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Māori, pharmacists, and medicines adherence – A mixed methods study exploring indigenous experiences of taking medicines ‘as prescribed’ and mechanisms of support[☆]

Joanna Hikaka^{a,*}, Nora Parore^a, Robert Haua^a, Anneka Anderson^b, Mariana Hudson^a, Brendon McIntosh^a, Kevin Pewhairangi^a, Rachel Brown^b

^a Ngā Kaitiaki o Te Puna Rongoā o Aotearoa - The Māori Pharmacists' Association, New Zealand

^b The National Hauora Coalition, Auckland, New Zealand

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ABSTRACT

Background: Medicines are the most common medical intervention and medicines adherence is associated with improved clinical outcomes. Understanding drivers and experiences of medicines adherence is important for optimising medicines use. Māori (Indigenous people of Aotearoa New Zealand) experience inequities in access to medicines yet little evidence exists regarding Māori and medicines adherence, or the role of pharmacists in supporting medicines adherence for Māori.

Objectives: To explore Māori experiences of medicines adherence and non-adherence, and pharmacists' role in supporting adherence.

Methods: This was a convergent parallel mixed methods study. Facilitated *wānanga* (collaborative knowledge-sharing group discussions) were undertaken either online or in-person with eligible participants, using convenience and snow-ball sampling to recruit. Participants were eligible if they were Māori, 18 years or older, and had recently obtained medicine from a pharmacy. *Wānanga* involved semi-structured interviewing and questionnaire completion. General inductive coding and thematic analysis and descriptive statistical analysis were used respectively, and findings were situated in social, cultural and political Māori contexts.

Results: Thirteen *wānanga* were conducted with 62 participants (71% female, median age range 35–44) from September 2021 to February 2022. Four themes were identified: The aspirations of hauora Māori (Māori wellbeing) - medicines as a component of holistic wellbeing; whanaungatanga (relationships); knowledge; and *whānau* (family and support network) advocacy and problem solving. Forgetting to take medicines was the most frequently identified reason for non-adherence, followed by not having medicines on hand, adverse effects, and lack of symptoms of health conditions. Participants identified that proactive pharmacist support, including developing caring therapeutic relationships, sharing knowledge, acknowledging medicines as just one component of holistic wellbeing, and giving adherence tips to support routine medicine taking were positive ways that pharmacists could support medicines adherence.

Conclusions: Factors contributing to medicines adherence were diverse and participants identified numerous practical solutions that pharmacists, health service providers and policymakers could employ to support Māori medicines adherence.

1. Introduction

Medicines are the most common therapeutic intervention in Western medicine and long-term medicine use is central to the management of many long-term conditions. Utilising the World Health Organization's definition of adherence more generally, medicines adherence can be defined as the extent to which a person's medicine-taking behaviour ‘corresponds with

agreed recommendations from a healthcare provider’.¹ This definition acknowledges the active role of patients in medicines adherence. Higher levels of medicines adherence result in improved clinical outcomes for those experiencing chronic and multi-morbidity.²

In Aotearoa New Zealand (NZ), inequities in health-related outcomes exist, driven by inequities in the access to determinants of health including quality healthcare.³ Māori are the Indigenous people of NZ and experience

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* Corresponding author at: PO Box 42013, Acacia Bay Post Shop, Taupō 3330, New Zealand.
E-mail address: j.hikaka@auckland.ac.nz (J. Hikaka).

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earlier onset of chronic co-morbidity,³ are prescribed higher numbers of medicines from a younger age,⁴ experience higher rates of medicine-related harm,⁵ and are less likely to be able to access medicines when disease burden is taken into account compared with non-Māori.⁶ Access to appropriate medicine therapy for Māori is likely to improve health outcomes and support the achievement of health equity for Māori.^{7,8}

Medicines adherence is an important aspect of medicine access. Research to date regarding Māori and medicines adherence has focused on reporting differences in adherence between Māori and non-Māori.^{9–11} Previous literature has highlighted the disconnect between clinician and patient understanding of Māori adherence in the health setting, with clinicians often adopting a ‘victim-blaming’ discourse which contrasts strongly to Māori perceptions of pro-active health seeking.¹² Health professionals have an important role to play in supporting medicines adherence.¹¹ Medicines adherence is central to the role of a pharmacist and a key component of the publicly-funded Long-Term Conditions service available in all NZ community pharmacies, which has been shown to improve medicines adherence,¹³ although any differences in success by ethnicity remain unexplored. There is a paucity of information that focuses on factors driving and enabling Māori medicines adherence or ways in which pharmacists can support this.

The aim of this study was to explore Māori experiences of adherence to prescription medicines and the role pharmacists have in supporting adherence.

2. Methods

The convergent parallel mixed methods study presented here is part of a larger study that explores pharmacists' role in improving medicines access equity through pharmacist minor ailments services (PMAS) and medicines adherence. Facilitated *wānanga* were used for data collection. *Wānanga* support collaborative, in-depth group discussions, considerations, and deliberations and, similar to focus groups, involve multiple participants. *Wānanga* in the Indigenous research setting have been utilised as a safe space for knowledge co-production that centres Indigenous methods and realities and ‘cut across relations of power’.¹⁴ This study is reported in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ).¹⁵ Ethics approval was granted by the NZ Health and Disability Ethics Committee (Ref: 21/CEN/152).

2.1. Theoretical framework

Kaupapa Māori theory guided the data analysis to situate the findings in the relevant social, political and cultural context for Māori. *Kaupapa Māori* theory utilises Māori methods of knowing, being and doing, aims for positive, transformative change and supports aspirational thinking.^{16–18} *Kaupapa Māori* research aims to give power back to Māori in the research process,¹⁶ has been used in other Māori health services research,^{19–23} and is best practice when undertaking research centring on Māori.²⁴ Further articulation of the application of *kaupapa Māori* practices in this research have been published previously.²⁵

2.2. Recruitment

2.2.1. Participants

Participants were eligible if they were 18 years or older, Māori (self-identified), and had purchased a medicine or received a dispensed medicine from a pharmacy any time in the last 3 years. Those unable to provide informed consent were excluded. Convenience sampling²⁶ was used to recruit participants through local networks and relationships by members of the research team using methods of communication already embedded within current practice. Communication methods included distribution of a recruitment poster in pharmacies and/or via personal and professional Facebook™ accounts, and verbal conversations. ‘Snow-balling’, with participants informing others of the research and inviting them to participate,²⁷ was also allowed. Those team members recruiting participants were

based in six different locations across NZ (two towns and four cities). The *wānanga* locations were chosen to provide urban and rural coverage. The recruitment approach was flexible allowing research team members to engage with potential participants in a manner that aligned with usual community member communication pathways.

2.3. Setting and location of collection of consent

Participants had a choice to consent online or in-person. Online: Participants were provided with an online participant information sheet (PIS) and consent form (CF) and were asked to confirm their eligibility to participate, with the option to request contact from researchers to ask questions prior to consent. In-person: participants were provided with printed PIS and CF, eligibility was confirmed, and consent obtained, by the researcher/pharmacist in a face-to-face meeting. In-person consent occurred at the location of the *wānanga*, immediately prior. Participants were able to invite *whānau* (family members/support people) to be present during the *wānanga*. PIS contained information pertaining to the study aim of better understanding the pharmacists' role in achieving medicines access equity. All people present were asked not to discuss any of the content of the *wānanga* afterwards so that individual confidentiality was maintained.

2.4. Sample size

The number of participants was guided by other similar research²⁸ as well as a pragmatic approach based on the resources available. Content saturation, a contested approach in qualitative research,²⁹ was not used to decide sample size.

2.5. Data collection

Data collection occurred through *wānanga* and it was intended that there would be 5 or 6 participants at each *wānanga*. *Wānanga* could be in-person at a location convenient to facilitators and participants, or online via a video-conferencing system. Online options were planned for and provided in acknowledgement of the potential impact COVID-19 pandemic and related restrictions.²⁵ The study was designed to have 2 facilitators at each *wānanga* with at least one facilitator being a pharmacist, one with qualitative research experience, and one who could facilitate in *te reo Māori* (Māori language). These facilitator traits were not exclusive (i.e one facilitator could fulfil all three requirements at once). Facilitators who were not pharmacists were recruited through networks and existing relationships. All facilitators were Māori. Facilitators underwent 2 training sessions (recruitment, informed consent, *kaupapa Māori* theory, topic guide, semi-structured interviewing techniques, role-playing) prior to facilitating *wānanga*. The *wānanga* format included time at the beginning for *whakawhanaungatanga* (getting to know each other and sharing of connections), a presentation by the facilitators about pharmacist qualifications, PMAS, and medicines adherence, and utilisation of a topic guide (supplementary material) to prompt discussions. At the end of the discussion, facilitators summarised the discussion to gain consensus from participants regarding the main findings from the *wānanga* and to identify other key concepts, as perceived by participants. The topic guide was designed to explore participant experiences of, and support mechanisms for, minor ailment treatments and medicines adherence, and the perceived role that pharmacists should play in supporting minor ailment treatment and adherence. After discussions had concluded, participants were asked to complete a questionnaire either on paper or online (Qualtrics®) to capture demographic information and other relevant information for contextualising and corroborating the qualitative data (supplementary material). The questionnaire was administered after the qualitative data had been collected so that aspects included or proposed in the questionnaire did not influence participants' dialogue during the qualitative data collection phase. Where questionnaires were completed on paper, they were entered into Qualtrics® retrospectively by a member of the research team. Questions relating to PMAS focused on the types of conditions people had previously sought treatment for and conditions which they

would feel comfortable seeking treatments for from pharmacists without involving a doctor. Although we acknowledge that prescribing scopes extend beyond medical doctors, for simplicity of question interpretation, this phrasing was used. Conditions included were based on conditions included in international PMAS services,^{30–32} conditions where community pharmacists can supply medicines and change doses under standing orders,^{33,34} as well as conditions that pharmacists can currently supply medicines for without prescription in NZ. Questions relating to reasons for non-adherence included adaptations of the Adherence Barriers Questionnaire.³⁵ It also included extra items informed by the researchers' experiences as pharmacists. Demographic questions were also included in this questionnaire. Content and face validity were undertaken through research team review and by piloting the survey with three people. Initial piloting led to refinement of questions with further piloting with five people to produce the final questionnaire.

Wānanga were audio-recorded with consent, and transcribed verbatim. Participants were assigned 'participant numbers' in order of which they appeared during the review of transcripts. Transcripts were checked for accuracy by 1 member of the research team and translations from *te reo Māori* to English were undertaken by research team members when transcripts were checked. Where participants had entered text into the 'chat' screen in the video-conferencing system, these were retained and then inserted into the correct place of the transcript.

2.6. Data analysis

Kaupapa Māori theory was applied within a general inductive approach³⁶ to coding and thematic development. Five *wānanga* transcripts were inductively coded by 2 researchers (JH and RH). All codes generated were reviewed by JH, similar codes de-duplicated with data merged and arranged to produce a coding framework. This coding framework was then presented to the research team, reviewed for alignment with quotes and further refinement of codes was undertaken. The remaining transcripts were coded by JH, with the ability to add extra codes if required. NVivo qualitative data analysis software (QSR International Pty Ltd. Version 12, 2018) was used for coding. After all transcripts had been initially coded, the transcripts and codes were re-reviewed by JH. Codes were used to generate themes in a full day analysis meeting with 7 members of the research team. Initial themes were checked against quotes, with final themes then being defined and named, with full research team consensus of final themes. Themes were presented to project stakeholder reference group to review the potential impact of findings. Quotations were presented to illustrate themes. Demographic data was not reported against participant number as the demographic data was collected separately in the questionnaire and was not linked to individual participants. Questionnaire results were analysed using simple descriptive statistics.

2.7. Positionality and reflexivity

The research team was made up of 9 Māori researchers and a non-Māori administrator. Although there is diversity in the individual positionality within the research team, the group discussed shared positionality as follows: experience providing and receiving care as Māori in the health system in Aotearoa New Zealand, belief that colonisation and racism impact negatively on health care access and outcomes for Māori, that pharmacists have an important role in improving health care for and with Māori communities, the importance of Māori methodologies in research, the right of Māori to equitable health outcomes, and the ability of, and need for, Māori to lead in solution development. This positionality affected the team's reflexivity and how the research was undertaken from identifying this topic as an important area to investigate, to designing the research approaches and interpreting findings, through to how results were disseminated.

3. Results

Thirteen *wānanga* (3 in-person, 10 online) were held from September 2021 to February 2022 with 62 participants in total (median = 4

participants/*wānanga*; range = 1–11). The median duration for *wānanga* was 95 min (range = 62–210 min). Of those who completed the questionnaire (94%; *n* = 58), which included demographic information, the median age range for participants was 35–44 (range 18–24 to 75-plus), participants lived in 1 of 7 different regions of NZ, 71% identified as female, and 28% identified as having a physical disability. Participants were affiliated to 37 different iwi (tribes) across NZ. Most participants preferred to participate in both English and *te reo Māori* languages (76%). Further demographic data is found in Table 1.

In the last 12 months all participants had visited a general practitioner (GP) at least once, and pharmacies were the most frequently visited primary health care provider with 58.9% of participants visiting a pharmacy five or more times in that period. Two-thirds of participants lived within a 10-min drive of a pharmacy, while 18.2% lived more than a 30-min drive away from a pharmacy. Further health service accessibility data is found in Table 2.

Participants were given the option to bring *whānau* to the *wānanga*. All *whānau* members who attended met the eligibility criteria for inclusion in the study, chose to consent to participate themselves, and are included in the participant numbers. Twenty-nine participants consented to participate and prospectively confirmed attendance but then did not attend the *wānanga*. The reasons for non-attendance included illness, bereavement, other commitments, and information technology (IT) difficulties.

In the questionnaire, participants were provided with a list of potential reasons for medicines non-adherence and asked to tick all options that applied to their personal experience of adherence. The most frequent reason for non-adherence was forgetting (*n* = 18), followed by not having medicines available when travelling or working (*n* = 16), stopping because

Table 1 Participant demographics.

Characteristic (<i>n</i> = 58)	Category	% (<i>n</i>)
Age (years)	18–24	8.6 (5)
	25–34	17.2 (10)
	35–44	34.5 (20)
	45–54	13.8 (8)
	55–64	17.2 (10)
	65–74	6.9 (4)
	75-plus	1.7 (1)
Domicile region	Northland	19.0 (11)
	Auckland	27.6 (16)
	Bay of Plenty	17.2 (10)
	Gisborne	17.2 (10)
	Wellington	1.7 (1)
	Canterbury	10.3 (6)
Age groups in participant household (years)	Otago	6.9 (4)
	0–5	34.5 (20)
	6–17	50.0 (29)
	18–55	75.9 (44)
	55–80	43.1 (25)
Medical conditions of participants*	80-plus	8.6 (5)
	Angina	0 (0)
	Asthma	15.5 (9)
	Chronic obstructive pulmonary disorder (COPD)/emphysema	5.2 (3)
	Diabetes	20.7 (12)
	Gout	10.3 (6)
	Heart attack	0 (0)
	Heartburn/reflux	5.2 (3)
	Heart failure	0 (0)
	High blood pressure	29.3 (17)
	High cholesterol	19.0 (11)
	Stroke	5.2 (3)
	None of these conditions	25.9 (15)
Current number of regular prescription medicines	Nil regular	44.8 (26)
	1–2	29.3 (17)
	3–4	10.3 (6)
	5-plus	15.5 (9)

* Participants were asked to indicate conditions from this pre-populated list – conditions which did not appear on this list were not recorded.

Table 2
Participant health care access and accessibility.

Provider	Number of visits in last 12-months				Total responses (n)*
	0% (n)	1–2% (n)	3–4% (n)	5 + % (n)	
GP	0 (0)	25.9 (15)	37.9 (22)	36.2 (21)	58
Nurse practitioner	11.2 (8)	20.7 (12)	15.5 (9)	15.5 (9)	58
Community pharmacy	3.6 (2)	14.3 (8)	23.2 (13)	58.9 (33)	56
Rongoā [#] practitioner	52.0 (26)	26.0 (13)	12 (6)	10 (5)	50

Provider	Driving time to provider/practice (mins)					Total responses (n)*
	0–10 (n)	11–20 (n)	20–30 (n)	30 + (n)	Unsure (n)	
GP	50.9 (29)	21.1 (12)	15.8 (9)	12.3 (7)	0 (0)	57
Community pharmacy	67.3 (37)	7.3 (4)	7.3 (4)	18.2 (10)	0 (0)	55
Rongoā [#] practitioner	37.7 (20)	13.2 (7)	3.8 (2)	11.3 (6)	34.0 (18)	53

* Not all participants completed all answers.

[#] Traditional Māori system of healing.

symptoms had not improved ($n = 8$), and stopping because of adverse effects ($n = 7$). Thirteen participants said it was not applicable as they had not taken regular medicines previously, while 20 participants said it was not applicable as they always take their medicines as prescribed. No participants identified a lack of trust or lack of belief in the medicines as a reason for non-adherence (Table 3). Participants were asked to identify the 3 most common reasons for non-adherence for themselves and forgetting to take them was most common.

Thematic analysis identified 4 overarching themes. The ways in which pharmacists could support with the adherence issues relevant to each theme are also discussed.

3.1. The aspirations of hauora Māori (Māori wellbeing) - Medicines as a component of holistic wellbeing

This theme explored participants' views on the place of medicines in wellbeing, and how this understanding influenced their desire to take

Table 3
Reasons that participants took medicines in a different way from which was prescribed.

Reason	% (n/45*)
Not applicable – I always take my medicines as prescribed	44.4 (20)
I forgot to take them	40.1 (18)
I forgot to bring my medicines from home with me when I was travelling/working	35.6 (16)
My symptoms had got better so I didn't think I needed them anymore	18.2 (8)
They made me feel sick	15.6 (7)
I didn't have any medicines left	8.9 (4)
I couldn't afford to pick up my medicines	8.9 (4)
I wasn't able to get the Dr. to get the prescription	6.7 (3)
I wasn't able to get the pharmacy to pick up my medicines	6.7 (3)
I didn't think they were right for me	6.7 (3)
Another health professional told me to take them differently to how they had been prescribed	4.4 (2)
The medicines made no difference to my health	4.4 (2)
I used alternative treatments instead of medicines	4.4 (2)
The prescriber made a mistake with what was prescribed	2.2 (1)
I had been given the wrong medicines so I didn't take them	2.2 (1)
It was a hassle to take the medicines	2.2 (1)
I hadn't been given enough information to decide if I wanted to take them	2.2 (1)
I take too many medicines	2.2 (1)
The medicine treatment was too complicated	2.2 (1)
It was inconvenient to take my medicines	2.2 (1)
I had more important things going on	2.2 (1)
I didn't trust the medicines	0 (0)
I didn't believe in the medicines	0 (0)
Other – not specified	6.7 (3)

* 13 other participants reported that this question was not applicable as they did not take regular medicines.

medicines. Many participants discussed their understanding of medicines as being important to good health. This importance was felt by the individual, and by those who had roles supporting others to adhere to their medicine regimens, and consequently non-adherence was often reported as being unintentional.

[Medicines] actually do help me get through my day. So that I can have a better tomorrow. – P39.

Although appropriate medicines were discussed as beneficial to health, participants often discussed that medicines were just one aspect amongst many that supported good health and wellbeing. Many participants specifically referred to *Te Whare Tapa Whā* (a holistic Māori model of health and wellbeing, developed by Sir Mason Durie)³⁷ as important to their understanding of wellbeing. *Te Whare Tapa Whā* literally means the house of four walls and represents the way in which the 'four walls' (physical, mental, spiritual and family wellbeing), sit on a solid foundation (land) and are all required to be strong and in balance to achieve overall wellbeing.³⁷

The kairongoā [rongoā practitioner], she's not only going to fix my knee but she's also going to delve into Te Whare Tapa Whā. For a lot of Māori is quite important because it's not only just fixing one area it's having a look at your entire wellbeing spiritually, whānau connections... it's not just about one thing. It's about the entire person - P57.

Many participants discussed the role of rongoā Māori (traditional Māori system of healing) in wellbeing, with the ability of this system to exist alongside and complement Western medicines. Participants commonly discussed that there should be increased accessibility to rongoā practitioners and rongoā practices with the potential for this access to be supported through community pharmacies, and that there was likely to be beneficial synergies to this approach.

It would be really great to see rongoā practitioners working in pharmacies. [They can] whakamana (uplift) each other... share the rongoā knowledge and uptake some of the pharmacist knowledge at the same time - a transfer of information - P49.

The inability to access medicines was also another reason for unintentional non-adherence to medicines. Many participants described that multiple barriers were in place to accessing medicines including cost and availability barriers to accessing a prescriber for repeat prescriptions, unavailability of medicines in pharmacies, and other commitments that make access to pharmacies during standard business hours difficult.

[My husband] doesn't have the time or opportunity to go to the doctor to get a [prescription] script. So, he simply doesn't have his medication.

And so, for me, that's extremely worrying because it's his work hours that don't allow him to attend the GP or the pharmacy. – P1.

Participants expressed that these barriers were more prominent for those living rurally with fewer health care providers, shorter and less frequent opening times, less choice in who to access for care, and longer distances to travel to access care and medicines.

I've just gone without [prescription medicines] cause of either cost or time where I can't get to the coast [town where GP pharmacy is located]. – P50.

As medicines were deemed important by participants, many participants took active steps to prevent forgetting to take medicines, by establishing daily routines and processes that supported adherence.

I'm just like a creature of habit. So, when I do something over and over again, I get used to it and I just keep doing it. Whereas if it's something, put this cream on your big toe twice a day for a week. I'll forget it because it's not part of my ritual as such. – P7.

Methods utilised to support adherence included setting alarms, taking the medicines at the same time each day, and having travel packs ready if they were away from home.

I'll have little stashes everywhere and like I'll have some in the truck. But then now I've got evacuation bags, packs and stuff, things like that. I put some pills in there too. – P10.

Some participants suggested that one of the ways pharmacists could support medicines adherence was by supplying medicines without a prescription, particularly when the medicine was for a long-term condition that the person themselves had years of experience managing.

Maybe having a long-term prescription that you don't have to keep going back to the doctors to access the same thing. So, if it was on your file or something, then you could go to your pharmacist for access, without having to go to the doctor's every time. I know that they have repeat prescriptions, but sometimes it's... you always have to feel like you're explaining why you need it all the time. – P32.

I think it would be much easier if I could just walk into the pharmacy and say, "please just check my records. You guys have sold me a puffer before, eczema cream, hay fever pills. Can I please just get these?" And I should be able to walk out with those things. – P50.

3.2. Whanaungatanga (relationships)

Effective relationships between pharmacists and patients were seen as important to supporting medicines adherence. It was felt that good relationships promoted the exchange of information, therapeutic conversations, and robust decision-making by both parties while also allowing the pharmacist to demonstrate care for those being supplied medicines, again supporting adherence.

Perhaps you're a forgetful person or something like that. Knowing that [the pharmacist] said it was a really good idea; and he was cool; and he made me feel welcome. And I've got a question. I'm going to go back and ask..., you know, that whakawhiti aroha (caring exchange) in the relationship, I think would really improve things. – P48.

Several participants also discussed the importance of adherence packaging, whereby tablets are organised and packaged by the pharmacist, family members or patient by date and time as an extra aid to identify when to take medicines. These participants felt that adherence packaging helped them to support others to improve the ability to manage their medicines and that through good relationships, pharmacists have a role to play in proactively offering this service.

That's my answer to a lot of noncompliance with medications. They shouldn't be just dispensed... in bottles and packets and stuff that people get confused with. Throw them in a blister pack, and then they know whether they've taken them or not, and they get the right amount. Doesn't matter how many white pills there are, they're not going to get confused. – P59.

Participants felt that good relationships with pharmacists could help with proactive adherence support more generally.

[Pharmacists should] give adherence tips - "I forget sometimes so I set an alarm on my phone" Or what something you do twice day i.e., "take one when you feed the cat." – P21.

The importance of pharmacist proactivity in relationship *development* was also discussed. Many participants stated that they would be guided by pharmacists and pharmacy staff in how to establish a meaningful relationship and to understand the type of care and support that was available.

We are the ones with the gaps in our knowledge. So, we are really leaning in on the professionals to guide us and show us how they want this relationship to look. – P49.

3.3. Knowledge

This theme explores how knowledge was viewed as a privilege possessed by pharmacists, and the importance of sharing knowledge to rebalance power and understanding. This knowledge was essential to facilitate informed decision-making, self-management and autonomy relating to medicines management, which may include adherence to prescribed medicines. Participants expressed that with knowledge, informed decision-making was facilitated. Where information was not provided, medicines were not used optimally.

No one gave me the time, the opportunity, to give me that understanding about how to utilise my medicine. – P1.

Participants' experiences of knowledge provision by pharmacists were varied. Some said that good information and advice supported their wellbeing, with one participant stating that the informative conversations were healing in themselves.

I think that's a good idea to be able to go to the pharmacy for a collective picture of your health and well-being, if you can have that kōrero (discussion) that's a part of rongoā (treatment). - P 29.

Several participants relayed experiences of receiving the bare amount of information relating to medicines. This included that medicines information provision was often limited to pharmacists and pharmacy staff reading the label aloud.

They just tell me what's on the packet. But I can read the packet myself... It's the WHY. Tell them how the medicine works in their body, and that this is the best way for their tinana (body) to use it. – P21.

Other participants discussed ways in which pharmacist could better communicate, and the types of information that are useful for making informed decisions.

Actually having a conversation to ensure that our whānau know what they're taking, if they're taking a series of pills that interact against each other. That's the type of information that our whānau need to know. That helps with compliance or taking the right dosage. That also leads to better trusting relationships. – P9.

Not all knowledge needs to be shared in person. Several participants discussed that there was the potential for electronic solutions to be utilised to impart information such as reminders that new prescriptions were needed, that medicine re-supply was available at the pharmacy, and daily reminders

to take medicines. One participant discussed that pharmacists could support the development of a *mōteatea* (traditional incantation/chant/song) which could be used to remind people to take medicines and with a dual purpose of supporting Māori knowledge and ways of doing in the medicine taking process as well as drawing on other methods of healing.

Knowledge of one's own body, medical conditions, and the effects of medicines supported participants to make active decisions about medicine therapy. This was an active process that relied on good information and was supported by the transfer of information from health professionals. Many participants reported that they would take medicines in a different way to what was prescribed as, through experience, they had grown to understand how best to tailor medicine therapy to manage their own conditions, although these decisions were often made in collaboration with advice from health professionals.

But over time I've learnt... how to stay in tune with my body a lot more. I take insulin depending on my own understanding of myself... I always take the advice from the medical profession, and then I gapped it [changed it] to what works for me. - P13.

Medicine-related adverse effects were also a common reason for intentional non-adherence. Many participants explained that they stopped taking medicines or took lower than prescribed doses of medicines because they had experienced adverse effects that they perceived as being related to their medicines. In 1 case, fear of becoming addicted to medicines motivated the non-adherence. Decisions to take medicines differently because of adverse effects may or may not have been communicated by the participants to health care professionals.

My husband had just had enough. The medicines were making him sick. He was getting worse. He just said, nah I don't give a shit[sic] what the doctor said, I'm gonna stop all these medications. - P33.

3.4. Whānau advocacy and problem solving

This theme incorporates how participants demonstrated the ability to advocate for themselves and others in relation to medicines adherence and processes that support this. *Whānau* relationships and networks were important in supporting others to take medicines. Often this was in the context of immediate or extended family, but it also extended into participants' own professional roles as support workers, carers, and teachers, as well as more generally being members of a community who looks out for others. The importance of *whānau* wellbeing to individual health is a central tenant in the *Te Whare Tapa Whā* model of health.³⁷ This theme also explored the inverse concept; the importance of an individual *whānau* member's health to overall *whānau* wellbeing as well.

Ways in which participants supported *whānau* adherence included helping to access medicine supplies and supporting conversations around why medicine is important to care, through to more intensive support with daily management of medicines.

Our grandpa has dementia, so he has to take certain pills in the morning and certain pills at night-time. We've had to come up with a system, like it takes the *whānau* to separate them out. - P17.

Strategic plans were developed and enacted to manage medicines on a daily basis, often in response to health service or system barriers to medicine information and access.

These are the games and the barriers that we've got to navigate. It's really frustrating; it's frustrating for *whānau*. What happens is they disengage in the services, and they start asking around for pills. - P8.

When health information was not provided to an appropriate standard, several participants discussed how they were proactive in asking pharmacists for further information related to medicine use for *whānau*.

They just say, here's your medicine and go. I've actually argued a few times with them I said to them, "no, no you explain to my *kuia* [elder female] what it's for and what, how long does she take it for." That's when they actually sit there and take that time. - P26.

In response to medicines access barriers, participants demonstrated how they proactively planned for issues and that local support networks were vital in this. Ways in which this happened included arranging with pharmacies for medicines for multiple household members to be dispensed on the same day, stockpiling of medicines, making decisions to shorten treatment course so extra medicines could be used in case of further need within a household or family, and sharing of medicines. In some cases, participants relied on networks to access medicines in the community.

I have come home [to rural location]. My babies have been young, we may not have bought any paracetamol and it's like quick message around trying to think who's got kids my age? "Cuz (cousin) [have you] got ibuprofen or nurofen or anything like that in your fridge? I need a couple of shots". Go, and pick it [up]. - P61.

Where cost of medicines was an access barrier, several participants reported that they budgeted to counter these barriers. Participant problem solving also included identifying potential pharmacist-facilitated solutions. Medicines optimisation was identified as important by participants to support adherence and was also posited as a mechanism to reduce medicine-related expenses.

The pharmacist, he told me that he took away some of [the] medicine. And by doing that it came to be a much cheaper price.- P39.

4. Discussion

This study describes Māori experiences of medicines adherence, barriers and enablers of adherence and suggestions for pharmacists to better support medicines adherence. The exploration of factors associated with, and experiences of, taking medicines as prescribed in Māori populations has not been explicitly studied previously. This study, which utilised *kaupapa Māori* theory and methods, is the first of its kind to explore Indigenous patients own attitudes regarding medicines adherence, as opposed to health professional suppositions. Other studies have largely relied on health professional perceptions, or by authors based on suppositions from related research data.³⁸ This study identified that there were both intentional and unintentional factors associated with adherence with participants able to identify ways in which pharmacists could better support medicines adherence.

The role of medicines as one interactive component of holistic wellbeing is an important finding. Sir Mason Durie (Rangitāne, Ngāti Kauwhata, Ngāti Raukawa), who created *Te Whare Tapa Whā* as a health paradigm to explain the multiple, interconnected aspects to Māori wellbeing,³⁷ also discusses the concept of working at the 'interface' where both Western and Māori knowledge systems can be brought together to combine the benefits of both systems for the betterment of individuals, *whānau* and communities.³⁹ Participants identified that they viewed both prescription medicines and Māori-centred treatment as important to wellbeing and were positive and hopeful about the ability of these 2 systems to work together in the pharmacy setting, and the potential for this is supported by similar approaches in other health service settings.⁴⁰

Qualitative data supported questionnaire findings that forgetting to take medicines and access barriers (such as cost or reduced access due to rurality) were frequent reasons for unintentional non-adherence, as opposed to intentional decisions to take medicines in a different way to what was prescribed. These barriers have previously been described for Indigenous adherence.³⁸ Although financial barriers were identified by some participants, the reasons for non-adherence were diverse and simple reallocation

of resources is not a complete solution. When medicine-taking behaviour intentionally differed to what had been prescribed this related to a person's own review of the appropriateness of medicines for themselves and included non-adherence in response to adverse effects, which has been identified in other literature.³⁸ Participants expressed intentional non-adherence as something initiated to improve health. This finding is in contrast with some previous literature where healthcare professionals discussed Indigenous non-adherence as people not caring about adherence,⁴¹ or lack of belief/fear of Western medicines,⁴² which were not reasons replicated in our work. These inconsistencies may well relate to the differences in the positioning and framing of Indigenous and non-Indigenous research approaches. The former rejects deficit framing and prioritises Indigenous people while the latter tends to treat Indigenous people as a minoritised other therefore creates and maintains racialised stereotypes.⁴³

Understanding mechanisms behind intentional non-adherence is important for pharmacists and has the potential to better guide patient relationships and provision of care. Participants discussed intentional non-adherence as an active, considered process from people engaged in their health journey. Pharmacists can support people with providing further information to make informed decisions and developing pathways to enact patient-level decision making. Intentional non-adherence is one aspect of exerting control over one's medicine journey, which earlier research has identified as a self-identified right and desire for Māori.²¹

The importance of pharmacists to developing effective relationships was identified in our research. Pharmacists' ability to identify the right of patients to play an active role in medicines management adds to effective therapeutic relationship development. Participants specifically discussed the need for pharmacists to be proactive in relationship development and management, rather than relying on patients to do so, potentially to overcome the perceived power imbalance in pharmacist-patient relationships. The importance of pharmacist proactivity in relationships has been identified previously.⁴⁴ The concept of pharmacist trustworthiness was discussed by a few participants in our research, and although trust was not a strong theme identified in our research, there is the potential much of the participant discourse centred on the implicit assumption of trust as this has been noted by numerous studies in the past to be central to the pharmacist-patient relationship.⁴⁴

Participants stated that requiring a prescription is a barrier to medicines access and that having medicines available from a pharmacist without a prescription would eliminate this barrier. This finding suggests that education could be provided by health professionals to patients and communities regarding the reason prescription, and relevant regulatory processes are in place. The step of prescribing medicines promotes safe and effective use of medicines at an individual and population level.⁴⁵ This finding does also have implications for medicine regulations and policy and calls on the need for critical review of prescription requirements to ensure that this potential access barrier is utilised appropriately. This regulatory and policy review could include identifying and reclassifying current prescription medicines which can be a prolonged and intensive process driven by numerous factors which may vary from country to country.⁴⁶ In the meantime, existing legislative frameworks could be leveraged to maximise access for whānau Māori. For example, NZ legislation allows for the supply or administration of approved medicines by a non-prescriber through use of standing orders.⁴⁷ Historically, standing orders have been developed in a general practice setting for use by practice nurses.⁴⁸ However, more recently, standing orders have been used to allow pharmacists to monitor and adjust medicines such as warfarin without a prescription. Similar processes could be established for other medicines, and as an example, in Canada pharmacists in a number of provinces are now allowed to initiate, alter or extend supply of certain 'prescription' medicines.⁴⁹

In this study, participants were asked explicitly about the role of pharmacists in supporting medicines adherence, which differs from other studies which have relied on authors suggesting ideas based on related research findings.^{50,51} Undertaking research for the goal of positive, transformative change is one of the tenants of *kaupapa Māori* research,¹⁸ and the authors purport that solution-focused, Māori-led problem solving at the 'flax-

roots' (foundational, community-level) will be key to achieving Māori health equity.⁵² Participants identified several ways in which pharmacists and pharmacy services could better support medicines adherence for Māori, many of which are already occurring to some degree within some NZ pharmacies. These are of relevance not only to clinicians but also commissioners and designers of pharmacist services when thinking about appropriate skillset and resourcing, and are listed here:

- Proactively and routinely provide services and tips that help people to incorporate medicine-taking into everyday routines, including the use of electronic solutions
- Develop caring therapeutic relationships with patients to support knowledge exchange
- Establish relationships with *rongoā* practitioners to support holistic approaches to care and wellbeing
- Provide adequate medicine and health information to allow Māori to make informed decisions about medicines use
- Support *whānau* and acknowledge their role in medicines adherence
- Optimise medicines to reduce risk of adverse effects, improve effectiveness and reduce the burden of dispensing fees for unnecessary medicines
- Support better medicines supply to rural communities
- Review medicine classifications to identify if some medicines could be supplied without prescriptions by pharmacists, particularly in the cases of resupply of medicines with good safety profile and wide therapeutic index
- Support funding mechanisms for *rongoā* practitioners within the primary care

This research highlights the importance of Indigenous-led research, which moves away from Eurocentric narratives, and provides space for alternative discourses reflective of Indigenous lived experience. Further research of this nature is important for advancing Indigenous health equity.

4.1. Strengths

This study, exploring Indigenous perspectives of medicines adherence, is the first of its kind. This was a relatively large convergent parallel mixed methods study and provided a rich amount of data from which to generate themes. Processes were put in place to make research participants feel comfortable and ensure they were able to share their experiences.²⁵ Our participant group were older than median Māori age (approx. 26 years),⁵³ and had similar rates of physical disability⁵⁴ and rural living⁵⁵ as the general Māori population in NZ. A strength is that this study included participants in rural and urban communities although participants were not drawn from all areas of NZ. There was diversity in responses which reflects the diversity of Māori communities, and it is not intended that these results can be generalisable to all Māori. COVID-19 public health measures in NZ meant that for the majority of the data collection phase in-person *wānanga* could not take place and a strength of this work was the flexible approach to data collection, however undertaking research during this time likely impacted overall recruitment due to extra burdens experienced by both facilitators and participants. The ability to recruit and undertake research during this time highlighted the commitment of researchers and participants to the research agenda, a point explicitly expressed by some participants during the data collection.

4.2. Limitations

Not all participants had experience of taking long-term prescription medicines and could not speak to their own experience of medicines adherence although some of these participants were able to speak to their experience supporting others with medicines adherence. Some who did have experience taking regular medicines were not prescribed any currently, which led to more people being able to respond to the question relating

to reasons for non-adherence than the number of people who identified they were taking 1 or more medicines currently. It is possible that if our study population were older or taking more regular medicines, results would have differed. Some wānanga had fewer or greater number of participants than had been anticipated, however, this was allowed for by researchers to support the flexible approach. It was noted by researchers on reflection that fewer participants allowed for greater depth of discussion while larger wānanga allowed more people to participate and increased the diversity of ideas. The approach was not explicitly adjusted for the wānanga with just 1 participant, except that only 1 facilitator participated, and the wānanga ended up being a one-on-one discussion rather than a facilitated discussion, as might be expected. The presentation at the start of the wānanga provided participants with information about what the term 'medicines adherence' meant and examples of how medicine-taking behaviour may differ from what was prescribed. There is the potential that the presentation given at the start of the wānanga influenced wānanga discussions and questionnaire responses, although information was provided to support understanding of what the terms minor ailments and medicines adherence mean, to facilitate discussion. Some participants were known to, and may have had health care services provided by, wānanga facilitators and this may have both positively and negatively influenced the level of information that was shared. The number of participants reporting to have seen a nurse practitioner seems high. The questionnaire did not define this role, or others such as rongōā practitioner, and there may have been diversity in application of this term by participants. A high proportion of participants completed the questionnaire, although not all participants completed all parts of questions when there were multiple rows to complete, and therefore there is some incomplete data which could be addressed in future questionnaires.

5. Conclusion

Māori reported intentional and unintentional reasons for taking medicines in a different manner to what is prescribed. Prescription medicines were identified as an important aspect of health within a wider context of holistic Māori wellbeing more generally. Participants identified a number of practical solutions that pharmacists, health service providers and policy-makers could employ to support Māori medicines adherence.

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Author contributions

JH: Conceptualization, Methodology, Investigation, Formal analysis, Resources, Data curation, Writing – Original draft, Supervision, Project administration, Funding acquisition; NP: Investigation, Methodology, Formal analysis, Writing – Review & editing; RH Formal analysis, Writing – Review & editing, Conceptualisation; AA Methodology, Formal analysis, Writing – Review & editing; MH: Investigation, Formal analysis, Writing – Review and editing; BM Investigation, Formal analysis, Writing – Review and Editing; KP Investigation, Formal analysis; RB Methodology, Formal analysis, Writing – Review & editing.

Declaration of Competing Interest

The authors have no conflicts of interest to declare.

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Appendix A. Supplementary data

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