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**Tau fifine Niue and the use of digital health tools: An intergenerational view**

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**ABSTRACT**

**Introduction:** Digital health technologies are rapidly changing the landscape of how healthcare is being delivered globally. Many international health systems are using digital technology to assist with delivery of information and healthcare, to enable more affordable, accessible, and acceptable care to manage key health priorities pertaining to that population. The key to success for any digital health approach for Pacific and ethnic-specific communities is ensuring digital inclusion is considered alongside the wider influences of health (family, cultural, economic, social, environmental). Digital technology could be the enabler to reduce inequities in health outcomes in some populations. The aim of this paper is to explore how an intergenerational group of *tau fifine Niue* (Niue women) use digital health tools for health and wellbeing.

**Methods:** *Tutala* (similar to *talanoa* in the Samaan language) a culturally appropriate method of conversation with Niue communities was used to guide the research approach with a *tau fifine Niue* (n=40). Six group *tutala* were undertaken with *tau afine* (young women), *tau mamatua fifine* (mothers), and *tau mamatua tupuna fifine* (older women).

**Results:** Three overarching themes were identified: (1) convenience of mHealth tools; (2) access to health information and resources; and (3) digital disconnection. There were differences in the adoption and use of digital tools for health-related purposes, which varied from using the internet, text messaging and health monitoring apps. Although *tau afine* and *tau mamatua fifine* were more likely to utilise digital health tools, it was clear not all *tau mamatua tupuna fifine* experienced the same benefits.

**Conclusion:** Supporting digital inclusion, digital skills, and digital health literacy for *tau fifine Niue* using an intergenerational approach can translate into health benefits for Niue families and communities. As more and more health services turn to digital technology to assist with delivering health information and care, it is critically important digital technology is delivered in an equitable way that benefits all people, including multi-ethnic populations in Aotearoa, New Zealand.

**Key words:** Pacific peoples; Niue women; health and wellbeing; digital health tools; mHealth; digital inclusion; digital health literacy.

**INTRODUCTION**

Digital health tools are rapidly transforming the delivery of healthcare globally. The broad scope of digital health, ranging from mobile health (mHealth), health information technology (IT), artificial intelligence (AI), wearable devices, social media, websites, and telehealth, offers the health sector an opportunity to reach diverse underserved communities, to enable service delivery and improvements.<sup>1</sup> Digital health tools provide significant advantages in terms of accessibility to health services, minimising geographical burden and time, as well as empowering individuals to take control of their health.<sup>2,3,4,5,6</sup> Pacific communities living in Aotearoa experience inequities in accessing health care, with the most well documented challenges were around: language; work and

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family responsibilities; financial and transport difficulties.<sup>7,8,9</sup>

The potential of digital health tools cannot be realised without acknowledging the challenges of digital inclusion.<sup>5</sup> Digital inclusion is defined as an end-state where everyone has equitable opportunities to participate in society using digital technologies.<sup>10</sup> There are four main factors important to digital inclusion which are essential for using digital health tools – digital skills, access, motivation and trust.<sup>4,5,6</sup> Although overall ownership of mobile phones, tablets, mobile devices, and internet connectivity is increasing, ethnic minority groups (Māori, Pacific, and recent migrants), older adults, people with disabilities, people living in social housing, and those who are economically disadvantaged have lower rates of access and ownership.<sup>11</sup> These communities are also most likely to experience health inequities; a pattern that is evident internationally.<sup>4,6,12</sup>

Digital inclusion includes the concept of digital health literacy; being able to understand information and health interactions using digital health technologies.<sup>13,14</sup> Digital health literacy, an extension of health literacy, is defined as “the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem.”<sup>15</sup> (pg. 2) Although digital health literacy can be empowering, limited digital health literacy is associated with low utilisation of online health information and health services, and an inability to discern between trustworthy or untrustworthy information.<sup>13,14,16,17</sup>

Emerging digital health tools should benefit everyone and not privilege groups who already effectively access and use digital health technologies.<sup>4</sup> The aim should be for ‘health equity gains’ while understanding the wider influences of health, specifically cultural, social, economic, and environmental factors, including the motivation and skills to use digital health tools meaningfully.<sup>4,14,18</sup> When these contexts are not considered, health inequalities may inadvertently widen.<sup>5,19</sup>

Considering the increasing number of digital health tools and interventions available, and the current inequities in access for Pacific people, understanding how Pacific ethnic-specific communities use digital health tools can offer important culturally contextualised insights to

improve healthcare. Therefore, the aim of this study is to explore how an intergenerational group of *tau fifine Niue* (Niue women) utilise digital health tools for health and wellbeing.

## METHODS

### Study design

*Talanoa* has long been considered a distinguished Pacific approach to research. Its roots are firmly embedded in oratory tradition in Tongan, Samoan, and Fijian cultural paradigms concerning face-to-face conversations or discussions.<sup>20</sup> In specific contexts, *talanoa* is considered a culturally appropriate method, making fieldwork more reliable and valued, which is not always achieved through formal question and answer sessions.<sup>20</sup> There are challenges when using *talanoa* as an approach for Pacific people who are often homogenised despite many cultural and language differences among communities from Polynesia, Melanesia, and Micronesia. For instance, using *talanoa* in a Niue context has negative references to ‘gossiping’ – an act of informal conversation usually undertaken with family or friends in everyday settings.<sup>21</sup> This has important implications when engaging with Niue communities as establishing and maintaining relationships (*fakafetuiaga*) is fundamental in *Niue aga fakamotu* (Niue values, beliefs, customs, and practices).<sup>22</sup> To *talanoa* with someone is to engage in discussions with no purpose or meaning, with Vilitama acknowledging “*talanoa* is non-inclusive to the Niuean audience.”<sup>21</sup>

Instead, *tutala*, a method of conversation within Niue communities, was used to guide the research approach with *tau fifine Niue*. Vilitama highlights *tutala* as a more respectful approach used for formal speech while acknowledging the time and courtesy given to each other (individuals and groups) within the spaces of dialogue.<sup>21</sup> *Tutala* embraces the essence of creative conversation and information sharing that is meaningful and devoid of negative connotations such as “gossip.”<sup>21</sup> *Tutala* was an essential method used to capture the stories and conversations with *tau fifine Niue*, which is also anchored on Niue cultural values *fakalilifu* (respect), *fakaalofa* (love), *fakafetuiaga* (relationships), and *loto fakalataha* (unity).

This research is part of an overarching study exploring the health and wellbeing and understanding of heart disease among *tau fifine Niue* and focuses specifically on the use of mHealth and/or digital health tools. Questions explored during the *tutala* included whether individuals owned a mobile phone, how they

used their mobile phone and if they used their phone to manage their health and/or access digital health tools. The study was approved by the University of Auckland Human Participants Ethics committee (Reference 023794).

### Data collection

An intergenerational approach was chosen with three groups of women selected for this study – *tau afine* (young women), *tau mamatua fifine* (mothers), and *tau mamatua tupuna fifine* (older women). The only criteria to participate was women needed to be of Niue descent and over 16 years of age for consent purposes.

Engagement and recruitment for the *tutala* varied and occurred through culturally appropriate spaces where *tau fifine Niue* were known to congregate. This included Niue weaving groups, women's church groups, the Niue tertiary student's association, Niue radio programme, youth groups and networks of young people including the researchers' community networks of *tau fifine Niue*. A flyer was distributed to these networks via email, or hardcopy. *Tau fifine Niue* were invited to attend the *tutala* at community locations in Mangere, South Auckland (church hall and birthing centre) organised by the researcher, except for one *tutala* undertaken in a home in West Auckland. Participation in the *tutala* was voluntary.

Before the *tutala* commenced, *tau fifine Niue* were provided with a participant information sheet and study overview. Signed consent forms were obtained. *Tau fifine Niue* were also asked to complete a short questionnaire, providing demographic information such as age, ethnicity (if more than one), place of birth, mobile phone ownership and access to the internet. Four *tutala* were facilitated by the first author (AMI) in English, including one *tutala* with *tau afine*, co-facilitated with a young *afine* and AMI. One *tutala* with *tau mamatua tupuna fifine* was facilitated by a cultural advisor in *Vagahau Niue*. *Tutala* were semi-structured and conducted in-person. Refreshments were provided during the *tutala* and all *tau fifine Niue* received a *fakaalofa* (supermarket voucher) in acknowledgement of their time and contribution.

### Data analysis

Each *tutala* was transcribed verbatim. The researcher (AMI) listened to the audio recording while reading the written transcript again to ensure accuracy. A cultural advisor fluent in *Vagahau Niue* reviewed the transcribed data - for accuracy and spelling.

Data analysis was led by the first author (AMI) and coded into NVivo12. Original transcripts were re-read to ensure the data's accuracy and

integrity. The research team met several times to discuss the coded *tutala*. A summary of the draft development of themes were also sent to several *tau fifine Niue* who attended the *tutala* to review and provide feedback. Quotes made in the *Vagahau Niue* (Niuean language) were translated into English by a cultural advisor.

## RESULTS

### Demographic characteristics

A total of 40 *tau fifine Niue* took part in six *tutala* between December 2019 and May 2020 each lasting between 1-2 hours. Two *tutala* consisted of *tau afine* (n=23), aged from 17-45 years, two *tutala* were held with *tau mamatua fifine* (n=7) aged between 29–48 years, and two *tutala* were held with *tau mamatua tupuna fifine* (n=10) ranging in age from 60-92 years. Most *tau fifine Niue* identified with more than one ethnicity, namely Samoan and Māori. The majority of *tau fifine Niue* owned a mobile phone and were able to access the internet, mostly at home or through their smartphone. Several *tau mamatua tupuna fifine* did not own a mobile phone and had no access to the internet. An overview of the demographics of the participants is provided in **Table 1**.

In the context of the overarching study exploring the health and wellbeing of *tau fifine Niue*, the following results describe the use of mHealth and/or digital health tools to manage health. Three key themes were identified: (1) convenience of mHealth tools, (2) access to health information and resources; and (3) digital disconnection. Excerpts that used *Vagahau Niue* are provided alongside an English translation to uphold the integrity of the *tutala* and quote, while also providing an overview for non *Vagahau Niue* speakers. Each quote is identified by a pseudonym, age band and *tutala* the women attended.

**Table 1: Demographic characteristics of tau fifine Niue**

	Tau afine n=23 (%)	Tau mamatua fifine n=7 (%)	Tau mamatua tupuna fifine n=10 (%)	Total n=40 (%)
<b>Age range</b>				
<25 years	17 (74)	-	-	17 (42.5)
26-45 years	6 (26)	5 (71.5)	-	11 (27.5)
46-65 years	-	2 (28.5)	3 (30)	5 (12.5)
> 65 years	-	-	7 (70)	7 (17.5)
<b>Ethnicity*</b>				
New Zealand European	1 (4.3)	-	-	1 (2.5)
Māori	3 (13)	2 (28.6)	-	5 (12.5)
Samoan	5 (21.7)	3 (42.9)	-	8 (20)
Cook Island Māori	3 (13)	1 (14.3)	-	4 (10)
Tongan	1 (4.3)	-	2 (20)	3 (7.5)
Niuean	23 (100)	7 (100)	10 (100)	40 (100)
Chinese	1 (4.3)	-	-	1 (2.5)
Indian	-	-	-	-
Other (not stated)	2 (8.7)	-	-	2 (5)
Tuvaluan	1 (4.3)	-	-	1 (2.5)
<b>Country of Birth</b>				
New Zealand (NZ)	20 (87)	7 (100)	-	27 (67.5)
Niue	3 (13)	-	10 (100)	13 (32.5)
<b>Employment status</b>				
Student	11 (47.8)	-	-	11 (27.5)
Home or caring duties	1 (4.3)	1 (14.3)	-	2 (5)
Employed for wages	11 (47.8)	6 (85.7)	2 (20)	19 (47.5)
Retired	-	-	8 (80)	8 (20)
<b>Mobile phone ownership</b>				
Yes	23 (100)	7 (100)	5 (50)	35 (87.5)
No			5 (50)	5 (12.5)
<b>Access to the internet*</b>				
Smartphone	16 (69.6)	5 (71.4)	1 (10)	22 (55)
Home	18 (78.3)	6 (85.7)	2 (20)	26 (65)
Friend of family's home	6 (26.1)	1 (14.3)	1 (10)	8 (20)
Free Wi-Fi spots	4 (17.4)	-	-	4 (10)
Library	-	-	-	-
School	1 (4.3)	-	1 (10)	2 (5)
Work	7 (30.4)	-	-	7 (17.5)

Church	-	-	-	-
Other (not stated)	1 (4.3)	1 (14.3)	-	2 (5)
I do not use the internet	-	-	5 (50)	5 (12.5)

\* Tau *fifine Niue* were able to select more than one response.

### Convenience of mHealth tools

This theme describes how *tau afine* and *tau mamatua fifine* used mHealth or digital tools to monitor or manage their health. Health and fitness tracking apps that monitored physical activity and food intake were frequently mentioned among *tau afine* and *tau mamatua fifine* who were conscious about their health. *Tau afine* shared their experiences of using mHealth apps in past and present contexts, and although mobile phones were a convenient medium, Ashley acknowledges she needed to remember to take her phone to monitor her steps constantly:

*I also use it as a pedometer like I would download the pedometer app, but the thing is you have to keep the phone on you, so I always had to put it in my pocket. (Ashley, <25 years, tau afine Niue tutala #1)*

*Yeah, I use the one that tells me how many steps I've done a day. I love it, yeah, I do. When I've done under 1000, I'm like walk. I think it's better where I can do over 3000 steps in the day, then you know, I just keep looking at it. It motivates me actually. All you have to do is press a button and it's telling you how many steps I'm taking and what time of the day it's done. I get a buzz. (Jean, 46-65 years, tau mamatua fifine Niue tutala #1)*

For several *tau afine*, the app 'Flo', which monitored their menstrual cycle was also popular. The young women liked being aware of their menstrual cycle, as it provided personal data so they could self-monitor and prepare for upcoming periods, which for some were irregular. An information section on the app also provided a space where women could connect with others and ask anonymous questions, which Mila used to seek advice about menstrual issues she was experiencing:

*Flo tells you like do you got your period, they'll ask you questions and all you have to do is say yes or no, they have articles, you read it, and it tells you, it gives you an update when you're getting your period. (Joy, < 25 years, tau afine Niue tutala #1)*

*That Flo app is a pretty good app. It helps me track my periods when they come or if they don't come, the secret chats that are*

*there, you know. It helped me, I don't know, be more aware and understand that I'm not the only one and the tips that are shared. (Mila, 26-45 years, tau afine Niue tutala #2)*

Health and fitness apps also enabled *tau afine* to become more aware of their health, Bella explained that she needed to be highly motivated to continue using the apps which was difficult, and if storage space was needed on her phone, fitness apps would be the first to be deleted:

*I used to have it (fitness app), but it took up too much storage on my phone (laughter). It also tracks, like you need to do your fitness, your 7-minute workout, but it's also if you're motivated to do it. Sometimes it works, sometimes you're like oh I'll do it later, but I don't do it later (laughs) I'll do it tomorrow. (Bella, <25 years, tau afine Niue tutala #1)*

Sana further adds, while there were many health apps that could add value for people, it was a matter of having this information accessible so individuals could track and manage their own health:

*There's lots of apps, there's a healthy eating app, there's walking for exercise apps, there's apps that can track where you walk and how long you've walked, the distance and all of that so yeah. It's not through lack of having information out there, it's the information and how it filters to people and accessibility. (Sana, 46 years, tau mamatua fifine Niue tutala #1)*

### Access to health information and resources

This theme describes where *tau fifine Niue* would access health information and resources online. Google was often used by several *tau afine* and *tau mamatua fifine* who searched for health information or medical conditions for themselves or family members. As Leah explains, Google provided her with information to understand her uncle's heart surgery in addition to using it to diagnose her own ailments:

*I go to google to ask. (Tracey, 26-45 years, tau mamatua fifine Niue tutala #2)*

*When my uncle had the triple bypass, I wanted to know what it involved and what*

*kind of surgery it was, so I would google that, and I would even diagnose myself with Google (laughs) like I've got a rash on my arm, or I have this cough (laughter). (Leah, <25 years, tau afine Niue tutala #1)*

The social media platform Instagram also proved to be an influential space, where *tau afine* found health related inspiration. This did however cause conflicting messages for Mila who wanted to lose weight but was encouraged by the body positive messages on this platform:

*I love Instagram, there's so much more influence on there than I find anywhere else, I screenshot posts. (Maia, 26-45 years, tau afine Niue tutala #2)*

*For myself it's social media. I spend a lot of time on it. Like for me, I really want to lose weight but then you go on the app like Instagram, the first thing you see is 'love your body' (laughter in room) and especially when you go to shops and you find clothes that suit your body size, you can actually dress your body, so I feel like there's some good stuff about it. (Mila, 26-45 years, tau afine Niue tutala #2)*

With a vast amount of information available online, it was often the first point of contact before health professional advice was sought. Consequently, this was problematic for *tau mamatua fifine* like Tracey who admitted she become overly worried with the amount of health information she was reading. To alleviate such experiences, Sana explains discretion is needed as not all online information is credible or helpful for individual experiences:

*...I just look for the remedies on google...sometimes it makes me worried because I read too much into it. (Tracey, 26-45 years, tau mamatua fifine Niue tutala #2)*

*There's lots and lots of information on the internet, but you have to think about the sources you go to. You have to use your own discretion as to what you think might work or might not work (Sana, 46-65 years, tau mamatua fifine Niue tutala #1)*

Sana continued to support this view about social media, recognising this platform had powerful influences for her own teenage children. As potential sources of health information for her children, she worried her own advice would compete with information on social media which was not always accurate or credible:

*My children are very influenced by social media, their friends, other people in general even family...there are so many*

*mixed messages and there are so many avenues for those messages to get to the children that, I mean, I can't compete with social media. I can't compete with their best friend or the person that whispers in their ear. I can't compete with the messages that come on TV. I can't compete with any of that. (Sana, 46-65 years, tau mamatua fifine Niue #1)*

While online information and social media provided accessible information, experiences outlined by Sana and Tracey offer insight into how caution is needed when using such platforms.

### Digital disconnection

This theme describes the digital disconnection among *tau mamatua tupuna fifine* with several not owning a mobile phone or being able to connect online. It was evident that digital tools were not a primary method for *tau mamatua tupuna fifine* to access healthcare or manage their health. Although a small number owned a mobile phone, it was clear many still relied heavily on their landline to maintain connection and contact family and friends. Even though Mele was encouraged in the past to use a mobile phone, her primary preference was to continue using her landline, which Eseta acknowledged other Niue *mamatua* (elders) like her were also experiencing:

*Kae taha e mena kaha ko au ni ne molea atu e tau ki luga...Na pehe a faoa ko ke fakaaoga au he mobile, pehe au "ai pule a mutolu, fakaaoga au he landline."*

*But the problem is, I am the only one that is older...people told me to use the mobile, I said to them "you are not the boss, I will just use the landline."*

*(Mele, >65 years, tau mamatua tupuna fifine Niue tutala #1)*

*Taha ni kaha e matua ha tautolu ae ne fano agaia he landline, tokologa a tautolu ma (name), ai ko au ni, tokologa e tau mamatua fuata tuga a mautolu e ne don't have a cell phone, it's very hard to get through.*

*There's one of our elders here that still uses the landline, there are lots of us (name) not just me. There are lots of older generations likes us that do not have a cell phone, it's very hard to get through.*

*(Eseta, >65 years, tau mamatua tupuna fifine Niue tutala #1)*

Although Sala is considered digitally disconnected as she did not own a mobile phone,

she was comfortable as she knew how to contact family members on their mobile phone if she needed:

*Ai iloa e au ke fakaaoga...ilola na au he tau numela he tau tama Haaku he tau cell foni ka hea ki ai poke land line, ka koe patu na ko haaku fae hea ki ai.*

*I don't know how to use it (phone)...all I know is the cell phone numbers for my children when I ring them or their land line, but only her (daughter) I always call.*

*(Sala, >65 years, tau mamatua tupuna fifine Niue tutala #2)*

Several *tau mamatua fifine* shared while they were privileged to own mobile phones and were using health apps and social media, their own parents were digitally disconnected. Interestingly, their parents were savvy enough to understand the language needed to describe the different phone features, as Ligi describes with her own parents who ask to use her mobile phone to call family members or to open Facebook so they could view photos:

*Our parent's generation don't have a phone, but they understand 'fakaoga e mobile haau ke hea atu ke so and so' (use your mobile phone to call so and so), tamai e Facebook ke onoono e tau ata (bring Facebook to look at the photos) (lots of laughter). (Ligi, 26-45 years, tau mamatua fifine Niue tutala #1)*

## DISCUSSION

This study explored how *tau fifine Niue* used their mobile phone or digital tools for health-related purposes, which is part of an overarching study exploring the health and wellbeing of *tau fifine Niue* and their understanding of heart disease. The findings showed that the use of digital health tools varied intergenerationally. While mobile phone ownership was ubiquitous among *tau afine* and *tau mamatua fifine*, only a small number of *tau mamatua tupuna fifine* owned or used a mobile phone.

The findings highlighted *tau afine* and *tau mamatua fifine* were using their mobile phones for health related purposes. Use of smartphone apps were broad, with women choosing to monitor key lifestyle behaviours such as menstruation, food intake and physical activity. Surprisingly, the most popular health app among *tau afine* was 'Flo'<sup>23</sup> which was used to monitor their monthly menstrual cycle. While the app provided a convenient modality for women to understand their menstrual pattern, the extra

features also provided a safe space to share health concerns related to their menstrual cycle. Perhaps the acceptance and popularity of the 'Flo' app among *tau afine* relate to the sensitive nature of menstruation and the challenges of discussing this topic openly with others in person. The apps private and personalised approach, over time may also motivate *tau afine* to engage in their menstrual health more actively. While more New Zealanders are accessing wearable devices such as fitness trackers to monitor health indicators and make necessary lifestyle changes<sup>24</sup> the findings from this study suggest the adoption and use of technology for *tau afine* and *tau mamatua fifine* was determined by how motivated they were to monitor their lifestyle and how much phone storage they had.

The internet is known to be a popular source of health information, so unsurprisingly, Google and social media platforms were seen to provide value for *tau afine* and *tau mamatua fifine* who used it to clarify health conditions or receive positive inspiration from social media influencers. *Tau afine* and *tau mamatua fifine* described using Google to seek health information for symptoms they were experiencing or planned health procedures for family members. Seeking information online often occurred before seeking an appointment with a family doctor. Similar views were shared in a study with young Niue women who chose the internet to search for sexual health information since it was private and free, and used to determine whether health professional advice would be sought.<sup>25</sup> In Sa'ulilo's work, Pacific mothers also preferred using their mobile device to access the internet due to its convenience accessing online health information.<sup>26</sup>

Social media provides an influential space for exploring body positive messaging for *tau afine*. In contrast, *tau mamatua fifine* expressed concerns about its credibility and the potential to provide inaccurate and harmful information over what they as mothers and parents had to share. Online health information is easily accessible, however, its quality and reliability remain questionable. Search engines can filter results that provide the best possible answer for users, but there is no fully integrated credibility framework for Web search engines.<sup>17</sup> The trustworthiness of online information is not necessarily validated, particularly on social networking sites, with the most popular and paid content often appearing most prominently.<sup>17</sup> These findings have important implications for health communication. It recognises that improving digital health literacy among *tau fifine Niue* to interpret the trustworthiness of online

health information and social media is essential to increase trust and mitigate the risks of unreliable misinformation.<sup>14,16</sup>

An apparent digital disconnect existed among *tau mamatua tupuna fifine* which *tau mamatua fifine* also recognised with their own parents. The few *mamatua tupuna fifine* who owned a mobile phone, were most comfortable using this for texting, phone calls or social media. Among those who did not have a digital device, landlines provided the primary modality to remain socially connected. What *tau mamatua tupuna fifine* did not appreciate was being forced to use mobile phones. This highlights the importance of understanding the motivation to use mobile phones for potential new users so that we can support access and developing digital skills if they agree. The ability to maintain social connections using their mobile phone or landline was essential for *tau mamatua tupuna fifine*, emphasising the need not to disregard the high value of low-tech solutions such as texting and phone calls, which also offers a convenient and cost-effective approach for digital inclusion efforts. Digital inclusion is essential to ensure full participation in an increasingly digitised society due to the impacts of COVID-19.<sup>10,27</sup> Using technology such as email or instant messaging has been attributed to lower levels of loneliness and improved subjective well-being lower depressive symptoms.<sup>28</sup> As such, efforts to improve digital inclusion, digital skills and digital health literacy are linked with improved health outcomes and social connections among vulnerable communities.<sup>14,15</sup>

In the context of Pacific health and well-being, maintaining and sustaining the balance between the physical, mental, and spiritual elements and families wellbeing is a critical foundation for good health.<sup>29</sup> While research suggests digital health tools can provide an opportunity for sustainable and equitable healthcare<sup>3,5</sup> there is a risk such tools can inadvertently cause a cultural shift away from family centric and collective values with designs that only focus on individual health outcomes. As seen with *tau mamatua tupuna fifine*, connecting with people is essential, while *tau afine* and *tau mamatua fifine* are comfortable using digital health tools for their personal well being. Designing digital healthcare approaches in partnership with Pacific communities across generations ensures approaches are contextualised to their worldviews, sociocultural environment and lived experiences. Further, when underserved population groups are afforded the same access and opportunities to using such platforms, digital health solutions have the potential to improve health outcomes.<sup>4,14,18</sup>

## Limitations

The strengths of this study lie in the intergenerational sample of *tau fifine Niue* and the understanding gained from the *tutala*. Major limitations include the study being situated in Auckland and only involving *tau fifine Niue* which limits the generalisability to the wider Niue community and those living in other regions of Aotearoa New Zealand and the diaspora. This research was also part of an overarching study exploring health and wellbeing and understanding of heart disease, and not the sole intent of this research which focuses specifically on the use of mHealth and digital health tools. Apart from one *tutala*, five were conducted prior to COVID-19.

## CONCLUSION

Although digital health technologies are changing the landscape of healthcare approaches, this study highlights the intergenerational variation and value of digital tools to manage health and wellbeing among *tau fifine Niue*. *Tau afine* and *tau mamatua fifine* were more likely to navigate mobile and online platforms for health, unlike *tau mamatua tupuna fifine* who preferred to use their phones (mobile or landline) to maintain social connectivity.

Considering *tau mamatua fifine* raised concerns about their children relying on social media for health information and their parents not having digital skills to go online, opportunities to leverage intergenerational programmes that bring different parts of a community together to improve digital inclusion and/or digital health literacy can help mitigate such concerns while understanding how best to engage with different generations. It also reinforces the need to not disregard the importance of in-person health approaches and understanding the motivation of using, or not using, digital or online tools for health and wellbeing. Future research could explore how strengthening intergenerational approaches has the potential to improve health and wellbeing in an increasing digitally connected world, in addition to how best to support communities as they transition and navigate digital health tools.

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### Translated terms

**Aga Fakamotu** – Niue values, beliefs, and customs

**Fakaalofa** – love / to gift with love

**Fakafetuiaga** - relationships

**Fakalilifu** - respect

**Loto fakalataha** - unity

**Mamatua** - elderly

**Tau afine** – young women

**Tau fifine Niue** - Niue women

**Tau mamatua fifine** – mothers

**Tau mamatua tupuna fifine** – older women

**Tutala** – a culturally appropriate method of conversation for Niue communities

**Vagahau Niue** – Niue language

### REFERENCES

1. World Health Organisation. mHealth: New horizons for health through mobile technologies: second global survey on eHealth. Report no. 3. Geneva. World Health Organisation. 2011.
2. Wilson B, Paunga H and Sharpe S. Telehealth as a mode of outpatient service delivery: A Pacific equity analysis. Auckland. Counties Manukau Health. 2021.
3. Gurney J, Fraser L, Ikihele A, Manderson J, Scott N and Robson B. Telehealth as a tool for equity: pros, cons and recommendations. *New Zealand Medical Journal*. 2021; 1341530: 111–115.
4. Thomas-Jacques T, Jamieson T and Shaw J. Telephone, video, equity and access in virtual care. *NPJ Digital Medicine*. 2021; 4159. DOI: <https://doi.org/10.1038/s41746-021-00528-y>.
5. Lyles CR, Wachter RM and Sarkar U. Focusing on digital health equity. *JAMA*. 2021; 32618: 1795–1796. DOI: 10.1001/jama.2021.18459.
6. Gann B. Transforming lives: Combating digital health inequality. *IFLA Journal*. 2019; 453: 187-198. DOI: 10.1177/0340035219845013.
7. Pacific Perspectives Limited. Tofa Saili: A review of evidence about health equity for Pacific Peoples in New Zealand. Wellington. Pacific Perspectives. 2019.
8. Ryan D, Southwick M, Teevale T, et al. Primary care for Pacific people. Wellington. Pacific Perspectives. 2011.
9. Southwick M, Kenealy T and Ryan D. Primary care for Pacific people: A Pacific and health systems approach. Wellington, New Zealand. Pacific Perspectives. 2012.
10. Department of Internal Affairs. The Digital Inclusion Blueprint, Te Mahere mō te Whakaurunga Matihiko. Wellington. Department of Internal Affairs. 2019.
11. Grimes A and White D. Digital Inclusion and Wellbeing in New Zealand. Motu Research. 2019.
12. Honeyman M, Maguire D, Evans H, et al. Digital technology and health inequalities: a scoping review.
13. Chesser A, Burke A, Reyes J and Rohrberg T. Navigating the digital divide: A systematic review of eHealth literacy in underserved populations in the United States. *Informatics for health & social care*. 2016; 411: 1-19. DOI: 10.3109/17538157.2014.948171.
14. Ehrari H, Tordrup L and Müller S. The digital divide in healthcare: A socio-cultural perspective of digital literacy. *Proceedings of the Annual Hawaii International Conference on System Sciences*. 2022. DOI: 10.24251/hicss.2022.499.
15. Norman CDSkinner HA. eHealth Literacy: Essential skills for consumer health in a networked world. *Journal of Medical Internet Research*. 2006; 82: e9. DOI: 10.2196/jmir.8.2.e9.
16. Kim HXie B. Health literacy in the eHealth era: A systematic review of the literature. *Patient Education and Counselling*. 2017; 1006: 1073-1082. DOI: 10.1016/j.pec.2017.01.015.
17. Lee K, Hoti K, Hughes JD and Emmerton L. Dr Google and the consumer: A qualitative study exploring the navigational needs and online health information-seeking behaviors of consumers with chronic health conditions. *Journal of Medical Internet Research*. 2014; 1612. DOI: 10.2196/jmir.3706.
18. Verbiest M, Borrell S, Dalhousie S, Tupa'i-Firestone R, Funaki T, Goodwin D, et al. A co-designed, culturally-tailored mHealth tool to support healthy lifestyles in Māori and Pasifika communities in New Zealand: Protocol for a cluster randomized controlled trial. *JMIR Research Protocols*. 2018; 78: e10789. DOI: 10.2196/10789.

19. Lee EW, Mccloud RF and Viswanath K. Designing effective eHealth interventions for underserved groups: Five lessons from a decade of eHealth intervention design and deployment. *J Med Internet Res.* 2022; 241. DOI: 10.2196/25419.
20. Vaioleti TM. Talanoa research methodology: A developing position on Pacific research. *Waikato Journal of Education.* 2006; 121. DOI: 10.15663/wje.v12i1.296.
21. Vilitama MJD. On becoming a liquid church: Singing the Niuean 'Fetuiaga Kerisiano' on a distant shore. Charles Sturt University, Australia, 2015.
22. Tavelia M, Kaue T, Sekene S, et al. Ko e fakatupuolamoui he tau magafaoa Niue: A Niuean conceptual framework for addressing family violence. Wellington. Ministry of Social Development. 2012.
23. Anonymous Flo: Track your health beyond periods., <https://flo.health/> (2021).
24. New Zealand Health Information Technology. Hauora, Mauri Ora: Enabling a healthier Aotearoa New Zealand. New Zealand Health Information Technology. 2021.
25. Matenga-Ikihele AM. Let's talk about sex: Knowledge, attitudes and perceptions towards sexual health and sources of sexual health information among New Zealand born Niuean adolescent females living in Auckland. University of Auckland, 2012.
26. Sa'uLilo L, Tautolo E, Egli V and Smith M. Health literacy of Pacific mothers in New Zealand is associated with sociodemographic and non-communicable disease risk factors: surveys, focus groups and interviews. *Pacific Health Dialog.* 2018; 212: 65-70. DOI: 10.26635/phd.2018.914.
27. Digital Government NZ. Significant support needed for Pacific peoples to be digitally included, <https://www.digital.govt.nz/news/significant-support-needed-for-pacific-peoples-to-be-digitally-included/> (2021, accessed 12.12. 2021).
28. Chopik WJ. The benefits of social technology use among older adults are mediated by reduced loneliness. *Cyberpsychology, Behavior and Social Networking.* 2016; 199: 551-556. DOI: 10.1089/cyber.2016.0151.
29. Pulotu-Endemann FK. Fonofale Model of Health. In: Anonymous. Wellington, New Zealand.