes disease prevention programme on an urban marae in New Zealand. *Health Promotion International Journal*, *18*, 41–50.

Smith, L. T. (1999). *Decolonizing methodologies: Research and indigenous peoples*. Dunedin, New Zealand: University of Otago Press.

Smith, L. T. (2012). *Decolonizing methodologies: Research and indigenous peoples* (2nd ed.). Dunedin, New Zealand: Otago University Press.

Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, *27*(2), 237–246. doi:10.1177/1098214005283748

Tipene-Leach, D., Pahau, H., Joseph, N., Coppell, K., McAuley, K., Booker, C., . . . Mann, J. (2004). Insulin resistance in a rural Maori community. *New Zealand Medical Journal*, *117*(1207), U1208.

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, *19*(6), 349–357. doi: 10.1093/intqhc/mzm042

Tuomilehto, J., & Lindstrom, J. (2003). The major diabetes prevention trials. *Current Diabetes Reports*, *3*(2), 115–122.

Van Aalst, I., & Daly, C. (2004). *Green Prescription in general practice*. Wellington, New Zealand: Sport and Recreation New Zealand.

Voyle, J. A., & Simmons, D. (1999). Community development through partnership: Promoting health in an urban indigenous community in New Zealand. *Social Science & Medicine*, *49*(8), 1035–1050.

Wilcox, S., Dowda, M., Griffin, S. F., Rheaume, C., Ory, M. G., Leviton, L., . . . Mockenhaupt, R. (2006). Results of the first year of Active for Life: Translation of 2 evidence-based physical activity programs for older adults into community settings. *American Journal of Public Health*, *96*(7), 1201–1209. doi:10.2105/AJPH.2005.074690

Williams, M. H. (2014). *Te Rongoā Kākāriki: Kanohi-ki-te-kanohi, e pai ana? A mixed methods randomised trial of two approaches to the Green Prescription*. Auckland, New Zealand: Auckland University of Technology. Retrieved from http://hdl.handle.net/10292/8648