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"The only vaccine that we really question is the new vaccine": A qualitative exploration of the social and behavioural drivers of human papillomavirus (HPV) vaccination in Tonga

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ABSTRACT

Introduction: Human papillomavirus (HPV) vaccination is crucial for cervical cancer elimination, particularly in the Pacific where screening and treatment are limited. The HPV vaccine was introduced through schools in Tonga in November 2022 for adolescent girls. Despite high routine childhood vaccine coverage in Tonga, uptake of the HPV vaccine has been slow. This study explored the social and behavioural drivers of HPV and routine childhood vaccination in Tonga to inform tailored strategies to increase vaccine uptake.

Methods: We conducted qualitative interviews and focus groups in Nuku'alofa between June and October 2023 with parents ($n = 32$), adolescent girls ($n = 24$), teachers ($n = 15$), nurses ($n = 7$), and immunization staff ($n = 5$). Data were analysed thematically and mapped to the World Health Organization's Behavioural and Social Drivers of vaccination framework.

Results: Parents, teachers, and girls had limited knowledge of the HPV vaccine. Some feared it would encourage promiscuity or impact fertility. While trust in routine childhood vaccines was high, participants felt the COVID-19 pandemic had reduced confidence in new vaccines. Some vaccinated girls felt the HPV vaccine offered protection whereas others were afraid of side effects. Practical barriers included non-standardised consent forms that had to be returned to schools, the vaccine rollout timing, and school participation.

Conclusion: Providing youth, parents and teachers with accurate, culturally appropriate information and supporting teachers to discuss vaccination and facilitate consent may improve HPV vaccine uptake in Tonga.

1. Introduction

With high coverage of the human papillomavirus (HPV) vaccine, cervical screening, and treatment of cervical disease, elimination of cervical cancer is possible [1]. Settings that have achieved high uptake of the vaccine have dramatically reduced the burden of HPV infection [2], however school closures and health service disruptions during the COVID-19 pandemic reduced global vaccine coverage by an estimated 15 % [3]. Although vaccine coverage is increasing through global and local efforts, only 10 % of eligible girls in the Western Pacific Region have received one dose of the HPV vaccine [4].

The Kingdom of Tonga is a Pacific Island nation with a

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predominantly Christian population of around 100,000, most of whom live on the main island of Tongatapu [5]. Coverage of routine childhood vaccines is high, with more than 90 % of infants receiving all recommended vaccines by two years of age [6]. The COVID-19 vaccine was rolled out across the country from April 2021, with booster doses continuing into 2022. The HPV vaccine was introduced free of charge in November 2022 with a two-dose schedule for girls aged 10–17 years. In 2023, this changed with the approval of a single-dose schedule, currently available to 10-year-old girls through routine immunizations, and to girls aged 11–14 years through a catch-up campaign. The HPV vaccination program is primarily implemented through schools and is also available in hospitals and clinics. Vaccine introduction was supported by communication activities including a media campaign with radio and television promotion, and training for nurses across the country. Quantitative data from parents or caregivers of children in Tonga prior to vaccine rollout suggested that knowledge of the HPV vaccine was low and support was high [7]. However, in February 2023 the Ministry of Health estimated that only 20 % of eligible girls had received the vaccine [7,8]. Only 6 % of women in Tonga have ever been screened for cervical cancer, further highlighting the importance of preventive HPV vaccination in this context [9]. While data on the burden of cervical cancer in Tonga is very limited, the age-standardised mortality rate from cervical cancer is estimated to be 17 per 100,000 women [9].

Clear and accurate communication around the importance, safety, and efficacy of vaccines is critical for supporting vaccine confidence and encouraging uptake, particularly for newly introduced vaccines [10–12]. It's important to identify and understand the context-specific barriers to vaccine acceptance in order to design appropriate solutions to address them [13]. There are currently no published qualitative studies looking at the drivers of vaccine uptake in Tonga. To fill this gap, we aimed to explore the social and behavioural drivers of routine childhood vaccine uptake in Tonga, with a focus on the HPV vaccine.

2. Methods

This study was led by the Murdoch Children's Research Institute (MCRI), in partnership with the Tonga Ministry of Health, UNICEF Pacific, and the Tupou Tertiary Institute (TTI). In January 2023, MCRI and the Tonga Ministry of Health implemented the Vaccine Champions program to support the HPV vaccine rollout. This program provided education and vaccine communication skills training for diverse community leaders and health workers to address misinformation, share their personal experiences and advocate for the HPV vaccine in the community [14]. To adapt the program to the Tongan context and inform educational materials to support Vaccine Champions, MCRI partnered with locally based Tongan researchers at Tupou Tertiary Institute (TTI) to conduct qualitative research on the social and behavioural drivers of vaccine uptake in Tonga. The data collection framework was informed by the validated tools developed by the World Health Organization (WHO) to understand what drives vaccine uptake [15]. Qualitative research methods were used, with Tongan facilitators conducting interviews and focus groups in Tongan, building trust and encouraging participants to speak freely.

This study is reported according to the Consolidated criteria for Reporting Qualitative research (COREQ) checklist [16].

2.1. Participants and recruitment

We explored the social and behavioural drivers of vaccine uptake with parents of children under five years who were eligible for routine childhood vaccines, parents of girls aged 10–17 who were eligible for the HPV vaccine, teachers, nurses, immunization program staff, and adolescent girls. Given the culturally sensitive nature of the HPV vaccine, we recruited girls aged 15–17 years only rather than those who were younger. During the initial HPV vaccine rollout in Tonga in November 2022, girls aged 10–17 years were eligible for the vaccine. This meant that girls in our target group had been eligible for the vaccine, and most had heard about it at school.

Parents and adolescent girls were recruited through existing networks of the data collection team and snowballing (i.e. participants inviting their peers). Participants were contacted by telephone calls, Facebook messenger, or face-to-face visits. They were informed about the study and invited to attend a focus group. Schools were identified purposively to represent different areas of Tongatapu and different school systems (government and church schools). School principals were given a letter from the Tonga Ministry of Health with support from the Ministry of Education and Training inviting them to send one teacher to join the focus group, followed up with phone calls or visits. Nurses and immunization program staff were recruited purposively through the Ministry of Health. Between six and ten participants were invited to each focus group; the number of focus groups was determined by the availability of project resources [17].

2.2. Data collection

As this research was exploratory, focus groups and semi-structured interviews were chosen to gain an in-depth understanding of the social and behavioural drivers of routine childhood and HPV vaccine uptake. Interview guides included open-ended questions and prompts to encourage discussion. Questions were developed in English by researchers YM, IO, JK, and MD, and reviewed by EL to check for cultural appropriateness. The local data collection team translated the question guides into Tongan using a collaborative group process to ensure that the meaning was retained. English versions of the question guides are available in the supplementary materials.

Seven Tongan data collectors (two male, five female) from TTI led the data collection, with support from a female Tongan researcher with a PhD in qualitative research (EL). Data collectors had education backgrounds and did not have specific research qualifications (except for EL). They were identified based on their ability to engage with the local community and build rapport in a culturally appropriate way. All data collectors attended a one-day training led by EL and an Australian-based PhD candidate with qualitative research experience (YM) on the study objectives, qualitative research methods, research ethics and consent, and the logistics of data collection. Four of the female data collectors attended an additional half-day of training on conducting qualitative research with adolescents.

According to Tongan cultural values, issues related to sexual activity are not commonly discussed in a mixed group of males and females [18]. Therefore, Tongan female data collectors led the group and individual interviews with female participants, and the two male data collectors facilitated the fathers' group. For teachers, parents, and adolescent girls, data collection was held in a private and neutral space at a local tertiary institute. Focus groups with nurses and immunization staff took place at the Ministry of Health.

All focus groups had one facilitator and one note taker present. In keeping with local cultural practices, all focus groups and interviews started with a prayer led by the Tongan facilitator or a participant [19]. Focus groups with adolescent girls also started with an icebreaker game. Refreshments and travel reimbursements were provided to all participants to thank them for their time.

Focus groups were conducted in the Tongan language, apart from one interview with immunization program staff in English. YM debriefed with the data collectors after each focus group to discuss the main findings, challenges, and things to explore in future discussions.

Ethical approval was granted by the Tonga National Health Ethics and Research Committee (MH 53:02) and the Royal Children's Hospital Melbourne Human Research Ethics Committee in Australia (#84863). All participants provided written informed consent, and all adolescent participants additionally required parental consent to participate.

2.3. Data analysis

All focus groups and interviews were audio recorded with participants' consent, transcribed verbatim, and translated into English by a Tongan transcription company. Facilitators checked transcripts for accuracy. Debrief meetings between YM and the local data collection team were used to discuss initial findings and the cultural context. YM analysed the data using NVivo software (QSR International Pty Ltd). Initial codes were developed inductively and then mapped onto the four domains of WHO Behavioural and Social Drivers of vaccination framework (Fig. 1): thinking and feeling; social processes; motivation; and practical issues [15]. Themes and codes were discussed with researchers JK and MD before being finalised, and overall findings were reviewed by EL to check cultural relevance and accuracy of the analysis.

3. Results

We conducted 12 focus groups and one interview (immunization program staff) with a total of 83 participants (Table 1), ranging from 28 to 70 min. All participants except fathers ($n = 9$) were female. The adolescent girls came from a mix of government and church schools. Immunization program staff included senior nurses working in management and public health roles within the Ministry of Health. The results have been grouped into the four domains of the WHO Behavioural and Social Drivers of vaccination framework (Fig. 2), with specific themes explored in each domain [15].

Table 1
Participant groups included in qualitative data collection.

Participant group	Focus group / interview	Number of participants
Reproductive health nurses	1	7
Immunization program staff	2	5
Mothers of girls aged 10–17 years	2	17
Fathers of girls aged 10–17 years	1	6
Parents of children aged <5 years	1	6 mothers; 3 fathers
Primary school teachers	1	7
Secondary school teachers	1	8
Adolescent girls aged 15–17 years	4	24
Total	13	83

3.1. Thinking and feeling

3.1.1. Trust in vaccines – "the only vaccine that we really question is the new vaccine"

Most parents trusted routine childhood vaccines and acknowledged their importance in preventing disease. Some parents talked about trusting the vaccines because of their personal experiences:

"I support the [routine childhood] vaccine, there has not been a person in my household that has been sick because of the vaccine, this gives me proof that the vaccine is safe." (Parent).

Participant in all groups felt that the COVID-19 pandemic had reduced community trust and confidence in all vaccines, and concerns around COVID-19 vaccine safety and effectiveness were described by parents, teachers, and adolescent girls. Some of these concerns extended to the HPV vaccine as it was seen as a "new vaccine" and therefore not as safe as those that had been used in Tonga for a long time, or because it was perceived to be unsafe to have both vaccines together.

"We had compared [the HPV vaccine] to the COVID-19 vaccinations. A lot of people had died as a result of these vaccinations and several more suffered long-term symptoms because of it." (Teacher).

"We have heard that if you had taken the COVID-19 vaccine and then you take the papilloma vaccine it would be too much for your body to handle." (Adolescent girl).

3.1.2. Perceived benefits – "I am protected"

Around half of the adolescent girls had been vaccinated against HPV; some described feeling happy and emphasised the importance of the vaccine for protecting their future health. Some teachers also appreciated the benefits of the HPV vaccine: "[HPV] vaccination benefits our children, who are in fact the future of our country." (Teacher).

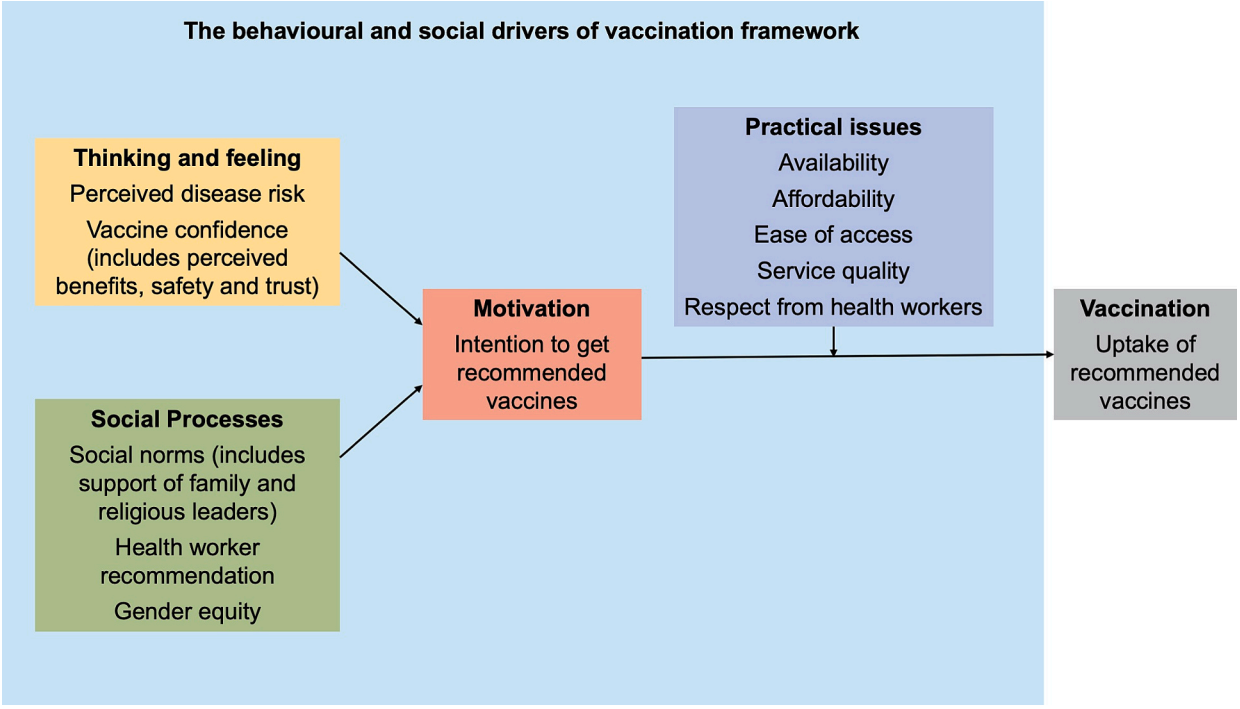

Fig. 1. WHO behavioural and social drivers of vaccination framework [15].

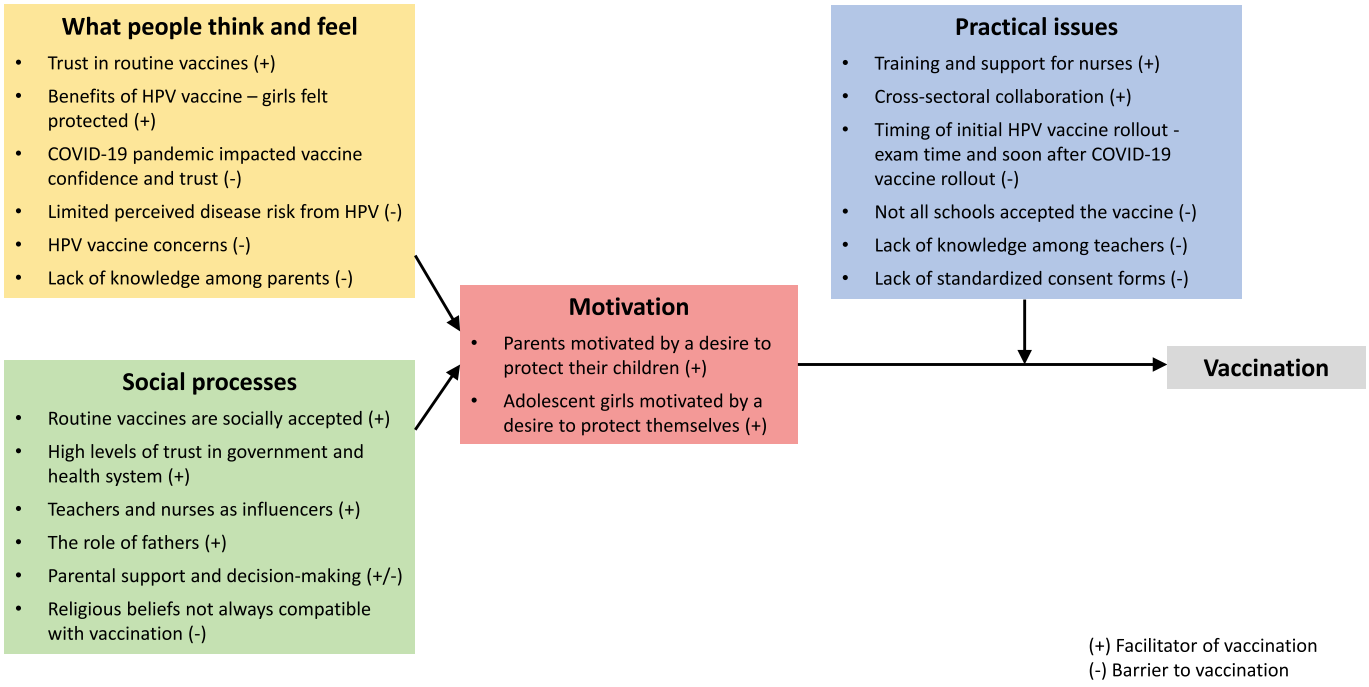

Fig. 2. Summary of the behavioural and social drivers of vaccination in Tonga.

3.1.3. Perceived disease risk – "people are still sick"

While many parents appreciated the need for routine childhood vaccines to keep babies and children healthy, some felt that there was no need for an HPV vaccine when they had survived this long without it.

"My mother told us not to get the vaccination. It is a new vaccination, in the past there was no such thing but there are people who had gotten cancer but it was nothing serious and they got better." (Adolescent girl).

One adolescent girl described how many people in her village did not believe the HPV vaccine was important because it could not completely stop cancer. Other girls also thought that the vaccine should be able to cure cancer rather than just prevent it.

In contrast, one mother who worked in health care was very aware of the risks of HPV and strongly supported the vaccine, highlighting the fact that the virus seldomly showed any symptoms.

"One thing about this virus that is very dangerous is that it does not show any signs that you can see and tell that you have the virus." (Mother).

3.1.4. Vaccine concerns – "what if something bad happens when you take the vaccine"

Teachers and parents were concerned that the HPV vaccine could cause infertility and promote promiscuity in young girls. Nurses and immunization staff reported hearing similar concerns in the community. Some participants questioned the need for a vaccine preventing a sexually transmitted infection for young girls who are not sexually active.

Some adolescent girls felt scared of the HPV vaccine, predominantly because of perceived side effects, and described similar sentiments in their communities.

"There are people in our village that are afraid of the [HPV] vaccine. Parents do not allow their children to get vaccinated saying that they might die or get other types of illness from the vaccine." (Adolescent girl).

3.1.5. Low knowledge and awareness – "I did not understand the purpose"

One mother supported the vaccine despite not having a lot of information about it:

"When my daughters asked me if they can get vaccinated and told me it was to help avoid cancer in the female body I accepted it because even though I did not fully understand but I knew that it was right." (Mother).

However, other parents did not plan to get the vaccine for their daughters as they did not feel they had enough information about it.

"I did not want my kids to get vaccinated [against HPV] just because I did not understand the purpose." (Mother).

Adolescent girls and nurses similarly felt that a lack of knowledge and understanding about the HPV vaccine was limiting uptake, and teachers believed that they did not know enough about the vaccine to support it fully.

"If no one explains the benefits of the vaccine to the people in terms of its positive impacts to the young girls, no one will come." (Adolescent girl).

3.2. Social processes

3.2.1. Vaccines as a social norm

Many parents felt that getting scheduled vaccines for their young children was an accepted part of routine practice, as it was something that had been done by their parents and grandparents before them: "Having our babies vaccinated is like a generation tradition where everyone follows." (Parent).

3.2.2. Trust in health system

Most parents and teachers reported high levels of trust in the government, the health system, and health workers, believing that "the Government would never give us something that would cause harm." (Father). However, immunization staff did report concerns they heard from some parents who thought that HPV vaccines were really a COVID-19 vaccine, and that the government was trying to deceive them.

3.2.3. Teachers and nurses as influencers

The network of reproductive health nurses with strong links to the community was seen as a strength of the immunization program. Teachers were seen as important and trusted advocates for vaccines given in schools, including the HPV vaccine.

"We have the power to explain to the parents properly and to push them or convince them to have their daughters get the vaccinations."

(Teacher).

3.2.4. Religious beliefs

Nurses and immunization staff reported that a small but growing number of parents refused all vaccines for their children due to specific religious beliefs. Some participants felt that faith was a more important way of caring for the body than vaccines. One mother felt that the HPV vaccine was not necessary as health outcomes were predetermined by God and should not be changed.

"Our body is the temple of God, He will protect us but if it is His will for us to have cancer and has set our timeline then so be it, who are we to question?" (Mother).

Religious leaders were also seen by some as potential advocates for vaccination. One father described the importance of including pastors in community awareness sessions about the HPV vaccine, as this would increase trust in vaccines.

"When they go out to talk about the [HPV] vaccine and to give out vaccines they should always go with a pastor. Our people like to look for answers to something and question a lot of things, with the pastor beside them it will sound and look more reliable." (Father).

3.2.5. Parental support and decision-making

Parental consent is needed for girls to get the HPV vaccine. Adolescent girls, parents, and teachers talked about girls who wanted to get the vaccine but could not because their parents did not consent. A lack of knowledge about the vaccine, and not understanding the consent process, were seen as the main reasons for not consenting.

"Some girls want to get vaccinated but they are stopped by their parents because they are not fully informed on the vaccine." (Adolescent girl).

Decision-making for the HPV vaccine mostly lay with parents, especially mothers. However, some parents and adolescent girls talked about the role of children in deciding whether to get vaccinated. A small number of parents did not want to be held responsible for making decisions about the HPV vaccine on behalf of their daughters, in case they were blamed for the impact of these decisions in the future.

3.2.6. The role of fathers – *"my wife did not approve and I did not ask why"*

Most of the fathers in our focus group had never heard of the HPV vaccine and deferred to either their wives or their daughters when making decisions about their children's health, including the HPV vaccine. However, some fathers described their role in facilitating these decisions.

"I will talk to my children, help them understand the purpose of [the HPV] vaccine and make it clear to them. When they fully understand and can decide on their own then I will let them decide if they want to get vaccinated or not." (Father).

Some fathers talked about the importance of empowering their daughters could make informed decisions about the HPV vaccine: "I believe that it is wrong for us parents to make decisions about the health of our children." (Father).

Other fathers felt that it was their responsibility to decide for their children and wanted as much information about the HPV vaccine as possible.

3.3. Motivation

In general, parents were highly motivated to get routine childhood vaccines for their babies and young children. They believed that vaccines were the best way to protect their child against diseases. Some parents felt the same about the HPV vaccine:

"I am looking forward to taking my daughters to get their HPV shot because I want them to be safe." (Mother).

Most adolescent girls who had been vaccinated against HPV were motivated by a desire to protect themselves. One girl described how getting the vaccine made her feel important:

"I did feel that we as girls are important because we are given this important and useful vaccine to protect ourselves and our reproductive organs." (Adolescent girl).

Some girls chose to get the HPV vaccine even when many of their peers were not. A father spoke with pride about his daughter being "brave enough to stand firm in what she believed" as the only girl in her school to accept the HPV vaccine.

3.4. Practical issues

3.4.1. Timing – *"Hard to accept another vaccine"*

Immunization program staff, nurses, and community members identified the timing of the HPV vaccine rollout as challenging. The vaccine was implemented shortly after the COVID-19 vaccine rollout which led some to be suspicious of the vaccine and concerned about new vaccines in general. The HPV vaccine was also initially rolled out towards the end of the school year, during exam time, when schools were busy and not able to provide the necessary support.

3.4.2. Accessibility – *"The school did not accept this vaccination"*

According to parents and teachers, some schools did not support the HPV vaccine and therefore did not allow students to receive it. In one case this was reportedly due to the principal not accepting the vaccine and in another it related to teachers' concerns about parental disapproval if the vaccine was available at school. One teacher from a school that did not allow the HPV vaccine in the initial rollout stated that parents could still take their daughters to the hospital to get a vaccine if they wanted to. A mother confirmed this:

"The first time I heard of HPV was on the radio, I decided to go to the school my kids go to […] and found out that they did not accept this vaccination. So I decided to take my kids to the Hospital [to] get vaccinated." (Mother).

3.4.3. Lack of knowledge among teachers – *"We had no idea what HPV was"*

While teachers played an important role in the HPV vaccine rollout, many felt that they did not have sufficient knowledge of the vaccine. Teachers were responsible for developing consent forms about the vaccine; however, most did not know what the vaccine was for.

"When [the Ministry of Health] came over to the schools we had no idea what HPV was and there were already negative thoughts due to the insecurity of not knowing what it was." (Teacher).

Most teachers wanted additional training about the vaccine so that they could share information with parents and students, as well as standardised consent forms provided by the Ministry of Health. Some felt that it was not their role to provide information about health issues, and that this should instead come from the health workforce.

3.4.4. Training and support for nurses – *"We train our nurses with a lot of knowledge"*

Reproductive health nurses from the Ministry of Health were responsible for raising awareness about the HPV vaccine and running information sessions in the community. Nurses received training about the HPV vaccine and most felt confident to share information about it. Some nurses found it challenging to talk about such a sensitive topic in groups of men and women, and many found it difficult to translate information about the vaccine into Tongan.

"Trying to Tonganise the words for mothers and for the communities to understand, because it's really hard translating Tongan words to English so that they have the same understanding as we have it, and also this is a very sensitive topic to talk to the community about, so we have to separate the mums from the male[s]." (Nurse).

One senior member of the immunization program also highlighted the challenge of inadequate numbers of staff and felt that while most nurses had enough knowledge about vaccines, training on how to

communicate about vaccines and counsel parents would be beneficial.

"We have the information, but how we deliver the information to the parents that we really need help on" (Program staff).

3.4.5. Cross-sectoral collaboration

Collaboration between the Ministries of Health and Education was seen as crucial for the success of the HPV vaccine rollout. Immunization program staff and nurses thought that a recently drafted agreement between the two government organisations would be helpful in implementing the vaccine in schools.

4. Discussion

This study sought to explore the social and behavioural drivers of childhood vaccine uptake among parents, adolescent girls, teachers, nurses, and immunization program staff in Tonga, with a focus on the HPV vaccine. We found that the COVID-19 pandemic had negatively impacted confidence and trust in vaccines, and there were specific concerns about the HPV vaccine causing infertility or promoting promiscuity. Lack of knowledge about the HPV vaccine among parents, teachers, and adolescent girls limited uptake. Nurses, teachers, and religious leaders were important social influences on vaccination. Practical barriers included non-standardised consent forms, limited vaccine accessibility through schools, and the timing of the initial vaccine rollout. These qualitative findings have been used to adapt the Vaccine Champions program to the Tongan context and guide development of tailored HPV vaccine resources.

While trust in routine childhood vaccines was high, many participants felt that the COVID-19 pandemic had reduced vaccine trust and confidence, especially for newly introduced vaccines. This finding is consistent with literature on the negative impact of the COVID-19 vaccine rollout on vaccine confidence and trust overall [20,21]. Research also suggests that new vaccines initially generate more vaccine hesitancy [22–24]. The high levels of trust in the health system in Tonga are promising and could be leveraged to support the HPV vaccine program through targeted communication activities such as community outreach by health workers and supporting community Vaccine Champions with Ministry of Health nurses [25,26].

Participants raised concerns about the HPV vaccine encouraging promiscuity or impacting fertility, as seen in other research from the Asia Pacific region [27,28], and some adolescent girls were afraid that the vaccine was harmful. Lower levels of confidence in the safety and efficacy of the HPV vaccine have previously been found to be associated with lower vaccine intention, and public perception of the safety and importance of the HPV vaccine was identified as a key barrier to implementation by Ministry of Health officials from across the Pacific [29,30]. These findings highlight a need for tailored messaging around the HPV vaccine in Tonga, framing it as a way to preserve fertility and prevent cancer, rather than focusing on HPV as a sexually transmitted infection. Implementing a gender neutral HPV vaccine strategy in the future may also help to reduce vaccine-related stigma [31,32]. While few low- and middle-income countries currently include boys in their HPV vaccination program, the available evidence suggests that barriers to vaccinating boys are similar to those for vaccinating girls [33]. Clear and appropriate messaging around HPV vaccines is essential as more countries move towards a gender neutral approach [32].

Many of the parents and adolescent girls we spoke to had limited knowledge of the HPV vaccine and misinformation was common. A quantitative rapid assessment of vaccine knowledge in Tonga in 2021 similarly estimated that only 37 % of caregivers had heard of the vaccine [7]. Provision of accurate and appropriate information is crucial for optimising vaccine uptake. A study from Fiji found that satisfaction with information about the HPV vaccine was strongly associated with provision of parental consent [34], and systematic reviews from the Asia-Pacific region suggest a correlation between lower levels of knowledge and reduced HPV vaccine intention [28,30]. Tailored communication activities and development of culturally appropriate and targeted materials in Tongan that reflect community needs and preferences should be a priority [26]. Statistics on the burden of HPV and cervical cancer in Tonga would make these resources more relatable, however this is challenging in a context without a national cervical cancer screening program and with limited local data available.

While mothers typically make decisions about childhood vaccination in Tonga [7], our findings suggest that fathers also play an important role. This fits with existing evidence of the benefits of engaging fathers in maternal and newborn health [35], and may also become more important if Tonga moves to a gender neutral HPV vaccination program in future [31].

We found that teachers, health workers, and in some cases religious leaders are important influencers on vaccine decision-making for parents and girls. Other studies from the region support the importance of health care worker recommendation in HPV vaccine acceptance [28,30], and health staff are known to be trusted sources of vaccine information for parents and caregivers in Fiji and Tonga [7,34]. The nurses in our study felt they had sufficient knowledge of the HPV vaccine, however many requested support in communicating their effectively with communities and wanted materials developed specifically for Tonga in Tongan. Training in vaccine communication and speaking with hesitant people could be helpful for immunization providers in Tonga, particularly as a lack of awareness about the HPV vaccine among health workers has been identified as a key barrier to vaccine implementation in the region [36].

While health workers are key to improving knowledge about vaccines, changing behaviour is complex and often requires information to come from multiple people within someone's existing social network [10]. Community influencers including religious leaders, opinion leaders, and leaders from community organisations all have a role to play in driving vaccine acceptance and uptake [37–39]. Teachers in our study acknowledged their role as trusted advocates for students. Training for this group would be especially beneficial for improving coverage of the HPV vaccine through schools. Addressing the concerns of teachers and principals is particularly important for schools that did not accept the HPV vaccine initially. The Vaccine Champions program is one way to upskill teachers, principals and other local influencers to become vaccine advocates in their communities, and evaluation of this program in Tonga is ongoing [14].

Practical barriers to HPV vaccine uptake in Tonga included a lack of standardised consent forms, the timing of the vaccine rollout, and the availability of the vaccine in schools. As some schools in our study did not support the HPV vaccine, there is a clear need to continue offering the vaccine in hospitals and health centres to maximise access. The requirement for parental consent has been a challenge in many low- and middle-income country settings [40]. While training on the HPV vaccine for teachers remains crucial, delegating the task of writing consent forms to staff within in the health sector may be most useful to streamline the consent process. Effective collaboration between the health and education sectors, where concerns are addressed and roles and responsibilities clearly mapped out, is critical to strengthen the HPV vaccination program [40].

4.1. Strengths and limitations

This is the first qualitative research on the social and behavioural drivers of vaccine uptake in Tonga. It provides insights from a range of community groups including adolescent girls, mothers, fathers, teachers, nurses, and senior immunization staff within the Ministry of Health. Data collection was conducted in Tongan and led by Tongan researchers with close links to their communities, allowing for in-depth and detailed discussions with Tongan people telling their own stories [41].

The project also has some limitations. A non-Tongan researcher (YM) led the data analysis, bringing their own experience to the results. This was mitigated by regular consultations with the Tongan data collection

team and data interpretation by the lead Tongan researcher (EK). Secondly, all the focus groups and interviews took place in Tongatapu. While most of the population live on this island, the views of people who live in the outer islands may differ from those in this study. In addition, recruitment of parents and adolescent girls through existing networks into a study specifically about vaccination could have resulted in sampling bias, with people who are supportive of vaccines being more likely to take part. Social desirability bias could also have impacted how honest the study participants were, however, all efforts were made to build rapport with facilitators and ensure that participants felt comfortable to speak honestly. Future research could explore an in-depth culturally based understanding of attitudes towards vaccines using a more unstructured approach instead of semi-structured guides, such as the Talanoa research method [42], a way of facilitating open discussions using storytelling, allowing the discussion to cover topics important to the participant that the data collector may not be aware of.

5. Conclusion

This study provides important insights into the modifiable drivers of HPV and routine childhood vaccination in Tonga. While vaccine confidence and trust are high in Tonga, the COVID-19 pandemic has impacted perceptions of newly introduced vaccines. Ongoing communication activities are needed to improve vaccine confidence and acceptance, including community outreach, health worker training, engaging community influencers, and developing targeted resources, as well as cross-sectoral collaboration to streamline the consent process and support the HPV vaccine rollout. Project findings continue to inform adaptation of the Vaccine Champions program and tailored strategies to improve HPV vaccine uptake in Tonga. Increasing HPV vaccine coverage is an important step towards eliminating cervical cancer as a public health program in this context.

Authors' contribution

JK and MD conceived the study and secured funding. All authors were involved in study design. UK, EL, SL and YM oversaw and contributed to data collection. YM led data analysis with support from MD, JK, and EL. All authors were involved in interpretation of data and critical revision of the manuscript. All authors approved the final manuscript.

CRediT authorship contribution statement

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Holly Seale reports a relationship with Pfizer Inc that includes: consulting or advisory and funding grants. OT, AT and RO are employed by the Tonga Ministry of Health and involved in the national HPV vaccine program. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.vaccine.2025.127280.

Data availability

Data will be made available on request.

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