Parental Vaccine Hesitancy among Former Refugees in Aotearoa New Zealand

Mulisa Senbeta Debela

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Abstract

Background: Vaccination is one of the most cost-effective and successful public health measures to prevent and control infectious diseases. Vaccine hesitancy is an important factor underpinning suboptimal vaccination uptake worldwide. Low immunisation uptake contributes to the resurgence of vaccine-preventable diseases (VPDs). Hence, the historic achievements of vaccinations in reducing the burden of VPDs have been threatened. There is substantial evidence on the magnitude and determinants of vaccine hesitancy in Western countries' general populations, yet evidence on subpopulations such as refugees is limited. The purpose of this study was to investigate the prevalence of vaccine hesitancy and its determinants among former refugees in Aotearoa New Zealand.

Methods: A cross-sectional survey was conducted in 2020/21 among former refugee parents who had been in New Zealand for more than 6 months and had a child 6 weeks–16 years old. Data collection was conducted using the Parental Attitudes about Childhood Vaccines (PACV) questionnaire, which was made available online and in paper format and in four languages (English, Arabic, Somali and Oromo). The internal consistency and predictive validity of different versions of the PACV was assessed. The prevalence of parental vaccine hesitancy was explored and the association between vaccine hesitancy and sociodemographic factors was examined using logistic regression.

Results: One hundred and seventy-eight participants completed the survey. Most participants were of African descent (70%) and lived in New Zealand for over a decade (61%). The rate of parental vaccine hesitancy was 16.3%, 95% CI (10.7, 21.3). About 20.6% of the parents had delayed vaccines and 11.8% had refused to vaccinate their child for reasons other than medical exemptions. Most caregivers were concerned about vaccine side-effects (47%), safety (43%) and efficacy (40%). The Cronbach's alpha scores for English, Arabic, Somali and Oromo PACV were 0.77, 0.53, 0.89 and 0.64 respectively. After controlling for confounders, the predictive validity of English PACV (p=0.04) and Arabic PACV (p=0.03) reached significance level. The combined PACV survey in four languages was contextually valid and

internally consistent with significant predictive validity (p=0.01) and very good internal consistency (Cronbach's alpha=0.77). After adjusting for covariates, primary source of information (p=0.045) and education (p=0.04) had significant association with vaccine hesitancy. Media as a primary source of vaccine information and low education status were linked with higher vaccine hesitancy. About 80% of the parents said their child(ren) had up-to-date immunisation status.

Conclusions: This is the first quantitative study that has investigated vaccine hesitancy among resettled refugees in New Zealand. The rate of vaccine hesitancy among former refugees was less than that of the host population, yet proportionally more refugee parents delayed and refused vaccines than the host population. Parents' educational status and primary source of vaccine information were important factors influencing vaccine hesitancy. Therefore, vaccine information tailored to former refugee parents' needs in a manner that addresses their concerns are required to reduce vaccine hesitancy and improve vaccine uptake. As the delay or refusal of vaccines is likely attributed to immunisation services barriers, reducing vaccine hesitancy and improving uptake requires a concerted and holistic approach.

Keywords: Vaccine Hesitancy; Parent Attitudes about Childhood Vaccines; Former Refugees; Parents; New Zealand; Cross-sectional Study.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

AUT	Auckland University of Technology
AUTEC	Auckland University of Technology Ethics Committee
CDC	Centers for Disease Control and Prevention
HBM	Health Belief Model
INZ	Immigration New Zealand
LMICs	Low- and Middle-Income Countries
MBIE	Ministry of Business, Innovation and Employment
MFT	Moral Foundation Theory
MMR	Mumps, Measles and Rubella
MRRC	Mangere Refugee Resettlement Centre
NIS	National Immunisation Schedule
OECD	Organisation for Economic Co-operation and Development
SEM	Socio-ecological Model
TIP	Tailored Immunisation Programme
UNHCR	United Nations High Commissioner for Refugees (known as the UN Refugee Agency)
UNICEF	United Nations International Children's Emergency Fund
VHPs	Vaccine-hesitant Parents
VPDs	Vaccine-preventable Diseases
WHO	World Health Organization
WPR	Western Pacific Region

Glossary

Convention refugees	Former asylum seekers whose refugee status have been given by the domestic authorities in New Zealand (MBIE, 2004).
Family reunion refugees	Refugee sponsored by family members residing in New Zealand (MBIE, 2004).
Former refugees	People with a refugee background who came to New Zealand through one of the refugee resettlement pathways (quota refugee, convention refugee, family reunification and community sponsorship).
Herd immunity	"Herd Immunity occurs when a large percentage of a population has become immune to an infection, whether through vaccination or previous infections so as to provide indirect protection against an infectious disease and can measure protection for individuals who are not immune to the infection" (Vyas et al., 2020, p. 108).
Immunisation	The process by which an individual develops immunity and is protected against a disease through vaccination.
Immunisation coverage	Information on the proportion of children who have received specific vaccines or are up-to-date with the recommended vaccine schedule
Marginalised populations	Subgroups excluded from mainstream social, economic, educational, and/or cultural life. Subgroups may be marginalised due to race, gender identity, sexual orientation, age, physical ability, language, and/or immigration status (Baah, Teitelman & Riegel, 2018).

Minorities	A group of people or communities with a distinct race, ethnicity or culture who usually have specific health needs that require different public health interventions.
Quota refugees	People with refugee status who are annually referred by the UNHCR to Immigration New Zealand. Quota refugees comprise of people with protection cases, women at risk and persons with impairment or people with medical needs.
Refugee	**"**A person who, owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country" (UNHCR, 1951, 1967, as cited in MBIE, 2004, p. 17).
Vaccination	"The action of introducing a vaccine into the human body to produce or boost immunity to specific disease." (CDC, n.d, para. 3)
Vaccination inequities	Disparities in immunisation coverage between different population groups arising "because of barriers to immunisation among disadvantaged groups are not addressed through policies, structures, governance or program implementation" (Mathew & Mittal, 2021, p.4).
Vaccine hesitancy	"Vaccine hesitancy refers to delay in acceptance or refusal of vaccines despite availability of vaccine services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence." (WHO, 2014, p.7)

Vaccine literacy	"can be defined as the degree to which people have the capacity to obtain, process, and understand basic health information and services to make appropriate health decisions" (Ratzan, 2011, p. 228).

Attestation of Authorship

"I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning."

Signature:

Date: 20/07/2021

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"I can do all this through him who gives me strength."

Philippians 4:13

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Chapter One: Introduction

1.1 Background

Vaccination is one of the most successful cost-effective public health measures to prevent and control infectious diseases. Vaccines also have the potential to support the fight against antimicrobial resistance and are vital for global health security (World Health Organization [WHO], n.d.). Every year, vaccines save about 2–3 million children from deadly infectious diseases (WHO, n. d). However, today, vaccine hesitancy has been observed in over 90% of countries worldwide (Lane et al., 2018; Lancet Child & Adolescent Health, 2019). Vaccine hesitancy is often defined as a "delay in acceptance or refusal of vaccines despite availability of vaccine services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence" (WHO, 2014, p.7). Vaccine hesitancy is not only a health threat to the hesitant group, who may be unvaccinated or under-vaccinated, but it is a threat to the health of wider society.

Studies conducted in developed countries have suggested suboptimal immunisation coverage can increase the risk of resurgence of vaccine-preventable diseases (VPDs), including measles, poliomyelitis and pertussis (Omer et al., 2009; Oostvogel et al., 1994; De Serres et al., 2013; Winter et al., 2010). Migrants and refugees have generally experienced higher VPD burden, yet lower reported vaccination coverage rates compared to their host populations due to various contributing factors (Charania et al., 2018). Low vaccination rates among subgroups, such as displace populations, could potentially lead to disease outbreaks that affect the migrant population and the general population in the host nations (Kouadio et al., 2010).
According to the United Nations High Commissioner for Refugees (UNHCR), known as the UN Refugee Agency, (2021), at the end of 2020 there were 84 million people forcibly displaced worldwide due to conflict, persecution, violence, human right abuses, and events that disturb public order. Of these, 26.6 million (32%) were refugees, and around half of these refugees

were children under the age of 18 (UNHCR, 2021). As refugees are forced to flee their country of origin, they may be deprived of social services including health care in the host countries for several years (Shrestha-Ranjit et al., 2020). Therefore, it is important for refugees to have access to health services that address their health needs. However, refugees continue to experience complex health problems after being resettled in the host countries (Shrestha-Ranjit et al., 2020). Compared to the European-born population, several studies have highlighted that those with a migration background have inadequate vaccination coverage and experience vaccine inequities several years after they have resettled in European countries (Mipatrini et al., 2017). Although evidence of low vaccination rates among former refugee and migrant populations in developed nations is abundant (CDC, 2018; Godoy-Ramirez et al., 2019; Mupandawana & Cross, 2016; Tankwanchi et al., 2021), little is known about whether vaccine hesitancy contributes to low immunisation rates in these subpopulations.

New Zealand has been hosting refugees since World War II (Marlowe & Elliott, 2014). For several decades, New Zealand has been resettling about 750 refugees per year via the UNHCR resettlement programme known as quota refugees (Marlowe & Elliott, 2014). While the quota refugee programme is the main pathway for refugee resettlement, a significant number of refugees and their dependents have been coming to New Zealand through other pathways including convention refugees (former asylum seekers), the family reunification scheme and a newly introduced community organisation sponsorship programme (Immigration New Zealand [INZ], 2022). The annual number of dependent refugee families who have been reunited with their loved ones through refugee family reunification was 300 (INZ, 2022) and the number of people who were resettled through convention refugees (former asylum seekers) is 200–500 (Ministry of Business, Innovation and Employment [MBIE], 2004).

Since the peak of the Syrian refugee crisis in 2015, New Zealand has been accepting 600 extra refugees from Syria annually (INZ, 2018). The current ruling government has doubled the annual quota refugees and family reunion refugees from 750 to 1500 and from 300 to 600 respectively (INZ, 2022). This means, once the temporary suspension of arrival due to COVID-

19 ends, the country will accept approximately 2100 refugees per annum through the quota and family reunion schemes.

There is no precise figure for the number of former refugees in New Zealand due to the continuous movements of refugees after they are granted citizenship. An estimated number of former refugees in New Zealand is 35,000–50,000 (Marlowe & Elliott, 2014; INZ, 2022). However, this figure only includes quota refugees who came through UNHCR referrals (Marlowe & Elliott, 2014). Almost half of the total refugees entering New Zealand are children (MBIE, 2012).

Refugees are among the vulnerable groups whose health needs are complex. Refugee children are at risk of under-immunisation. Parents' immunisation decisions about whether to vaccinate their children links to complex systemic factors, including those that are socio-economic (e.g., geographic barriers, parental difficulties and complex vaccine schedules) or related to vaccination views (e.g., vaccine hesitancy) (WHO, 2014). Refugee children entering New Zealand were reported to be more susceptible to VPDs (Rungan et al., 2013). Also, foreign-born refugee children have lower recorded age-appropriate vaccination rates compared to New Zealand-born children (Charania et al., 2018). National surveys conducted by Lee and Sibley (2017; 2020b) indicated that approximately a quarter of New Zealanders (26%) were classified as vaccine sceptics and that their attitudes to vaccinations can shift over time. This indicates whether vaccine hesitancy influences immunisation inequities is subject to further investigation. This study investigated the magnitude of parental vaccine hesitancy and its determinants among former refugees living in New Zealand. Understanding parents' perspectives and concerns about children's vaccinations is vital to inform intervention strategies to increase vaccine coverage.

To prevent VPD-related outbreaks, a very high level of vaccine compliance is required from both general populations and subgroups (WHO, 2014). Therefore, specific interventions targeting such distinct subgroups are recommended to improve vaccine uptake. But there are only limited examples of effective interventions used to reduce VPD burden among migrants and refugees (Charania et al., 2020). Addressing vaccine hesitancy and improving confidence in

vaccines and vaccination services could only be achieved when the evidence of vaccine hesitancy and vaccine acceptance, as well as factors associated with vaccine hesitancy across general populations, and specific population groups, are understood (Leask et al., 2014). Since vaccine hesitancy is indeed a threat to vaccination progress (Alsuwaidi et al., 2020; Siddiqui et al., 2013) and vaccine hesitancy has been reported in migrant communities in multiple countries (Tankwanchi et al., 2021); vaccine hesitancy and its determinants amongst former refugees needs to be examined to inform the interventions that address the specific needs of former refugee parents to make informed vaccine decisions.

1.2 Research questions and objectives

The study seeks to answer two main research questions**:**

Q1. What is the rate of parental vaccine hesitancy among former refugees in Aotearoa New Zealand?

Q2. What factors contribute to parental vaccine hesitancy among former refugees in Aotearoa New Zealand?

The primary aim of the current study was first, to assess the prevalence of parental vaccine hesitancy towards childhood vaccination and second, to investigate the determinants of parental vaccine hesitancy among former refugees in New Zealand. Since this study used the Parental Attitudes about Childhood Vaccines (PACV) and offered it in four languages, some of which have not been previously validated, this study also determined the validity and reliability of different PACV versions.

1.3 Rationale

Understanding the rate of parental vaccine hesitancy and its determinants among former refugees is important for many reasons. First, vaccine hesitancy is an emerging public health issue that has posed a threat to immunisation programmes (Cooper et al., 2018). An editorial published in the Lancet Child & Adolescent Health (2019) reported that vaccine hesitancy threatens the historical achievements made in reducing the burden of infectious diseases which

have plagued humanity for centuries. Recently, vaccine hesitancy has gained attention from international actors, such as the WHO, United Nations International Children's Emergency Fund (UNICEF) and researchers from various countries (Lane et al., 2018). To address vaccine hesitancy, context-specific interventions are recommended (WHO, 2014). However, limited studies have been conducted on vaccine hesitancy among specific subgroups, and refugee communities in particular. Therefore, it is important to expand research in this area.

Second, vaccine hesitancy (delay or refusal to vaccinate children) is linked to the decline in vaccine coverage rates; low immunisation coverage in turn can contribute to a resurgence of VPDs such as measles, rubella and pertussis (Gowda & Dempsey, 2013). Several studies found an association between suboptimal immunisation and VPD-related outbreaks (Gahr et al., 2014; Hall et al., 2017; Sonder & Ryan, 2020). To contain VPD outbreaks, a high immunisation coverage rate; for instance, approximately 95% is required to hinder measles transmission (Sonder & Ryan, 2020). This implies the need for strong parental vaccine compliance to prevent the community transmission of VPDs. Thus, to minimise the risk of VPDs, understanding the factors influencing vaccine hesitancy is essential (Marti et al., 2017).

Third, compared to children born in New Zealand with a recent migration background, lower immunisation rates were documented among foreign-born children, including those entering New Zealand on refugee pathways (Charania et al., 2018). Whether vaccine hesitancy plays a role in the gaps in immunisation coverage between refugee children and host country children has not been studied in New Zealand. However, as mentioned, vaccine hesitancy has been reported in migrant communities in multiple countries (Tankwanchi et al., 2021). Therefore, it is important to examine whether parental vaccine hesitancy contributes to low vaccine coverage among former refugee children in New Zealand.

Finally, understanding parental vaccine hesitancy among former refugee caregivers is important in the prevention of rising numbers of VPDs cases in wider society. Given the recent measles outbreak, there is a growing concern about increasing numbers of VPD outbreaks in both New Zealand and surrounding Polynesian countries (Craig et al., 2020). The Ministry of Health (MOH) in New Zealand is concerned about immunisation inequities among marginalised

groups. Thus, the Ministry has suggested reducing inequities as a priority to achieve the national immunisation target (MOH, 2019). One of the Ministry's strategic directions to achieve the immunisation goal was the implementation of a family-oriented strategy (MOH, 2003). Thus, understanding refugee families' perspectives on childhood vaccines and vaccination services is crucial to inform the vaccination programme for former refugee children.

1.4 Significance of the study

In New Zealand, a retrospective study by Rungan et al. (2013) revealed that only two-thirds of children under five years old who were resettled via the quota refugee programme had a complete vaccination certificate upon arrival. Almost three-quarters of newly arrived quota were administered one or more vaccines after they arrived in New Zealand at the Mangere Refugee Resettlement Centre (MRRC) to align them with the National Immunisation Schedule (NIS) (Rungan et al., 2013). There is still a considerable gap in vaccination coverage between different ethnicities in the country (MOH, 2019; MOH, 2021a). A study suggested that when an immunisation programme is available/accessible and underutilised, vaccine hesitancy could contribute to low vaccination uptake (Tankwanchi et al., 2020). Therefore, whether vaccine hesitancy contributes to low coverage among former refugee children in New Zealand is a worthwhile topic for investigation.

As a very small cluster of an under-vaccinated or unvaccinated group can negatively affect "herd immunity" (optimal coverage that can prevent outbreaks of VPDs) (Sonder & Ryan, 2020), and potentially be a hotspot for a VPD outbreak (Tankwanchi et al., 2020), it is important to investigate the magnitude of vaccine hesitancy among former refugees and the underlying factors. This study can inform healthcare professionals and policymakers in efforts to improve the future immunisation programmes and interventions among the target population to improve coverage rates as per the targets set out in the New Zealand Refugee Resettlement Strategy (Immigration New Zealand, 2022) and the newly developed Health System Indicators framework (MOH, 2021b). As vaccine hesitancy among marginalised communities, specifically

the refugee community, is an under-researched area, this work contributes to filling the current knowledge gaps and informing future research nationally and internationally.

1.5 Research Context

It is important to note that this research was conducted amidst the global pandemic of COVID-19. To date, the COVID-19 pandemic has caused hundreds of millions of cases and over 5 million deaths worldwide (WHO, n.d). In New Zealand, there have been over 50,000 cases and 50 deaths recorded (MOH, 2022). The WHO set a target for 70% of the global population to be vaccinated by mid-2022 and New Zealand has already passed the 90% mark in the COVID-19 vaccination rates among the population of aged 12 and over.

A number of events surrounding the development of the COVID-19 vaccines and the roll-out could have affected this study and/or parents' views on children's routine immunisation both around the world and in New Zealand. Three key aspects that might influence parents' views on routine vaccination in this study are: (i) that data collection was conducted when the COVID-19 vaccines were under development. Previous research showed that new vaccines and those under-development could affect parents' view of vaccines (WHO, 2014); (ii) this study coincided with a rise in anti-vaccination sentiment due to the imminent vaccine mandate across most western countries including New Zealand (iii) the role of media (social media and mainstream media) in spreading dis/mis-information about vaccinations was also reported. He et al. (2021) suggested vaccine misinformation could be a possible reason behind increased vaccine hesitancy towards the childhood routine immunisations during the current global pandemic. The impacts of the COVID-19 pandemic and vaccines on childhood immunisation among former refugees in New Zealand is a subject of future studies

1.6 Researcher's position

The motivation to undertake a study on vaccine hesitancy came from my personal background, educational, and professional experience. I am a former refugee resettled in New Zealand in 2015. My position in this enquiry is determined by a combination of my previous degree, political science, and my current study in public health. In political science, I had

learned about social science theories, in particular in relation to social factors in different national contexts, whereas in public health, I have gained knowledge about how social factors/social determinants impact on the population's health.

Furthermore, in my previous job, in the country of asylum (Egypt), I used to come across refugee families who feared, delayed and declined children's vaccines. Since then, I have been curious about the perspectives of refugee parents on childhood vaccines. Initially, I wanted to do a qualitative study on the barriers and enablers of childhood vaccines using a focus group discussion. But, in order to apply the social determinants of health that I have studied extensively throughout my educational career, I decided to conduct an observational study where I could measure the influence of social, economic and cultural factors on parental vaccine decision-making. So then, I chose a quantitative method, a survey, to understand the prevalence and determinants of vaccine hesitancy among former refugee parents.

In the current study, my educational and work experience were important in developing the inquiries and research questions, and in finding a position, yet the personal motivation that came from my lived experience as a former refugee is also important. Education and work experience can play a critical role in determining one's "research paradigm", and a researcher's personal motivation can contribute to producing high-quality research. My research paradigm is discussed in detail in Chapter Three.

Conducting research as an "insider" potentially has several advantages (Chavez, 2008). Some advantages of being an insider are access to a group; horizontal relationships; and building rapport and trust with participants, as they usually accept inside researchers from a representation viewpoint (Chavez, 2008). Thus, the advantages of being an insider can outweigh the disadvantages (Chavez, 2008), yet observational skills to reduce bias and substantiate validity should not be overlooked. A reporting guideline — Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) — which is a checklist of 22 items can help a researcher to report the results of an observation study more accurately and comprehensively (Von Elm et al., 2014). Thus, in this study, STROBE checklists are used in reporting the results where applicable (see **Error! Reference source not found.**).

1.7 Overview of the thesis

This thesis is divided into six chapters. The present first chapter is an introduction. In the introductory sections, the background information about the topic, the rationale for the study, the researcher's position, the study objectives, and research questions were presented. Chapter Two reviews relevant studies conducted on parental vaccine hesitancy at international, regional, national and local levels. The key determinants of vaccine hesitancy are also discussed in this chapter. Chapter Three describes the study design, methods of data collection, and analysis, along with a discussion of validity and reliability. Chapter Four presents the results of the study. Then Chapter Five discusses main results from the study by comparing them with other findings in the literature. The study's strengths and limitations are also critically discussed in Chapter Five. Finally, Chapter Six concludes the study, looks at implications and provides recommendations.

Chapter Two: Literature Review

2.1 Introduction

This chapter presents a literature review in order to understand vaccine hesitancy and its determinants among different populations and regions. This review serves as a background or conceptual framework for the thesis. The existing evidence on the magnitude and determinants of vaccine hesitancy among refugees in a broader context is interpreted and summarised. The chapter also distinguishes relevant variables in parental vaccine hesitancy, defines these variables and maps the relations between them. By interpreting and summarising existing knowledge on vaccine hesitancy, this review identifies gaps in the literature.

The sections of this chapter address various main points, as follows. Section 2.3 provides background information on the concept, definition, and scope of vaccine hesitancy and its measuring tools. In sections 2.4 and 2.5, alternative relevant theories and models of vaccine hesitancy and reasons behind vaccine hesitancy are critically discussed. Next, in section 2.6, the impacts of parental vaccine hesitancy on the health of refugee children are examined. Section 2.7 looks at the prevalence of vaccine hesitancy among refugees at international, regional, and national level. Then potential determinants of vaccine hesitancy among the refugee population are elaborated in section 2.8. In section 2.10, intervention strategies to address vaccine hesitancy are critically appraised.

2.2 Search methods

Databases including Medline, CINAHL Complete, Web of Science and Scopus were initially used to identify the literature included in this review. All the literature sources identified through these databases were limited to those published in the year 2000 onwards and published in the English language. Most of the peer-reviewed articles were retrieved via these scientific databases. The following search terms were used to retrieve studies from the above databases:

1. vaccin* OR immunis* OR immuniz*

2. refugee* OR migrant* OR "asylum seeker*"

3. refugee* OR migrant* OR "asylum seeker*" OR immigrant*

4. #1 AND #3

5. hesitancy OR hesitat* OR refus* OR confidence OR trust

6. #1 AND #3 AND #5

7. hesitancy OR hesitat* OR refus* OR confidence OR trust OR acceptance OR awareness

8. (hesitancy OR hesitat* OR refus* OR confidence OR trust OR acceptance OR awareness) n5 (vaccin* OR immunis* OR immuniz*)

9. #2 AND #8

Given lack of publications on the topic, in particular those focused on refugee populations, an open-dated search was conducted on Google and Google Scholar to locate additional grey literature. Manual searching for relevant literature was also undertaken on the reference lists of some of the key articles. Overall, a range of data sources were used in this review, including quantitative, qualitative, and mixed methods research articles; reviews; editorials; conference papers; unpublished reports; organisations websites; and governmental and non-governmental reports.

2.3 Vaccine hesitancy

Vaccine hesitancy is a complex behaviour that encompasses varying degrees of indecisive actions about vaccines and vaccination services (Kalok et al., 2020). The notion of vaccine hesitancy implies not only inaction or refusal to vaccinate, but it can also include beliefs, attitudes and behaviours about certain types of vaccines or vaccination services in general (Peretti-Watel et al., 2015). Although vaccine hesitancy has a long history (Dubé et al., 2014), it has gained attention from academics more recently (Larson et al., 2014). Larson et al. (2014) found that between 2009 and 2011 the phrase “vaccine hesitancy” was used in the title and abstract of only six peer-reviewed articles but since then there have been numerous studies published on vaccine hesitancy, particularly in Western countries.

As there is no consensus on the choice of terminologies to represent the issue, different terms are used to represent indecisive action on vaccinations (Peretti-Watel et al., 2015; WHO,

2014). After the WHO SAGE Working Group report in 2014, “vaccine hesitancy” has become the most commonly used phrase in the literature, followed by “vaccine confidence” and “vaccine acceptance” (WHO, 2014). According to WHO (2014), “vaccine confidence” — which denotes the behaviour in terms of trust in vaccines and vaccination services — is the second commonest phrase used to represent the issue (WHO, 2014). Both “vaccine confidence” and “vaccine acceptance” literally represent the contrary meaning to “vaccine hesitancy” and were chosen mostly for their positive outlook rather than embracing all the concepts and contexts of vaccine hesitancy. Other terminologies relevant to the concept are “vaccine doubters”, “vaccine sceptics”, “detractors”, “anti-vaxxer”, “vaccine refusers” and “vaccine distrust” (Dubé et al., 2014; Jarrett et al., 2015; Kashyap et al., 2019; Larson et al., 2015).

2.3.1 Definition of vaccine hesitancy

Due to the complexity of attitudes towards the vaccination decision, there is no established definition of vaccine hesitancy in the literature (Dubé et al., 2013). The definition of vaccine hesitancy is still evolving (Dubé et al., 2013). The WHO SAGE Working Group proposed definition of vaccine hesitancy as the “delay in acceptance or refusal of vaccines despite availability of vaccine services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence” (WHO, 2014, p.7). It is also the belief, attitudes and perceptions about vaccines and vaccinations services. This is the most widely used definition of vaccine hesitancy in the literature. The key to this definition is the phrase ‘despite the availability of vaccine services.’ Thus, hesitancy entails a range of complex and context-specific attitudes and behaviours, ranging from outright acceptance to outright rejection, and varying over time, based on the context, types of vaccine and programme.

Since its adaptation in 2014, the WHO’s definition of vaccine hesitancy has been widely used as a working definition. However, there are several criticisms of this definition. First, whereas the definition by the WHO encompasses all aspects of the issue, the choice of the word “hesitancy” is critiqued because it has a negative connotation (WHO, 2014; Peretti-Watel et al., 2015). In contrast, other proposed alternatives such as “vaccine confidence” lack the

depth and breadth of the concept (WHO, 2014). For example, confidence can cover trust in vaccine safety or health care providers, yet it is narrow and could only represent one dimension of vaccine-related decisions in the determinant matrix which is discussed in section 2.8 and illustrated in **Table *3***. Similarly, "vaccine acceptance" cannot differentiate between those who hesitate but might accept and those who hesitate but delay in accepting, which may not be according to the recommended vaccine schedule (Bedford et al., 2018).

Secondly, Bedford et al. (2018) insisted some non-vaccinators who reject vaccines may not always be hesitant, but they might have a belief in alternatives like natural immunity or homoeopathic therapy. Hence, while hesitancy can lead to refusal of a vaccine, non-acceptance of vaccines may not always imply vaccine hesitation. This could be why another author added the concept of "motivation" to vaccine hesitancy definition (Brewer et al., 2017). Motivation is willing to be vaccinated or being open to receive vaccines which is an overlapping construct of willingness, hesitancy, intention, acceptability vaccine hesitancy definition while avoiding the past vaccination behaviour (Brewer et al., 2017). Thus, these authors suggested an updated definition which is "hesitancy is a motivational state of being conflicted about or opposed to getting vaccinated" without reference to vaccination behaviour (i.e., delay or refusal) (Brewer et al., 2017, p.163). While this is a concise definition, it is only an emerging definition that may require further theoretical framework to substantiate it as an operational definition.

Thirdly, because of ambiguity in the hesitancy concept and the scope of vaccine hesitancy, indicators at the population level have not been clearly distinguished. Low vaccination coverage is usually used as an indicator of vaccine hesitancy (Yaqub et al., 2014). Indeed, vaccine hesitancy can lead to low vaccine coverage. However, low vaccine coverage is not necessarily caused by vaccine hesitancy; rather, low vaccine coverage can also be linked with access, availability and affordability of vaccines and vaccination services (Bedford et al., 2018; WHO, 2014).

The fourth critique of vaccine hesitancy relates to the "scope of vaccine hesitancy", which is detailed in section 2.3.2, below. According to Peretti-Watel et al. (2015), representing vaccine hesitancy on a linear continuum is oversimplified. A linear hesitancy continuum is not

self-evident because from a statistical point of view, it is difficult to put a population on an axis as most are clumped in the middle position (Peretti-Watel et al., 2015).

The fifth drawback of the above definition is that it might not work for low- and middle-income countries (LMICs) where there is a shortage of vaccine supplies (WHO, 2014). In the LMICs, delaying or missing out on vaccination can be linked to vaccine supply issues which appear as a lack of access, associated costs, and delays in the distributions of vaccines, or can even relate to inefficient health systems. For instance, a study conducted in relatively wealthy, middle-income Saudi Arabia reported that almost three-quarters of delays in children's vaccinations were caused by a shortage of vaccine supply — a lack of vaccine stocks in the hospitals and medical centres (Al-Saeed et al., 2018). By contrast, only 2.5% of the delay was attributed to vaccine rejection, those parents who intentionally refused to receive vaccines (Al-Saeed et al., 2018). In the USA, where some vaccines are not freely available, low-income parents faced financial barriers to vaccinating their children (Quinn et al., 2016). Therefore, the vaccine hesitancy definition lacks practical significance in countries that have limited vaccination services and have a cost associated with the services.

Having acknowledged the underlying gaps in the definitions of vaccine hesitancy, the WHO SAGE Working Group has suggested the need for elaborating vaccine hesitancy with the model known as the 3Cs (WHO, 2014). Accordingly, vaccine hesitancy is elaborated as "complex and context-specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence" (MacDonald, 2015, p. 4163). The current study will use the WHO's proposed definition as an operational definition because it can fit reasonably well into the context of the study.

2.3.2 Scope of vaccine hesitancy

Although most studies focus on parents' vaccine hesitancy towards their children, hesitancy can also be manifested by adults towards their own vaccines and even sometimes by health professionals (Dubé et al., 2013; Marti et al., 2017). This study of vaccine hesitancy focuses on parental vaccine hesitancy. Hesitancy denotes a section of a continuum that covers a

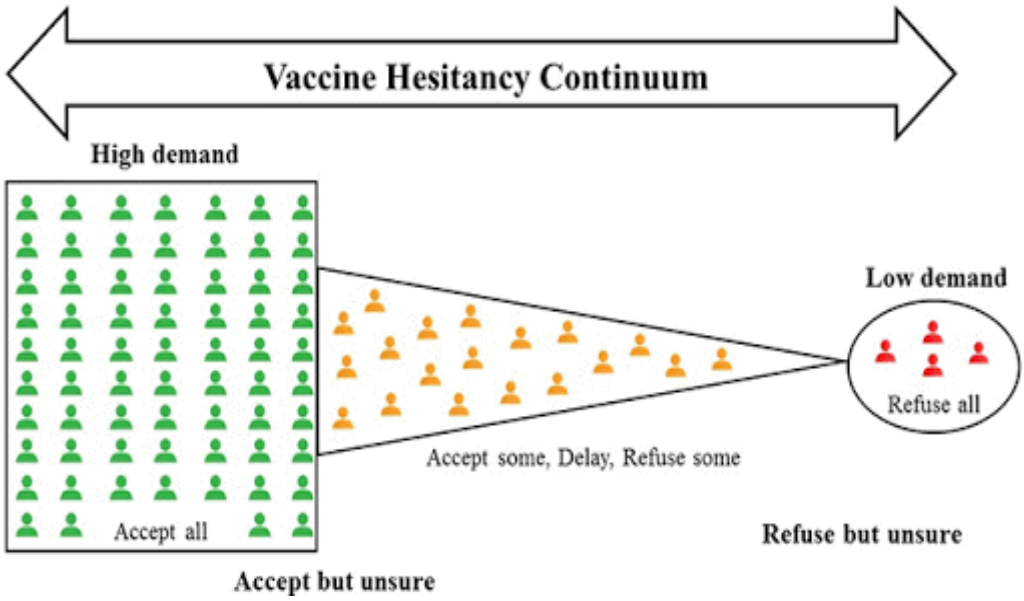
heterogenous group between the two extremes of anti-vaccine (anti-vaxxers) and pro-vaccine (vaccine promoters) (Dubé et al., 2015; MacDonald, 2015). Most vaccine hesitant parents are those found between the two extremes, they accept or delay some or all vaccines (see **Figure *1***). The proportion of those who hold anti-vaccine views (i.e., those who refuse the entire set of recommended vaccines for their children) to the total hesitancy is very low and usually estimated to be only 1%–2% of total hesitancy nationally in several countries (Gowda & Dempsey, 2013). Parents who delayed vaccines also outnumbered those who refused vaccines. For example, the ratio of those who delayed vaccines to those who refused vaccines was about (30:1) in Iraq, 4:1 in Malaysia, 3:1 in the US and UAE (Alsuwaidi et al. 2020; Azizi et al., 2017; Opel et al., 2013; Raof, 2018). On the other hand, high rates of refusal were reported with some vaccines (Gowda & Dempsey, 2013). For instance, in the USA, the percentage of VHPs who refused the H1N1 pandemic, seasonal flu, HPV, and varicella vaccines were 86%, 76%, 56% and 32% respectively (Dempsey et al., 2011; Freed et al., 2010).

The concern about vaccinations is neither static nor limited to a particular group and can vary with individual, group, place and time (Larson et al., 2016; WHO, 2014). This was demonstrated by a follow-up study by Henrikson et al. (2017) who suggested vaccine hesitancy "behaviour" was dynamic as parents who refused to vaccinate can accept a vaccine later on, and those who accepted vaccination at the beginning could decline later. A longitudinal study in New Zealand reported similar dynamics (Lee & Sibley, 2020b). While nearly 30% of parents' confidence in childhood vaccines declined over five years (2013–2017), 10% of parents' confidence in vaccines increased during the same time period among the New Zealand general population (Lee & Sibley, 2020b).

Hesitancy also emerges from various underlying reasons; while some people are concerned about vaccine safety (long-term negative impacts), others are concerned about vaccine effectiveness or temporary side effects (Larson et al., 2016). As a result, some parents may accept or delay vaccines yet be unsure in doing so, while some other parents agree to accept certain types of vaccines and decline other vaccines (MacDonald, 2015). Those who accept or refuse, yet are not sure why, might easily be influenced by misinformation from peers

or society. Therefore, examining factors in a broader social context, in addition to personal factors and source of information, is important for understanding a pattern of vaccine hesitancy in societies (Dubé et al., 2014).

Figure 1. *Vaccine Hesitancy Continuum*



Note. A diagram showing the hesitancy continuum. Adapted from *Vaccine hesitancy* by K. Schumacher (n.d.), Inland NW Report, http://inlandnwreport.com/2019/08/15/vaccine-hesitancy/

2.3.3 Measuring vaccine hesitancy

Because it is a relatively new concept, knowledge about measuring vaccine hesitancy is at an early stage (WHO, 2014). There is no universally applicable validated survey tool for either the general population or subgroups. Before choosing an assessment tool, it is important to comprehend who is hesitant, what are their concerns, where the hesitant individuals/groups are located and in which social or political-context or sub-population (Larson et al., 2015). There is evidence in the literature of a growing use of survey tools to assess vaccine hesitancy. For instance, a review by Larson et al. (2015) found seven relevant survey tools used to evaluate vaccine hesitancy, confidence, or trust. Generally, the existing survey instruments in the literature can be classified into three categories: vaccine-specific tools; vaccine and healthcare

service trust tools; and health education and other public service sectors measuring tools (see **Table *1***, below).

Table 1. *Measuring Tools of Vaccine Hesitancy*

Group	Survey tool	Reference
I. Vaccine-specific tools	● Parental Attitude about Childhood Vaccine (PACV)	Opel et al. (2011)
	● Caregiver Vaccine Acceptance Scale (CVAS)	Wallace et al. (2019)
	● Vaccine Hesitancy Survey (VHS)	WHO (2014)
	● Immunization Hesitancy Survey	Luthy et al. (2010)
	● The Vaccine Safety, Attitudes, Training, and communication Project (VACSATC)	Stefanoff et al. (2010).
	● Series of surveys with strong focus on trust in the influenza vaccine using the Trust and Confidence Model and Protection Motivation Theory	Van der Weerd et al. (2011)
	● Vaccine Confidence Index (VCI)	Larson et al. (2015)
	● Vaccine Acceptance Instrument	Sarathchandra et al. (2018)
II. Vaccine and healthcare service trust measuring tools	● Measuring Trust in Physicians	Larson et al. (2015)
	● Nine items developed to assess patient–health provider trust in post-partum mothers' relationships	Hall et al. (2002)
	● Healthcare Confidence Index	LIoyds Bank (2021)
III. Health education and other public service sectors measuring tools	● Knowledge, Attitude and Behaviour (KAB)	Dubé et al. (2016)
	● The National (US) Network for Immunization Information (NNii) Survey Instrument	Gellin et al. (2000)

The measuring tools in Group I, were designed to assess hesitancy, trust, confidence and acceptance of vaccines and immunisations services. Group II, vaccine and healthcare service trust tools, were designed to understand the level of confidence/trust in healthcare services, including vaccination services (Larson et al., 2015). Group III, healthcare education and other sectors, are healthcare-related measuring tools that can be utilised in broader healthcare or other public service sectors. For example, KAB can be used both in health education and the sports sector to assess knowledge, attitudes, and behaviour about different topics of interest (Stevens et al., 2003).

The Vaccine Acceptance Instrument is a more comprehensive survey that was designed and validated in the US (Sarathchandra et al., 2018). This instrument was for the general adult population and it incorporates more vaccine hesitancy dimensions, such as political ideology, trust in science and conspiratorial ideation (Sarathchandra et al., 2018). PACV and CVAS are specific to parental vaccine hesitancy. The CVAS was designed and validated in Ghana (Wallace et al., 2019). Although CVAS was validated for low-income countries, there is limited evidence of the usability of this tool in the literature.

While PACV, VCI and VHS were all validated and widely used in many countries to assess hesitancy (Larson et al., 2015), other survey tools, such as VACSATC and NNii, were limited to particular contexts (Gellin et al., 2000; Stefanoff et al., 2010). PACV was among the pioneer survey tools specifically designed to measure parental vaccine hesitancy towards childhood vaccination (Opel et al., 2011). PACV has been widely used to determine vaccine hesitancy among caregivers (Larson et al., 2015), and this wide use has seen the survey tested and modified within different contexts and settings, and using different study methodologies (Opel et al., 2011; Larson et al., 2015). During the initial validation process, PACV was also tested in a focus group (Opel et al., 2011). New information was generated from the focus group outcomes — the likelihood of parents' preference to rely on own research to vaccinate the children; hence, the item about level of trust in the source(s) of vaccine information was modified in the trust domain of vaccine hesitancy (Opel et al., 2011).

PACV, a 15-item survey instrument, has shown promising results in measuring parental vaccine hesitancy in both the general population and sub-groups (Larson et al., 2016). It was found to be rigorous in detecting vaccine-hesitant behaviour (Kalok et al., 2020) and has also shown a degree of flexibility in identifying hesitant parents among caregivers in different countries, using different methods in multiple languages (Alsuwaidi et al., 2020; Azizi et al., 2017; Henrikson et al., 2017; Napolitano et al., 2018; Opel et al., 2011). Hence, this survey seems the best option from the available tools to assess vaccine hesitancy among subgroups and, specifically in this case, former refugees.

2.4 Theories and models relevant to vaccine hesitancy

Theories underpinning vaccine hesitancy are limited (Dubé et al., 2018). Relevant theories and models explaining vaccine hesitancy are mainly used in wider behavioural health topics, and include health promotion models (Bednarczyk, 2018), a social science theory (Piltch-Loeb & DiClemente, 2020), and the Vaccine Hesitancy Model (WHO, 2014).

Immunisation has two goals. One is to protect individuals from contracting serious illnesses and the second is to achieve herd immunity — optimal coverage that can prevent community transmissions or outbreaks of VPDs (Bednarczyk, 2018; Dube et al., 2014). The notion of herd immunity is not only protecting the vaccinated group but others who cannot be vaccinated because of compromised immunity that is related to age or underlying health conditions in addition to a small proportion of the society who do not develop immunity after being vaccinated. The continued success of vaccinations depends on herd-immunity, which is sufficient numbers of individuals receiving vaccines to create and maintain herd immunity (Quinn, 2016). Therefore, the theories and models of vaccine-hesitancy rely on the premise of herd-immunity. Brief descriptions of the most commonly used theories and models of vaccine hesitancy are summarised in **Table *2*** below.

Table 2. *Theories and Models of Vaccine Hesitancy*

Theory/model	Origin and year	Proposed reason for hesitancy	Recommendation for intervention	Main strength	Main limitation
Health Belief Model (HBM)	Social Psychology (1950s)	Perceived barriers (e.g., safety, side effects) are greater than perceived benefits and severity	Positive behavioural change can be achieved by giving information about the benefit and severity, and educating to overcome the barriers	Established and widely utilised in behavioural health areas	While perceived benefit and perceived barriers are known as strong predictors, perceived severity is weak in vaccine hesitancy
Moral Foundation Theory (MFT)	Social Sciences (2004)	Underlying moral foundation elements: harm, wellbeing of others, authority, fairness, purity, and liberty determine intention to vaccinate	Values-based messages which appeal to core morality of individual or group need to be used in vaccination interventions	Moral foundation-based messages have a potential to shift polarised attitudes on vaccinations	Limited evidence is available as to whether MFT can predict vaccine-hesitant individuals or groups of people
Socio-ecological Model (SEM)	Human Development Psychology (1970s)	Vaccine demand can be influenced by layers of factors that interact between individual and social environment including family/friends, organisations, community, and health policy	Comprehensive understanding of broader socio-cultural, political, systemic, and historical determinants in which parents belong is crucial to the development of effective strategies to tackle vaccine hesitancy	Powerful tool to determine factors that may influence health behaviours by attributing health outcomes to factors which exist on several levels beyond the individual	Does not provide a cue for motivation to change the behaviour/attitude at the individual level
Three Cs Model	Vaccine Hesitancy (2014)	Vaccine hesitancy is a complicated behavioural health issue that is context-specific, varying across time, place, and vaccines, which is influenced by factors of complacency, convenience and confidence	Understanding multitudes of determinants (listed in determinants matrix) helps to address vaccine hesitancy	Vaccine-hesitancy-specific and comprehensive as it summarises factors influencing vaccine hesitancy into convenience, complacency and confidence	There is doubt about its applicability in low-income context

The HBM is a useful model for understanding the reasons behind vaccine hesitancy and the range of potential factors that could help catalyse health-promoting behavioural change (Piltch-Loeb & DiClemente, 2020). The elements of HBM that help to predict behavioural change decision-making are perceived benefits, barriers, the services and severity of the VPDs (McKellar & Sillence, 2020). HBM refers to the perceived susceptibility and severity in relation to perceived benefits and barriers of the health-promoting behaviour which can also be moderated by broader factors, like demographic characteristics and cues to action (McKellar & Sillence, 2020). The core principle of behavioural health theories including HBM is the idea that people engage in an internal decision-making process by weighing the pros and cons of undertaking specific actions, in this case vaccinating their own child(ren) (Piltch-Loeb & DiClemente, 2020). This means parents cognitively weigh the severity of VPDs and perceived benefits or harms that a vaccine carries vis-à-vis the barriers to vaccinating the child(ren) (Piltch-Loeb & DiClemente, 2020).

Elements of the HBM can be moderated by sociodemographic variables including age, income, religion, number of children and education, among other factors (McKellar & Sillence, 2020). A common recommendation from HBM is to improve individual-based access to information about the benefits and risks of vaccinations (Bednarczyk, 2018). Although the "knowledge deficit" approach in HBM can work temporarily in improving vaccine uptake, studies have shown that trying to correct misconceptions about vaccines not only failed to improve vaccine uptake in some cases, but also backfired and decreased intentions to vaccinate in the long run (Amin et al., 2017; Bednarczyk, 2018; Peretti-Watel et al., 2015). Some authors asserted that health messages that might not appeal to the core values of individuals/groups, cannot persuade, or shift attitudes about the vaccination decision amidst growing polarising attitudes on vaccination (Bednarczyk, 2018; Butler & MacDonald, 2015; Rossen et al., 2019).

The MFT is an emerging social science theory that applies to vaccine hesitancy (Amin et al., 2017). The MFT proposed six foundations on which people base their morality. These foundations are harm, fairness, authority, purity, in-group (favouring one's in-group) and liberty (Rossen et al., 2019). The moral foundation elements determine peoples' stance on childhood

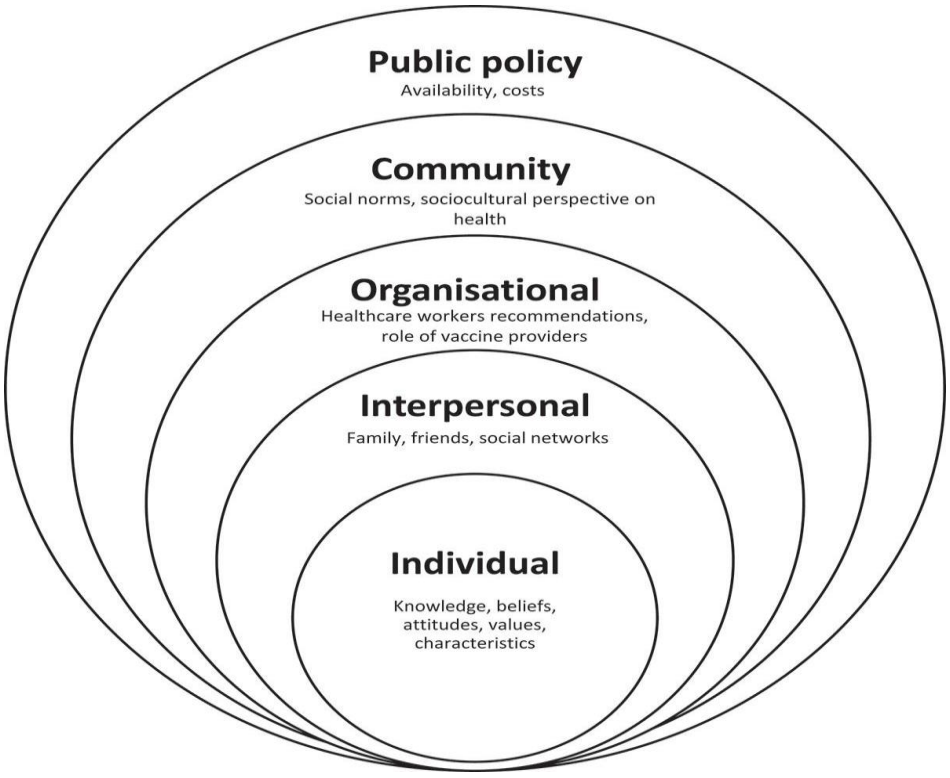
vaccination decisions (Rossen et al., 2019). “Harm” implies the safety/wellbeing violation of others; “fairness” shows the pursuit of justice for others; “in-group” implies favouring one’s own group; “authority” reflects a special view of those in positions of power in traditional societal structures; “liberty” is about personal autonomy or individualism; and purity is a rejection of ‘unnatural acts/elements’ for body and mind (Rossen et al., 2019). These elements can potentially inform efforts to promote messages about childhood vaccinations that address religious and cultural elements influencing vaccine decision-making. For instance, moral domains of “authority” can be well suited to the influential role of religious/community leaders vaccine acceptance (Jalloh et al., 2020); and “purity” can align with the belief of “non-halal” (the belief among some Muslims who are concerned about vaccines being composed of materials/ingredients banned by Islam) (Wong et al., 2020).

The MFT provides a framework for assessing underlying values that may inform downstream attitude and belief development. For instance, value-based differences in political thought can lead to policy and belief differences in individuals and groups. Public health researchers increasingly move upstream of traditional assessments of attitudes and beliefs that have, to date, guided health promotion activities (Bednarczyk, 2018). These values can be shown through conspiratorial thinking, reactance, disgust sensitivity, and individual/hierarchical worldviews (Bednarczyk, 2018). These values often align with anti-vaccine attitudes regardless of geographical, social or cultural differences. For example, a prior lack of trust in healthcare providers and or the real or perceived quality of health service providers can be a predictor of vaccine hesitancy across all societies, hence this needs to be addressed (Everist, 2015). A study on the intervention to improve vaccine uptake supported the notion that parental decisions depend on trust in health professionals, the health systems, the government, and friends and family members (Larson et al. al., 2018). This is even more important to marginalised sub-populations. For instance, a study with Middle Eastern immigrants showed individuals were wary of persons they viewed as authority figures, which might include health workers (Everist, 2015).

Although the MFT partially explains vaccine hesitancy, as a theory it has an empirical problem: MFT elements are not supported by Moral Foundation Questionnaire (MFQ) that was originally developed to measure the domains (Curry et al., 2019). Since MFT is a relatively new alternative theory, only limited studies have been done using MFT as a theory to explain the moral reasons that underpins vaccine hesitancy; thus, whether MFT can predict vaccine hesitant individuals/groups needs further investigation.

The SEM is another model used as a conceptual framework to explain vaccine hesitancy. This model suggests an individual caregiver's attitudes and behaviour about childhood vaccines are determined by layers of factors which interact within a complex social and ecological environment (Dubé et al., 2018). According to this model, the parental vaccination decision is influenced by complex interactions between and among these factors at different levels, including individual (e.g., caregivers' cognitive and behaviour factors); interpersonal (e.g., peer pressure from social networks); institutional (e.g., healthcare worker communication); community (e.g., cultural norms); and policy (e.g., healthcare policy) (see **Figure *2***). In combination with health promotion models which educate to counter vaccine hesitancy misconceptions, SEM can be utilised to resolve socio-environmental barriers to improve vaccine uptake. However, unlike vaccine hesitancy, which is often represented by a continuum, the SEM framework is not linear. Therefore, the SEM framework is theoretically not well aligned with vaccine hesitancy. The practical significance of SEM is also questioned because it does not indicate how to motivate individual parents in combating hesitancy.

Figure 2. *Socio-ecological Model for Vaccine Hesitancy*



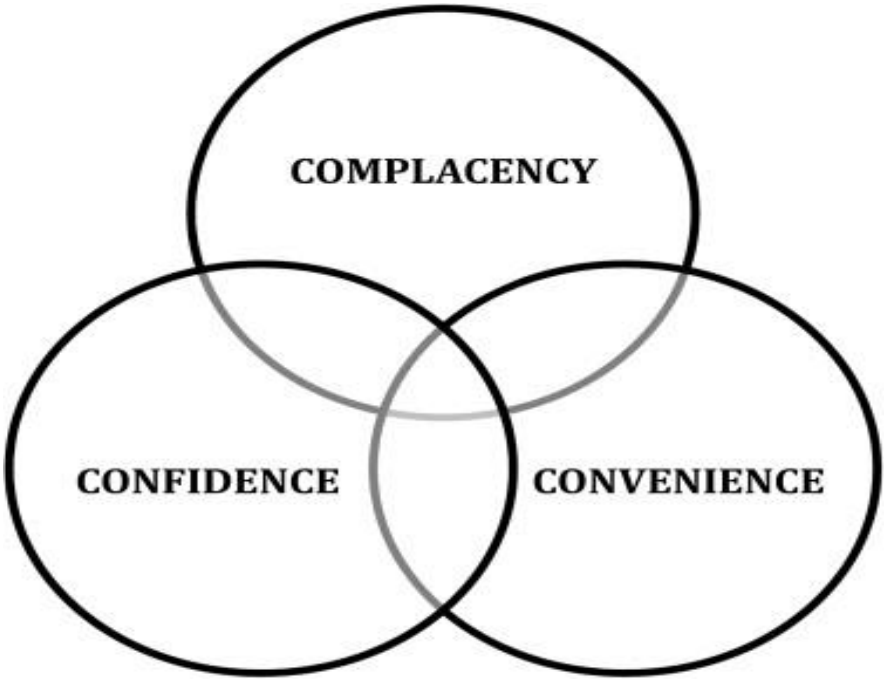
Note. Bronfenbrenner's diagram of the socio-ecological model, adapted from "Underlying Factors Impacting Vaccine Hesitancy in High Income Countries: A Review of Qualitative Studies," by E. Dubé et al., 2018, *Expert Review of Vaccines, 17*(11), pp 991. https://doi.org/10.1080/14760584.2018.1541406

The Vaccine Hesitancy Model, which is also known as the 3Cs model (convenience, complacency, and confidence) (see **Figure *3***) was proposed by the WHO SAGE Working Group on Vaccine Hesitancy (WHO, 2014). This model broadly summarises determinants that influence decision making in vaccination under convenience, confidence, and complacency. Convenience refers to accessibility, confidence implies trust in providers, complacency denotes situations where there are low perceived risks of VPDs, or else vaccination is not deemed a necessary preventive action (WHO, 2014). Confidence or public trust was reported as a leading driver for vaccine uptake that transcends different geographical and cultural differences. As already mentioned, for people with migrant or refugee backgrounds who might experience abuse and exploitation, lack of trust in health care professionals could even be a more important factor than it is for the general population.

Potential barriers to vaccinations, including cultural norms, knowledge gaps, lack of access to health care, and anti-vaccination beliefs (commonly known as convenience) are

contextual factors (WHO, 2014). Given the complexity of vaccine hesitancy, the 3Cs model is specifically designed for vaccine-related behaviour in a reasonably comprehensive and easy to grasp (WHO, 2014). In line with the continuum nature of vaccine hesitancy, the 3Cs model can help to determine the dynamic determinants of hesitancy, including health-seeking behaviour. The wider critique of the 3Cs model is its lack of practical significance in establishing the link between contextual factors (socioeconomic factors) and vaccine hesitancy in the LMICs (Wagner et al., 2019).

Figure 3. *Three Cs Model of Vaccine Hesitancy*



Note. Diagram of three Cs (convenience, complacency, and confidence) model of vaccine hesitancy proposed by the SAGE Working Group, adapted from "Vaccine Hesitancy: Definition, Scope, and Determinants," by N. E. MacDonald, 2015, *Vaccine, 33*(34), pp 4162. https://doi.org/10.1016/j.vaccine.2015.04.036

Other more specific theories which are partially covered in the above general theories are "healthism" or "risk culture" and dis(trust) toward health authorities and mainstream medicine (Peretti-Watel et al., 2015). "Healthism" or "risk culture" is a concept of how society seeks to exercise autonomy over their own lives, which implies using their judgement to assess the risks and opportunities in their daily lives so as to make their future healthy and secure (Peretti-Watel et al., 2015). Healthism and risk culture, along with a pre-existing general (dis)trust in different actors, including providers, pharmaceutical companies, and general

mainstream medicine, are what make parents delay or refuse to vaccinate their children. In some developed countries healthism implies socio-economic factors that might influence vaccine hesitancy; for instance, parents with high socio-economic status delay and refuse vaccines for their children as they think they have control over their health and their family's health (Swaney & Burns, 2019). In marginalised communities, a combination of risk-culture and dis(trust) implies possible doubt about medical authorities/mainstream medicine, and parents could turn to consult alternative experts or seek alternative information sources (Siddiqui et al., 2013). For example, the beliefs about traditional healers may exist among African immigrants who come from where belief in traditional healers are profound (Tuwe, 2012). But there is no detailed information about traditional healers and their influence on the health-seeking behaviour of former refugee parents in the New Zealand context.

Overall, theories underlying vaccine hesitancy imply behaviour, belief, and attitudes which manifest as a continuum, ranging from outright rejection to outright acceptance (Peretti-Watel et al., 2015; Dube et al., 2018). "Vaccine hesitancy theories and models may help to explain why some vaccine-hesitant individuals may accept all vaccines but remain concerned or unsure about other vaccines, may reject or delay some vaccines yet accept others, or may refuse all vaccines" (Tankwanchi et al., 2020, p.2). However, the above theories and models are ambiguous and have several drawbacks. First success of vaccines depends on herd immunity — which means optimum vaccination coverage that ultimately leads to the eradication of diseases (Mallory et al., 2018). This means theories of vaccine hesitancy rely on the premise of herd immunity. But whether the concept of herd immunity is salient in vaccine messages is questionable (Sobo, 2016). In a study conducted in the US, while only 11.3% of participants acknowledged herd immunity, 70% of those who were familiar with the concept perceived herd immunity to be unnecessary or unachievable (Sobo, 2016). Secondly, theories underlying vaccine hesitancy, especially health promotion theories, mostly focus on individual behavioural/cognitive factors. However, the parental vaccination decision is complex and multidimensional, and is influenced by broad social factors such as information sources, type of vaccines and mode of vaccine deliveries (WHO, 2014).

As already mentioned, to address the growing concern about vaccine hesitancy and improve vaccine confidence, understanding the factors that influence hesitancy among the general population, and subpopulations, is essential (Bednarczyk, 2018). The 3Cs model has increasingly been used in studies of the general population, but the application of this theory in subgroups has not been studied well. Therefore, more research is required to investigate whether available theories/models are relevant for explaining vaccine hesitancy among marginalised groups, including the refugee population.

2.5 Common causes of vaccine hesitancy among marginalised communities

There are several underlying reasons for vaccine hesitancy in the general population. But whether the same reasons are behind vaccine hesitancy among marginalised subgroups have not been well studied. According to the annual report to the WHO, "risk-benefit perception," "lack of knowledge" and "religion" are the three major reasons why families might not comply with their national immunisation schedule (Lane et al., 2018). Risk-benefit perception (i.e., perceived severity) and safety concerns (concerns about side effects) were the most common reasons for vaccine hesitancy reported by national immunisation authorities worldwide. The ranking order of these reasons varies with societies at regional and national level, and for subpopulations. For example, in 2014 and 2015 the most frequently cited reasons for hesitancy in LMICs was lack of knowledge. In contrast, in high-income countries, the most frequently cited reason for hesitancy was safety concerns (Larson et al., 2016). In terms of regions, safety concerns and religious incompatibility were frequently cited as main reasons for vaccine hesitancy in the Western Pacific Region (WPR) (Larson et al., 2016). While most reasons behind hesitancy were similar across both the general and subpopulations, some quantitative and qualitative studies have shown cultural and religious factors to be the most influential factors behind low vaccine acceptance among immigrants (Tankwanchi et al., 2021).As religious conviction and strong culture, which interrelate, are among the common attributes of marginalised societies (Tuwe, 2012), along with risk–benefit and safety concerns, they could be major driving factors of vaccine hesitancy.

i) Risk–benefit concerns

The term ‘risk–benefit concerns’ refers to parents’ informal risk-benefit analysis whereby they believe in the existence of risk when vaccinating instead of not vaccinating. Risk–benefit analysis is a cognitive process of individual parents that may be influenced by multiple social factors. In general, vaccination is said to be a victim of its own success. Since the most prevalent infectious diseases have been controlled, families of young children have no fear about these diseases anymore; instead, they worry about temporary side-effects. Risk–benefit concerns fit under ‘complacency’ in the 3Cs vaccine hesitancy model (WHO, 2014).

Although complacency contributes to vaccine hesitancy for both general populations and marginalised groups, it is not identical (Quinn et al., 2016). For example, a recent study in the US general population found at least 1 in 8 families believed it was better for their children to get diseases and develop a natural immunity instead of vaccination (Barrows et al., 2015). While complacency influences vaccine hesitancy for both white and black parents in America, complacency and confidence clearly influence vaccine acceptance among marginalised African-American parents (Quinn et al., 2016). On the other hand, in New Zealand, low confidence in vaccines was linked with low education among parents of a low socio-economic status (Lee & Sibley, 2020a).

ii) Safety concerns

Safety concerns underlying vaccine hesitancy range from a fear of temporary side-effects to ‘vaccines cause the diseases they are supposed to prevent’ (Dubé et al., 2016). The most commonly reported safety concern was side effects (Dubé et al., 2016; Alsuwaidi et al., 2020; Azizi et al., 2017). The fear of alleged temporary vaccine reactions (side effects) has overtaken the fear of VPDs. “For people who already perceive low vaccine benefit and low disease risk, the fear of side effects may be enough to deter them from vaccines” (Quinn et al., 2016, p. 13).

In the 3Cs model, safety concerns reflect distrust/lack of confidence. Despite compelling evidence refuting associations between vaccines and autism spectrum disorder

(ASD), about 40% of parents of children with ASD still believed that vaccines caused their child's ASD condition (Sahni et al., 2020). As already discussed, some marginalised communities can have less trust in their health systems, and are more sceptical about health services, including vaccination, than the general population. This could be because of the tendency of some marginalised communities to be more influenced by negative perceptions that are present in their particular community (e.g., historical distrust) than their non-marginalised counterparts (Quinn et al., 2016). However, although this suggests more possibility for hesitancy and delay, it did not influence vaccination behaviour as they ultimately accepted the vaccine (Quinn et al., 2016). A study with Somali resettled refugees in the US has found a significant drop in measles, mumps and rubella (MMR) vaccine coverage which was linked to the concern that 'MMR vaccines cause autism' (Mölsä et al., 2017). Elsewhere, findings from a qualitative study among African immigrants in the UK indicated parents' fear of their daughters being sterilised was the main driving factor of hesitancy related to the HPV vaccine (Mupandawana & Cross, 2016).

iii) Religious/Philosophical beliefs

Religious or philosophical beliefs as exemptions from vaccinating children are believed to be deep-rooted and widespread across different religions, regions and cultures (Piltch-Loeb & DiClemente, 2020). Today, vaccine-related indecisive actions result from a multitude of factors which come from deeply rooted belief systems. These beliefs are not limited to religion; rather, they encompass philosophical stances, such as individual liberty, and health beliefs/approaches, e.g., "natural" health, fear of adverse health consequences, and other beliefs that justify vaccine reluctance. Religious beliefs or philosophical stance can be seen as 'convenience' in the 3Cs model because parents who refuse vaccines state that vaccines non-compliance with their religious belief (Jalloh et al., 2020; WHO, 2014). Larson et al. (2016) reported that even when the parents claimed they had no religion, their response reflected religious or some other sort of belief which had an implication for vaccine-related decision-making. There is some evidence in the literature that showed parents from disadvantaged and

isolated communities attempted to use religious beliefs to exempt children from vaccination (Butler & MacDonald, 2015; CDC, 2018).

Though it is not consistent, some religions have a significant correlation with vaccine hesitancy (Larson et al., 2016). Findings from qualitative studies also reported vaccine contents (which are not halal) raised a concern among the Muslim communities as a reason not to accept vaccines (Wong et al. 2020). Even though the specific religion was not cited, high religious non-compliance with vaccination was documented in the wider WPR (Larson et al., 2016). Because of structural racism, socio-economic position, or cultural distinction, individual parents from some marginalised groups have pre-existing belief systems which may need special attention from vaccine providers. Generally, anti-vaccine beliefs, whether related to religious conviction or philosophical stance, need to be understood prior to developing targeted interventions to address hesitancy, which helps to influence parents' risk assessment (risk–benefit analysis) and eventual vaccination behaviour.

2.6 Health effects of vaccine hesitancy in New Zealand

Children of vaccine-hesitant parents (VHPs) may delay a recommended schedule or miss out on them altogether (WHO, 2014). Delays in immunisation for individual children result in under-immunisation (cannot fully prevent diseases) or prolonged exposure time (increased risk of infections). In the wider society, the lack of timely vaccinations can lead to VPD outbreaks and a rise in VPDs cases and deaths, and an increase in complications which result in hospitalisation and sometimes disabilities (Turner, 2019). Furthermore, VPD outbreaks can also have other indirect detrimental impacts on health systems and socio-economic growth of the countries (Lo & Hotez, 2017). A study on MMR vaccine hesitancy in the USA has shown a 5% drop in the vaccine coverage rate would increase cases of measles among children threefold, and raise the cost to the public sector by US$2.1 million annually (Lo & Hotez, 2017). It is worth noting that large-scale VPD outbreaks have compounding socio-economic effects, but here only health effects were emphasised.

VPD outbreaks resulting from low vaccination rates among the pockets of under-immunised people might have national, regional and, sometimes, global health impacts Regionally, the latest measles outbreak (2019/2020) in New Zealand had a devastating impact on the surrounding Pacific Island nations with concurrent outbreaks of measles in Polynesian countries (Williamson et al., 2020). Towards the end of 2019, Samoa was in a state of emergency due to a massive measles outbreak that was believed to have a link with a New Zealand cluster. Over 5,700 measles cases and 80 deaths were reported in Samoa during this outbreak. Most of the cases and deaths were children under five years (Williamson et al., 2020). There was also a record of simultaneous outbreaks in New Zealand and other Pacific Island nations, including Tonga, American Samoa, and Fiji).

In New Zealand, reported cases of measles in the first quarter of 2019 rose by 300% compared to the same period in the previous year (Sonder & Ryan, 2020). A study showed low vaccine confidence among disadvantaged non-European parents in New Zealand. This might cause a disproportionate burden of VPD-related health outcomes to fall upon marginalised groups. In the latest measles outbreak of 2019/2020, a total of 2,195 cases were notified in New Zealand (ESR, 2020). Of the total cases of measles, over two-thirds were from marginalised communities of Pasifika immigrants, Indigenous Māori and Middle Eastern/Latin American/African (MELAA) or unknown people. Confirmed cases from Pasifika, Māori, and MELAA groups represented 41%, 24% and 2% of total cases respectively (Sonder & Ryan, 2020). The MELAA ethnic category encompasses various ethnicities, many of which former refugees may identify as (Tuwe, 2012; MBIE 2012; Perumal, 2010). Thus, this preliminary report may indicate overrepresentation of refugee children in a VPD outbreak in New Zealand.

From a health system viewpoint, VPD outbreaks can increase pressure on public health providers (Gahr et al., 2014). Outbreaks can easily overwhelm already under-pressure public hospitals. In New Zealand, public hospitals have long waiting lists with overwhelming hospitalisation demand for chronic conditions even without any disease outbreaks (Ardagh et al., 2006). Thus, outbreaks could increase waiting times as resources could be redirected to control VPDs during outbreaks. A report from New Zealand also suggested increased measles-

related complications, which raised the number of hospitalisations in the latest measles outbreak of 2019/2020 (Sonder & Ryan, 2020). Such increases in complications may increase hospitalisation rates, which may overwhelm public hospitals. As previously discussed, there was evidence of a disproportionate burden of VPD-related health outcomes in the 2019/2020 measles outbreak in New Zealand (Sonder & Ryan, 2020). Pasifika children with suboptimal immunisation status were believed to be a hotspot of recurrent measles outbreaks in New Zealand, Australia and the wider Polynesian region (Turner, 2019; Williamson et al., 2020). Along with other marginalised ethnicities in New Zealand, former refugees' children might disproportionately be affected due to low immunisation-coverage (Rungan et al., 2013). There are various factors associated with low immunisation outcomes for refugee children. These include systemic factors (sociodemographic factors), lack of trust in health care (confidence) and barrier of access (convenience), as reported among former refugees in New Zealand (Charania et al., 2018; Rungan et al., 2013). There is a lack of evidence about the health effects of VPDs among refugee children; therefore, future studies need to investigate the health effects of immunisation inequities among former refugees in New Zealand.

2.7 Prevalence of vaccine hesitancy among refugees

A longitudinal study showed a global decline in the trends of vaccine confidence over the last five years (de Figueiredo et al., 2020). A significant proportion of parents have a concern about childhood vaccinations (MacDonald, 2015). Studies on the rates of vaccine hesitancy in general populations have increased internationally. However, since numerous studies in general populations have shown even parents who vaccinate their child(ren) might have doubts and fears about vaccinations, national estimates of vaccine coverage rates are limited in reflecting vaccine hesitancy (Dubé et al., 2014). Evidence on the magnitude of vaccine hesitancy within marginalised subgroups is very limited (WHO, 2014). Due to lack of specific evidence, this section overviews the rate of vaccine hesitancy in a broader regional and national context, including refugees along with other disadvantaged groups. In other words, since evidence on the rates of vaccine hesitancy among former refugees is limited, information on coverage rates as hesitancy indicators are presented in comparison with national figures, and

data on other marginalised subgroups including immigrants, isolated communities, and minorities in developed countries. This broader comparative assessment provides a contextual understanding of vaccine hesitancy in a bigger picture (Larson et al., 2016).

2.7.1 Prevalence of vaccine hesitancy in the OECD context

Since almost all refugees have been resettled in the OECD countries, understanding the rates of vaccine hesitancy in this context is important. Hence, vaccine hesitancy in the general population of OECD countries is discussed before hesitancy among the specific refugee population. Despite having relatively high immunisation coverage rates, a growing vaccine scepticism has become a concern in many OECD countries. According to both country-specific studies and transnational surveys, rates of vaccine hesitancy were substantially high in some developed nations (de Figueiredo et al., 2020; Hadjipanayis et al., 2020; Larson et al., 2016; Rey et al., 2018). A global mapping survey by Larson et al. (2016) on vaccine hesitancy found Europe had the highest average vaccine hesitancy (negative responses for vaccine safety, effectiveness and importance were 17%, 11.3% and 8% respectively), compared to a global average of 13%, 9.1% and 5.8% (Larson et al., 2016). A high rate of vaccine scepticism was not limited to continental Europe, as high hesitancy scores were documented in several OECD countries. For instance, the rates of vaccine hesitancy in Australia, Canada, France, Italy, New Zealand and the US were 24.7%, 40.2%, 46%, 34.7%, 28.1% and 30.4% respectively (Dubé et al., 2016; Lee et al., 2020b; Napolitano et al., 2018; Opel et al., 2013; Rey et al., 2018; Rossen et al., 2019). Another national survey in Turkey showed an increase in the prevalence of unvaccinated children over time (from 1.6% to 2.9% between 2008 and 2013) (Yalçin et al., 2020). Given the high rates of vaccine coverage in the OECD countries, these figures are surprising. A study by Yaqub et al. (2014) underlined vaccine hesitancy is likely underestimated by high coverage because not all vaccine hesitant people refuse vaccines.

As investigating the magnitude of vaccine hesitancy in host country contexts is important to evaluate former refugees' vaccine hesitancy rates, it is also equally important to be mindful that the rate of vaccine hesitancy among the resettled community can be influenced by their previous experiences in host countries or countries of asylum. The limited data in the

available studies focused on refugees hinder to make any definite conclusion. For example, Somali refugees in the US (Minnesota) showed lower acceptance of MMR vaccines amongst concerns expressed about autism being linked to the MMR vaccine (CDC, 2018). Low vaccine coverage among refugees and a measles outbreak among the Somali community in America substantiate the need for further studies among refugee populations in Western countries (Tankwanchi et al., 2020).

2.7.2 Prevalence of vaccine hesitancy in the WPR context

With the global resurgence of measles and the rapid movement of populations, some countries including New Zealand remain vulnerable to measles outbreaks in the WPR (WHO, 2019). The resurgence of measles occurs in spite of high immunisation rates in some countries due to variability in immunisation coverage between subpopulations. Populations with low vaccine coverage rates at the subnational levels have been hotspots for the recurrent outbreaks in the regions. As already mentioned, a great concern about vaccine safety and importance, as well as the religious incompatibility of vaccination, were raised by parents of the WPR countries (Larson et al., 2016). Like any other Western countries, high-income countries in the WPR such as Japan, Australia and New Zealand have high rates of vaccine hesitancy. Among the LMICs in the WPR, parental vaccine hesitancy rates of 36.4% were documented in the Philippines (Migriño et al., 2020). The incident known as 'Denguevaxia' or a dengue vaccine scare — 'a controversy about anti-dengue vaccine causing severe illness among those who received vaccines'—was a reason behind a sharp rise in vaccine hesitancy in the Philippines.

The two countries which resettle almost all the refugees in this region, Australia and New Zealand, note concerns about vaccines (Lee et al., 2020b; Rossen et al., 2019). Furthermore, former refugees were among the groups with low vaccination coverage rates both in New Zealand and Australia (Rungan et al., 2013; Williamson et al., 2020). As already stated, in Australia, New Zealand and the surrounding Pacific Island nations, there was evidence of measles clusters being linked to Pacific Island immigrant children/adolescents and immunisation inequities (Craig et al., 2020; Williamson et al., 2020). This demonstrates how

communities with low vaccine uptake could be hotspots for VPD outbreaks in the dynamic region of the WPR, particularly in the Trans-Tasman region.

2.7.3 Prevalence of vaccine hesitancy in New Zealand

Historically New Zealand had low childhood vaccination coverage until the 1990s (Turner, 2019). After the 1990s coverage rate improved substantially yet the gap between subpopulations has been persisted. Like most of the OECD countries, the rate of childhood immunisation has declined in New Zealand recently. While the national coverage for two-year-old children has dropped from 92.8% (2016) to 90.3% (2019) and 88% (2021) (MOH, 2021a), the measles incidence rate has increased from 2.3/100,000 (2016) to over 1000/100,000 (Sonder & Ryan, 2020). A decline in the rate of childhood immunisation has not only hindered the achievement of the national target (>95% coverage rate) but also triggered the resurgence of VPDs (Nowlan et al., 2019). A national survey conducted in New Zealand's general public by Lee et al. (2017) found around 26% of parents were moderate sceptics about vaccines while 5.5% were very sceptical about vaccines in 2013. This means roughly 31.5% of parents in New Zealand were sceptical of vaccines (Lee et al., 2017). This dropped slightly to 28.1% in 2017 (Lee & Sibley, 2020b). Both of the New Zealand studies were representative of the general population and used data from New Zealand Attitudes and Value Survey (NZAVS) that used a national survey to estimate vaccine confidence.

In New Zealand, evidence on refugee children showed they are among the group at high risk of being under-immunised or unimmunised (Charania et al., 2018; Rungan et al., 2013). New Zealand refugee children had a lower immunisation rate than children with no migration backgrounds (Charania et al., 2018). Besides, other studies have shown Middle Eastern and African children have lower immunisation rates compared to New Zealand European and Asian children (MOH, 2020; Nowlan et al., 2019). The inequities across the ethnicities have been an issue, as the New Zealand MOH has already acknowledged, and set up a strategy to address it. Closing the gap in immunisation inequities among different ethnicities was one of the strategic directions that the MOH listed as a priority (MOH, 2003). On the other hand, increased uptake of age-appropriate immunisation among quota refugee children during post-arrival (6–12

months) was a refugee-specific health outcomes goal set by the New Zealand Refugee Resettlement Strategy (INZ, n.d.). This goal was intended to boost immunisation catch-up among former refugee children, but it is exclusively for quota refugee children.

Given refugees can face a lack of access to vaccination in their countries of origin (Mipatrini et al., 2017), while they are on the move (in transit countries) (Mipatrini et al., 2017) and even long after they have resettled in the host country (Tankwanchi et al., 2020), former refugees in New Zealand might have different views on vaccination. The low perceived risk of VPDs, and the rise of vaccine scepticism coupled with misinformation in the media and from populist politicians, challenge views on the safety of vaccines in some Western countries and this may reinforce the hesitancy of resettled people who have pre-existing concerns about the safety of vaccines (Tankwanchi et al., 2020). The repeated measles outbreaks among Somali refugees in Minnesota, in the US, is a good example (Tankwanchi et al., 2020). Elsewhere, there was an indication of low coverage related to hesitancy in multiple qualitative studies among Somali refugees in the United Kingdom (UK), Norway and Sweden (CDC, 2018; Godoy-Ramirez et al., 2019; Mupandawana & Cross, 2016). In addition, another study among the parents of refugees resettled in Europe from Eastern, Southern and Western Africa showed hesitancy related to the HPV vaccine (Mupandawana & Cross, 2016).

As vaccine hesitancy is dynamic and driven by societal influences, the estimation of the prevalence of vaccine hesitancy requires close monitoring of vaccine acceptance or confidence at both national and subnational level (Leask et al., 2014). As already outlined, the 2019 WHO report showed low coverage among subpopulations in the WPR was a driving factor behind the repeated measles outbreaks (WHO, 2019). This suggested the need for improving vaccine coverage among subpopulations in the region. Prior to conducting interventions to improve vaccine uptake, an understanding of the reasons behind low uptake among minority populations is required. In New Zealand, apart from coverage rate data which shows it is comparatively low among former newly arrived quota refugees' children (Rungan et al., 2013), there is limited evidence on the magnitude of vaccine hesitancy. Hence, whether the low vaccine coverage rate among former refugee children is attributable to vaccine hesitancy requires further study.

2.8 Determinants of vaccine hesitancy

Vaccine hesitancy is influenced by different factors which are context-specific, varying across time, programme (routine vs. mass vaccinations) and with types of vaccine (WHO, 2014). While some factors leading to vaccine delay or refusal could be the same all over the world (Braczkowska et al., 2017; Yalçin et al., 2020), other determinants of vaccine hesitancy may vary in different contexts (WHO, 2014). Some factors that lead to vaccine hesitancy in all contexts can be lack of time, poor knowledge or awareness, mistrust of public institutions, lack of effective communication from health professionals, and fear of adverse effects of vaccines (Yalçin et al., 2020). In contrast, according to a review study, there was evidence of limited universal determinants that influence vaccine hesitancy dimensions; as a result, the relative strength and independence of each factor varied by context, settings, and types of vaccine (Dubé, et al., 2018). This is consistent with findings from several observational studies that measured the strength of association between different determinants and vaccine hesitancy in different contexts (Adel et al., 2019; Brown et al., 2018; Cunningham et al., 2018; Lee et al., 2017; Rey et al., 2018). For example, illiteracy or low education is associated with high vaccine hesitancy in many developing countries (WHO, 2014) whereas high education is also correlated with high vaccine hesitancy in some high-income countries (Rey et al., 2018). In other words, education can either be a barrier to vaccine acceptance or a promoter of vaccine acceptance depending on the context.

Health providers noted that parental vaccine decisions are complex and are influenced by a mixture of previous experience, various factors including information sources, emotions, risk perceptions and level of trust in health personnel (Yalçin et al., 2020). This means specific sociodemographic factors such as gender, education, religion, family structure and level of trust in the health system (as a vaccine information source) among other factors could influence a parental decision on childhood vaccination (WHO, 2014). The WHO SAGE Working Group (2014) broadly categorised factors affecting parental decision-making about vaccines into three groups. These multidimensional factors that affect a parental decision on vaccinations are: (a) individual/group factors (factors related to individuals' perceptions of vaccines or peer-

pressure); (b) vaccine-specific factors (factors directly related to certain vaccines); (c) contextual factors (factors related to the wider socio-cultural environment and public institutions) (WHO, 2014). A total of 21 determinants were assigned to these three broad groups (**Table *3***).

Table 3. *Vaccine Hesitancy Determinant Matrix*

Individual/group factors	**Vaccine-related factors**	**Contextual factors**
a. Personal, family and/or community members' experience with vaccination, including pain b. Beliefs, attitudes about health and prevention c. Knowledge/awareness d. Health system and providers-trust and personal experience e. Risk/benefit (perceived, heuristic) f. Immunisation as a social norm vs. not needed/harmful	a. Risk/benefit (epidemiological and scientific evidence) b. Introduction of a new vaccine or new formulation or a new recommendation for an existing vaccine c. Mode of administration d. Design of vaccination program/Mode of delivery (e.g., routine program or mass vaccination campaign) e. Reliability and/or source of supply of vaccine and/or vaccination equipment f. Vaccination schedule g. Costs h. The strength of the recommendation and/or knowledge base	a. Communication and media environment b. Influential leaders, immunisation programme gatekeepers and anti- or pro-vaccination lobbies. c. Historical influences d. Religion/culture/ gender/socio-economic e. Politics/policies f. Geographic barriers g. Perception of the pharmaceutical industry

Note. Determinant Matrix with 21 potential factors of vaccine hesitancy adapted from "Vaccine Hesitancy: Definition, Scope, and Determinants," by N. E. MacDonald, 2015, *Vaccine, 33*(34), 4161– 4164. https://doi.org/10.1016/j.vaccine.2015.04.036

Wilson et al. (2018) reported factors influencing vaccine decision-making amongst newcomers. Cultural norms could also include the perception of diseases (VPDs in this case) or even general health-seeking behaviour (Everist, 2015). Some common factors, for example, religion, which plays an important role in parents' decisions about vaccinating their children, are greatly influenced by strong cultural and religious convictions (Wilson et al., 2018). Evidence about strong religious convictions among the refugee communities in New Zealand is

widely documented (Gardner et al., 2014; Mohamed, 2011; Tuwe, 2012). Therefore, it is important to investigate the influence of religion and culture on vaccine hesitancy among former refugees.

Previous experience in health systems and different vaccine programmes (routine vs. mass immunisation) might also influence vaccine acceptance among minority subgroups, particularly immigrants (Wilson et al., 2018). Adverse events leading to vaccine hesitancy is more common in mass-immunisation than routine ones and in new vaccines than more familiar vaccines (WHO, 2014). As a result, former refugees who predominantly come from countries with non-routine immunisation programme might hold pre-existing vaccine hesitancy. In addition, as former refugees who might have experienced abuse and exploitation could lack confidence in the host country health systems, including vaccination services (Everist, 2015). Overall, cultural norms, strong religious convictions coupled with health-seeking behaviour (seeking health care only in an emergency situation) and previous experience could influence childhood vaccination decisions among former refugees (Everist, 2015; Wilson et al., 2018).

Investigating the determinants of vaccine hesitancy among former refugee parents assists immunisation programmes in improving vaccine uptake among children from refugee backgrounds. Without understanding both the distribution of vaccine hesitancy and acceptance, and factors associated with vaccine hesitancy across populations, including subpopulations, as well as factors underlying vaccine hesitancy within a population-specific context, addressing vaccine hesitancy and improving confidence in vaccines and vaccination services could not be achieved (Bednarczyk, 2018).

2.9 Addressing vaccine hesitancy

Traditionally, mandatory vaccination as a legal instrument has been used to override parental concerns about vaccines, yet a public health approach to combat vaccine hesitancy is at its early stage. While mandatory vaccination has lost acceptance in contemporary free societies (Zimmerman, 2006), the public health approach to improve vaccine uptake among subpopulations is limited (Jarrett et al., 2015).

With the increasing influx of migrants and the associated risk of VPD outbreaks, more studies are required to address how the complex interactions between immunisation providers, parents and health systems impact on vaccination uptake among refugee and migrant communities (Charania et al., 2020). The primary goal of vaccine hesitancy interventions is to increase the perceived value of vaccination through "shifting" people's risk assessment (Piltch-Loeb & DiClemente, 2020). Enhancing vaccine uptake requires clear, coordinated, and concerted public health efforts (Piltch-Loeb & DiClemente, 2020).

Addressing vaccine hesitancy requires a multi-component approach including a "social (behavioural) science approach" (Piltch-Loeb & DiClemente, 2020) a "social marketing approach" (Nowak et al., 2015) and "clinical (pain) mitigation" or "pain management" (Shen & Dubey, 2019). Jarrett et al. (2015) more specifically classified interventions to address vaccine hesitancy into "dialogue-based", "incentive-based" and "reminder-based" approaches to enhance parental vaccine acceptance. The WHO's Tailoring Immunisation Programmes (TIP) is an emerging intervention that has been used to improve vaccine uptake among different minorities (Butler & MacDonald, 2015). Brief descriptions of these interventions are provided below.

The behavioural science approach is an intervention method that was developed from the behavioural health model (Piltch-Loeb & DiClemente, 2020) which was discussed in section 2.4 under the theories and model of vaccine hesitancy. Piltch-Loeb and DiClemente (2020) attempted to incorporate social and behavioural sciences theories to understand vaccine hesitancy as a continuum and propose solutions accordingly. In line with the scope of vaccine hesitancy as a continuum, a behavioural science approach proposed a continuum for vaccine uptake. This can help to conceptualise personal and social factors that influence vaccine hesitancy and can inform designing more effective vaccine promotion programmes that target specific subgroups.

The vaccine uptake continuum comprises five factors including awareness of the health threat, availability, accessibility, affordability and acceptability of the vaccines (Piltch-Loeb & DiClemente, 2020). According to Piltch-Loeb and DiClemente (2020), systematically

addressing each step of the continuum can bring about greater understanding of the factors affecting vaccine hesitancy and help to conceptualise, develop, implement, and evaluate effective interventions designed to promote vaccine uptake. In the New Zealand context where childhood vaccines are free, the reasons behind suboptimal vaccine coverage among marginalised groups have mostly been reported as an accessibility issue from the supply side. Although availability and affordability (the supply side of vaccination services) should not be overlooked as a barrier to vaccine uptake, the acceptance issue (the demand side of vaccination) might be even more important for improving coverage rates in the country where vaccination services are publicly available.

The second proposed intervention approach to tackling vaccine hesitancy is social marketing (Nowak et al., 2015). Social marketing practises and principles have been used by several programmes in different contexts to foster vaccine acceptance. Although these approaches have been efficient and cost-effective in terms of reaching out to large audiences, they need to be used with caution for a diverse group (Kreuter et al., 2013). Successful social marketing is like successful commercial marketing; both need to go beyond promotions and communications in their efforts to persuade audiences (Nowak et al., 2015). This means that immunisation programmes should avoid "one-size-fits-all" approaches in communications and messaging since it may not lead to successful results. Each population segment with a different set of values and a different culture requires different messages that do not contradict their traditional values. Paradoxically, given the diversities of refugee communities, it is worth noting that entertaining diverse health needs in terms of languages would require a great deal of resources. Thus, future vaccination interventions should consider alternative cost-effective approaches to intervention designs (Charania et al., 2020), for example, health technology (in other words, digital communication).

The third vaccine hesitancy intervention approach is injection pain mitigation (Shen & Dubey, 2019). Since injection pain can cause distress for parents of the children and those who give the injections, the mitigation of pain is important in the effort to improve vaccine uptake. Fear of needles and post-injection side-effects can lead to hesitancy (Dubé et al., 2013).

According to emerging clinical guidelines on pain mitigation during vaccination, pain can be mitigated and indeed parents are more comfortable with child vaccinations when pain is mitigated (Shen & Dubey, 2019). There are some pain mitigation techniques that could be undertaken during vaccine injections (Shen & Dubey, 2019). For example, an empirical study found providing sucrose and a topical anaesthetic for children before injection reduces the pain and improves parents' trust in vaccines. Addressing vaccine-related injection pain could also add value for the improved quality of care delivered to children (Taddio et al., 2015). Nevertheless, pain mitigation techniques during children's vaccination are underutilised and their inclusion in the overall pain management guidelines are unclear.

The fourth recommended approach is a communication-based approach or dialogue-based approach. Due to the variation in the drivers of vaccine hesitancy, effective and well-informed communication in all health promotion, public health campaigns and health care practice settings are key to vaccine attitude shift (Amin et al., 2017). As a dialogue-based approach (Jarrett et al., 2015), skilled interpreters and culturally competent facilitators should be employed to overcome communication barriers with the goal of improving vaccine uptake among migrants and refugees (Charania et al., 2020). This study also emphasised the benefit of engaging with family, community and religious leaders in vaccination service delivery.

There is a profound need for culturally tailored communication to improve vaccine confidence among former refugees in New Zealand. But, in New Zealand, complaints about a lack of professional interpreters in Primary Healthcare Organisations (PHOs) were common (Tuwe, 2012). The lack of professional interpreters at PHOs could negatively affect vaccination services as PHOs give vaccinations in New Zealand. The latest report on former refugees' health and wellbeing underscored the importance of professional interpreters in the PHOs (Mortensen, 2020). Furthermore, consulting communities and religious leaders is important for addressing hesitancy, as a dialogue-based mechanism that involved community/religious leaders would work to improve vaccine uptake because refugee caregivers likely trust information from their religious leaders (Jalloh et al., 2020). A non-financial incentive-based intervention also had a moderate positive impact among the low-income marginalised groups (Jarrett et al., 2015).

Another intervention mechanism which can be part of a communication-based approach is a recall-based intervention. The recall-based intervention can help to reduce vaccine delays and missing appointments by reminding parents. Recall-based interventions target individual parents by reminding them of childhood vaccine schedules (Jarrett et al., 2015) and such interventions in the form of mail and digital apps have shown promising results among migrants and refugee populations (Charania et al., 2020). This approach may also be efficient and minimise the cost of a campaign to improve vaccine uptake among diverse refugees. Nonetheless, recall-based interventions did not seem effective in improving parents' fear or hesitancy about the vaccines. Therefore, this technique needs to be used along with other intervention mechanisms.

The final intervention mechanism to reduce vaccine hesitancy and improve uptake is TIP. TIP is an assessment tool that was developed by the WHO Europe Regional Office as a follow-up to the SAGE Working Group on Vaccine Hesitancy, to help countries address vaccine hesitancy more effectively (Butler & MacDonald, 2015). TIP was designed to assess relevant barriers and enablers of vaccine uptake among marginalised populations while simultaneously being used as a guide to develop an intervention that was tailored to the findings and contexts with available resources for each particular group, setting and vaccine. In other words, as a diagnostic tool, TIP helped to identify hesitant population sub-groups, assess their needs, including demand and supply of vaccines, coupled with barriers and enablers factors; and, finally, it helped to develop an evidence-informed solution based on the contexts. The guide to TIP has theoretical and practical significance. There was an attempt to validate TIP by modifying it as a common intervention tool in parental vaccine hesitancy which focuses on the segmentation of the population to determine populations at risk.

In Sweden, the TIP diagnostic tool was applied in groups with prevalent vaccine hesitancy including Somali refugees, undocumented migrants/refugees, and anthroposophical (alternative medicine) believers (Butler & MacDonald, 2015). TIP has helped to better prioritise the immunisation programme in Sweden to distinguish the needs of these communities and provided better insights into their preferences and requirements. Recently, the UK also launched

a TIP framework to address vaccine hesitancy in the isolated Orthodox Jewish communities in London (Butler & MacDonald, 2015). By modifying TIP to fit into the local context, New Zealand can follow suit in addressing low vaccine uptake among former refugees in particular, and marginalised populations in general.

A systematic review by Jarrett et al. (2015) reported multicomponent interventions that have the following characteristics had achieved the most success in changing attitudes and increasing knowledge, and achieved a 20–25% increase in vaccination coverage rates: (a) targeting under-vaccinated communities; (b) improving access and convenience; (c) mandated vaccinations or sanctions against non-vaccination; (d) aiming at improving vaccination knowledge and awareness, especially using influential leaders (religious and community leaders) in vaccination promotion; and (e) education initiatives embedding new knowledge into routine vaccination information processes. In contrast, passive health promotion methods such as posters, brochures, websites, and social marketing were less successful, with an increase of less than 10% in vaccination coverage.

Most of the above intervention methods are neither new nor unique to vaccine hesitancy— they have been widely applied to other behaviour/lifestyle health issues such addiction, obesity, nutrition, exercise and sexual health. Evidence on the implementation of these interventions in vaccine hesitancy among marginalised groups, specifically among former refugees, is rare. Multi-component interventions are essential to address vaccine hesitancy that is influenced by a multitude of factors which are complex and embrace more than just knowledge deficit (Shen & Dubey, 2019; Eskola et al., 2015). Nevertheless, as has already been discussed, most interventions to address vaccine hesitancy are primarily based on the premises of "knowledge deficit" (Amin et al., 2017). This implies providing proper information would change the minds of parents who hesitate about vaccination. In contrast, trying to address the knowledge deficit to change vaccine perceptions failed to achieve the desired goal (Bedford et al., 2018).

TIP has increasingly been used as vaccine hesitancy intervention strategies among subpopulations (Butler & MacDonald, 2015) though it has been limited to European contexts

thus far. But it is good to bear in mind that one strategy will not, by itself, improve childhood immunisation rates and this highlights the importance of having a toolkit of strategies from which to draw for an effective intervention (Eskola et al., 2015). Having recognised the need for international evidence to support evidence-informed tools, the WHO have been working with partners to prepare a standardised tool, 'Measuring Behavioural and Social Drivers of Vaccination' (BeSD) since the end of 2018 (WHO, 2020). When the work is completed, this tool will be able to be utilised to assess and address reasons for under-vaccination and help to prepare effective programmes as an intervention to improve vaccination uptake. Overall, evidence on the effectiveness of existing vaccine hesitancy intervention strategies is limited (Eskola et al., 2015). Thus, only a handful of interventions have been implemented to address vaccine hesitancy among marginalised communities particularly refugees. The WHO SAGE Working Group underscored the need to investigate the magnitude and determinants of vaccine hesitancy, including among subgroup populations (WHO, 2014). Therefore, to reduce vaccine hesitancy and increase vaccine uptake, and ultimately to eradicate VPDs, there is a need to examine the rates of vaccine hesitancy and its determinants in this specific group of former refugees in New Zealand.

Overall, evidence on the effectiveness of existing vaccine hesitancy intervention strategies is limited (Eskola et al., 2015). Thus, only a handful of interventions have been implemented to address vaccine hesitancy among marginalised communities particularly refugees. The WHO SAGE Working Group underscored the need to investigate the magnitude and determinants of vaccine hesitancy, including among subgroup populations (WHO, 2014). Therefore, to reduce vaccine hesitancy and increase vaccine uptake, and ultimately to eradicate VPDs, there is a need to examine the rates of vaccine hesitancy and its determinants in this specific group of former refugees in New Zealand.

2.11 Summary

This chapter began with general information about the definition, scope and theories of vaccine hesitancy. Then, existing instruments for measuring vaccine hesitancy were described

briefly, along with their relative strengths and weaknesses. Factors influencing vaccine hesitancy (risk-benefit concern, safety concerns and beliefs) in line with the 3Cs model (complacency, confidence and convenience) among the general population and marginalised populations were illustrated. There is almost a universal consensus among authors that, compared to the host populations, new arrivals (migrants and refugees) have relatively low vaccine coverage rates. This low coverage could make those with migrant and refugee backgrounds more susceptible to VPDs. There is a dearth of evidence on whether under-vaccination among the resettled refugee population is because of vaccine hesitancy and/or other reasons. Hence, the presented study was justified by these knowledge gaps.

Vaccine hesitancy — delay or refusal of vaccinations whilst the service is available — can negatively affect immunisation uptake and increase the burden of VPDs, particularly among under-immunised groups. VPD health among this segment of the population could affect wider public health outcomes at both national and regional levels. As vaccine hesitancy is dynamic, context-specific and influenced by a multitude of personal, psychological, social and structural factors, understanding the rates and determinants of vaccine hesitancy are important in addressing the issue. While most of the determinants are common across populations, factors like previous experience, cultural norms and strong religious commitment might influence vaccine hesitancy among resettled populations. Therefore, vaccine campaigns that take into consideration some distinctive aspects of former refugees could proactively reduce vaccine hesitation and increase childhood vaccination uptake. Therefore, examining the rate of vaccine hesitancy and its determinants is important to inform the strategies to improve vaccine uptake among former refugees.

Chapter Three: Methodology

3.1 Introduction

This study aimed to understand the rate of parental vaccine hesitancy and factors influencing hesitancy among former refugees in New Zealand. This chapter addresses the research paradigm, study design, development of the survey questionnaire, survey translations, methods of data collection (study population and location, sampling, inclusion criteria, recruitment, pilot study, and study variables), data analysis, validity and reliability and ethical considerations, as well as funding.

3.2 Research paradigm

The term 'paradigm' refers to the overarching philosophical or ideological stance of researchers (Broom & Willis, 2007). The choice of research methodology and method can be influenced by the research questions, personal motivation, and experience. Examples of commonly used research paradigms in public health are positivism, interpretivism, post-positivism and the radical/critical paradigm (Grant & Giddings, 2002). When considering ontology (the theory of reality), positivists assume the existence of a reality that can be examined by researchers objectively (without influencing the realities and not being influenced by them) (Carpiano & Daley, 2006). In contrast, interpretivists believe a reality is subjective, and multiple reality can exist (Creswell, 2014; Matveev, 2002); hence, interpretivists view reality as subjective and dependent on the observer's worldview (Clark, 1998). Post-positivists believe in the existence of reality but, in contrast to positivist assumptions, reality as bound by the context and so it might only be apprehended with a degree of probability (Carpiano & Daley, 2006). A radical/critical approach, on the other hand, is a paradigm in which the primary goal is to build a theory by critiquing the way the social world is constructed or proposing alternative ways of utilising science to understand it.

My personal worldview aligns with post-positivism. As previously explained in Chapter One, under "Researcher's Position," my worldview was shaped by different experiences. These

experiences include a lived experience as a refugee, work experience with refugee communities, previous education, which was a degree in political science, and current study in public health. My worldview in turn determines the study methodology (study design, method and research questions), data analysis and interpretations.

The epistemology (study of knowledge) and methodology are intrinsically related; whereas epistemology involves how the researcher views the world, methodology is the practice, i.e., how to develop an inquiry, choose the study design, and formulate the research questions (Carpiano & Daley, 2006).

The differences in paradigms are mainly observed in the way one asks questions, collects and analyses data, and draws conclusions from the findings (Grant & Giddings, 2002; Lin, 1998). Positivists and post-positivists primarily use closed-ended questions while interpretivists use open-ended questions to collect data. Both positivists and post-positivists often use numerical values, yet the goal of the positivist is to reach generalisability by verifying a hypothesis to answer a research question (Creswell, 2014). In contrast, interpretivism seeks in-depth information about attitudes, preferences, motives and actions that are not usually represented by numerical values. In an attempt to address positivist limitations, the post-positivist paradigm acknowledges the fact that the experiences of researchers (their positionality) and context of the research can influence their inquiry and method (Carpiano & Daley, 2006).

Due to the absence of a single paradigm that could address all the astounding range of concerns (Grant & Giddings, 2002), a growing number of researchers borrow elements from competing paradigms. The emergence of post-positivism through an attempt to redress limitations in the positivist paradigm is a good example. Based on my experience, as a post-positivist, I assume a “reality” exists regarding vaccine hesitancy among former refugees in New Zealand, but that reality is shaped by social factors and systemic elements. To address the multiple social factors that might influence the view of former refugee parents on childhood vaccination in the New Zealand context, some demographic questions were added to the pre-validated questionnaires.

The basic tenets of modern research entail the use of claims and re-claims that involve refining and abandoning some aspects of the positivist and interpretivist paradigm via quantitative and qualitative methods (Grant & Giddings, 2002). This includes borrowing some elements of different paradigms in a single research investigation to minimise the limitations in the study designs. In the current study, an open-ended question (an element of the interpretivist paradigm) was included in the questionnaire, which primarily employed close-ended questions.

In terms of analysis, the main data analysis process in this study was undertaken using a quantitative method. The feedback from an open-ended question was also analysed separately to provide an insight along with the quantitative results. The inclusion of some aspects of interpretivism can improve the survey questions and even provide researchers with additional confidence in drawing conclusions in a quantitative study. Although the main conclusions were not drawn from an interpretivist stance, elements of interpretivism provided additional insights in this study. Generally, when drawing conclusions, in line with a post-positivist paradigm, generalising the findings is not the primary aim; rather, recommendations are given by taking into consideration the limitations of the study.

A post-positivist stance in observational research has advantages over conventional positivism in yielding results that are more holistic, meaningful, understandable, and applicable from a policy standpoint (Babones, 2016). In other words, a post-positivist stance is useful for shedding light on the process of generating ‘unobservable data’ (subjective information from the participants) that underlies the main ‘observed data’ (statistics) (Babones, 2016). Therefore, having used a post-positivist stance, this study might provide a useful insight for policies, practice and researchers while acknowledging potential limitations.

3.3 Study design

A cross-sectional study was the study design of choice for the current study. Cross-sectional studies are the dominant study design in health science research (Webb & Bain, 2017). They are observational studies that are useful in measuring the prevalence of conditions and risk factors in a particular population. In addition, cross-sectional studies are also useful for

investigating the associations between different risk factors and conditions (Arnett & Claas, 2017). Therefore, a cross-sectional study design can help to answer the research questions in this study (section 1.2).

In cross-sectional studies, data is collected at one point in time or over a short period of time to give a snapshot on the topic (Levin, 2006). In this study, the prevalence of vaccine hesitancy and its associated factors were investigated at one point in time. Cross-sectional studies have inherent limitations which relate to not being able to establish a causal link between independent variables (risk factors) and dependent variables (diseases/conditions) (Webb & Bain, 2017, Mann, 2003). As they do not involve follow-up investigations over time, such studies usually provide preliminary evidence to support other studies. Despite inherent shortcomings, the survey study is known to be the most efficient and flexible study design, because it enables investigators to collect multiple data on diseases/conditions and risk factors. Generally, a survey study is relatively quick, efficient, convenient and cheap (Mann, 2003). Since survey studies can estimate the burden of certain conditions, diseases, behavioural risk factors and health needs, these studies are useful for informing health planners and policymakers on allocating resources (DiPietro, 2010; Levin 2006). Cross-sectional study findings are also useful in generating hypotheses that can be tested by other study designs in the future (Webb & Bain, 2017).

3.4 Development of survey questionnaire

A self-administered questionnaire known as Parent Attitudes about Childhood Vaccines (PACV) (Opel et al., 2011) was used in data collections. PACV was first developed and tested in 2011 by Opel et al. (2011). Since then, it has been used in English and other languages including Malay, Arabic and Spanish (Alsuwaidi et al., 2020; Azizi et al., 2017; Masters et al., 2018; Opel et al., 2013). Different versions of PACV have been validated via field testing, expert panels and psychometric testing (Abd Halim et al., 2020; Cunningham et al., 2019; Sabahelzain et al., 2020). The PACV survey has also shown flexibility in identifying vaccine hesitancy among caregivers in different study settings (i.e., health centres, schools, and

communities) (Alsuwaidi et al., 2020; Masters et al., 2018; Napolitano et al., 2018) with different research methods (i.e., cross-sectional and longitudinal studies) (Kalok et al., 2020; Williams et al., 2013). PACV can also predict children's risk of under-immunisation, especially among parents with high hesitancy scores (Opel et al., 2013). Previous studies demonstrated that the PACV was valid and reliable both in the original English (Opel et al., 2011) and in translated languages, e.g., Malay (Azizi et al., 2017), Spanish (Masters et al., 2018) and Arabic (Alsuwaidi et al., 2020).

The PACV survey scale includes 15 questions (Q3–Q17) that assess the individual parent's hesitancy (**Error! Reference source not found.**). The first two questions (Q1&Q2) are demographic questions. The core items have three domains: i) parental behaviour about vaccines, ii) attitudes/perceptions about vaccine safety and efficacy, and iii) trust about vaccines and vaccination services (Alsuwaidi et al., 2020; Opel et al., 2011). The details of the PACV domains and corresponding questions are presented below under the PACV scale descriptions.

Some modification was made to the original questionnaire. First, with the first 17 questions, some terminology used in the original questionnaires (the English PACV) was modified without changing the original meaning (e.g., the term 'shot' was replaced by 'vaccine'). This was done according to the context of the target population (New Zealand former refugees). Secondly, some questions about vaccinations were also added to the questionnaire. These questions were about the primary source of vaccine information (Q18); vaccination status of the children in the household (Q22); and parents' additional comments on childhood vaccination (Q28). Demographic questions which included (Q19–Q21) and (Q23–27) were also added to the questionnaire. After the original English version was adapted, PACV was translated into the three languages (**Error! Reference source not found.**).

3.5 Translations of survey questionnaire

For the purpose of this study, the adapted English PACV was translated into Arabic, Somali and Oromo for participants who did not speak English. The English version of PACV was also made available for participants along with these three languages. The choice of the

three languages was justified by the number of people who speak those languages among former refugees living in New Zealand. According to Tuwe (2012) and MBIE (2012), Eastern Africans, including Somali and Ethiopians, and immigrants from the Middle East and North Africa region, make up the majority of the recent refugee population in New Zealand.

The translations were done by a nationally accredited translation agency known as TransNational Translation and Interpreting Service Ltd (Transnational Ltd., n.d.). The translation processes followed the guidelines by Maneesriwongul and Dixon (2004) of forward and backward translations for Somali and Oromo PACV. First, bilingual primary translators carried out the translations from English to Somali and Oromo languages. Then native speakers of the respective languages reviewed the documents. Subsequently, reverse translations to English were done by independent translators who did not know the aim of the survey. Eventually, the draft translations were sent to the primary researcher for final review. Since PACV Arabic was already validated by other authors (Alsuwaidi et al., 2020), only reverse translations from Arabic to English were undertaken on the core questions while additional demographic questions were translated with forward and backward translations. The core questions of the adopted Arabic version had already undergone a similar process of back-and-forth translation (**Error! Reference source not found.**).

3.6 Method of data collection

3.6.1 Study population and locations

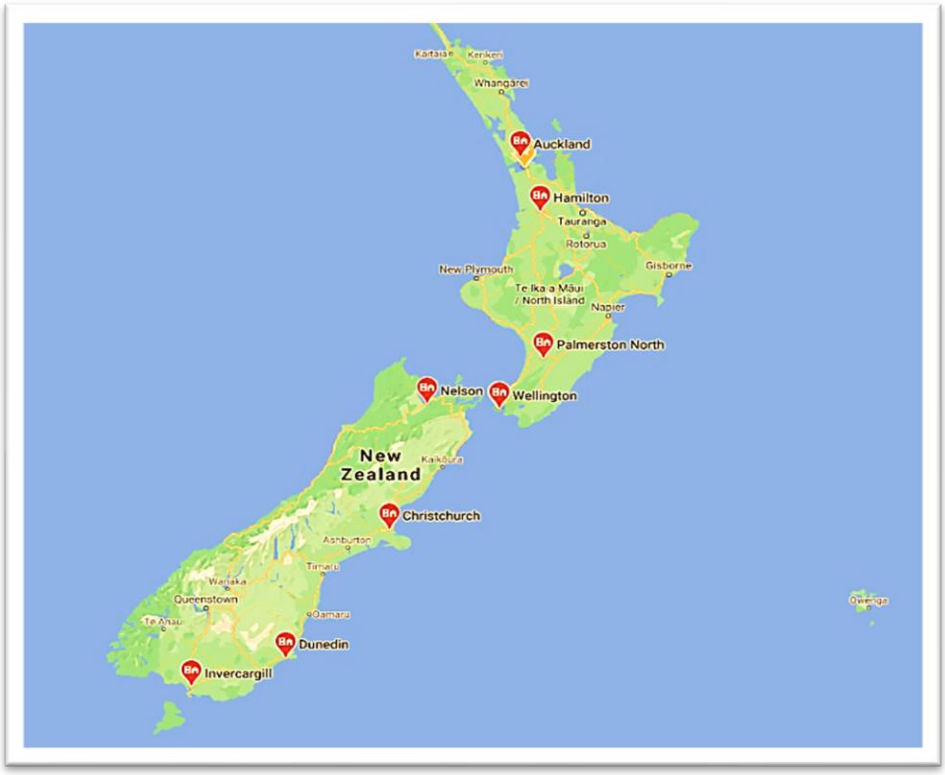
The study population was parents of refugee background living in New Zealand. "Refugee" can be defined as people who have fled war, violence and conflict or persecution and seek safety in another country (UNHCR, n.d.). Refugees have a well-founded fear of persecution, and therefore are unwilling or not able to return to their countries of origin, and thus they are protected under international law. Consequently, as opposed to migrants, refugees' arrival in the countries of resettlement is not based on choice.

New Zealand provides residence for quota refugees and their families upon arrival, but people who come to New Zealand via the asylum-seeker pathway must undergo the refugee

determination process and only if successful, are given refugee status (known as convention refugees) before receiving residence. In this study, the phrase “former refugee” represented a person with a refugee background who has a permanent residence or citizenship status in New Zealand, regardless of their resettlement pathways.

Although New Zealand has a long history of hosting refugees, there is no precise official figure for the refugee population in New Zealand. Perhaps this is due to the multiple pathways of receiving refugees from multiple countries and the continued emigration of former refugees to other countries after being granted New Zealand citizenship (MBIE, 2012; Tuwe, 2012). Nearly a third of adult former refugees who arrived in New Zealand between 1993 and 1999 have moved to other countries, especially Australia, after being granted citizenship (MBIE, 2012). Mortensen et al. (2012) and Marlowe et al. (2014) estimated that over 50,000 people have been resettled in New Zealand since the Second World War. Around 66% of refugees had a dependent child or children (MBIE, 2012). The study targeted main refugee resettlement centres where almost all refugees have been resettled to date. The refugee’s resettlement locations at the time of the study were cities including Auckland, Wellington, Hamilton, Palmerston North, Nelson, Christchurch, Dunedin and Invercargill (**Error! Reference source not found.**).

Figure 4. *Map of New Zealand with Main Refugee Resettlement Locations*



Note. Adapted from *Maps of New Zealand main cities*, by Google (n.d.). Retrieved April 4, 2021, from http://www.google.com/maps/search

3.6.2 Sampling

The sample size was determined based on the result of a previous study by Lee et al. (2017) conducted within the New Zealand general population. By assuming a 31.5% vaccine hesitancy rate, a minimum of 92 participants was required to achieve a 5% margin of error with a statistical power of 80%, and a significance level of 95% CI. As a low response rate was anticipated, the final target sample size was increased to 150 participants.

Previous studies showed low vaccine survey response rates in the regional context. For instance, a vaccine survey among New Zealand's general population had a 16.6% response rate (Lee et al.,2017). Likewise, in Australia, the response rate was only 13.4% (Chow et al., 2017). This demonstrates that extra effort is required to improve response rates and strategies were planned to optimise response rates. First, the survey was prepared both electronically and in hard copy, then extensive promotions and distributions were carried out to reach out to a large number of potential participants. Secondly, virtual snowball sampling was utilised to increase

the number of respondents. Information about access to alternative hard copies was included in the soft copy versions and vice versa. Thirdly, an effort was made to reach out to diverse refugee communities using different gateways including refugee agencies, associations, community/religious leaders and chief elders.

3.6.3 Inclusion criteria

The target population consisted of former refugee parents who live in New Zealand. Participants who met the following specific criteria were invited to take part in this study:

- Former refugee or person with a refugee background who came to New Zealand through one of the four resettlement pathways (quota refugee, family reunification, asylum seeker and newly introduced community organisation sponsorship).
- Lived in New Zealand as a resident/citizen for at least six months.
- An adult 18 years old and above who is the mother or father or legal guardian of a child between 6 weeks and 16 years old.

To make it clear for the participants, the first criterion was presented as two separate points on the consent form 'whether potential participants is a person of refugee background' and 'he/she came to New Zealand on one of the refugee resettlement pathways.' This was partly because of misconceptions around the terminology of "refugees" and "former refugees." Terms were not equally well understood by refugees who arrived through the different pathways that were mentioned above. The age group between 6 weeks and 16 years was chosen because it covers the age range when main childhood vaccines are given to children as per the New Zealand National Immunisation Schedule (MOH, 2007). The study was designed to avoid participants from a non-refugee background. For example, the inclusion criteria were highlighted on an invitation flyer and on the information sheet, as well as screening questions (**Error! Reference source not found.** and **Error! Reference source not found.**).

The eligibility criteria were presented at three important stages of the recruitment process: during survey advertisement, on the information sheet, and on screening questions. First, the inclusion criteria were included in the survey advertisement on the invitation flyers

that were posted on different social media platforms such as Facebook pages, WhatsApp and Viber groups. In addition, the hard copy flyers with eligibility criteria were also placed on the notice boards of former refugees' gathering places including community association centres, churches and mosques. Second, the eligibility criteria were also outlined in the Information Sheet for the potential respondents to read prior to giving consent. Third, the list of inclusion criteria was presented as "screening questions" right after the statement of consent and before respondents proceeded to the survey questions. All participants were required to fill out the screening questions to confirm their eligibility before proceeding to the questions.

3.6.4 Recruitment procedure

As mentioned above, the PACV survey was adapted and translated into three languages, Arabic, Somali and Oromo. Due to the difficulties in reaching out to former refugees and COVID-19-related restrictions, data collection had initially been planned to be done fully online using the Qualtrics (Provo, UT) survey platform. But later, as the COVID-19 restrictions were eased, the survey was conducted both online and on paper. The survey link was distributed using email, Facebook, Viber, Imo, Telegram and WhatsApp both on individual parents' and community/group accounts. Many participants were targeted with online posts on the above platforms; whereas, others were reached with hard copies of flyers that were posted in major refugee gathering places including community events centres, churches and mosques.

The advertisements highlighted the topic of childhood vaccine hesitancy and the purpose of the study. Detailed information about the nature and procedure of the study were explained in the Information Sheet, which was found on the link (**Error! Reference source not found.**). The link also led to the survey and included the consent statements for participants to confirm whether they wanted to proceed with the questionnaire. After the respondents agreed with the statement of consent, they had to answer four screening questions before proceeding to the survey questions (**Error! Reference source not found.**). The hard copy version of the survey also followed a similar process, as the survey provided the Information Sheet and asked for participants to provide consent then fill out screening questions to check for eligibility. If

they met all the eligibility criteria, they could proceed to the survey questions. As a snowball technique there was a statement which requested participants to share it with others.

3.6.5 Pilot survey

Before the main data collection, I did a pilot survey using Qualtrics. The purpose of the pilot was to test the acceptability, reliability and clarity of the survey by participants. The pilot participants did not meet the exact inclusion criteria (so as not to recruit individuals from the small target sample of refugees that are often described as "hard-to-reach"). The pilot respondents all identified as former refugees, but some of them had no child. Participants completed the survey in the three languages, Arabic, Somali and Oromo. They were also asked to compare with the English version and give their feedback on the translated ones.

The PACV pilot survey link was distributed to 15 people through the researcher's networks. In four days, eight participants responded to the survey in three languages: Arabic (n=3), Somali (n=2) and Oromo (n=3). A reliability analysis was conducted on the non-demographic items (Q3–Q17), and the result was Cronbach's alpha = 0.74, suggesting good internal consistency.

The overall feedback about most of the survey questions was positive, and participants said the survey was clear and easy to understand. But some negative comments were given on the screening questions and question six (Q6). The feedback about the screening question was specifically with the first sentence which asked whether the potential participant was "… a former refugee who has been in New Zealand at least for 6 months" (**Error! Reference source not found.**). This was not clear to some respondents, particularly to respondents who were non-quota refugees. Some non-quota former refugees who had come through other pathways, especially family reunification, do not consider themselves to be former refugees. Perhaps this was because former refugees who came to New Zealand through family reunification did not have refugee status prior to entering New Zealand, and had less experience of receiving social support from refugee agencies upon arrival. As there was another supplementary screening question that asked whether the participant came to New Zealand on one of the refugee

resettlement pathways (quota refugee, family reunification, convention refugees and community organisation sponsorship), only a slight modification was made by adding a phrase “refugee background person” to the first screening sentence (**Error! Reference source not found.**).

Arabic-speaking participants said question six (Q6) “children get more vaccines than are good for them” was not clear (**Error! Reference source not found.**). But, as the ambiguity of Q6 relates to the original questionnaire (English PACV), no change was made to this question to maintain the same meaning across all languages and remain in line with the validated English PACV. In the previous study by Cunningham et al. (2019) Spanish PACV translators and expert panellists noted that Q6 was vague in the original English and when translated to Spanish language. The same issue was reported in the Malay version, where the author questioned the clarity of Q6 in the validation report (Abd Halim et al., 2020). Overall, no major changes were made to the survey questionnaire for the main study as the survey was generally well accepted, reliable and clear.

3.6.6 Data collection

After the pilot survey was done, data collection for the main study began on November 17, 2020. Initially, it had been planned to keep the survey online for one month, but as the target number was not met, it was extended by three more weeks and the survey stayed live for nearly seven weeks until January 6, 2021. The PACV survey was used to gather information pertinent to the study aims, including parents’ attitudes about childhood vaccines and related demographic characteristics of individual parents, their child(ren) and households.

Through the use of screening questions, the survey was formatted to exclude people who were younger than 18 years; not of a refugee background; had stayed in New Zealand for less than 6 months; and did not have a child between 6 weeks and 16 years old. The participants could choose from four languages: English, Arabic, Somali and Oromo. Both online and paper PACV surveys were featured in the same way as much as possible. For example, both online and paper surveys had similar order of questions and instructions — beginning with the

participant information sheet, consent, screening questions and then followed by the survey questions.

3.6.7 PACV scale descriptions

As mentioned earlier, the PACV has fifteen core questions grouped into three domains. The first part is a behavioural domain which comprises items 3, 4 and 13. The second domain is about the perception of the safety and efficiency of vaccines, which is represented by items 9–12. The third domain is general attitude and trust about vaccines and vaccination services, and comprises items 5–8 and 14–17.

The PACV score was assigned for the non-demographic 15 items and converted according to Opel et al.'s (2011) guidelines. For each question, the score of zero was assigned to the answer indicating non-hesitancy, such as “not at all hesitant” or “not too hesitant”; one is assigned for neutral answers (e.g., “not sure”); and two is assigned to responses indicating hesitancy (e.g., “somewhat hesitant” or “very hesitant”). The PACV raw score for each individual ranged from 0 to 30. By using a linear equation as suggested by Opel et al. (2011), the raw score was converted to 0 to 100.

3.6.8 Study variables

Multiple demographic variables were collected using a pre-existing survey (Opel et al., 2011) designed to gather information on parental vaccine hesitancy. Vaccine hesitancy was the main variable of interest (outcome variable). Individual parents’ vaccine hesitancy could be determined by a hesitancy score as outlined above. Another dependent variable was immunisation status (the estimation of immunisation status might not be accurate because two responses from parents (father and mother) could indicate the same child vaccination status. But, taking into consideration this scenario, the question asked the immunisation status of all the children in the household (Q22 Has/have child(ren) in your household received all the recommended vaccines required for their age?).

As depicted in **Error! Reference source not found.**, the independent variables were: first-born status of the child, number of children in the household, parent's age, income, education, religion, family type, relation to the child, sources of information, duration of residence in New Zealand, and regions of country of origin.

Table 4. *Study Variables and Descriptions*

Variable	Type of variable	Description
Hesitancy (Dependent)*	Categorical	≥50 = Yes <50 = No
Immunisation status of the child(ren) (Dependent)	Categorical	1 = Yes 2 = No 3 = Not sure
Source of vaccine information (Independent)	Categorical	1= Health professionals 2 = Mass media 3 = Social media 4 = Internet 5 = Family and friends 6 = Community 7 = Brochures 8 = Other
Age of parent (Independent)	Categorical	1= 18–24 2 = 25–34 3 = 35–44 4 = 45 +
Type of the family (Independent)	Categorical	1= Couple with child(ren) 2 = Single parent with child(ren) 3 = Extended family 4 = Other
Number of children (Independent)	Categorical	1= One child 2 = Two children 3 = Three children and more
First-born status (Independent)	Categorical	1= Yes 2 = No
Relation to child (Independent)	Categorical	1= Father 2 = Mother 3 = Other
Religious affiliation (Independent)**	Categorical	1= Christian 2 = Muslim 3 = Other
Educational level (Independent)	Categorical	2 = Primary 3 = High school 4 = Vocational/Trade qualification 7 = University qualification 8 = No qualification
Duration of residence in New Zealand (Independent)	Categorical	1= less than 1 year 2 = 2–4 years 3= 5–9 years 4= More than 10 years
Household income (Independent)	Categorical	1= Less than $25,000 2 = $25,001–$50,000 3 = $50,001–$75,000 4 = Above $75,001

Note. *Converted from continuous variable to categorical variable. **Collapsed because of low responses in some categories.

3.7 Data analysis

After data collection was completed, data was entered into an Excel spreadsheet. While the electronic data were exported from Qualtrics, the paper survey responses were manually entered into the spreadsheet. The PACV score was assigned for the 15 items and converted, according to Opel et al.'s (2011) guidelines, for each participant. The cumulative score for each participant was calculated and converted before being exported to the Statistical Package for Social Science (IBM SPSS Statistics, version 27) for analysis.

Descriptive analysis of all the variables of interest mentioned above were conducted using counts, percentages, means, medians and standard deviations. The predictive validity of the PACV tool was determined using simple and partial correlations. Agreement between paper and online surveys was also checked using Independent Sample T- test and Chi-square test of independence ($\chi 2$). The reliability analysis of the different versions of the PACV survey was done to test the internal consistency.

Logistic regression, which is the most common model used to estimate binomial health outcomes (Deddens & Petersen, 2008), was used to estimate the association between sociodemographic variables and hesitancy. The bivariate association between each of the categorical variables and vaccine hesitancy was analysed using a Chi-square test ($\chi 2$) of proportion and reported as unadjusted odds ratio with 95% confidence intervals (CI). All the variables with a p-value < 0.5 in the bivariate model were included in multiple variable model. Multiple variable model was performed by entering all the variables scoring the required p-value into a bivariate model using a stepwise method.

A bivariate logistic regression simply determines the crude odds ratio between one independent variable and a dependent variable (Pallant, 2013). Multiple variable logistic regression is a more advanced statistical model that helps to test the association between a dichotomous dependent variable and multiple independent variables while controlling for covariates in the equation. As it is adjusted for confounders, multiple variable regression analysis yields maximum likelihood estimates (Deddens & Petersen, 2008). The results of

associations from both bivariate and multiple variable models were reported as odds ratio along with 95% CI, and a corresponding $p < 0.05$ was considered to be significant.

3.8 Validity and reliability

Validity refers to the extent to which a measuring tool (questionnaire) measures what it intended to measure while reliability denotes the extent of consistency in results when the research instrument is used in the same situation (Heale & Twycross, 2015). Well-conducted research that informs evidence-based practice not only considers the results but also the rigour of the study (the degree to which the researcher enhances the quality of the study and reports on the limitations). The evaluation of validity and reliability enhances the quality of quantitative studies. Therefore, it is important to identify potential threats to validity and reliability in the research process.

There are several elements that pose threats to validity when conducting studies (Kline, 2018). One potential threat to validity in quantitative research arises from the misunderstanding or misinterpretation of the survey questions by the respondents (Kline, 2018). A caregiver's responses could be what "they think is right" instead of "what they actually do or how they behave" in real life. Another potential threat to the current study was a recall bias. Recall-bias occur when participants are unable to remember answer(s) to the question(s) accurately (Mann, 2003). Recall bias is a common threat to validity when using survey questionnaires in research (Creswell, 2014). The PACV survey accounted for recall bias where necessary. For example, a neutral answer ("I don't know") was treated as a missing value in items 3 and 4.

Provided a survey is voluntary, respondents might either choose not to respond to some or all questions, which could affect the representation and quality of the data (Kline, 2018). In this survey, individuals whose three or more responses to the core questions (Q3–17) missed were carefully identified and excluded from the analysis.

Another validity and reliability threat to this study can also be attributed to the translations. The translations of the survey questionnaires into different languages may lead to changes in the meaning of the questions or the meaning of the questions is not matching across

all the languages (Dörnyei & Taguchi, 2009). To minimise such threats, first, PACV translation was done through a process of forward and backward translations by independent and certified interpreters. We also conducted the pilot study to check the acceptability, reliability and clarity of the survey. Finally, the predictive validity was tested and results are reported in Chapter Four. The response consistency between different versions of the surveys could also be a potential threat to the reliability of the measuring instruments. Bearing in mind these threats, the reliability of PACV was tested thoroughly and reported in terms of Cronbach's alpha score in the subsequent chapters.

3.9 Ethical procedure

This study was approved by the Auckland University of Technology Ethics Committee (AUTEC) on October 12, 2020, for three years until October 12, 2023, with AUTEC Reference number 20/267 (**Error! Reference source not found.**). Participants were given an Information Sheet and agreed with a statement of voluntary consent. Detailed information about the purpose, nature and rationale of the study was stated in the Information Sheet. Participants were informed that the survey was anonymous, as their names and addresses were not recorded. They were also assured that the information gathered from them would be stored in a secured place. Although the name of a respondent was not required, there was a place where participants could leave their phone number/email for the prize draw and summary of the results. Leaving contact details was up to the participants, and participants' details were collected separately on different URL (in the case of the electronic survey) and a separate piece of paper (in case of the paper survey). Therefore, their details could not be connected to their answers. Five grocery vouchers, each worth $40, were sent to the winners as a *koha* in appreciation of their participation, and a one-page summary of the results was emailed to those who had left their contact details.

This research also fulfils some basic requirements for minority research. First and foremost, the primary researcher is a person with a refugee background. Familiarity and closeness to the study population provides unique insights into marginalised and under-represented communities such as refugees, immigrants, and colonised and minority groups

(Chavez, 2008). When a researcher is an insider, there is a potential to minimise the power imbalance and ethical dilemmas. An insider researcher could also improve the response rate through building rapport with participants. This was evidenced in this study, as prior knowledge and awareness of the hard-to-reach community of former refugees assisted in meeting the target number of participants during data collection.

3.10 Funding

This research was funded by a grant from the New Zealand Health Research Council (HRC) 18/586, postgraduate research funding from AUT and personal expenses from the researcher.

3.11 Summary

This chapter has outlined the research design, and methods of data collection and analysis. A cross-sectional survey was the study design of choice. The purpose of the study was to examine the rates of vaccine hesitancy and its determinants among former refugees in New Zealand. The PACV survey in four languages was used both online and in hard copies to collect data from former refugee parents with a child between 6 weeks and 16 years old. Data collection was carried out for 50 days, between November 17, 2020, and January 5, 2021. Information about parents' attitudes on childhood vaccination, vaccination services and immunisation status were collected, along with the key demographic characteristics of caregivers.

Data analysis was conducted as per the research questions and the aim of the study. Descriptive analysis was conducted using counts, percentages, measures of dispersion and central tendencies. The predictive validity of the PACV survey was analysed by a correlation coefficient and internal consistency was tested using Cronbach's alpha score. Major inferential statistical analyses including Chi-square ($\chi 2$) and binary logistic regression were used in this study to examine the associations between vaccine hesitancy and sociodemographic variables. The answers to the research questions and summary results of descriptive and inferential statistics are presented in Chapter Four.

Chapter Four: Results

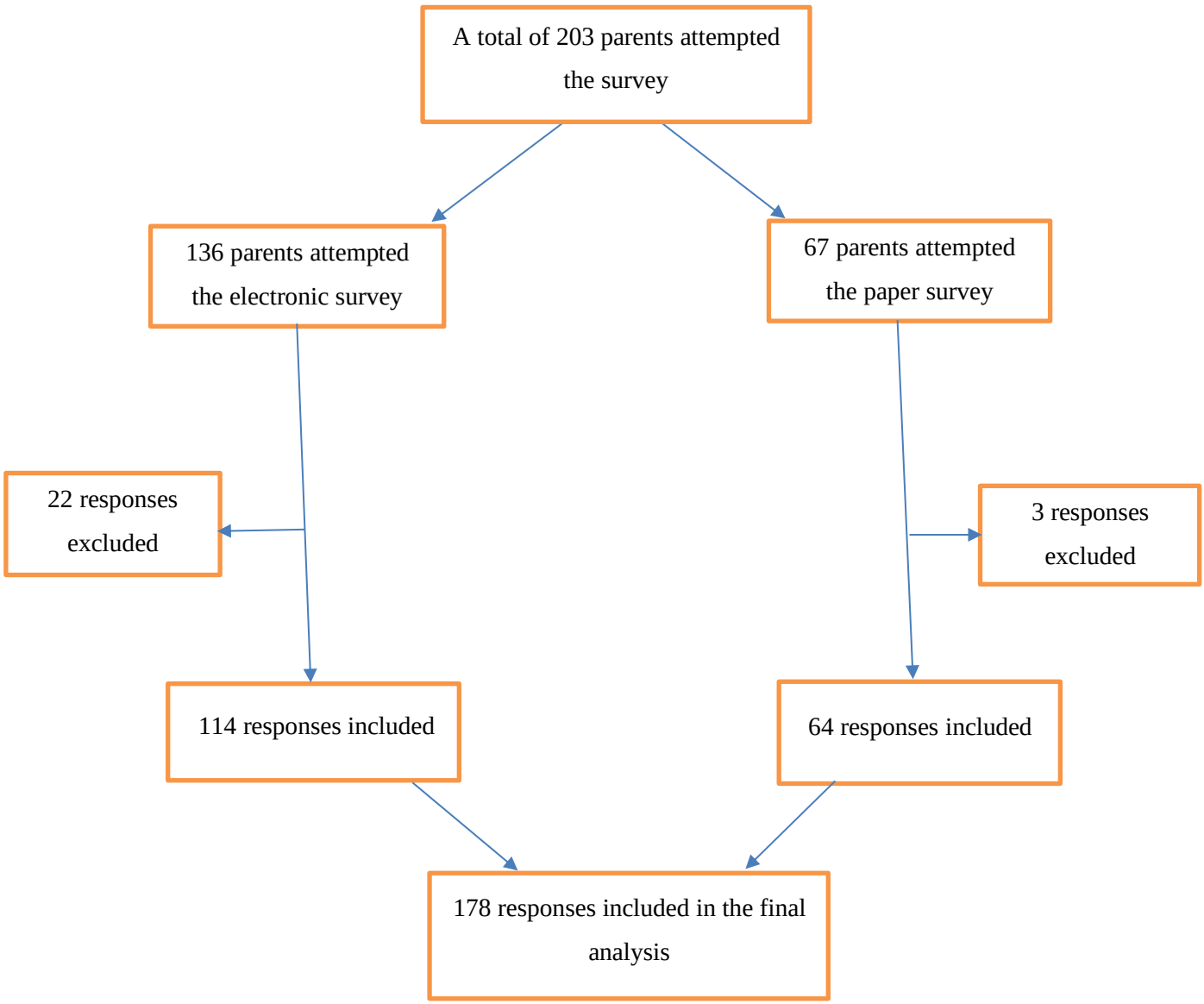
4.1 Introduction

The purpose of this study was to assess the rate of vaccine hesitancy and explore the associations between sociodemographic factors and vaccine hesitancy among former refugees in New Zealand. How well the PACV questionnaire performed, the prevalence of vaccine hesitancy and associations between sociodemographic factors and vaccine hesitancy are the primary outcomes presented in this chapter. Besides the main results, this chapter also reports the results of descriptive statistics, indication of vaccination coverage among former refugee children (provided most responses reflect up-to-date immunisation status of all eligible children in the households) and brief information on open-ended responses. Tables and charts are used to illustrate the key results where necessary.

4.2 Data collection

A total of 203 people attempted the survey. Of participants who attempted the survey, 136 (67%) responded to the electronic survey and 67 (33%) responded to the paper survey. Out of 136 online responses, 22 were excluded because they were either partially completed (n=18) or did not meet the inclusion criteria (n=4). One hundred and twenty-two paper surveys were distributed and 67 were returned. The response rate for the paper surveys was approximately 55%. Out of 67 paper survey responses, 3 were excluded because they returned with incomplete consent information (n=2) or incomplete responses (n=1). Concerning the partial responses, only the responses equal or above 45% progress were included in the analysis. This was because all responses to the core PACV questions (Q3–Q17) could only be obtained with > 45% response progress. Eventually, out of 203 attempted responses to both the online and paper surveys; 25 (22 online and 3 paper surveys) were excluded, and 178 responses were included in the analysis. The summary of the data collection process is depicted on the following diagram, **Figure *5***.

Figure 5. *Flowchart of Data Collection Process*



The following variables were collected with the survey along with PACV scale: children immunisation status, first-born status, parent's age, level of education, family type, relation to the child, household income, number of children in the household, duration of residence in New Zealand, religious affiliation, region of origin and sources of vaccine information. The summary results of these data are presented below in the frequency table (**Table 5**). Aside from these variables, responses from an open-ended question (Q28) "Do you

have any additional comments about childhood vaccinations?" were analysed and results are presented.

4.3 Descriptive statistics

4.3.1 Sociodemographic characteristics

Findings from the descriptive analysis showed the majority of participants, n=123 (70%) were of African origin (**Table *5***). About 31 (18%) of parents were from the Middle East region, whereas parents from Asia were 15 (9%) of the sample. The remaining 3% of the parents were from other regions, which included the Pacific, Europe and America. More respondents were fathers (56%) than mothers (39%) and legal guardians ("other") (5%). Most caregivers were married (couple with a child or children) (73%). Single parents and extended family constituted 13% and 11% respectively. Approximately 44% of parents had three or more children, 29% of parents had two children, and 27% of parents had one child. Participants between age 35–44 accounted for 34.5% of the sample, and those 45 years and above constituted slightly less, 31%. Younger parents aged 25–34 and 18–24 years represented 28% and 7% respectively.

Approximately 98% of participants were followers of either Islam (51%) or Christianity (47%). In terms of income, parents who annually earned less than NZ$50,000 accounted for 52% of the sample. Over 30% of the parents earned between NZ$50,001 and NZ$75,000 while only 16% earned above NZ$75,001 per annum. Regarding educational attainment, 69% of parents had tertiary qualifications (trade/vocational or university qualifications). Around 23% of the parents had high school qualification while participants with primary education and no qualification were 4% each. Most participants (61.2%) had lived in New Zealand for over a decade, while only 1% had been in the host country between six months and one year. Results from descriptive statistics are summarised in **Table *5***.

Table 5. *Sociodemographic Characteristics of Participants*

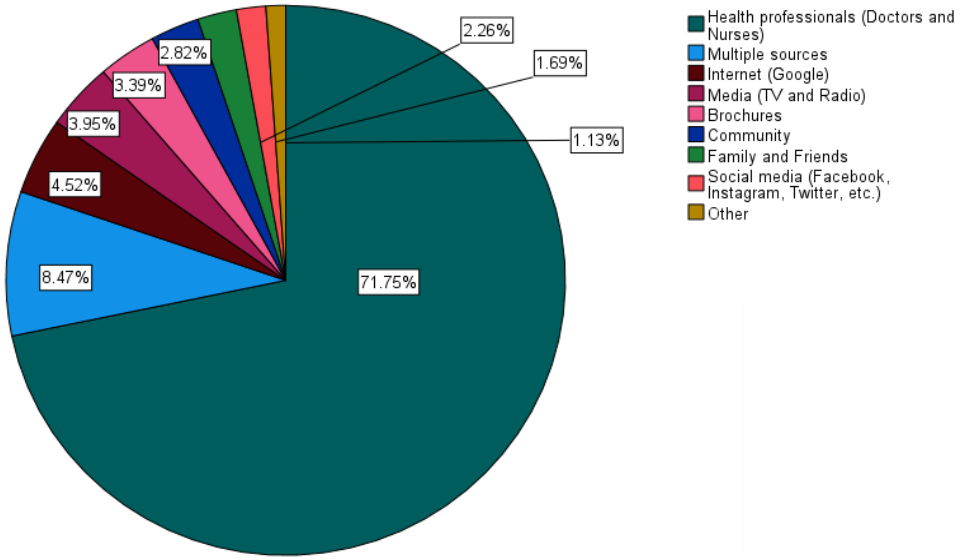
	Frequency	Percent
Parent		
Father	99	56%
Mother	69	39%
Other	9	5%
First-born status		
Yes	90	51.1%
No	86	48.9%
Age		
18–24	12	6.8%
25–34	49	27.7%
35–44	61	34.5%
45+	55	31.1%
Family type		
Couple	130	73.4%
Single parent	23	13%
Extended family	19	10.7%
Other	4	2.3%
Number of children		
One	47	27%
Two	51	29.3%
Three and above	76	43.7%
Religion		
Christian	83	47%
Muslim	91	51%
Other	3	2%
Educational level		
No qualification	7	4%
Primary	7	4%
Secondary	40	22.9%
Trade/Vocational	39	22.2%
University	82	46.9%
Household income		
< $25,000	29	17.5%
$25001– $50,000	58	34.9%
$50001 – $75,000	52	31.3%
> $75001	27	16.3%
Duration in NZ		
< 1 year	2	1.1%
2–4 years	22	12.4%
5–9 years	44	24.9%
>10 years	109	61.6%
Region of origin		
Africa	123	70.3%
Asia	15	8.6%
Middle East	31	17.7%
Other*	6	3.4%

Note. Total number of counts for each demographic characteristic may not be equal to 178 because of missing values.
*Other = Pacific region, Europe and America.

4.3.2 Sources of vaccine information

In this survey, participants were asked to choose one primary source of vaccine information for Q18 (What is the primary source of vaccine information for you? Please check one). As 15 (8.5%) of the paper survey respondents selected more than one source for this question, they were included in the descriptive analysis as a "multiple sources" (see **Figure *6***). Therefore, here in the descriptive analysis, the entire set of responses (N=177) and missing response (n=1) are illustrated. Only participants with one source of information (n=162) were included in the logistic analyses which is discussed in section 4.7.

Figure 6. *Parents' Source of Vaccine Information*



Note. Participants with multiple source of information (8.47%) were only from the paper-based survey, and the rest (91.53%) of the responses that came from both paper and online survey recorded a single source of information.

Health professionals were a primary source of vaccine information for most participants (71.8%), followed by those who selected multiple sources (8.5%). Internet sources including social media were regarded as a primary source of information for over six percent of the participants (6.2%). Other primary sources of vaccine information included family, friends, and community (5%), mass media (4%), and brochures (3.4%) (see **Figure *6***). The primary source of information was collapsed into three categories: official source (health professionals and

brochures) (75%); media (mass-media, social media and internet) (10%); and personal source (family and friends, community and others) (6.5%).

Out of the 15 (8.5%) respondents who chose more than one source of information, the number of sources ranges from two to six. The most frequently chosen source of information was health professionals (13 times) followed by both mass media and the internet (each of them 8 times) and family and friends (7 times). Social media (Facebook, Instagram and Twitter, etc.) was chosen twice as sources of vaccine information. Caregivers who chose one source of vaccine information tended to have lower median vaccine hesitancy score (Md=30, n=162) than those who chose multiple sources of vaccine information (Md=38.5, n=15).

4.4 Validity, reliability and agreement of PACV questionnaires

Initially, the validity of the translated versions of PACV in Arabic, Somali and Oromo were strengthened qualitatively through back-and-forth translations. Then the clarity and acceptability of all translated versions of the PACV survey was further tested via a pilot study before the main data collection. Moreover, the predictive validity of PACV was determined using Q22 as a proxy variable. Self-reported vaccination status was recoded into a dichotomous variable, not immunised plus unknown status, versus immunised. As explained above, this was justified based on the previous study by Kline (2018).

To check if the PACV predicted vaccination status, the correlations analysis was done. The result from a simple correlation analysis showed there was significant association between parental vaccine hesitancy score and children's vaccination status for the general PACV (four languages), Spearman's rho = 0.2, p = 0.005. After controlling for potential confounders including age, relationship to child, and number of children in the household using a partial correlation analysis, the association remained significant with Spearman's rho = 0.2, p = 0.01.

The association between parental vaccine hesitancy score and children vaccination status among the English- and Arabic-speaking parents were also significant after controlling for age, relationship to child, and number of children: English PACV, Spearman's rho=0.16, p = 0.04; and Arabic PACV, Spearman's rho= 0.55, p= 0.03. The partial correlation score for the

remaining languages did not reach significant level: Somali PACV, Spearman's rho= 0.23, p=0.31; and Oromo PACV, Spearman's rho= 0.04, p= 0.46. The significant association between parental vaccine hesitancy score and child vaccination status implied the predictive validity of the PACV survey tool for the general survey (four languages combined) and for both pre-validated English and Arabic versions of PACV.

The reliability of the PACV survey was examined using Cronbach's alpha score. The internal consistency of the general PACV (four languages combined) and for each language (English, Arabic, Somali, and Oromo PACV) were tested and results are presented in **Error! Not a valid bookmark self-reference.**. The Cronbach's alpha score for the combined PACV survey was 0.77, which suggested very good internal consistency. Likewise, Cronbach's alpha score for the English PACV in this study was also 0.77, indicating very good internal consistency. The Somali version scored the highest of all, with Cronbach's alpha = 0.89, suggesting excellent internal consistency, while the Oromo PACV Cronbach's alpha score = 0.64, which was within an acceptable range. There was no variation in the responses to item 16 among Oromo language speaking participants. As a result, while item 16 was treated as a missing item, the model was computed for only 14 items for the Oromo PACV. Despite its previous validation, the Arabic PACV scored the lowest Cronbach's alpha coefficient = 0.53, which was slightly below the acceptable range (< 0.6) (Pallant, 2013). In the Arabic PACV, item five (Q5) was not well correlated with other questions. When item 5 was removed from the Arabic PACV, the internal consistency was within the acceptable range (Cronbach's alpha = 0.63).

Table 6. *Internal Consistency of Different PACV Versions*

	Reliability score			**N of Items**
	Number (n)	*Cronbach's Alpha*	*Cronbach's Alpha (Standardised Items)*	
English PACV	109	0.76	0.77	15
Somali PACV	10	0.89	0.89	15
Oromo PACV	18	0.62	0.64	14*
Arabic PACV	17	0.58	0.53	15
Combined PACV	178	0.77	0.77	15

Note. * The Oromo PACV was only 14 items because there was no variation in the responses to Q16.

In this study, agreement between the online and paper surveys was first measured using hesitancy scores. Further agreement assessment was done to check if there was a difference between parents who took the online and paper survey based on age and gender. The agreement (consistency) of hesitancy scores between the online and paper surveys was assessed using t-tests while agreement in terms of sociodemographic characteristics, i.e., age and gender were tested by Chi-square test.

Results from an independent sample t-test showed there was a good agreement between online and paper surveys; in other words, there was no significant difference in the average vaccine hesitancy scores between those who filled in the online survey (average vaccine hesitancy score = 31.6) and those who filled in the paper survey (average vaccine hesitancy score = 32.4) with $p = 0.68$.

Prior to conducting a Chi-square, both age groups and gender were recorded as a dichotomous variable. In the case of gender, the original coding "parent relation to child", which has three categories, father, mother and other (legal guardians), was changed to father and mother by treating legal guardians as missing data because legal guardians' gender was not identified and there were only a few cases. In case of age, the original coding of age group was also collapsed to two levels, a "younger group" (18–34 years) and an "older group" (> 35 years). A 2 by 2 table of independent Chi-square results showed no significant difference between online vs. paper survey respondents based on gender (father vs. mother) ($\chi2$ (1, n = 168) = 0.0001, p = 0.99) nor based on age (older vs. younger group) ($\chi2$ (1, n = 177) = 3.6, p = 0.58). These results suggested there was no significant difference between online and paper survey respondents based on gender and age. Overall, there was a significant similarity between online and paper survey respondents in terms of hesitancy score, gender and age.

Despite the similarities in the instructions, some inconsistency appeared in the responses. Such inconsistency occurred due to the differences in online and paper survey formats. For instance, an online PACV can limit the number of choices by making the question "required", whereas it was impossible to do so on the paper survey. This was why some paper

survey respondents filled in more than one answer for some questions. For instance, the outcome from the paper survey showed 15 participants gave more than one response for Q18 "What is the primary source of information about vaccines for you? Please check one." As already explained, the multiple responses to Q18 were accommodated and analysed separately.

4.5 Parents' attitudes and concerns pertinent to vaccine hesitancy

4.5.1 Vaccine hesitancy domains

The domains of vaccine hesitancy (behaviour, attitudes and trust about vaccination) were examined by 15 items of the PACV questionnaire (Q3–Q17). The PACV questionnaire distinguishes parents' behaviour with regard to vaccines by examining what they have decided about children's vaccines in the past and what they would do in the future (Q3, Q4 and Q13 of PACV) *(see **Error! Not a valid bookmark self-reference.**)*. Parental vaccine behavioural indicators showed more parents (34, 20.6%) had delayed than decided not to vaccinate their children (19, 11.8%) for reasons other than medical exceptions. Sixteen (6.2%) parents would not get recommended vaccines for their infants if they had other babies.

Eighty-three (47%) parents were concerned about the side effects of vaccines, 75 (43%) were concerned about the safety of vaccines and 69 (40%) parents worried vaccines might not work well for their children (i.e., they worried about efficacy). About 78.7% of caregivers believed that VPDs are severe, yet 53.4% of the parents thought either it was better to develop natural immunity (their children getting sick and developing immunity) or were unsure about whether a vaccine or natural immunity is good for their child. Nearly 58% of parents thought their child received more vaccines than is good for them and about 35% of parents wanted fewer vaccines at the same time (i.e., fewer immunisations at a single immunisation event).

The trust domain of PACV indicated that most parents (85.6%) agreed they could openly discuss a concern about childhood vaccines with doctors, and even more parents (88.4%) indicated some forms of trust in their children's doctors. Most caregivers (82.5%) trusted the information they received about childhood vaccines. Health professionals were the most popular

source of information, as at least 72% of the parents viewed health professionals as a primary source of information.

Table 7. *Responses to Individual PACV Questions (N=178)*

Question Number	PACV Questions	Response	N (%)
3	Have you ever delayed having your child get a vaccine (not including seasonal flu or swine flu (H1N1) vaccines) for reasons other than illness or allergy? *	Yes	34 (20.6)
		No	131 (79.4)
		Don't know	Excluded
4	Have you ever decided not to have your child get a vaccine (not including seasonal flu or swine flu (H1N1) vaccines) for reasons other than illness or allergy? *	Yes	19 (11.8)
		No	142 (88.2)
		Don't know	Excluded
5	How sure are you that following the recommended vaccination schedule is a good idea for your child? Please answer on a scale of 0 to 10, where 0 is Not at all sure and 10 is Completely sure.	0 – 5	29 (17.2)
		6 – 7	30 (17.8)
		8 – 10	110 (65.1)
6	Children get more vaccines than are good for them.	Agree	102 (57.6)
		Disagree	27 (15.3)
		Unsure	48 (27.1)
7	I believe that many of the illnesses that vaccines prevent are severe.	Agree	137 (78.7)
		Disagree	22 (12.7)
		Unsure	15 (8.6)
8	It is better for my child to develop immunity by getting sick than to get a vaccine.	Agree	45 (26)
		Disagree	82 (47.4)
		Unsure	46 (26.6)
9	It is better for children to get fewer vaccines at the same time.	Agree	60 (34.6)
		Disagree	52 (30.1)
		Unsure	61 (35.3)
10	How concerned are you that your child might have a serious side effect from a vaccine?	Concerned	83 (47.1)
		Not concerned	77 (43.8)
		Unsure	16 (9.1)
11	How concerned are you that any one of the childhood vaccines might not be safe?	Concerned	75 (43.4)
		Not concerned	72 (41.6)
		Unsure	26 (15)
12	How concerned are you that a vaccine might not prevent the disease?	Concerned	69 (40.1)
		Not concerned	71 (41.3)
		Unsure	32 (18.6)
13	If you had another infant today, would you want him/her to get all the recommended vaccines?	Yes	151 (84.8)
		No	16 (6.2)
		Don't know	11 (9)
14		Hesitant	43 (24.3)
		Not hesitant	113 (65.3)

	Overall, how hesitant (uncertain) about childhood vaccines would you consider yourself to be?	Unsure	20 (10.4)

Table 7. *Cont.*

Question Number	PACV Questions	Response	N (%)
15	I trust the information I receive about vaccines.	Agree	146 (82.5)
		Disagree	19 (10.7)
		Unsure	12 (6.8)
16	I am able to openly discuss my concerns about vaccines with my child's doctor.	Agree	149 (85.6)
		Disagree	13 (7.5)
		Unsure	12 (6.9)
17	All things considered, how much do you trust your child's doctor? Please answer on a scale of 0 to 10, where 0 is Do not trust at all and 10 is Completely trust	0 – 5	18 (11.6)
		6 – 7	30 (19.4)
		8 – 10	107 (69)

Note. Highlighted responses indicate hesitancy; Q5–Q17 responses were collapsed from 5 into 3 categories; *don't know in Q3 and Q4 excluded as missing data.

4.6 Prevalence of vaccine hesitancy as defined by the PACV

Cumulative hesitancy scores were calculated and converted for each participant based on the value assigned to each answer to the 15 questions in The domains of vaccine hesitancy (behaviour, attitudes and trust about vaccination) were examined by 15 items of the PACV questionnaire (Q3–Q17). The PACV questionnaire distinguishes parents' behaviour with regard to vaccines by examining what they have decided about children's vaccines in the past and what they would do in the future (Q3, Q4 and Q13 of PACV) *(see **Error! Not a valid bookmark self-reference.**).* Parental vaccine behavioural indicators showed more parents (34, 20.6%) had delayed than decided not to vaccinate their children (19, 11.8%) for reasons other than medical exceptions. Sixteen (6.2%) parents would not get recommended vaccines for their infants if they had other babies.

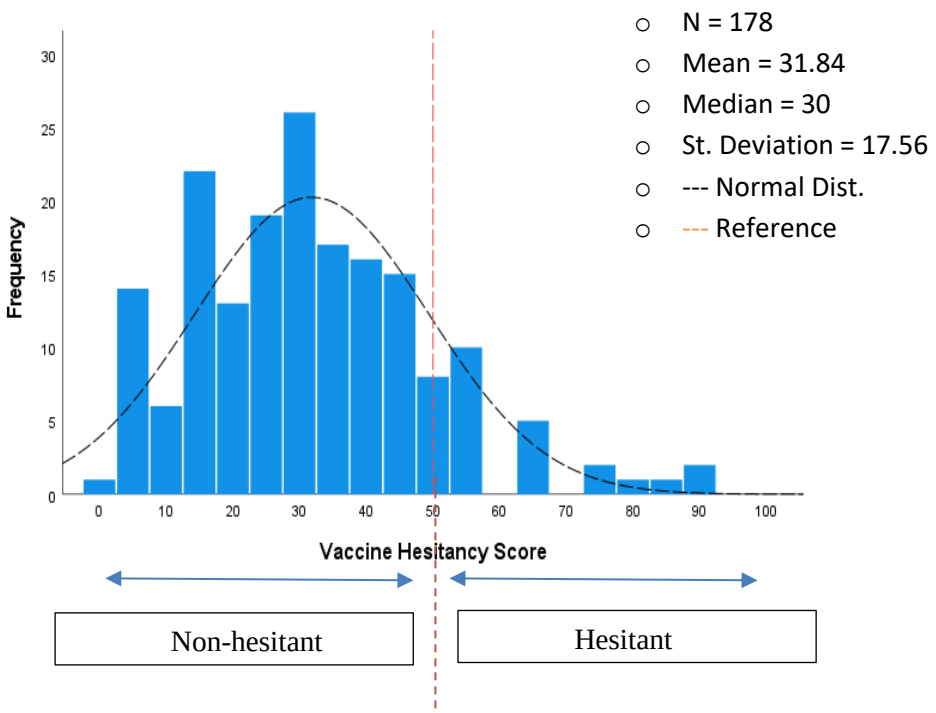
Eighty-three (47%) parents were concerned about the side effects of vaccines, 75 (43%) were concerned about the safety of vaccines and 69 (40%) parents worried vaccines might not

work well for their children (i.e., they worried about efficacy). About 78.7% of caregivers believed that VPDs are severe, yet 53.4% of the parents thought either it was better to develop natural immunity (their children getting sick and developing immunity) or were unsure about whether a vaccine or natural immunity is good for their child. Nearly 58% of parents thought their child received more vaccines than is good for them and about 35% of parents wanted fewer vaccines at the same time (i.e., fewer immunisations at a single immunisation event).

The trust domain of PACV indicated that most parents (85.6%) agreed they could openly discuss a concern about childhood vaccines with doctors, and even more parents (88.4%) indicated some forms of trust in their children's doctors. Most caregivers (82.5%) trusted the information they received about childhood vaccines. Health professionals were the most popular source of information, as at least 72% of the parents viewed health professionals as a primary source of information.

Table *7*. The cumulative score ranges from 0 to 100. A PACV score equal to or more than 50 (PACV $\geqslant$ 50) was classified as vaccine hesitant, and PACV < 50 was considered as non-hesitant. The minimum PACV score in this study was 0, and the maximum was 90. In this study, the prevalence of parental vaccine hesitancy was 16.3%, 95% CI (10.7, 21.3). This was less than the self-rated hesitancy which was 24.3% ("somewhat hesitant" [19%] and "very hesitant" [5.3%]) based on the response to item 14. There was a statistically significant difference between PACV scale-based prevalence (16.3%) and self-reported hesitancy prevalence (24.3%), $\chi 2$ (1, N=178) = 4.9, p = 0.03. The mean, median and standard deviation for the PACV score were 31.8, 30, and 17.6 respectively. The summary of each participants' hesitancy scores is shown on the following histogram (**Figure *7***).

Figure 7. *Histogram of summary results of vaccine hesitancy score (N=178)*



4.7 Association between sociodemographic determinants and vaccine hesitancy

4.7.1 Results from bivariate and multivariate logistic regression

A bivariate logistic regression was performed to determine the likelihood of any of seven independent sociodemographic variables having an association with vaccine hesitancy. These sociodemographic variables were first-born status of the child, parental age, religion, education, primary sources of vaccine information, duration of residence in host country and household income. Following the bivariate analysis, two variables, age ($p = 0.60$) and household income ($p = 0.67$), which were above required p-value ($p < 0.5$) for consideration for a multivariate model, were excluded. The remaining five variables were retained and entered the multivariate model using a stepwise-backward elimination process.

The overall model containing five predictors (first-born status, religion, education, primary source of vaccine information and duration of residence in the host country) was

statistically significant, $\chi 2$ (10, N=158) = 21.87, p = 0.02. This suggested the model could differentiate hesitant and non-hesitant participants. The model also explained the variance in hesitancy, with a pseudo R-squared between 13% and 22 %, and the model was able to classify 84.2% of the cases accurately.

The bivariate logistic model outcomes demonstrated the primary source of information had a significant association with vaccine hesitancy (p = 0.03) (see **Table *8***). Parents who used media (mass media and electronic media) as a primary source of vaccine information were three times more likely to be hesitant than those who used official sources (health professionals and brochures) as a primary source of vaccine information, OR= 3.20, 95% CI (1.07, 9.58).

In a multivariate model, after adjusting for other covariates (first-born status, religion, education, and duration of residence in the host country), the primary source of information remained significantly associated with vaccine hesitancy (p=0.045). Compared to a reference group (parents who view official sources of information as a primary source), parents who chose media as a primary source of vaccine information were nearly five times more likely to be hesitant, OR= 4.87, 95% CI (1.36, 17.38).

Table 8. *Association Between Sociodemographic Variables and Vaccine Hesitancy*

Variable	**Hesitant n=29 (16.3%)**	**Non-Hesitant n=149 (83.7%)**	**Bivariate Analysis**		**Multiple Variable Analysis**	
			UOR (95% CI)	**P**	**AOR (95% CI)**	**P**
First-born status						
Yes	13	77	1.35 (0.61, 3.01)	0.45		
No	16	70	1.00			
Age						
18–34	21	89	1.68 (0.609, 4.63)	0.60		
35+	17	99	1.00			
Religion						
Christian	9	74	1.00	0.16		
Muslim	19	72	2.17(0.92, 5.11)			
Other**	1	2	4.11(0.34, 49.99)			
Education						
No qualification	2	5	3.70 (0.62, 22.27)	0.08	4.69(0.45,48.90)	0.04*
Primary	3	4	6.94 (1.31, 36.68)		8.97(1.48,54.33)	
Secondary	9	31	2.69 (0.95, 7.60)		2.91(1.02,8.29)	
Tertiary	14	107	1.00			
Duration in NZ						
< 9 years	14	54	0.90 (0.238, 3.374)	0.21		
>10 years	15	94	1.00			
Source of info. *** Information						
Official †	18	115	1.00	0.03*		0.045*
Media †	6	12	3.20(1.07,9.58)		4.87(1.36, 17.38)	
Personal †	4	7	3.65(0.97,13.74)		2.25(0.32, 15.85)	

Table 8. *Cont.*

Variable	Hesitant n=29 (16.3%)	Non-Hesitant n=149 (83.7%)	Bivariate Analysis		Multiple Variable Analysis	
			UOR (95% CI)	P	AOR (95% CI)	P
Household income						
< $25,000	6	23	1.15 (0.31,4.31)	0.67		
$25001– $50,000	11	47	1.03 (0.32,3.33)			
$50001 – $75,000	6	46	0.57(0.16, 0.09)			
> $75001	5	22	1.00			

Note. NA: Not applicable; UOR: unadjusted odds ratio; AOR: adjusted odds ratio; * Significant result, p < 0.05; **Other: Hindu, Buddhist, Atheist, and other religion; 1.0: Reference group; *** only 162 participants with single source of information were included; † Official: professional sources + brochure; Media: mass media + social media + internet (google); personal: family and friend + community + other.

Another variable that had a significant association with vaccine hesitancy was education (p=0.04). After controlling for other covariates (first-born status, religion, primary source of information and duration of residence in the host country) parents with primary education were almost nine times more likely to be vaccine hesitant than parents with tertiary education, OR= 8.97, 95% CI (1.48, 54.33). Furthermore, compared to parents with tertiary qualifications, parents with secondary education were nearly three times more likely to be hesitant, OR = 2.9, 95% CI (1.02, 8.29). Other variables including first-born status, age, religion, income, duration in New Zealand were not significantly associated with vaccine hesitancy (see **Table *8***).

4.8 Vaccination status

Provided at least 178 children's vaccination status were obtained in this survey without redundancy, the result indicated about 80% (95% CI: 73.7, 85.4) of the parents said all children in the households had received all vaccines required at their age. In contrast, while 9.7% of the parents said their children had not received all the recommended vaccines, slightly more parents, 10.3%, were unaware of their children's vaccinations status.

As the PACV survey tool can predict children's immunisation status (Williams et al. 2016), vaccination coverage was another outcome variable in this study. Since most cases of VPDs, particularly measles, are linked to unvaccinated and under-vaccinated status (45%) and unknown vaccination status (38%) (Kline, 2018), including "unknown status" as "under immunised" is justifiable. Therefore, this study treated unknown status as under-vaccinated, and only those who answered "Yes" to Q22, "Has/have child(ren) in your household received all the recommended vaccines required for their age?" were treated as vaccinated. In this study, more hesitant parents had delayed or refused vaccines for their children than non-hesitant parents (Qs3 & 4). Results from $\chi 2$ showed 17 (63%) of hesitant parents had ever delayed vaccines for their children compared to 17 (12%) of non-hesitant parents ever

delayed vaccines for their children for any reason other than medical allergy or illness ($p < 0.001$). Furthermore, 12 (46%) of hesitant parents had decided not to vaccinate their child at some point compared to 7 (5%) of non-hesitant parents who had refused vaccines for reasons other than medical exemptions $p < 0.001$.

4.9 Open-ended responses

Twenty-seven people (15%) responded to the last question of the survey, which was an open-ended question that asked, "Do you have any additional comments about childhood vaccinations?" Of the total respondents, 24 responses were pertinent to childhood vaccinations. Nearly half of the respondents (12/27) displayed positive beliefs in vaccination with participants noting the benefits of vaccines in protecting children from diseases and the importance of vaccines in reducing infant mortality rates.

> *"Vaccination is highly important for all kids in the world."* (Respondent #9)

Slightly less than half of participants (11/27) noted concerns related to the safety and efficacy of vaccines. Some parents raised concerns that vaccines cause behaviour changes in children and that natural immunity is superior. Importantly, one participant noted the racism and discrimination present within the New Zealand health care system and how this impacts refugees' access to and utilisation of health services, including their perceptions of vaccinations. The participant wrote that:

> "*The health care system fails to adequately care and support those who are non-white, this in turn creates a significant doubt and mistrust of the health care providers and professionals. Racism and discrimination are the main reasons for refugees to be blatantly subjugated to mistreatment and poorer health outcomes and experiences…[therefore] you can't trust those who mistreat you when you are vulnerable and at their mercy for help and support. Hence [this has led to] the surge of anti-vaccination sentiments amongst refugees.*" (Respondent #47)

Given these concerns, some participants noted the need for more research about vaccines and parental education about the side effects and benefits of vaccination in the language of the parents, so as to improve comprehension.

4.10 Summary

This chapter presented key results from both descriptive and inferential analysis to answer the research questions. A total of 178 participants were included in the final analysis. Around 70% of parents in this study were of African origin. Over 16% (29/178) of former refugee caregivers were vaccine hesitant as determined by the PACV scale. This was less than the self-reported hesitancy rate, which was 24.3% (43/178). Around 47% of parents were concerned about vaccine side-effects, 43.4% of parents were concerned about vaccine general safety and 40.1% of parents were concerned about vaccine efficacy. The combined PACV survey instrument in this study was contextually valid and internally consistent with a good agreement between online and paper surveys.

The bivariate analysis showed the primary source of information had a statistically significant association with vaccine hesitancy, while the multivariate model showed education and primary source of information had significant associations with vaccine hesitancy. Former refugee caregivers with higher educational attainment were less vaccine hesitant than participants with lower educational status. Parents who used media (electronic and mass media) as primary sources of vaccine information were more hesitant than those who reported health professionals and brochures as a primary source of vaccine information.

In this study, significantly more VHPs had delayed or refused vaccines for their children than non-hesitant parents for reasons other than medical exemptions ($p < 0.001$). According to parents' reports of their child's vaccination status, around 80% of former refugee children had received recommended vaccines at the appropriate age (provided no two

parents responded to one child's vaccination status). Further discussion of these findings in comparison with previous studies is reported in Chapter Five.

Chapter Five: Discussion

5.1 Introduction

Investigating parental vaccine hesitancy and the factors associated with hesitancy among resettled refugees in New Zealand were the objectives of the current study. A self-administered survey in multiple languages completed by parents of refugee background with a child aged between six weeks and sixteen years was analysed. This chapter broadly discusses the interpretation of the main results in relation to the knowledge base on the following topics: demographic profiles, the performance of PACV survey tools, the prevalence of vaccine hesitancy, the determinants of vaccine hesitancy, and immunisation status and vaccination coverage. The strengths and limitations of the study are also critically discussed in this chapter.

5.2 Interpretation of the findings

Nationally, this is the first parental vaccine hesitancy study among the former refugee population. Internationally, while there are some qualitative studies, a thorough literature review indicated no quantitative study on vaccine hesitancy among former refugee populations in countries of resettlement. Therefore, due to the absence of comparative evidence on vaccine hesitancy rates and its determinants among the refugee population, the study findings are compared with vaccine hesitancy reports in general populations or other marginalised sub-groups and minorities (e.g., immigrants, indigenous people and isolated communities).

5.2.1 Demographic profiles

The descriptive analysis showed over two-thirds (70%) of the participants were of African origin. This showed former refugees of African descent are likely overrepresented in

the current study. A previous study reported that most quota refugees in New Zealand were Africans (33.5%) (Tuwe, 2012). It is worth noting that the current study surveyed any former refugees who came to New Zealand via other pathways including family reunification, asylum seekers and community sponsorship. As a result, a large proportion of participants of African origin was apparent.

Unlike in previous vaccine hesitancy surveys done in the general population (Alsuwaidi et al., 2020; Migriño et al., 2020; Napolitano et al., 2018), in the current study there were a greater representation of fathers (56%) than mothers (39%). The difference in representation between fathers and mothers could be attributable to the gender composition of former refugees in New Zealand. A previous study reported there were more males (56%) than females (44%) among former refugees in New Zealand (MBIE, 2012).

In terms of income, findings from the current study were comparable with previous reports. For instance, parents who earned less than NZ$50,000 per year accounted for 52% of the sample, while only 16% earned above NZ$75,001 per annum. According to a previous study in New Zealand, almost 50% of African and Middle Eastern immigrants were welfare benefit or unemployment benefit recipients with an estimated annual income of no more than NZ$25,000 for job seeker benefit rates for couples with two children and above (Tuwe, 2012; Work and Income, n.d.). Furthermore, over 35% of New Zealand-based African immigrants and 44% of Middle Eastern immigrants' annual income was in the low-income bracket (less than $20,000 a year) (Tuwe, 2012). The New Zealand Council of Christian Social Services (n.d.) states that families with less than NZ$50,000 income per year fall in the low-income bracket. Furthermore, data from MBIE (2012) stated almost two-thirds of former refugees had reported that they had no money to spend on what they like.

Over 73% of parents in the current survey had more than two children. Of those who have two or more children, about 44% of the parents had three and more children. A previous

survey among former refugees in New Zealand reported a lower proportion of parents (60%) had more than two children (MBIE, 2012). Studies showed most refugees were with a child or children (Almidani, 2020; MBIE, 2012). As already mentioned in Chapter One, children accounted for about half of the former refugee population in New Zealand (MBIE, 2012). This differs from the host country population which composed of an increasingly ageing population. A previous report on ethnic-based health needs assessments among the diverse MELAA ethnicities (which is mainly composed of former refugees) suggested this group was one of the fastest-growing communities in New Zealand, and they were also among the groups who were dissatisfied with the health care system (MBIE, 2012). Therefore, it is important to ensure there is an immunisation programme which responds to the needs of former refugees.

A simple majority of participants were Muslim (51%) followed by Christian (47%). This is somewhat comparable with a previous study among quota refugees which found about 40% of former refugees were Muslim and 39% were Christian (MBIE, 2012). Parents who had no formal education, primary or secondary, accounted for about a third of the sample. In a previous report, a third of former refugee adults had less than high-school qualifications (MBIE, 2012). In general, in terms of gender, household income, the number of children in the households, religious affiliation, and educational status, findings from the current study are comparable with previous reports. This indicates the sample population in the current study is a reasonable representation of the wider former refugee population in New Zealand.

5.2.2 PACV performance

The combination of four versions of PACV in English, Arabic, Somali and Oromo used in this study was reliable. The total Cronbach's alpha score was 0.77, suggesting very good internal consistency, as a Cronbach's alpha > 0.75 indicated a very good internal consistency. This was comparable with both the original and previous translated versions

(Alsuwaidi et al., 2020; Opel et al., 2011). The original English PACV's Cronbach's alpha score was 0.74 for 'Safety and Efficacy' and 'Behavioural' domain) and 0.84 for 'General Attitudes' domain) (Opel et al., 2011). The Translated Arabic and Malay PACVs had overall Cronbach's alpha scores of 0.79 (Alsuwaidi et al., 2020) and 0.77 (Abd Halim et al., 2020) respectively.

Other than the Arabic PACV, all individual PACVs, in English, Somali and Oromo have scored fair-to-excellent internal consistency. The English PACV's Cronbach's alpha was 0.77, a very good internal consistency that is comparable to the original authors' findings (Opel et al., 2011). Among the translated versions, the Somali PACV showed the highest internal consistency (Cronbach's alpha = 0.89) while the Arabic version showed the lowest internal consistency (Cronbach's alpha = 0.53). The Oromo PACV had a Cronbach's alpha score of 0.64, which shows acceptable internal consistency. When compared to translated versions, the Somali PACV had slightly less internal consistency than the Italian PACV with a Cronbach's alpha of 0.91 (Napolitano et al., 2018) and greater than the Malay PACV (0.77) (Abd Halim et al., 2020) and the previous Arabic PACV (0.79) (Alsuwaidi et al., 2020). The Oromo version showed less internal consistency, yet it was above the acceptable threshold (0.6) (Pallant, 2013). This implies the Somali and Oromo PACV versions can be used in future research.

The Arabic version was adopted from another study by Alsuwaidi et al. (2020). Therefore, only a reverse translation was conducted in the same way as for the Somali and Oromo versions. Despite a good internal consistency report in the previous study by Alsuwaidi et al. (2020), with Cronbach's alpha = 0.79, in the current study, the Arabic version showed the lowest internal consistency with Cronbach's alpha = 0.53. This score is slightly below an acceptable threshold. The low internal consistency could be attributable to differences in Arabic dialects. There is a considerable variation in Arabic dialects between

countries and regions. As Arabic-speaking participants in this study came from various regions including the Middle East, North Africa and the Horn of Africa, it is unlikely that the Arabic version accommodated all dialects. Therefore, the Arabic PACV requires some revisions in accordance with target populations' country of origin or regional dialects.

After controlling for age, gender and number of children, the following PACV versions demonstrated a significant association between hesitancy score and vaccination status; the general PACV scale (p=0.01), English PACV (p=0.04) and Arabic PACV (p=0.03). These suggested a significant predictive validity of the PACV survey tool. A previous study showed the PACV score was significantly associated with intent to vaccinate with the influenza vaccine among African-Americans with low household-income (Orr & Beck, 2017). According to Orr and Beck (2017) VHPs with a PACV score <50 had 28-times greater adjusted odds of intention to receive the influenza vaccine compared to hesitant parents with a PACV $\geqslant$50, OR= 28, 95% CI (5.4, 144.3). Even after adjusting for potential confounders, the results remained the same — for each 1-point decrease in PACV score, the odds of intention to receive the influenza vaccine increased by 7.7%, 95% CI (4, 12) (Orr and Beck, 2017).

Moreover, the proportions of vaccine hesitant parents who delayed or refused vaccination for a reason other than medical exemption were greater than non-hesitant parents ($p < 0.001$). This indicated parental vaccine hesitancy can predict the immunisation status of children. This finding complemented previous studies by Williams et al. (2016) and Abd Halim et al. (2020) which found a predictive validity with the original English PACV and the construct validity of the Malay version respectively. Therefore, the predictive validity evidence from the current study could strengthen the existing evidence for PACV as a vital tool for identifying VHPs in different languages and socio-cultural contexts.

Besides validity and reliability, the agreement between different formats of a measuring instrument is another important indicator of how well that survey tool performs (Kottner & Streiner, 2011). Agreement measures the degree of closeness of the scores from the instrument(s) while reliability provides information about the ability of the scores to distinguish between cases despite measurement error (de Vet et al., 2006). In other words, agreement measures the degree of homogeneity in the subjects and reliability measures the degree of heterogeneity in the subjects (de Vet et al., 2006). Results from the T-test and $\chi 2$ agreement analysis showed no difference in hesitancy score between online and paper respondents based on the average hesitancy score, gender and age. The variance between online and paper surveys was not statistically significant, based on hesitancy score ($p = 0.68$), gender ($p = 0.99$), and age ($p = 0.58$). In other words, there was substantial agreement between online and paper PACVs in this study.

5.2.3 Prevalence of vaccine hesitancy

In this study, the prevalence of vaccine hesitancy among former refugee parents in New Zealand was 16.3%. This was less than the latest report of the prevalence of vaccine sceptics in the host population, 28% (Lee & Sibley, 2020b). It is notable that different survey tools were used in these studies, as the previous study used a national survey known as the New Zealand Attitudes and Value Survey (NZAVS) (Lee & Sibley, 2020b). Elsewhere, studies using the PACV tool in general populations found a prevalence range from 5.8% in Bahrain (Adel et al., 2019) to 34.7% in Italy (Napolitano et al., 2018). Studies which used the VHS found a prevalence range from 1.1% in Guatemala (Domek et al., 2018) to 46% in France (Rey et al., 2018). Other general population studies using a vaccine hesitancy tool within a specific country or group of countries found a prevalence ranging from 7.4% in Georgia (Larson et al., 2015) to 60% in China (Du et al., 2021). Besides the difference in measuring tools, such a great variation in the prevalence can be attributed to differences in

socio-economic and cultural contexts, immunisation programmes and study settings. Studies that utilised similar survey tools in similar contexts would possibly enable better comparisons than studies that employed different tools and that were conducted in different contexts.

Interestingly, there was statistically a broad difference, 8% between the rate of vaccine hesitancy determined by the PACV scale (16.3%) and self-reported hesitancy (24.3%). This variation reached statistical significance (p=0.03). Conversely previous studies that conducted in general populations found similar rates of vaccine hesitancy as defined by the PACV scales and self-reported ones (e.g., Alsuwaidi et al., 2020). The variation in the current study might show gaps in the PACV survey tool. The PACV scale may underestimate the vaccine hesitancy rate in former refugee parents. As a result, a community-specific hesitancy assessment tool might be required to estimate vaccine hesitancy accurately.

Whereas about 1 out of 5 parents had delayed their child's vaccines, nearly 1 in 8 parents had refused to vaccinate their child for reasons other than medical allergy. This was more than that of the general population in New Zealand, where approximately 1 in 6 parents had missed childhood vaccines (MOH, 2007), and only approximately 1 in 20 caregivers had ever refused children's vaccines for reasons other than medical allergy (Lee et al.,2020). The difference could be explained by gaps in accessibility. A potential barrier to accessing a vaccination service is one of the important determinants for low uptake among migrants and refugees (Tankwanchi et al., 2021). In New Zealand, childhood vaccines are freely available for all, regardless of residency status. Therefore, a lack of accessibility, not availability, could be underpin this finding. For refugees, utilising an unfamiliar health care system hinders their ability to access publicly available health care services (Shrestha-Ranjit et al., 2020). Unfamiliarity with the healthcare system could also lead to low vaccine uptake among former refugees in New Zealand.

As anticipated, in this study, more hesitant parents had delayed and refused vaccines for their children than non-hesitant parents. Almost two-thirds of hesitant parents had delayed vaccines and nearly half of hesitant parents had decided not to vaccinate their children for reasons other than medical exemptions. Although the PACV survey accounted for recall bias by proposing neutral answers for items 3 and 4, the responses to these items did not distinguish how many times or what types of vaccines the parents had delayed or refused, so these remain unknown. Abd Halim et al. (2020) suggested converting items 3 and 4 on the PACV questionnaire into numerical scales representing the frequency and type of vaccines being delayed or refused. This could also help parents to give the reason for refusal or delay of particular vaccines.

5.2.4 Parental attitudes and concerns about vaccines

The top three concerns about childhood vaccines in this study were side effects, safety and efficacy. Almost half of surveyed parents were concerned about the side effects of vaccines (47%); just under a half of parents were concerned about the safety of vaccines (43%); and over a third of parents worried vaccines might not work well for their children (40%). Despite these concerns, about three-quarters (82.7%) of the parents were sure that the childhood immunisation schedule is good for their children and well over three-quarters (88.4%) of them trusted their children's doctors. Over half (58%) of parents believed their children received more vaccines than are good for them, while a third (35%) of them wanted fewer vaccines for their children at the same time. The most frequently cited concerns among the general population in New Zealand were also the risk of side effects (52%), vaccines are upsetting/painful for children (safety) (30%), and vaccines are unnecessary as the diseases are not around (8%) (MOH, 2007). Internationally, several studies found that side effects, safety and efficiency were the top three reasons for parental concern about childhood vaccines

(Alsuwaidi et al., 2020; Azizi et al., 2017; Napolitano et al., 2018; Williams et al., 2016; Yufika et al., 2020).

Over three-quarters (82%) of parents declared they trusted the information they received about vaccines. Vaccine confidence issues are not the only elements that influence parental vaccine hesitancy (WHO, 2014). A study has shown a high level of vaccine hesitancy and a high rate of confidence in vaccination could coexist in society (Du et al., 2021). Du et al. (2021) revealed that a high prevalence of vaccine hesitancy (60%) coexisted with high confidence in vaccine safety (82.7%), vaccine effectiveness (88.3%), and trust in healthcare professionals (92.1%). These findings corroborated a theory of vaccine hesitancy, the 3Cs model, which noted that vaccine hesitancy embraced complacency- and convenience-related problems, in addition to confidence issues (MacDonald, 2015).

Although the responses from the open-ended question represented only 15% (27) of the total sample (178), they might provide some insights on childhood vaccination. According to the responses to open-ended questions, almost half of respondents had a concern about childhood vaccines. The open-ended response indicated that most parents had a concern about the general safety, side effects and efficacy. This corroborated the PACV scale explained above. Some caregivers raised concerns that vaccines cause “behavioural changes” in the children, so they said natural immunity is superior. The concern that vaccines may cause illnesses was widely reported in the previous literature (Dubé et al., 2016; Tankwanchi et al., 2020; Sahni et al., 2020; Dubé et al., 2016).

Some of the statements by parents who have concerns about vaccination suggested the need for more vaccination information and education about the safety of vaccines and, particularly, about the side effects as well as the benefits of vaccination for former refugee parents. Among the other statements, one indicated a former refugee parent’s mistrust in the vaccination service due to perceived racism, discrimination, and the lack of culturally and

linguistically appropriate vaccine information/education. A recent review by Tankwanchi et al. (2021) reported xenophobia can be among the factors that can exacerbate vaccine hesitancy among immigrants, because xenophobia (racism) diminishes the trust in the host countries' health systems.

Overall, the participants' statements in response to the open-ended question support the idea of the vaccine hesitancy spectrum and their comments related to the three reasons for vaccine hesitancy: confidence, complacency, and convenience (WHO, 2014). In other words, reasons explaining vaccine hesitancy fit into three categories: "confidence (in effectiveness, safety, the system, or policymakers), complacency (perceived low risk of acquiring VPDs), and convenience (in the availability, accessibility, and appeal of immunisation services, including time, place, language, and cultural contexts)" (McDonald, 2015, pp.4162–4163).

In the current study, the concern about lack of education and information about vaccines is a supplementary insight for the PACV scale findings on the vaccine hesitancy, significant association with parents' education status and source of information. On the other hand, refugees' complaints about the New Zealand health system and demands for improvement was not a new phenomenon. A current study reported a lack of culturally and linguistically appropriate health care services for former refugees (Mortensen, 2020). Findings in this study underscored that barriers to vaccinations that transcend mere health care services (e.g., language, racism, etc.) have the potential to affect vaccine acceptance. Hence, strategies to address vaccine hesitancy and improve vaccine coverage for refugee children may not be achieved in isolation; rather, a collaborative effort from different public health and social service sectors is required.

5.2.5 Sociodemographic correlates of vaccine hesitancy

There is substantial evidence on the determinants of vaccine hesitancy among the general population. However, evidence of the sociodemographic determinants of hesitancy

among the refugee subpopulation is scarce. In this study, education and source of vaccine information were found to be significantly associated with vaccine hesitancy after controlling for other sociodemographic factors.

5.2.5.1 Education

A low educational status was a predictor of vaccine hesitancy among former refugee parents, $p = 0.04$. Given tertiary education as a reference group, parents with primary education were nearly nine times more likely to be hesitant, adjusted OR= 8.97, 95% CI (1.48, 54.33) and parents with secondary education were almost three times more likely to be hesitant, adjusted OR = 2.9, 95% CI (1.02, 8.29). Education as an enabler of vaccine acceptance was documented in New Zealand as parents with higher educational status exhibited greater confidence in vaccine safety than those with lower educational status (Lee et al., 2017). But generally, the role of education in parental vaccine hesitancy is inconclusive. According to a review by Larson et al. (2016) parental education was positively correlated in countries such as Greece and The Netherlands but in other countries including China, Lebanon, Israel, Bangladesh and USA higher education was a potential barrier to vaccine acceptance.

Although several studies including a systematic review found conflicting results of educational status and vaccine hesitancy, (Larson et al., 2014; Furman et al., 2020; Masters et al., 2018; Rey et al., 2018; WHO, 2014), studies among most of the LMICs and marginalised subpopulations suggested a positive role of education in vaccine acceptance (Brown et al., 2018; Masters et al., 2018; Wagner et al., 2019). While the role of education in vaccine acceptance is inconclusive, it is a common understanding that formal education (higher educational status) can improve health literacy (e.g., knowledge and awareness about vaccines and VPDs) which likely has a positive impact on vaccine acceptance in populations with low education such as refugees. In other words, education can improve knowledge or

health literacy which can positively affect behavioural health. But, the role of education in vaccine acceptance requires further studies as vaccine literacy is not simply knowledge about vaccines, it is how to develop and deliver tailored vaccine services to communities (Ratzan, 2011). However, it is still notable that education can affect the parents' information-seeking behaviour.

5.2.5.2 Source of vaccine information

A primary source of vaccine information was another factor that showed significant correlation with vaccine hesitancy, $p = 0.045$. Parents who viewed official source (health professionals and brochures) as a primary source of information were about five times less likely to be reported as hesitant compared to parents who considered media (both mass media and internet) as a source of vaccine information, adjusted OR= 4.87, 95% CI (1.36, 17.38). The positive association between vaccine confidence and health professionals as a source of vaccine information has been previously reported (Du et al., 2021). In the same study, caregivers who reported media as a source of information were more hesitant. Perhaps this is due to the fact that information from a professional source can improve vaccination awareness and positively shape perceptions of vaccine acceptance. Positive vaccine information from professional sources such as health workers could reduce vaccine hesitancy and boost parents' confidence in vaccines, while negative vaccine messages from non-professional sources such as media could undermine vaccine confidence and increase hesitancy.

At least 75% of the parents in the current study considered official sources (health professionals (72%) and brochures (3%) as a primary source of vaccine information, around 10% viewed media (mainstream media and social media) as a primary source, and 6% viewed personal sources (parents, friends, communities and other) as a primary source. The remaining 9% reported multiple sources of vaccine information. Official sources of information, particularly health professionals, were the most trusted source or primary source

of vaccine information for the majority of the caregivers in several countries, for example, 86% of the parents in Italy, 72% in Israel and 83% in Australia (Chow et al., 2017; Napolitano et al., 2018; Velan, 2016). While the majority of caregivers still use health professionals as their source of vaccine information, in some countries such as China, a large percentage of caregivers reported using the internet and social media as an alternative source of vaccine information (Du et al., 2021). Another study in Indonesia found mainstream media to be the most popular source of vaccine information (Darmawan & Kristina, 2020). The source of information could have a significant influence on vaccine compliance (Du et al., 2021); as a result, credible sources of vaccine information have become vital for maintaining high vaccine compliance. For example, a recent publication from the Philippines reported nearly 70% of caregivers cited negative information from the media as a primary reason for vaccine refusal for their children (Migriño et al., 2020).

In the current study almost 9% of the total participants or about 24% of the paper survey respondents said they had multiple sources of information. Given that the question about the source of vaccine information asked the participants to choose only one primary source of information, and the responses selecting multiple sources came only from the paper surveys, the number of parents who seek information from multiple sources could have been much higher had the online survey allowed for multiple responses. Compared to parents with a single source of information (Md=30, n=162), parents with multiple sources of information had greater median hesitancy score (Md=38.5, n=15). Du et al. (2021) reported that caregivers who had multiple sources of vaccine information had significantly greater odds of being vaccine-hesitant than those who used a single source of vaccine information. The same study revealed the group of parents who reported using media (internet) and interpersonal information as sources of vaccine showed a higher prevalence of vaccine hesitancy. Although it is inconclusive due to the low number of respondents, the present study may indicate that former refugee parents who sought vaccine information from multiple sources

might have more concerns about childhood vaccinations. But, more studies are required to substantiate this claim.

With the expansion of the internet, the numbers of parents who seek information about health on the internet have been increasing (Kline, 2018). The evidence of vaccine-related online information searching showed most parents searched for vaccine safety or, particularly, side effects information (Kline, 2018). In the current study, almost half of the parents were concerned about vaccine side-effects so, unless the parents had received adequate information from official sources, it is plausible that more parents had turned to alternative online information source(s). In this study, many parents requested more information or education about vaccinations. Likewise, a previous study by MOH (2007) found over 60% of New Zealand parents who were non-English first language speakers wanted vaccine information in their native languages. Amidst rising vaccine hesitancy, and misinformation about vaccines, parents' engagement in immunisation policy is underscored (Ward et al., 2019).

In addition to the ongoing COVID-19-related public forum on vaccinations, some countries have already introduced a public consultation on routine vaccinations (Ward et al., 2019). For example, the National Vaccine Advisory Committee of the US Centres for Disease Control started a public forum on immunisation in 2009; France did similarly in 2016, and the European Commission commenced public consultation in 2017 to inform their immunisation policies (Ward et al., 2019). Apart from improving parent engagement, public consultations/public forums on immunisation may enable the health authorities to understand the concerns of the groups in the population who have low vaccination uptake (Ward et al., 2019). As a democratic nation, New Zealand could also use a public consultation to understand the needs and concerns of under-immunised groups, such as former refugees, to inform immunisation policy.

Public trust is a key to the success of childhood vaccination (Dubé et al., 2016). Addressing vaccine hesitancy and improving vaccine confidence requires an effective health system (healthy public policy) and vaccination communication (WHO, 2014). In other words, health literacy is a key to improving health outcomes (Ratzan, 2011). Both determinants of vaccine hesitancy among former refugees' parents, education and source of vaccine information, can be modifiable. Although about 69% of former refugees claimed they had tertiary qualification, these qualifications are unlikely accredited by the New Zealand education systems. Therefore, former refugees may need special support to achieve formal education in the New Zealand education system. But, since such support is a long-term strategy, improving health literacy through health promotion is vital. As vaccine literacy goes beyond knowledge (Ratzan, 2011), it is important to embrace former refugees' values in vaccine education. Change in knowledge rather than change in anti-vaccine attitudes is required to promote vaccination culture in society (Costantino et al., 2020). There is evidence in the literature that claimed value-based vaccination intervention is effective in shifting the perception of parents on the acceptance of vaccines (Amin et al., 2017). In general, vaccine literacy through value-based health education could improve vaccine compliance remarkably among communities with relatively low educational attainment such as former refugees.

Provided most parents consider health professionals as a primary source of vaccine information, health professionals can, potentially, play a vital role in improving vaccine uptake. In the current study, parents who use health professionals as a primary source of vaccine information were less likely to be hesitant than those using media as a source of vaccine information. Similarly, previous studies also showed parents who used health professionals as a source of vaccine information were less likely to be vaccine-hesitant (Al-Saeed et al., 2018; Du et al., 2020). Therefore, intervention strategies for vaccine hesitancy or vaccine uptake improvement should put health professionals at the forefront.

Thus, adequate information about vaccines and vaccination services should be given to refugees. This information can be given by different stakeholders. For example, researchers have suggested that vaccination communication strategies that are supported by religious leaders using simple language were effective in shifting negative views of vaccines among minorities (Amin et al., 2017; Jalloh et al., 2020). The data from the current study showed some former refugee parents demanded more information on vaccination. In fact, in practical terms, it is difficult to reach out to extremely diverse refugee communities using a face-to-face information delivery. Hence, health professionals should accommodate online platforms to promote vaccinations (Dubé et al., 2016). Online education by health professionals could improve the availability of credible sources of information while countering anti-vaccine rhetoric.

5.2.6 Immunisation status and vaccination coverage

In this study, the immunisation status of children was assessed based on parents' accounts. Though accurate immunisation status of children in New Zealand is documented by the National Immunisation Registration (NIR) (MOH, 2007), parental reports (verbal accounts) about childhood immunisation status could be consistent with medical records. Thus, it might provide reasonable estimates of vaccination. The self-reported vaccination status in the present study showed around 80% coverage rate among former refugee children. Compared to a previous report, the current study showed an improvement in the coverage rate. Rungan et al. (2013) found only 66% of quota refugee children in New Zealand had a complete vaccination certificate upon arrival at the MRRC. Indeed, such progress in coverage rate is expected as part of the New Zealand Refugees Resettlement Strategy, at least for quota refugees. However, there could be a gap among non-quota refugee children because they might not receive the same screening and follow-up for immunisations upon arrival (Kennedy et al., 2020). This study suggests that the vaccination coverage rates of former refugees'

children were also substantially below the average national coverage rate for New Zealand children, which was about 90% (Lee & Sibley, 2020b; MOH, 2021a) before the current global pandemic. Furthermore, the vaccination coverage rate among the children of refugee background (80%) was also comparatively lower than that of Māori children (85.5%), Pasifika children (87%) and Asian immigrant children (92%) (Lee & Sibley, 2020b). Although the rate of parental vaccine hesitancy was higher among the host country population than former refugees, the lower coverage rates implied former refugee children are at a higher risk of suboptimal immunisation compared to other children of different ethnicities in New Zealand.

Lower vaccination coverage among immigrants, in particular East African children, was documented in some OECD countries including, the USA, UK and Norway (Abdi et al., 2019; Hall et al., 2017; Jenness et al., 2021). But other studies in countries like Australia found mixed results of childhood vaccine coverage rate depending on migrants' regions of origin (Abdi et al., 2021). For example, Abdi et al. (2021) found higher on time coverage for diphtheria-tetanus-pertussis dose 3 at one year of age for children of Australian born mothers compared to children born to migrants' mothers except the Asian mothers. While high coverage among Asian children was also documented in New Zealand and Canada (Charania et al., 2018), little is known about the enablers of vaccination uptake among this group (Abdi et al., 2021). A qualitative study in New Zealand reported high coverage in the Asian community was attributed to this community being mainly having positive attitudes and to a lesser extent being well-informed about immunisations and minimal barrier to immunisation services access (Pal et al., 2014).

A substantial gap in coverage rates of vaccination between refugee children and the national average was also reported among Somali refugees in America and Norway (Hall et al., 2017; Jenness et al., 2021). While the national average of MMR vaccine coverage rate

was above 90% in the US, the coverage rate among Somali refugee children in Minnesota sharply dropped starting from the 2008 birth year cohort (Tankwanchi et al., 202). For example, Hennepin County has seen a 36% drop in coverage rate for first dose MMR vaccination among aged 2 years Somali children (Hall et al., 2017). The MMR coverage rate among Somali children in the Hennepin County before 2008 was above 90%, equivalent to the national average; after 2008 it plummeted to 54% (Hall et al., 2017). This led to a devastating measles outbreak in 2017 (Tankwanchi et al., 2021). The drop in the coverage rate was in response to concerns about autism that was spread in the community by anti-vaccine groups (Hall et al., 2017). In Norway, measles vaccine coverage rate of approximately 85% was reported among Somali children, compared to the national average of 96% (Jenness et al., 2021).

A recent study by Abdi et al. (2021) found not only variations in coverage rates between immigrants and general society but also differences in coverage rates among different ethnic minorities children in Australia. This was also the case in New Zealand, where immunisation coverage rates are uneven across different ethnic groups (Lee et al., 2017). The current study did not look at the difference of immunisation coverage among different ethnic groups. The general health data and immunisation status information for non-quota refugees are very limited in the literature. Therefore, in future, coverage rates among major ethnicities and quota and non-quota refugee children need to be monitored and assessed thoroughly. This may require capturing information on ethnicity, migration backgrounds, and the resettlement strategy that should cover both quota-and non-quota refugees.

Lower vaccination coverage rates among refugee children were reported in previous studies, which looked at “supply side” factors, particularly lack of access and structural barriers, as the major reason for low vaccine coverage rates (Rungan et al., 2013). But this present study looked at the demand side (acceptance) as a major driving factor of low vaccine

coverage among former refugee children. Low uptake and access to vaccination among minority groups are known to be complex and multidimensional (Khan et al., 2021). It is argued that emphasis on the demand side of vaccination (vaccine hesitancy) alone could not fully address low coverage among minority groups; rather, it is important to focus both on aspects of vaccine hesitancy and on other barriers to vaccination among refugee communities (Khan et al., 2021; Tankwanchi et al., 2021). Addressing hesitancy while simultaneously improving systemic/structural barriers to vaccination access may not only improve vaccine uptake among the minorities (former refugees) or reduce the disparities, but it can also accelerate average national immunisation rates (Boyce et al., 2019).

As the current estimate of immunisation rate based on self-reported responses which was not cross-checked by medical record, hence, it might be flawed. Further studies are required to accurately estimate the immunisation rate among former refugee children. But, as explained above, there is a preliminary finding based on self-reported immunisation status showing a significant relation between the parental vaccine hesitancy score and the vaccination status of the children. Future research needs to use the immunisation records to provide a more accurate association between parental vaccine hesitancy and children's vaccination coverage rate.

5.3 Strengths and limitations

The study has several strengths. First, the survey questionnaire is versatile as it was adaptable and matched the objective of the study. The PACV survey instrument was adapted and used in four languages and on two distribution channels. The participants were also able to respond to the questionnaire autonomously and with anonymity. Secondly, forward and backward translations were done in translating the surveys. Thirdly, a pilot survey was conducted prior to data collection to check the clarity, reliability and acceptability of the

translated versions. Finally, adjustment was made for the covariates that could potentially interfere with the outcomes.

This study has also a number of limitations that require noting. One of the limitations of this study was related to the method of data collection. As mentioned above, former refugees are often described as a "hard-to-reach" community; for this reason, a snowball sampling approach was used both for the paper and online surveys when recruiting participants. Therefore, this study likely has a selection bias. As a result, the study sample might not be a proportional representation of the diverse refugee community in New Zealand. In this study, former refugees of African origin were likely overrepresented in the sample. Thus, generalisations should be made with caution. To overcome this limitation, a future study may use stratified sampling based on ethnicities and/or country of origin.

The second limitation of the study was related to response bias. The response bias could arise from respondents not remembering past vaccination events, which is known as recall bias. Another response bias could also arise from the difference between online and paper surveys. Despite similar formatting and the same instructions being used for both online and paper surveys, there was some inconsistency between paper- and online-based responses. Some responses also showed the likelihood of misunderstandings or misinterpretations of a few questions. The last response bias that might occur in this study was a social desirability bias. Since the outcome variable (i.e., vaccination status) was based on respondents' self-reported data, the study could be exposed to social desirability bias. Participants might respond according to what they think should be right rather than what they normally did in their real lives. A cross-checking of a self-reported behaviour (e.g., cross-checking immunisation status with medical records) could minimise response biases.

Lastly, this study has inherent limitations related to the study design and the survey questionnaire. As this study is a cross-sectional study design, it could not establish a causal

link between independent variables and outcome variables. In other words, because of the study design, a causal link could not be established between sociodemographic factors and vaccine hesitancy. Another inherent limitation relates to the PACV questionnaire. Specifically, the PACV behavioural domain (items 3 and 4) does not address the frequency and type of vaccines being delayed or refused. Therefore, these items might need to be modified so that they can capture information about how many times parents delayed or refused vaccines along with the reasons for delay or refusal, and if they were delayed and/or refusing all vaccines or selected ones (Abd Halim et al., 2020). Despite these limitations, this study can be a valuable reference for future work on vaccine hesitancy among the resettled refugees in particular, and among minorities in general.

5.4 Summary

This chapter critically discussed key findings in the study. Key results including the PACV performance (validity and reliably), the rates and determinants of vaccine hesitancy were critically discussed.

The overall PACV survey in the current study was valid and internally consistent, which was complementary with the previous reports. The revalidated PACV English and Arabic versions showed significant predictive validity whereas Somali and Oromo versions were internally consistent. Both the Somali and Oromo PACV can be used by the future researchers in the respective communities.

The study found vaccine hesitancy among former refugees was considerable, yet lower than that of the general population in New Zealand. Nevertheless, as former refugee children had relatively low coverage rates (more delayed and refused childhood vaccines) compared to the general population children, lower vaccine hesitancy does not mean former refugee children are at a low risk to VPDs. Therefore, vaccine hesitancy among former refugees needs to be addressed in addition to addressing other broader systemic factors.

Findings from multiple variable logistic regression indicated educational attainment and source of information were a significant predictor of vaccine hesitancy. This implies the importance of formal education and credible sources of vaccine information in improving vaccine literacy. Vaccine literacy is not merely about knowledge but also taking into consideration the complex issues behind low vaccine acceptance, including socio-economic factors and cultural values (Ratzan, 2011). Vaccine information and education are concurrently considered to be convenience issues in vaccine hesitancy. Therefore, improving access to education and credible information sources could address vaccine hesitancy and improve vaccine uptake among former refugee children.

Given the rapid expansion of the internet as an alternative source of vaccine information for parents, the source of vaccine information is also an important factor in improving vaccine acceptance and in countering misinformation. Parents whose primary source of information was an official source were less likely to be hesitant than parents who reported media as a primary source of vaccine information. Moreover, some parents indicated dissatisfaction with the information they had received from the doctors and demanded more information in their written feedback. Since health professionals could play an important role in tackling hesitancy by providing credible information to VHPs, they need to deliver vaccine information tailored to the socio-cultural and linguistic demands of former refugees. The lack of adequate information for the parents and the increasing anti-vaccine information online suggests online vaccination promotion from professional sources (i.e., health professionals) may be useful.

Finally, this study has both strengths and weaknesses. The current study was exposed to selection bias due to non-probabilistic sampling, and to response bias that related to a lack of understanding by some respondents, or social desirability. This exposure to bias in turn limits the generalisability of the findings to the wider former refugee population. Some of the

major strengths of the current study include utilising a questionnaire that was well-aligned with the study objectives; previously validated survey tools; flexible study design; and, the collection of many variables which enabled adjustments for covariates in different analyses.

Chapter Six: Conclusion

6.1 Introduction

The research results and discussion were presented in the previous chapters. Based on the main findings, this chapter draws conclusions, describes implications, and provides recommendations for vaccination policies or programmes, health practitioners, and future researchers.

6.2 Conclusions

Vaccine hesitancy contributes to suboptimal immunisation coverage, which in turn increases the risk of VPDs. There is ample evidence of rising vaccine hesitancy in the Western world and lower vaccine coverage among resettled refugee children. An extensive literature review showed limited evidence of the prevalence and determinants of vaccine hesitancy among resettled refugees. Hence, this study was justified with reference to these knowledge gaps.

The current study is a cross-sectional survey that assessed the validity and reliability of different versions of the PACV survey; determined the rate of vaccine hesitancy and examined sociodemographic risk factors associated with hesitancy. The combined PACV surveys, consisting of the versions in four languages, showed contextual validity and internal consistency. A reliability analysis of the newly translated Somali and Oromo PACVs showed good internal consistency, suggesting future usability. In contrast, the Arabic version showed slightly below acceptable internal consistency, suggesting a need for further revision per the dialects of a target population.

The study found the rate of vaccine hesitancy among former refugee parents was sizable, yet lower than that of the general population of New Zealand. Interestingly, there

were more refugee parents who had delayed and refused to vaccinate their children for reasons other than medical exceptions.

Former refugee parents with tertiary education had lower odds of vaccine hesitancy compared with those with only primary or secondary education. This suggested improving access to formal education is imperative in improving vaccination acceptance in the long run. Because of a lack of access to education, former refugee parents likely had low vaccine literacy. Hence, a targeted health promotion on childhood vaccination should be given to former refugee caregivers. For instance, the development of vaccine promotion materials in former refugees' main languages can help as a supplement to a health promotion strategy that ensures ease of access to vaccine information.

The source of vaccine information is an important variable that was also associated with vaccine hesitancy. Parents who chose media as their primary source of vaccine information were more likely to be hesitant than those who chose health professionals and brochure as a main source of vaccine information. Many former refugee parents noted that information provided on children's vaccines was insufficient. Hence, they suggested that more vaccine information from health professionals need to be provided. Improving access to credible vaccine information should be emphasised because quality information is part of quality services, and is vital for improving vaccine acceptance. Therefore, to overcome vaccine hesitancy and increase immunisation coverage among former refugees in New Zealand, health care professionals should also build trusting relationships with parents and ensure they receive adequate information, especially about the side effects, safety and efficacy of vaccines.

6.3 Implications

These results have implications for both vaccine hesitancy theories, and policies and practices related to immunisation services. First, results from this study supported the theory of vaccine hesitancy, particularly the 3Cs model. For example, this study found "vaccine hesitancy" is not synonymous with "lack of trust or confidence" in vaccines. In other words, vaccine hesitancy goes beyond lack of trust in vaccination, immunisation schedules and/or health professionals. In the 3Cs model, confidence or trust in vaccination is only one dimension of vaccine hesitancy (MacDonald, 2015). Generally, vaccine hesitancy has three major components, namely confidence, complacency and convenience (MacDonald, 2015).

Moreover, this study found not all parents who delayed or refused vaccines for their children were hesitant and not all hesitant parents delayed or refused vaccines for their children for reasons other than medical exemptions. This reflected how vaccine hesitancy is complex and multifaceted, as put forward by the 3Cs model (WHO, 2014). Vaccine hesitancy includes parents who have not yet rejected vaccines (Yaqub et al., 2014). In fact, a vaccine intervention strategy should focus on VHPs who do not hold anti-vaccine views, as they usually constitute a substantial proportion of the society (Yaqub et al., 2014). In contrast, parents who hold anti-vaccine views are few, and provoking them with scientific argument is often counterproductive (Dubé et al., 2016). Therefore, a vaccination intervention programme that targets VHPs might need supplementary and wider population-based education.

The finding of a substantial number of VHPs among former refugees underscores the importance of focusing on the demand side of childhood vaccines and vaccination services. In other words, immunisation programmes need to emphasise the demand side of the childhood vaccination issue (vaccine hesitancy) which is mainly rooted in personal attitudes or beliefs yet is influenced by supply side factors (i.e., access issues or barriers) (WHO, 2014). This study found former refugee parents who had refused vaccines for their children were about 3

times that of the host population and those refugee parents who delayed vaccines for their children without any medical exceptions were about 1.25 times that of the host population parents. Perhaps this is due to less accessibility of vaccination services for former refugees than the host population. However, since this is a preliminary finding, further study is required to examine why more former refugee parents refuse or delay to vaccinate their children. Moreover, a lower reported vaccination coverage rate found among former refugees means further work is required to ensure immunisation equity.

A significant correlation between vaccine hesitancy score and vaccination status (delay and refusal of vaccines) underlies the importance of addressing vaccine hesitancy to improve vaccine uptake among children of former refugees. Addressing vaccine hesitancy requires multi-component interventions at different levels, including: making vaccination policy; improving the quality of healthcare delivery, which includes vaccination services; information; and maintaining public trust between parents and health care providers (Kline, 2018). Addressing parental vaccine hesitancy is important to improve the coverage rate among former refugee children, which ultimately will lead to the herd immunity that is vital to prevent VPD outbreaks.

The association between education and vaccine hesitancy supported views on the importance of formal education in improving vaccine confidence. A previous study showed education, either formal education or health literacy, has a great deal of impact on health behaviour (The Lancet Public Health, 2020). Therefore, as with any other health issues, improving educational opportunities for the marginalised refugee community could improve vaccine compliance in the long run and improve general health and wellbeing. Improving educational opportunities for the target group also has far-reaching consequences for the overall health outcomes of the community, because education is one of the critical social determinants of health (The Lancet Public Health, 2020). Indeed, education and health and

wellbeing are intrinsically linked, while education has also direct impacts on health behaviour by reducing risky lifestyle choices, e.g., refusing to vaccinate children (The Lancet Public Health, 2020).

Apart from formal education, targeted health education among VHPs can also improve vaccine uptake considerably (Dubé et al., 2016). Since not all hesitant parents delay or refuse children's vaccinations, and parents were not satisfied with the information they had received, adequate information from health professionals reassured many parents who have concerns but still accept vaccines. Vaccine literacy for the wider former refugee population could serve as an early intervention to address those parents who hesitate and have little knowledge of vaccines. Anti-vaccine rhetoric could easily misinform parents with less understanding about vaccines. Indeed, the anti-vaccination group is small but vocal in vaccine discourses in the community as well as on the media (Kline, 2018). This means the rise of "vaccine activism" or "vaccine nationalism" vis-à-vis digital communication could easily erode public trust in childhood vaccination over time (Du et al., 2021; Kline, 2018). The good news is that the majority of parents still viewed health professionals as their primary source of vaccine information. This implies health professionals are in the best position to promote childhood vaccines and to counter misinformation.

6.4 Recommendations

Based on the findings, this study provides the following recommendations to policymakers, clinicians, public health and health promotion and future researchers.

To policymakers:

- Given the high vaccine hesitancy rates among New Zealand society in general and former refugees in particular, and the sustained gaps in vaccination coverage, the Ministry of Health should urgently set up a strategy to reduce vaccine hesitancy and

improve vaccination uptake while closing the gap in coverage rates. Two suggestions are given:

1) Communication strategies that may increase parental engagement on immunisation policy (e.g., public forums and consultation on routine immunisations).

2) A targeted intervention that is tailored to minorities' specific needs and concerns (e.g., TIP).

- Improve accuracy of national migrant-specific vaccination coverage data to help understand immunisation inequities among children living in New Zealand and inform future immunisation policy and practice. As some VHPs have not yet delayed or refused their children's vaccines, immunisation authorities need to set up an early intervention to identify VHPs, for example, by using a screening tool to identify VHPs and provide them with counselling in accordance with the level of hesitancy.

- Improve access to education for better health outcomes. Low education attainment predicts hesitancy in former refugees; hence, the critical role of education in overall behavioural health needs to be emphasised.

- Improve access to vaccine information and prepare communication strategies which is culturally and linguistically appropriate. It is worth noting that the most effective intervention approaches were the ones which were tailored to a specific population and their specific concerns (Dubé et al., 2016).

- Support PHOs and public health professionals to provide quality information on vaccine side-effects, general safety and efficacy, to boost vaccine literacy among former refugee parents.

- Enhance capacity building through training health care professionals on how to address vaccine hesitancy, achieve cultural competence and manage pain.
- Increase funding to train more medical interpreters and cultural facilitators.

To clinicians:

- Implement effective pain mitigation procedures to reduce parents' concerns on temporary side-effects. Recently, Shen and Dubey (2019) published a clinical guideline for primary health workers on comforting children and their parents during and after receiving vaccines. Since needle pain is widely worrisome for parents, regardless of their background, it is important to improve pain mitigation.
- Develop or adopt vaccine hesitancy screening tools and address the parents according to the level of their vaccine hesitancy. The PACV has shown promising results as a screening tool to identify VHPs (Napolitano et al., 2018; Williams et al., 2016). Thus, the PACV tools can be modified and used to distinguish VHPs among former refugees who still visit health professionals to vaccinate their children.
- Set up a counselling service to address the concerns of VHPs. Since a different level of hesitancy requires different messages (Dubé et al., 2016), it is suggested that it is necessary to foster a counselling service for VHPs. The medical counsellors need to be culturally sensitive and supported by trained interpreters where necessary.
- Scale up recall-based strategies, such as messaging, as a reminder for the parents about their children's vaccination schedule ideally in languages and formats that are easily understood and received by former refugee parents.

To public health and health promotion services

- Enhance a proactive vaccination promotion that can appeal to the core values of a particular community, such as language, religion and culture. Linguistically and culturally appropriate vaccination education for former refugees is needed in both healthcare and community settings.

- Develop vaccine promotion materials in refugees' main languages to improve access to vaccine information and vaccination uptake among former refugees.

- Deliver positive vaccine messages in collaboration with community and religious leaders and chief elders.

- Anchor a tailored and targeted health promotion specific to the concerns of the refugee parents (side effects, safety and efficacy) to improve vaccine literacy and uptake.

- Consider internet-based vaccine promotion about the safety, necessity, and effectiveness of vaccines. Internet-based health promotion on vaccines and vaccination services is a good starting point to enhance the proper channelling of requests for information about vaccinations (Costantino et al., 2020). An online health promotion campaign is also cost-effective as it can broadly reach many people. Aside from being cost-effective, internet-based vaccination messages could help to counter misinformation.

To researchers:

- Conduct further research using a larger sample size recruited through proportional representation on the basis of ethnicity or country of origin. Stratified sampling can

be used to recruit proportional representative samples based on the official figure of parents in former refugee communities.

- Build up on the WHO SAGE Working Group Report on Vaccine Hesitancy (WHO, 2014) it is important to employ different research methods, e.g., a mixed-method study can help to further investigate if there are unique determinants of vaccine hesitancy among the resettled refugee populations which might not match with the proposed determinants in the vaccine hesitancy determinant matrix.

- Conduct further research on the area of association between vaccine hesitancy and online source(s) of information using a longitudinal study.

- Introduce pilot projects and conduct evaluation research to identify the most efficient and cost-effective intervention approaches. A qualitative study could help to understand how people access information and what they interpret from it.

- Develop socio-culturally and contextually appropriate vaccine hesitancy assessment tools that could measure hesitancy among minority populations including resettled refugees.

- Given the complexity of vaccine hesitancy, the lack of assessment tools, and the need for ongoing tailored strategies to address hesitancy, future work needs to focus on empirical studies, supported by immunisation records, evaluation research and follow-up investigations to create robust assessment tools, and understand the driving factors of vaccine hesitancy or acceptance among former refugee communities.

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Appendices

Appendix A. *STROBE Statement—checklist of items that should be included in observational studies*

	Item No	Recommendation	Checked	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	✓	ii
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	✓	ii & iii
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	✓	1– 6
Objectives	3	State specific objectives, including any prespecified hypotheses	✓	4
Methods				
Study design	4	Present key elements of study design early in the paper	✓	8 & 50
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	✓	53, 57&59
Participants	6	*(a) Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *(b) Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *(c) Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	✓	56
Variables	7	*(a) Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *(b) Case-control study*—For matched studies, give matching criteria and the number of controls per case *(c) Cross-sectional study* —Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	✓	60–61
Data sources/	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	NA	
Bias	9	Describe any efforts to address potential sources of bias	✓	63–64

STROBE Statement—checklist of items that should be included in observational studies

Study size	10	Explain how the study size was arrived at	✓	55
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	✓	60 & 76
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	✓	62
		(*b*) Describe any methods used to examine subgroups and interactions	✓	70–71
		(*c*) Explain how missing data were addressed	✓	70–71
		(d) Cohort study—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	✓	70–81,
		(*e*) Describe any sensitivity analyses	-	-
Results				
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	NA	
		(b) Give reasons for non-participation at each stage	NA	
		(c) Consider use of a flow diagram	✓	67
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	✓	68–69
		(b) Indicate number of participants with missing data for each variable of interest	✓	69 &75
		(c) Cohort study—Summarise follow-up time (eg, average and total amount)	NA	
Outcome data	15*	Cohort study—Report numbers of outcome events or summary measures over time	NA	
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	NA	
		Cross-sectional study—Report numbers of outcome events or summary measures	✓	75–76
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	✓	71–72 & 77–81
		(b) Report category boundaries when continuous variables were categorized	✓	76
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA	

Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	✓	70 & 73
Discussion				
Key results	18	Summarise key results with reference to study objectives	✓	107–108
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	✓	103–105
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	✓	85–103
Generalisability	21	Discuss the generalisability (external validity) of the study results	✓	106
Other information				
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	✓	65

Note: NA= Not applicable

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Appendix B. PACV Questionnaires

1) English Version

Parent Attitudes about Childhood Vaccines Survey

Instruction

PLEASE READ THIS PART FIRST:

Your child's doctor or nurse gives vaccines like MMR (measles, mumps and rubella) or Polio at check-ups to help keep your child from getting sick. This survey aims to understand your perspectives about vaccines and vaccinating your child.

THIS SURVEY IS NOT ABOUT SEASONAL FLU OR SWINE FLU (H1N1) VACCINES.

When filling out the survey, if you have more than one child, please answer each question as if the child with the next birthday had an appointment today.

Part 1: Please check only one answer to each of the questions below.

1. Is this child your first born?

- ○ Yes
- ○ No

2. What is your relationship to this child?

- ○ Father
- ○ Mother
- ○ Other _____

	Yes	No	Don't know
3. Have you ever DELAYED having your child get a vaccine (not including seasonal flu or swine flu (H1N1) vaccines) for reasons other than illness or allergy?	○	○	○
4. Have you ever DECIDED NOT to have your child get a vaccine (not including seasonal flu or swine flu (H1N1) vaccines) for reasons other than illness or allergy?	○	○	○

5. How sure are you that following the recommended vaccination schedule is a good idea for your child? Please answer on a scale of 0 to 10, where 0 is Not at all sure and 10 is Completely sure.

Not at all sure 0 1 2 3 4 5 6 7 8 9 10 Completely sure.

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
6. Children get more vaccines than are good for them.	○	○	○	○	○
7. I believe that many of the illnesses that vaccines prevent are severe.	○	○	○	○	○
8. It is better for my child to develop immunity by getting sick than to get a vaccine	○	○	○	○	○
9. It is better for children to get fewer vaccines at the same time.	○	○	○	○	○

	Not at all Concerned	Not too Concerned	Not Sure	Somewhat Concerned	Very Concerned
10. How concerned are you that your child might have a serious side effect from a vaccine?	○	○	○	○	○
11. How concerned are you that any one of the childhood vaccines might not be safe?	○	○	○	○	○
12. How concerned are you that a vaccine might not prevent the disease?	○	○	○	○	○

	Yes	No	Don't Know
13. If you had another infant today, would you want him/her to get all the recommended vaccines?	○	○	○

	Not at all Hesitant	Not too Hesitant	Not Sure	Somewhat Hesitant	Very Hesitant
14. Overall, how hesitant (uncertain) about childhood vaccines would you consider yourself to be?	○	○	○	○	○

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
15. I trust the information I receive about vaccines.	○	○	○	○	○
16. I am able to openly discuss my concerns about vaccines with my child's doctor.	○	○	○	○	○

17. All things considered, how much do you trust your child's doctor? Please answer on a scale of 0 to 10, where 0 is Do not trust at all and 10 is Completely trust.

Do not trust at all 0 1 2 3 4 5 6 7 8 9 10 Completely trust

18. What is the primary source of information about vaccine for you? Please check one.

- ○ Health professionals (Doctors and Nurses)
- ○ Media (TV and Radio)
- ○ Social media (Facebook, Instagram, Twitter, etc.)
- ○ Internet (Google)
- ○ Family and Friends
- ○ Community
- ○ Brochures
- ○ Other _____

Part 2: questions are about you. Please check only one answer to each question.

18. How old are you?

- ○ 18-24 years
- ○ 25-34 years
- ○ 35-44 years
- ○ 45+

20. What is your family type?

- ○ Couple with child(ren)
- ○ Single parent with child(ren)
- ○ Extended family (parents and grandparent/s)
- ○ Other _____

21. How many children are in your household?

- ○ One
- ○ Two
- ○ Three and above

22. Has/have child(ren) in your household received all the recommended vaccines required for their age?

- ○ Yes
- ○ No
- ○ Not sure

23. What is your religious affiliation?

- ○ Christian
- ○ Muslim
- ○ Buddhist
- ○ Hindu
- ○ Atheist
- ○ Other _____

24. What is your highest education level?

- ○ Primary
- ○ High school
- ○ Vocational/Trade qualification
- ○ University qualification
- ○ No qualification

25. How long have you been in New Zealand?

- ○ Less than 1 year
- ○ 2 - 4 years
- ○ 5 - 9 years
- ○ More than 10 years

26. What is your approximate household income?

- ○ Less than $25,000
- ○ $25,001- $50,000
- ○ $50,001- $75,000
- ○ More than $75,001

27. In which region your country of origin located? Please check one.

- ○ Africa
- ○ Asia
- ○ Latin America and Caribbean
- ○ Middle East
- ○ Europe
- ○ Pacific/Oceania
- ○ North America
- ○ Other

28. Do you have any additional comments about childhood vaccinations?

_____
_____
_____
_____
_____

Your response has been recorded. We thank you for your time spent taking this survey. Please help me by forwarding this link

https://aut.au1.qualtrics.com/Q/EditSection/Blocks?ContextSurveyID=SV_3I3ciBbltDSuQMR

2) Arabic PACV

استبيان عن موقف الأهالي تجاه إعطاء اللقاحات للأطفال

تعليمات

أرجو قراءة هذا الجزء أولا

إن طبيب أو ممرضة طفلك يقومون بإعطائه لقاحات مثل اللقاح الثلاثي MMR (الحصبة و النكاف و الحصبة الألمانية) أو شلل الأطفال في مواعيد المراجعة لمحاولة منع الطفل من الإصابة بالأمراض. يهدف هذا الإستبيان لفهم وجهة نظرك تجاه اللقاحات و تلقيح طفلك.

هذا الإستبيان ليس عن لقاح مرض الإنفلونزا أو لقاح إنفلونزا الخنازير (SWINE FLU (H1N1).

عند قيامك بتعبئة الإستمارة و إذا كان لديك عدة أطفال أرجو الإجابة عن الأسئلة متخيلاً و كأن الطفل ذو عيد الميلاد الأقرب عنده موعد تلقيح اليوم.

الجزء الأول: أرجو اختيار جوابٍ واحدٍ للأسئلة التالية:

1. **هل هذا الطفل أكبر أطفالك؟**

- ○ **نعم**
- ○ **لا**

2. **ما علاقتك بالطفل؟**

- ○ **أب**
- ○ **أم**
- ○ **آخر.....**

3.هل سبق وأن تأخرت عن إعطاء التطعيم لطفلك لأي سبب عدا المرض أو الحساسية؟	○ **نعم** ○ **لا** ○ **لا أعرف**
4. هل سبق وأن امتنعت عن إعطاء التطعيم لطفلك لأي سبب عدا المرض أو الحساسية؟	○ **نعم** ○ **لا** ○ **لا أعرف**
5. كم أنت متأكد من أن إتباع جدول التطعيمات الموصى به فكرة جيدة لطفلك؟ الرجاء اختيار الإجابة على مقياس من 0 إلى 10، حيث 0 هي "غير متأكد على الإطلاق و" 10 " متأكد بشدة"	**غير متأكد على الإطلاق** **متأكد بشدة** 0 1 2 3 4 5 6 7 8 9 10

6. يعطى الأطفال عدد تطعيمات زائد عن ما هو جيد لهم.	○ **أوافق بشدة** ○ **أوافق** ○ **غير متأكد** ○ **لا أوافق** ○ **لا أوافق بشدة**
7. أعتقد أن الكثير من الأمراض التي تقي منها التطعيمات هي أمراض خطيرة.	○ **أوافق بشدة** ○ **أوافق** ○ **غير متأكد** ○ **لا أوافق** ○ **لا أوافق بشدة**
8. من الأفضل لطفلي أن يحصل على مناعته عند إصابته بالمرض من أن يأخذ التطعيم.	

	○ أوافق بشدة ○ أوافق ○ غير متأكد ○ لا أوافق ○ لا أوافق بشدة
9. من الأفضل أن يحصل الأطفال على تطعيمات أقل كل مرّة.	○ أوافق بشدة ○ أوافق ○ غير متأكد ○ لا أوافق ○ لا أوافق بشدة
10. ما مدى مخاوفك من أن طفلك قد يصاب بآثار جانبية خطيرة من التطعيم؟	○ غير خائف تماماً ○ غير خائف ○ غير متأكد ○ خائف قليلا ○ خائف كثيراً
11. ما مدى مخاوفك من أن إحدى تطعيمات الطفولة قد تكون غير آمنة؟	○ غير خائف تماماً ○ غير خائف ○ غير متأكد ○ خائف قليلا ○ خائف كثيراً

12. ما مدى مخاوفك من أن التطعيم قد لا يمنع الإصابة بالمرض؟	○ غير خائف تماماً ○ غير خائف ○ غير متأكد ○ خائف قليلا ○ خائف كثيراً

13.إذا لديك طفل آخر، هل تحرص على إعطائه كافة التطعيمات الموصى بها؟	○ نعم ○ لا ○ لا أعرف
14.عموماً، ما مدى ترددك حول إعطاء تطعيمات الطفولة؟	○ غير متردد تماماً ○ غير متردد ○ غير متأكد ○ متردد قليلا ○ متردد كثيراً
15.أنا أثق بالمعلومات المقدمة لي عن التطعيمات.	○ أوافق بشدة ○ أوافق ○ غير متأكد ○ لا أوافق ○ لا أوافق بشدة
16. أنا قادر على مناقشة مخاوفي عن التطعيمات بكل صراحة.	○ أوافق بشدة ○ أوافق ○ غير متأكد

								○ لا أوافق ○ لا أوافق بشدة			
17. مع الأخذ بعين الاعتبار لكل الامور، ما مدى ثقتك بطبيب الأطفال في العيادة؟ الرجاء اختيار الإجابة حسب المقياس من 0 إلى 10، حيث 0 هي "عدم الثقة على الإطلاق" و 10تعني "الثقة بشدة"	**لا أثق على الإطلاق**										**أثق بشدة**
	0	1	2	3	4	5	6	7	8	9	10

18. ما هو مصدر معلوماتك الأساسي حول اللقاحات؟ أرجو اختيار مصدر واحد:

○ **في طبي مختص (أطباء أو ممرضين)**

○ **وسائل الإعلام (التلفزيون أو الراديو)**

○ **وسائل التواصل الإجتماعي (فيسبوك، انستغرام، تويتر، إلخ)**

○ **الإنترنت (غوغل)**

○ **العائلة والأصدقاء**

○ **المجتمع**

○ **المنشورات التعليمية**

○ **أخرى.....**

الجزء الثاني: معلومات عنك. أرجو اختيار إجابة واحدة لكل سؤال.

19. ما هي فئتك العمرية؟

○ **١٨-٢٤ سنة**

○ ٢٥-٣٤ سنة

○ ٣٥- ٤٤ سنة

○ ٤٥ سنة أو أكبر

20. ما هو نوع عائلتك؟

○ زوجان مع طفل/أطفال

○ أب أو أم فقط مع طفل/أطفال

○ عائلة كبيرة تسكن مع الأجداد

○ أخرى.....

21. كم عدد الأطفال في البيت

○ واحد

○ اثنان

○ ثلاثة أو أكثر

22. هل حصل الطفل/الأطفال الساكنين معكم على اللقاحات المناسبة لأعمارهم؟

○ نعم

○ لا

○ لا أدري

23. ما هو انتماؤك الديني؟

○ مسيحي

○ مسلم

○ بوذي

- هندوسي
- ملحد
- آخر.....

24. ما هو مستواك التعليمي (أعلى درجة تعليمية حصلت عليها)

- الإبتدائية
- الثانوية
- تعليم مهني
- تعليم جامعي
- بلا تعليم

25. كم المدة التي قضيتها في نيوزيلندا؟

- أقل من سنة
- ٢-٤ سنوات
- ٥-٩ سنوات
- أكثر من ١٠ سنوات

26. ما هو دخل العائلة التقريبي؟

- أقل من ٢٥٠٠٠ دولارً سنويًا
- من ٢٥,٠٠١ إلى ٥٠,٠٠٠ دولاراً سنوياً
- من ٥٠,٠٠١ إلى ٧٥,٠٠٠ دولاراً سنوياً
- أكثر من ٧٥,٠٠١ دولاراً سنوياً

27. في أي منطقة كان بلدك الأصلي؟ أرجو اختيار منطقة واحدة فقط.

- ○ أفريقيا
- ○ آسيا
- ○ أمريكا اللاتينية والكاريبي
- ○ الشرق الأوسط
- ○ أوربا
- ○ أوشيانيا و جزر المحيط الهادئ
- ○ أمريكا الشمالية
- ○ أخرى

28. هل لديك أي تعليق آخر بخصوص موضوع لقاحات الأطفال؟

.....

.....

.....

.....

.....

أذا كنت ترغب في الدخول بالسحب للحصول على قسيمة تسوق بقيمة ٤٠ دولارًا يرجى إدخال رقم تلفونك أو بريدك الإلكتروني بالضغط على الرابط الإلكتروني التالي:
https://aut.au1.qualtrics.com/jfe/preview/SV_3t7UVdfSztRFHlb?Q_CHL=preview&Q_SurveyVersionID=current

3) PACV Somalí

Xog Uruurinta Aragtida Waalidiinta ee ku Saabsan Tallaalada Carruurnimada

Tilmaan:

FADLAN AKHRI QAYBTAN MARKA KOOWAAD:

Dhakhtarka ama kalkaalisada caafimaad ee ilmahaaga waxay siiyaan tallaalada sida MMR (jadeecada, qaamo-qashiirta iyo rubella) ama kan Dabaysha xilliyada baaritaanka caafimaad si looga ilaaliyo ilmahaaga inuu bukoodo.Xog uruurintan waxay ujeedadeedu tahay in la fahmo aragtidaada ku saabsan tallaalada iyo inaad tallaasho ilmahaaga.

XOG URUURINTAN KUMA SAABSANA TALLAALADA HARGAB XILLIYEEDKA AMA HARGAB DOOFAARKA (H1N10).

Marka aad buuxineysid xog uruurintan, haddii aad leedahay wax ka badan hal cunug, fadlan uga jawaab su'aal kasta sida inuu cunugga tariikhda dhalashada xigta leh uu maanta ballan lahaa.

Qaybta 1-aad:Fadlan ka calaamadee kaliya hal jawaab mid kasta oo kamid ah su'aalaha hoose.

1. Cunugan ma curadkaagaa?

- ○ Haa
- ○ Maya

2. Waa maxay xiriirka aad la leedahay cunugan?

- ○ Aabe
- ○ Hooyo
- ○ Wax kale_____

	Haa	Maya	Ma aqaan
3. Waligaa miyaad ka HABSAAMISAY in ilmahaaga tallaal u qaato (oo aan ku jirin tallaalada hargab xilliyeedka ama hargab doofaarka (H1N10)) sababo aan ka ahayn jirro ama xasaasiyad?	○	○	○
4. Waligaa miyaad GO'AANSATAY INAADAN ilmahaaga u siinin tallaal (oo aan ku jirin tallaalada hargab xilliyeedka ama hargab doofaarka (H1N10)) sababo aan ka ahayn jirro ama xasaasiyad?	○	○	○

5. Ilaa iyo intee ayaad hubtaa in raacidda jadwalka tallaalka ee lagu taliyo uu yahay fikrad u wanaagsan ilmahaaga?Fadlan kaga jawaab cabbirka 0 ilaa iyo 10, halkaas oo 0 ay ka dhigan tahay Ma hubo gebi ahaanba 10 na ay ka dhigan tahay Waan hubaa si buuxda.

Ma hubo gebi ahaanba 0 1 2 3 4 5 6 7 8 9 10 Waan hubaa si buuxda.

	Aad Ayaan Ugu Raacsanahay	Waan ku raacsanahay	Ma Hubo	Kuma raacsani	Aaad Ayaan U Diidanahay
6. Carruurta waxaa la siiyaa tallaal ka badan inta u wanagsan.	○	○	○	○	○
7. Waxaan rumeysanahay in jirrooyinka uu tallaalka ka hortago badankood ay yihiin kuwa daran.	○	○	○	○	○
8. Waxaa wanaagsan in ilmahayga uu awooda difaaca jireed ku yeesho inuu jirrado inti uu tallaal qaadan lahaa	○	○	○	○	○
9. Waxaa wanaagsan in carruurta la siiyo tallaalo yar halki marba.	○	○	○	○	○

	Gebi Ahaanba kama Walaacsani	Aad ugama Walaacsani	Ma Hubo	Xoogaa ayaan ka Walaacsanahay	Aad ayaan Uga Walaacsanahay
10. Ilaa iyo intee ayaad ka walaacsan tahay in ilmahaaga uu saameyn xun ku yeesho tallaalka?	○	○	○	○	○
11. Ilaa iyo intee ayaad ka walaacsan tahay in mid ka mid ah tallaalada carruurnimada laga yaabo inuusan badbaado lahayn?	○	○	○	○	○
12. Ilaa iyo intee ayaad ka walaacsan tahay in tallaalka laga yaabo inuusan ka hortagin cudurka?	○	○	○	○	○

	Haa	Maya	Ma Aqaan
13. Haddii aad yeelan lahayd dhallaan kale maanta, ma rabi lahayd inuu asaga/ayada qaato dhammaan talaallada lagu taliyay?	○	○	○

	Gebi ahaanba kama Gaabinayo	Aaad ugama Gaabinayo	Ma Hubo	Xoogaa ayaan ka Gaabinayaa	Aad ayaan uga Gaabinayaa
14. Guud ahaan, ilee intee ayaad u maleysaa inaad ka gaabineyso (aadan hubin) tallaalada carruurnimo?	○	○	○	○	○

	Aad Ayaan Ugu Raacsanahay	Waan ku raacsanahay	Ma Hubo	Kuma raacsani	Aaad Ayaan U Diidanahay
15. Waxaan rumeysanahay macluumaadka aan helay ee ku saabsan tallaalada.	○	○	○	○	○
16. Waxaan awoodaa inaan si daah furan ugala hadlo walaacyadeyda ku saabsan tallaalka dhakhtarka ilmahayga.	○	○	○	○	○

17. Adiga oo tixgelinayo wax kasta, ilaa iyo intee ayaad ku kalsoon tahay dhakhtarka ilmahaaga? Fadlan kaga jawaab cabbirka 0 ilaa iyo 10, halkaas oo 0 ay ka dhigan tahay Kuma kalsooni gebi ahaanba 10 na ay ka dhigan tahay Waan ku kalsoonahay si buuda.

Kuma kalsooni gebi ahaanba buuxda	0	1	2	3	4	5	6	7	8	9	10	Waan ku kalsoonahay si

18. Waa maxay isha koowaad ee aad ka hesho macluumaadka ku saabsan tallaalka? Fadlan mid calaamadee.

- ○ Xirfadlayaasha caafimaadka (Dhakhaatiirta iyo Kalkaaliyaasha)
- ○ Warbaahinta (TV-ga iyo Raadiyaha)
- ○ Baraha bulshada (Facebook, Instagram, Twitter, iwm.)
- ○ Internetka (Google)
- ○ Qoyska iyo Asxaabta
- ○ Bulshada
- ○ Buugagaga yar yar
- ○ Wax kale_____

Qaybta 2-aad: su'aalaha adiga ayay ku khuseeyaan.Fadlan ka calaamadee kaliya hal jawaab su'aal kasta.

19. Meeqa sano ayaad jirtaa?

- ○ 18-24 sano
- ○ 25-34 sano
- ○ 35-44 sano
- ○ 45+

20. Qoyskaagu waa noocee?

- ○ Reer cunug(carruur) leh
- ○ Hal waalid oo cunug(carruur) leh
- ○ Qoys ballaaran (walidiin iyo awoowe/awoowooyin iyo ayeeyo/ayeeyooyin leh)
- ○ Wax kale_____

21. Meeqo carruur ah ayaa joogto qoyskaaga?

- ○ Hal
- ○ Labo
- ○ Saddex iyo wax ka badan

22. Miyuu/miyey cunuga(carruurta) joogta qoyskaaga heleen dhammaan tallaalada lagu taliyay ee looga baahan yahay da'dooda?

- ○ Haa
- ○ Maya
- ○ Ma hubo

23. Waa maxay diintaadu?

- ○ Masiixi
- ○ Muslim
- ○ Buddhist
- ○ Hindu
- ○ Diin laawe
- ○ Wax kale_____

24. Waa maxay heerkaada waxbarasho ee ugu sarreeya?

- ○ Dugsi hoose
- ○ Dugsi sare
- ○ Heer Farsamo/Ganacsi
- ○ Heer jaamacad
- ○ Ma lihi heer waxbarsaho

25. Intee in leeg ayaad joogtay New Zealand?

- ○ Wax ka yar 1 sano
- ○ 2 - 4 sano
- ○ 5 - 9 sano
- ○ Wax ka badan 10 sano

26. Waa maxay qiyaas ahaan dakhliga qoyskaaga?

- ○ Wax ka yar $25,000
- ○ $25,001- $50,000
- ○ $50,001- $75,000
- ○ Wax ka badan $75,001

27. Halkuu ku yaalaa wadanka aad ka soo jeedo?Fadlan mid calaamadee.

- ○ Afrika
- ○ Aasiya
- ○ Latin Amerika iyo Kariibiyaanka
- ○ Bariga Dhexe
- ○ Yurub
- ○ Pacific/Oceania
- ○ Waqooyiga Ameerika
- ○ Wax kale

28. Ma haysaa wax faallooyin dheeraad ah oo ku saabsan tallaalada carruurnimada?

_____

_____

_____

_____

_____

Jawaabtaada waa la diiwaangeliyay.Waxaan kaaga mahadcelinaynaa waqtigaaga aad ku bixisay buuxinta xog uruurintan. Fadlan igu caawi inaa sii gudbiso xiriiriyahan (link).
https://aut.au1.qualtrics.com/Q/EditSection/Blocks?ContextSurveyID=SV_3I3ciBbltDSuQMR

4) PACV Oromo

Sarveyii waa'ee Ilaalcha Maatii Kittibaata Daa'immanii irratti

Qajeelfama

DURSA KANA DUBBISAA:

Akkuma Beekamu ogeessii fayyaa ykn Dookterri keessan kittibaata garagaraa kan akka kittibaata farra dhukkuba Gifiraa, Pooliyoo fi kan biroo akka mucaan keessan hin dhukkubsanneef kan gargaaruu ni kennaaf. Gaaffilee armaan gadii kun yaada keessan waa'ee kittibaata da'immanii irraatti qabdan hubachuuf kan qophaa'ee dha.

HUB: GAAFFIWWAN ARMAAN GADII KUN, KAN KITTIBAATA FARRA DHUKKUBA QUFAA YKN "FILUU" KAN ILAALLATU MITI.

Yeroo gaaffi kana deebistan akkaa waan daa'imni keessan kan guyyaa keessan har'aa beellama kittibaati qabutti yaadaa deebisaa.

Kutaa 1ffaa: Gaaffiwwan armaan gadiif deebii tokko qofa filadha.

1. Daa'imni (Mucaan) keessan kan jalqaba ti?

- ○ Eeyyee
- ○ Lakki

2. Daa'ima (Mucaa) dhaf atii maalii?

- ○ Abbaa
- ○ Haadha
- ○ Kan biroo _____

	Eeyyee	Lakki	Hin beekuu
3. Sababa dhibee ykn alarjikiin alatti, daa'ima kee kattabsiisuuf **beellammi si jala darbee beekaa?** (Hub bellamni kun kan kittibaata farraa dhibee qufaa/qorraa ykn filuu hin ilaallatuu)	○	○	○
4. Daa'ima kee kattabsiisuf **diddee** beektaa? (Hub bellamni kun kan kittibaata farraa dhibee qufaa/qorraa ykn filuu hin ilaallatuu)	○	○	○

5. Kittibaati daa'ima keef keennamuu hundi isaa fi yeroon/bellamni isaa gaarii dha jettee yaaddaa? gaarumman kittibaata kana siin hangam akka si amansiisu yaada kee lakkofsan 0 hanga 10 filachuun ibsii! Hub: 0 "tasa nan amansiisuu" jechuu yoo bakka bu'u; 10 immoo "guutummatti na amannsiisa" jechuu bakka bu'a.

Tasa nan amansiisu 0 1 2 3 4 5 6 7 8 9 10 Guutummatti na amansiisa

	Cimseen deggera	Ni deggera	Hin beekuu	Ni morma	Cimseen morma
6. Daa'immaniif kittibaatni daran dabalamu qabaa.	○	○	○	○	○
7. Dhibewwan kittibaatni ittisu dhibee hamaa/ciccimaa dha.	○	○	○	○	○
8. Daa'ima koof dhukkubsatee/dhukkubsattee ittisa qaama kan uumamaan dhibee ofirraa ittisu yoo danda'ee ykn dandeesse irraa wayya dha	○	○	○	○	○
9. Daa'immaniif yoo kittibaata amma irraa muraasi/irra-xiqqaan kennameef irraa wayyaa dha.	○	○	○	○	○

	Tasa nan yaadessu	Hedduu nan yaadessu	Hin beekuu	Xiqqoo na yaadessa	Hedduu na yaadessa
10. Daa'imni kee kittibaata yeroo fudhatu/fudhattuu dhukkubbiin isaa hangam si yaadessa?	○	○	○	○	○
11. Kittibaatota daa'imaf kennaman keessa kamiyyuu daa'imaaf balaa dha jettee hangam yaaddofta?	○	○	○	○	○
12. Kittibaati dhibee ittisuu dhiisuu danda'aa jettee hangam yaadofta?	○	○	○	○	○

	Eeyyee	Lakki	Hin Beekuu
13. Osoo har'aa kaatee mucaa/daa'ima biraa argattee talaallii ykn kittibaata ajajamuu hundaa ni kattabsiistaa?	○	○	○

	Tasa nan shakkisiisu	Hedduu nan shakkisiisu	Hin Beekuu	Hanga-tokko na shakkisiisa	Baay'ee na Shakkisiisa
14. Akka walii galatti, kittibaatiin daa'imaa keef kennamu hangam si sodaachisa (shakkisiisa)	○	○	○	○	○

	Cimseen deggera	Ni deggera	Hin Beekuu	Ni morma	Cimseen morma
15. Oddeffannoon waa'ee kittibaataa naaf amansiisa dha.	○	○	○	○	○
16. Waa'ee rakkoo kittibaataan wal qabatu Hakimaa ykn Dookteraa mucaa/daa'ima koo wajjiin ifatti dubbachuu naaf danda'ama.	○	○	○	○	○

17. Wanti hundi ilaalcha keessa galee, amantaa ati Dookteera mucaa keetii irraa qabduu hangam? Lakkofsaa 0 hanga 10 giddu jiru filachuun argisiisi! Hub: Lakkoofsi 0 "Tasa hin amanu," yoo bakka bu'u; 10 immoo "Gutummaattin amana" bakka bu'a.

Tasa hin amanu 0 1 2 3 4 5 6 7 8 9 10 Gutummaattin amana

18. Maddi oddeffanno keessan kan yeroo hedduu waa'ee kittibaati irraa argattan isaa kam? Tokko qofa filadhaa!

- ○ Ogeessota fayyaa (Dookteerii fi Narsii)
- ○ Midiyaa (Televeejinii fi Raadiyoo)
- ○ Midiyaa Hawaasummaa (Feesbuukii, Instagiramii, Tiwitarii, fi kkf.)
- ○ Marsaaneetii/Interneetii (Gogilii)
- ○ Maatii fi Hiriyyoota
- ○ Hawaasa irraa
- ○ Waraqaa Odeffannoo mana yaalaa kan akka Birosherii irraa
- ○ Kan biroo _____

Kutaa 2ffaa: Gaaffilee waa'ee keessaan ilaallatu

19. Umriin keessaan meeqa?

- ○ Waggaa 18 - 24
- ○ Waggaa 25 - 34
- ○ Waggaa 35 - 44
- ○ Waggaa 45 ol

20. Maatiin keessan nama meeqan of keessaa qabaa, nama meeqa taatanii jiraattuu? kan armaan gadii keessaa tokko filadhu?

- ○ Abba warraa, haadha-warraa fi daa'imaa
- ○ Abbaa warraa fi daa'ima qofa ykn Haadha warraa fi daa'ima qofa
- ○ Maatii bal'aa — Abba warraa, haadha-warraa , daa'ima, akkasumas Akkoo fi Akkakayyu kan of keessa qabuu
- ○ Kan biroo _____

21. Ijoollee ykn Daa'ima meeqa qabda?

- ○ Tokko
- ○ Lama
- ○ Sadii fi isa ol

22. Daa'imni/daa'imman maatii kee keessa jiran hundi kittibaata umrii isaanitiif barbaachiisu hunda fudhatanii jiruu?

- ○ Eeyyee
- ○ Lakki
- ○ Hin beekuu

23. Amantaan kee maalii?

- ○ Kiristaana
- ○ Muslima
- ○ Buddistii
- ○ Hinduu
- ○ Amanta hin qabuu
- ○ Kan biroo _____

24. Sadarkaan barnoota keessanii kam?

- ○ Sadarkaa 1ffaa
- ○ Sadarkaa 2ffaa
- ○ Kolleejjii
- ○ Yunivarsiitii
- ○ Hin barannee

25. Biyyaa Niwu Zilaandiin hangam jirattee?

- ○ Waggaa 1 gadii
- ○ Waggaa 2 hanga Waggaa 4
- ○ Waggaa 5 hanga Waggaa 9
- ○ Waggaa 10 ol

26. Galiin maatii kee walii galaa waggaatti meeqa?

- ○ $25,000 gadi
- ○ $25,001 hanga $50,000
- ○ $50,001 hanga $75,000
- ○ $75,001 ol

27. Biyyi dhaloota kee naannoolee/ardii armaan gadii keessaa kam keessatti argamaa? Tokko qofa filadhaa!

- ○ Afrikaa
- ○ Eeshiyaa
- ○ Kibba Amerikaa fi Naannoo Karibiyaa
- ○ Baha jiddu-galeessaa
- ○ Awuroppaa
- ○ Naannoo Paasifikii/Oshaniyaa
- ○ Kaabaa Amerikaa
- ○ Kan biroo

28. Waa'ee kittibaata daa'immanii irratti yaada dabalataa yoo qabattaniif bareessuu dandeessuu.

_____

_____

_____

_____

_____

Appendix C. Participant Information Sheet

1) English Version

12/10/2020

Project Title: Parental vaccine hesitancy among former refugees in New Zealand

The survey is available in four different languages you can choose from English, Arabic, Somali and Oromo

If you are a former refugee, you are invited to participate in this research. In order to take part in this project, you need to complete an anonymous survey online. Whether or not you take part in this research is your choice. If you decide not to take part, you do not have to give a reason.

If you agree to do this survey please read through the **Information Sheet** and provide your Consent before proceeding. Thank you!

Who is a researcher?

My name is Mulisa Debela. As part of a Master programme, I am undertaking a thesis to understand vaccine hesitancy among the former refugees in New Zealand. Completing this project will help me to gain a qualification.

What is the purpose of the study?

This project is justified by:

- Vaccine hesitancy (delay or refusal to vaccinate children) is linked with decline in vaccine coverage rates; low immunisation coverage in turn can lead to a resurgence of vaccine preventable diseases (VPDs) (e.g. measles, etc.)
- In New Zealand, compared to children without a migration background, lower immunisation rates have been documented among former refugee children
- Understanding parental vaccine hesitancy among former refugee parents is important in preventing the wider society from VPDs.

This project may benefit the former refugee community by providing useful insights regarding strategies to increase the number of former refugee children who receive age-appropriate immunisations. The final result of this research may be disseminated via academic publications and presentations. This survey is partially funded by the Health Research Council of New Zealand (HRC).

How was I identified and why am I being invited to participate in this research?

This project involves former refugees living in New Zealand. If you are a former refugee and meet the following criteria, you are eligible to participate.

Inclusion criteria are:

- A former refugee who has been in New Zeeland at least for 6 months
- Entered New Zealand via one of the refugee resettlement pathways (quota refugee, family support, asylum seeker and community organisation sponsorship)
- Adult age above 18
- Mother/father or legal guardian of a child(ren) (between 6 weeks and 16 years old)

How will my privacy be protected?

This survey is anonymous, which means that no personal identifiable information will be collected. You may wish to provide your contact details for the prize draw or the summary of findings; this will be collected using a separate url/page and cannot be connected to your survey responses. The survey data will also be confidential meaning information gathered from you will be stored in a safe and private place. No information that can be personally identifiable will be used in any report of this study. Collected information will only be used in the study, and will not be shared with third parties.

Will I receive feedback on the results of this research?

By the end of the study, a summary of the findings will be available to the participants who would like to receive this through their contact information provided on a separate url/page

What are the costs of participating in this research?

Your participation in this research is voluntary (it is your choice). The survey will take about 10 minutes and you can do this survey on your computer, tablet or phone. There will be 5 grocery vouchers worth $40 each as a prize draw to acknowledge your time spent completing the survey. You can indicate your phone/email on a separate url/page at the end of the survey if you wish to enter into the prize draw.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Nadia Charania: nadia.charania@aut.ac.nz: Phone 09 921 9999 ext 5430

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, ethics@aut.ac.nz, (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Researcher: Mulisa Senbeta Debela mulisasenbeta.2013@gmail.com mobile: 0220573457

Primary Supervisors: Dr. Nadia Charania nadia.charania@aut.ac.nz

Secondary Supervisor: Dr. Nick Garett nick.garrett@aut.ac.nz

Approved by the Auckland University of Technology Ethics Committee on 12/10/2020 AUTEC ***Reference number 20/267***

Consent Statement

Please tick to indicate your consent to the following statements.

"By checking in the "I Agree" box below, I am agreeing to be participate in this survey. I have read this form, been given the chance to ask questions and have my questions answered. If I have more questions, I have been told who to contact. If I do not want to be in this study, I can close my internet browser."

○ I agree

I wish to receive a summary of the research findings

○ Yes: Please write your email on the separate page

○ No

Screening Questions

Please check in the following statements if they apply to you

○ I am former refugee (a person of refugee background) who has been in New Zealand at least for 6 months

○ I came to New Zealand on one of the refugee resettlement pathways (quota refugee, family reunification, asylum seeker and community organisation sponsorship)

○ I am 18 years and above

○ I am mother/father or legal guardian of a child(ren) (between 6 weeks and 16 years old)

2) Arabic Version

استمارة معلومات الإستبيا

12 تشرين الأول-أكتوبر 2020

عنوان المشروع: تردد عوائل اللاجئين من إعطاء اللقاحات للأطفال في نيوزيلندا

هذا الإستبيان متوفر بأربعة لغات مختلفة؛ اللغة الإنكليزية، العربية، الصومالية و الأورومية

دعوة

هذه دعوة للعوائل التي مرت بتجربة اللجوء للمشاركة في هذا البحث عن طريق ملء استمارة الإستبيان على الإنترنت بدون تقديم أي معلوماتٍ شخصيةٍ. إن المشاركة في الإستبيان قرارٌ شخصيٌّ و إذا لم ترغب بالمشاركة لا ضرورة لذكر الأسباب.

إذا رغبت بالمشاركة في الإستبيان يرجى قراءة استمارة المعلومات و تزويدنا بموافقتك قبل أن تبدأ ، و شكراً لك.!

من الباحث؟

اسمي موليسا ديبيلا، و أقوم بكتابة أطروحة عن تردد عوائل اللاجئين عن تلقيح الأطفال في نيوزيلندا كجزء من متطلبات درجة الماجستير التي أقوم بها.

ما هو الهدف من هذه الدراسة؟

دواعي القيام بهذه الدراسة:

- **تردد الأهالي عن إعطاء اللقاحات للأطفال (تأجيل أو رفض تلقيح الأطفال) مرتبطٌ بانخفاض نسبة التلقيحات وانخفاض المناعة العامة مما يؤدي بدوره إلى ازدياد انتشار الأمراض التي يمكن منعها من خلال إعطاء اللقاحات مثل الحصبة و غيرها**
- **لوحظ في نيوزلندا أن نسبة الأطفال غير الملقحين من اللاجئين تفوق نسبة الأطفال غير الملقحين من العوائل النيوزلندية غير المهاجرة**
- **فهم أسباب تردد عوائل اللاجئين عن إعطاء اللقاحات للأطفال مهمّ لمنع إعادة انتشار الأمراض التي يمكن الكبح من انتشارها في المجتمع من خلال إعطاء اللقاحات**

إن هذا البحث قد ينفع مجتمع اللاجئين من خلال توفير معلومات لتطوير استراتيجياتٍ لزيادة نسبة تلقيح أطفال اللاجئين في الأعمار المحدد لها. قد يتم نشر نتائج هذا البحث عبر المؤتمرات أو المنشورات الأكاديمية. إن هذا الإستبيان مدعومٌ جزئياً من قبل مجلس البحث الصحي في نيوزيلندا (HRC).

كيف تم ترشيحي للمشاركة في هذا الإستبيان؟

إن هذا البحث يشمل اللاجئين السابقين في نيوزيلندا. إذا كنت لاجئًا سابقًا و تنطبق عليك المواصفات التالية يمكنك المشاركة في الإستبيان:

- **إذا كنت لاجئًا سابقًا ووصلت إلى نيوزيلندا قبل ستة أشهر على الأقل**
- **دخلت الى نيوزيلندا عبر أحد برامج إعادة توطين اللاجئين (نصيب نيوزيلندا من اللاجئين، لم شمل وإسناد العائلة، طلب اللجوء بكفالة أحد مؤسسات المجتمع)**
- **عمر المشارك أكبر من 18 عام**
- **يجب أن تكون أبًا أو أمًا أو الراعي القانوني لطفل أو أطفال تتراوح أعمارهم بين ستة أسابيع إلى 16 سنة**

كيف تتم حماية خصوصيتي؟

هذا الإستبيان يبقي شخصية المشتركين مجهولة من خلال عدم طلب أية معلوماتٍ شخصية. إن أحببت الدخول في السحب على الجائزة أو معرفة نتائج البحث يمكنك تزويدنا بطريقة للتواصل معك من خلال الدخول إلى رابط إلكتروني مختلف و لن ترتبط هذه المعلومات بإجاباتك في الإستبيان. إن هذا الإستبيان سري و ستكون المعلومات مخزنة في مكان آمن و خاص و لن يكون من الممكن ربط المعلومات بالمشاركين في الإستبيان. سيتم استخدام الإجابات لغرض هذا البحث فقط ولن تحصل عليها أي جهة ثالثة.

هل بإمكاني الحصول على نتائج البحث؟

سيتم إرسال ملخص نتائج البحث إلى المشاركين الراغبين بذلك، و الذين قاموا بتزويدنا بمعلومات تمكننا من التواصل معهم عن طريق رابط إلكتروني إضافي يعرض في نهاية الإستبيان.

ما هي تكلفة المشاركة في الإستبيان؟

المشاركة في الاستبيان مسألة تطوعية إختيارية. سوف تأخذ من وقتك 10 دقائق. يمكنك تعبئة الإستبيان عبر حاسوبك الشخصي أو اللوح الإلكتروني أو الهاتف المحمول. سنقوم في النهاية بالسحب على 5 قسائم تسوق، كل قسيمة منها بقيمة 40 دولار، و ذلك لشكر المشاركين في الإستبيان على وقتهم. يمكنك تزويدنا برقم هاتفك أو بريدك الإلكتروني إن أحببت المشاركة في السحب من خلال الدخول إلى رابط إلكتروني إضافي يعرض في نهاية الإستبيان.

ماذا أفعل إذا كنت قلقًا بخصوص الإستبيان؟

.إذا كانت لديك تحفظات بخصوص طبيعة مشروع البحث يرجى التواصل مع مشرفة البحث نادية شارانيا

nadia.charania@aut.ac.nz

هاتف رقم ٠٩٩٢١٩٩٩٩ رقم التحويلة: ٥٤٣٠

إذا كانت عندك تحفظات بخصوص طريقة إجراء البحث يرجى الإتصال بـ السكرتير التنفيذي لجامعة أوكلاند التقنية على

ethics@aut.ac.nz

هاتف رقم: ٠٠٦٤٩٩٢١٩٩٩٩ رقم التحويلة: ٦٠٣٨

بمن يمكنني أن أتصل للحصول على المزيد من المعلومات عن هذا البحث؟

الباحثة: موليسا سينبيتا ديبيلا، البريد الإكتروني: mulisasenbeta.2013@gmail.com **هاتف رقم: ٠٢٢٠٥٧٣٤٥٧**

المشرفة الأساسية: د. نادية شارانيا، البريد الإكتروني: nadia.charania@aut.ac.nz

المشرف الثانوي: د.نك كاريت، البريد الإكتروني:

nick.garrett@aut.ac.nz

تمت الموافقة على البحث من قبل اللجنة الأخلاقية في جامعة أوكلاند التقنية بتاريخ 12 تشرين الأول-أكتوبر 2020 رقم 20-267

الموافقة على الاشتراك في الإستبيان

يرجى الضغط في صندوق "أنا موافق" للموافقة على التصريح التالي:

"بالضغط على "أنا موافق" أقوم بالموافقة على أن أصبح أحد المشاركين في الإستبيان. لقد قرأت هذه الإستمارة و حصلت على الفرصة لطرح الأسئلة و الحصول على إجاباتها. و قد تم تزويدي بعناوين للإتصال أذا كانت عندي أسئلة إضافية. و إذا لم أرغب بالمشاركة يمكنني إغلاق صفحة الإنترنت."

○ **أنا موافق**

أنا أرغب بالحصول على نتائج البحث

○ **نعم. الرجاء إدخال عنوانك البريدي بالضغط على هذا الرابط:**
https://aut.au1.qualtrics.com/jfe/preview/SV_5vR6k5YLbS8nnGB?Q_CHL=preview&Q_SurveyVersionID=current

○ **لا**

التأكد من كونك مؤهل للمشاركة في الإستبيان

أضغط في الصندوق إذا كانت الجملة تنطبق عليك:

- ❑ **أنا لاجئ سابق ووصلت الى نيوزيلندا قبل ستة أشهر على الأقل**
- ❑ **أنا وصلت إلى نيوزلندا عبر أحد برامج إعادة توطين اللاجئين (نصيب نيوزيلندا من اللاجئين، لم شمل و إسناد العائلة، طلب اللجوء بكفالة أحد مؤسسات المجتمع)**
- ❑ **عمري 18 عام أو أكثر**
- ❑ **أنا أب أو أم أو الراعي القانوني لطفل أو أطفال تتراوح أعمارهم بين ستة أسابيع إلى 16 سنة**

3) Somali Version

Xaashida Macluumaad Siinta Ka Qaybgalaha

12/10/2020

Cinwaanka Mashruuca: Ka gaabinta tallaalka ee ka dhex jirta waalidiinta kamidka ah dadka qaxootiga hore ahaa ee New Zealand

Xog uruurintan waxaa lagu heli karaa afar luuqadood oo kala duwan oo aad kala dooran karto Ingiriis, Carabi, Soomaali iyo Oroma

Casumaad

Hadii aad tahay qof qaxooti hore ahaa, waxaa laguugu casumayaa inaad ka qaybqaadato xog uruurintan.Si aad uga qaybqaadato mashruucan, waxaad u baahan tahay inaad onleen ahaan ku buuxiso xog uruurin qarsoodi ah.Inaad ka qaybqaadato ama inaadan ka qaybqaadanin xog uruurintan waa ikhtiyaarkaaga. Hadii aad go'aansato inaadan ka qaybqaadanin, uma baahnid inaad sabab u yeesho.

Hadii aad oggolaato inaad ka qayqaadato xog uruurintan fadlan si dhameystiran u akhri Xaashida Macluumaad Siinta oo Oggolaanshahaada bixi kahor intaadan horay u sii socan. Mahadsanid!

Waa kuma Cilmibaare?

Magaceygu waa Mulisa Debela.Iyada oo qayb ka ah barnaamijka shahaadada Master-ka (heerka labaad), waxaan samaynayaa daraasad si aan u fahmo ka gaabinta tallaalka ee ka dhexjirta dadka qaxootiga horay u ahaa ee New Zealand.Dhameystirka mashruucan wuxuu iga caawin doonaa inaan helo aqoonsi.

Waa maxay ujeedada daraasada?

Mashruucan waxaa sabab u leh:

- Ka gaabinta tallaalka (daahinta ama diidmada in la tallaalo carruurta) waxa lala xiriiriyaa hoos u dhaca heerka bixinta tallaalka; heerka tallaal bixinta oo hooseeya ayaa isna horseedi kara dib u soo noolaanshaha cuddurada lagaga hortagi karo tallaalka (VPDs) (tusaale, jadeecada, iwm.)
- Dalka New Zealand, marka la barbardhigo carruurta aan lahayn taariikh socdaal, heerarka hoose ee tallaal qaadashada ayaa laga soo diiwaangeliyay carruurta dadka qaxootiga horay u ahaa.
- Fahamka ka gaabinta tallaalka ee waalidiinta ee ka dhex jirta waalidiinta qaxooti horay u ahaa waxay muhiim u tahay in laga ilaaliyo bulshada guud cuddurada VPDs (lagaga hortagi karo tallaalka).

Mashruucan wuxuu ugu faa'iideyn karaa bulshada qaxooti horay u ahaa inuu siiyo fikrado wax ku ool ah oo la xiriira istaraatiijiyado kor loogu qaado tirada carruurta qaxootigii hore ee hela tallaalada da'da ku habboon.Natiijada ugu danbeysa ee ka soo baxda cilmi-baaristaan waxaa lagu faafin karaa iyadoo la adeegsanayo daabacadaha iyo bandhigyada tacliinta.Xog uruurintan waxaa qayb ahaan maalgeliyay Golaha Cilmi-baarista Caafimaadka ee New Zealand (HRC).

Sidee laigu soo aqoonsaday maaxase laiigu soo casuumay inaan ka qaybqaato cilmi baaristan?

Mashruucan wuxuu ku lug leeyahay dadka qaxootiga horay u ahaa ee ku nool New Zealand.Hadii aad tahay qaxooti hore oo aad buuxiso shuruudaha soo socda, waxaad u qalantaa inaad ka qaybqaadato.

Shuruudaha kamid noqoshada waa:

- Qof qaxooti hore ahaa oo joogay New Zealand ugu yaraan 6 bilood.

- Ku soo galay New Zealand mid kamid ah barnaamijyada dib u dejnta dadka qaxootiga ah (dib u dejinta qaxootiga ee wadan seddexaad, isukeenidda qoyska, nabadgelyo doonka ah iyo kafaala-qaadida urur bulsho)
- Qof wayn oo ka wayn 18 jir
- Hooyo/aabo ama masuulka sharciyeeysan ee cunug(carruur) (u dhaxaysa 6 toddobaad iyo 16 sano jir)

Sidee baa sirteyda loo ilaalin doonaa?

Xog uruurintan waa qarsoodi, taas oo ka dhigan in aan la aruurin doonin macluumaad qof lagu aqoonsan karo.Waxaad u baahan kartaa inaad reebto meel lagaala soo xiriiro si aad u hesho abaalmarinta baqtiyaanasiibka ama soo koobista natiijooyinka; tani waxaa lagu uruurin doonaa iyadoo la adeegsanayo url gaar ah lalamana xiriirin karo jawaabahaaga xog uruurinta.Xogta xog uruurinta waxay sidoo kale noqon doontaa mid qarsoodi ah taas oo ka dhigan macluumaadka lagaa soo ururiyey in lagu keydin doono meel aamin ah oo gaar ah.Ma jiri doono macluumaad qof lagu aqoonsan karo oo loo adeegsan doono warbixin kasta oo laga diyaariyo cilmi baaristan.Macluumaadka la uruuriyo waxaa kaliya oo loo adeegsan doonaa cilmi baarista, lalamana wadaagi doono koox saddexaad.

Miyaan jawaab-celin ka heli doonaa natiijoooyinka cilmi baaristan?

Dhamaadka cilmi baarista, soo koobista natiijooyinka waxaa heli doona ka qeybgalayaasha jecel in loogu soo diro midan macluumaadka xiriirkooda ay ku bixiyeen url-ka gaar ah.

Maxay ku baxaya ka qaybgalka cilmi baaristan?

Ka qaybgalkaada cilmi baaristan waa ikhtiyaar (waa dookhaaga)Xog uruurintan waxay qaadan doontaa ku dhawaad 10 daqiiqo waxaadna ku sameyn kartaa xog uruurintan kombiyuutarkaaga, tablet-kaaga ama taleefonkaaga.Waxaa jiri doona 5 foojarro raashin ah oo qiimahoodu yahay $40 dollar midkiiba oo loo bixin doono abaalmarin baqtiyaanasiib ahaan si loo xuso waqtiga aad ku bixisay dhameystirka xog uruurinta.Waxaad ku cadeyn kartaa taleefonkaaga/iimaylkaaga url gaar ah dhamaadka xog uruurinta hadii aad dooneyso inaad gasho baqtiyaanasiibka.

Maxaan sameeyaa hadii aan walaac ka qabo xog uruurintan?

Walaac kasta oo ku saabsan hannaanka mashruucan waa in la ogeeysiiyo marka ugu horeysaba Kormeeraha
Mashruuca, Nadia Charania: nadia.charania@aut.ac.nz:Telefoon 09 921 9999 ext 5430

Walaacyada ku saabsan anshaxa cilmi baarista waa in la ogeysiiyaa Xoghayaha Maamulka Sare ee AUTEC, ethics@aut.ac.nz, (+649) 921 9999 ext 6038.

Yaan kala xiriiraa si aan u helo macluumaad dheeraad ah oo ku saabsan cilmi baaristan?

Cilmibaare:Mulisa Senbeta Debela mulisasenbeta.2013@gmail.com telefoonka gacanta:0220573457

Kormeerayaasha Koowaad:Dr. Nadia Charania
nadia.charania@aut.ac.nz Kormeeraha Labaad:Dr. Nick Garett
nick.garrett@aut.ac.nz

Waxxaa oggolaaday Auckland University of Technology Ethics Committee markay ahayd 12/10/2020 AUTEC ***Lambarka Tixraaca 20/267***

Oraahda Ogolaanshaha

Fadlan sax si aad u muujiso oggolaanshahaaga oraahaha soo socda.

Aniga oo calaamadeenayo sanduuqa "Waan Oggolahay" ee hoose, waxaan oggolaaanayaa inaan ka qaybqaato xog uruurintan.Waan akhriyay foomkan, waxaana la i siiyay fursad aan su'aalo ku waydiiyo su'aalahaygana waa laga jawaabay.Hadii aan su'aalo dheeraad ah qabo, waxaa la ii sheegay

cida aan kala xiriirayo.Hadii aanan u baahneyn inaan ka qaybqaato xog uruurintan, waan iska xiri karaa biraawsarkayga internetka.

- ○ Waan oggolahay

Waxaan jeclaan lahaa inaan helo soo koobida natiijooyinka cilmi baarista

Su'aalo Qiimayn ah

- ○ Haa:Fadlan ku qor iimaylkaaga bogga gaarka ah https://aut.au1.qualtrics.com/jfe/preview/SV_5vR6k5YLbS8nnGB?Q_CHL=preview&Q_SurveyVersionID=current
- ○ Maya

Fadlan sax oraahyadan soo socda hadii ay adiga ku khuseeyaan

- ○ Waxaan ahay qof qaxooti hore ah oo joogay New Zealand ugu yaraan 6 bilood.
- ○ Waxaan ku imid New Zealand mid kamid ah barnaamijyada dib u dejnta dadka qaxootiga ah (dib u dejinta qaxootiga ee wadan seddexaad, isukeenidda qoyska , nabadgelyo doon iyo kafaala-qaadida urur bulsho)
- ○ Waxaan jiraa 18 sano iyo ka badan
- ○ Waxaan ahay Hooyo/aabo ama masuulka sharciyeeysan ee cunug(carruur) (u dhaxeeysa 6 toddobaad iyo 16 sano jir)

4) Oromo Version

Fuula Odeeffannoo Hirmattotaa

12/10/2020

Mata-duree Qorannoo: **Shakkiin Kittibaata daa'immanii Baqattootaa biyyaa Niwu Zilaand jiraatan keessatti maal fakkaata**

Sarveyiin kun afaanota 4'n argama, afaanota armaan gadi keessaa afaan barbaaddan filachu dandeessu: Ingiliffaa, Arabiffaa, Afaan Sumalee fi Afaan Oromoo

Afeerraa

Sarveyiin kun namoota baqataa (hamba-galeeyyii) ta'anii biyya kana dhufaan kan hirmaachisu dha. Qorannoo kana irratti hirmaachuuf, gaaffiwwaan armaan gadiif yaada kee kennii. Gaaffi kana yeroo deebistuu maqaa kee bareessuu **hin barbaachisu**. Hirmannaan keessan fedhii keessan yoo hirmaachuu hin barbaannee maaliif akka hirmachuu hin barbaannee sababa osoo hin kennin dhiisuu dandeessu.

Yoo gaaffii kana deebisuu irratti hirmaachuu barbaaddaan "Fuula Odeeffannoo Hirmattota" kana dubbisa ti irratti hirmaachuuf fedhii keessan mirkaneessaa.

Galatoomaa!

Qoratan eenyuu?

Maqaan kiyya Mul'isaa Dabalaa jedhama. Qorannoon kun yaada maatiin baqattoota/hamba-galeeyyii kittibaata/talaalli daa'immanii isaanii irraatti qaban hubachuuf kan qopha'ee yoo ta'u, pirojektii barnoota digrii lammafaati. Pirojektiin kun barnoota kana xumuruuf murteessa dha.

Kayyoon qorannoo kanaa maalii?

Barbaachisumma Projektichaa:

- Shakkiin kittibaata ykn kittibaata amanu dhabuun (akka daa'imman yeroon hin kattabsiisne, ykn akka bellamni jala darbuuf sababa ta'a) kun immoo akka uwwisi kittibaata gad-bu'uu/hir'atu godha. Uwwisi kittibaata hirrachuun immoo, akka dhibeen kittibaataan ittifaman kan akka Gifira fi dhibee Laamshessaa (Pooliyoo) deebi'ee hawaasa weeraruu ykn miidhuu waan danda'uuf.
- Niwu Zilaandii keessatti, uwwisi talaallii/kittibaata ijoolleen baqattootaa fi godantotaa yeroo ijjoollee baqattoota/godantota hin taaneen wal madalaan, daran xiqqadha waan ta'eef.
- Waa'ee kittibaataa ilaachisee yaada maatii baqataa/hamba-galeeyyii hubachuun fayyaa hawaasa bal'aa eeguuf haalan barbaachisaa waan ta'ef.

Qorannoon kun ijoollee baqataa/hamba-galeeyyii biyyaa kanaf, haala ittin kittibaata yeroon kennamu ol guddisuuf tarsiimoo bu'ura ta'ee kennuu ni danda'aa. Bu'aan qoranno kanas dhumarratti maxxanfamuun ykn bifa gabaasa afaanitiin qophaa'ee rabsamu mala. Deggersi mallaqaa qorannoo kana hanga tokkoo Dhaabbata Mana maree Dhimma Qo'annoo Fayyaa Niwu Zilaandii (HRC) ti.

Sarveyii kana irratti hirmaachuun koo maaliif barbaachise?

Pirojektiin kun namoota hamba-galeyyii kan Niwu Zilaandii jiratan kan hirmaachiisu dha. Yoo kan ulagaalee armaan gadii kan guuttan ta'eef, hirmachuu ni dandeessu.

Ulagaalee hirmaannaaf barbaachisan:

- Hamba-galeessaa/baqataa kan Niwu Zilaandii baatii 6 fi isa ol jiraate/jiratte.
- Niwu Zilaandii baqataa ta'ee/taatee kan seentee ykn karaa koolu-galtummaa UNHCR kan dhufte/dhufe, maatii ykn firaan spoonsarii kan dhufte/dhufe, kooluu-galtummaa asitti kan gaafate/gaafatte, kara spoonsarii Komunitii kan dhufee/dhuftee
- Umrii waggaa 18 ol
- Haadhaa, abbaa ykn guddistuu/guddisaa daa'imaa umrii baatii tokko fi walakkaa jalqabee hanga waggaa 16 gidduu kan taatee/ta'e.

Iccitiin koo akkamitti naaf eegama?

Gaaffii kana yeroo deebistan maqaan keessan hin gaafatamu, deebii deebi'ee eenyuun akka deebifame beekuun hin barbaachisuu jechuu dha. Yoo cuunfaa bu'aa qorannoo kana dhumarratti waraqaa fuula 1-2 kan ta'uu fudhachu barbaddan, ykn yoo carraa kennaa maallaqaa xiqqaa keessaa seenuu barbaaddan, waraqaa duwwaa kan deebii keessan irraa adda ta'e irratti Imeelii ykn lakk. Biliblaa keessan qofa bareessuu dandessu. Odeffannoon funaanamus bakka iccitiin isaa eegamu, bakka namni biroo arguu hin dandeenye ol-kayama. Odeeffannoon waa'ee dhuunfaa keessaanii hin maxxansamuu ykn hayyama keessanin alatti qaama sadaffaaf dabarsamee hin kennamu.

Argannoo ykn bu'aa qorannichaa akkamittin argadha?

Dhumarratti cuunfaan bu'aa qorannichaa kan fuula 1-2 ta'u, hirmattotaaf waan qopha'uuf, yoo fudhachuu barbaaddan, Imeelii keessan qofa waraqaa duwwaa kennamu irratti bareessuu dandeessu.

Gatiin hirmaannaa qorannoo kana maal?

Hirmaannaan keessan fedhii keessan. Sarveyiin kun naannoo daqiiqaa 10 fudhata. Interneetiin ykn sarara irratti yoo deebii keessan lachu barbaaddan; Koompiyutera irratti, Taableetii fi Bilbila harkaa keessan irraatti deebii kennuu ni dandessuu. Yeroo keessaniif kennaan xiqqoo bifa carraan qopha'ee jiraa. Kennichis kennaa kaardii Giroosera 5 kan tokkon tokkon isaa doolara 40 ta'ee dha. Carraa kana keessa seenuuf Imeelii ykn lakk. bilbila keessan waraqaa duwwaa/liinkii irratti katabaa.

Waa'ee qorannoo kana ilaalchisee gaaffii yoon qabaadhee eenyuunan quunnama?

Gaaffii ykn yaadaa walii galaa waa'ee qorannoo kana yoo qabattan jalqabaa irraatti Suppervayzera

Pirojektichaa kan taatee Dr. Naadiyaa Charaniyaa: Imeelii nadia.charania@aut.ac.nz: Bilbila 09 921 9999 ext

5430

Akkasumas gaaffii waa'ee hayyama namuusaa (Itiksii) qorannoo kan ilalu yoo qabattan Barreessaa Koomitee Dhimmaa Namuusa Qorannoo kan Yunvarsiitii AUT (AUTEC) beeksisuu dandeessu. Imeelii: ethics@aut.ac.nz, Bilbila (+649) 921 9999 ext 6038.

Dhimma qorannoo kanaf odeeffannoo ykn yaada dabalataa yoon barbaadee eenyunin quunnama?

Qorataa: Mul'isaa Sanbataa Dabalaa: Imeelii mulisasenbeta.2013@gmail.com Bilbila: 0220573457

Suppervayzera 1ffaa: Dr. Nadiyaa Charaniyaa Imeelii: nadia.charania@aut.ac.nz

Suppervayzera 2ffaa: Dr. Niik Gaareet Imeelii: nick.garrett@aut.ac.nz

Kan raggasifame Koomitee Dhimmaa Namuusa Qorannoo kan Universiitii AUT (AUTEC) Gaafa:12/10/2020 Lakk: 20/267

Himaa Walii-galtee:

Fedhii keen hirmaachuu keef himaa armaan gadii dubbisii sanduqaa keessatti guutii

“Sanduqaa “Walii-galaa” jettuu armaan gadii cuqasuun/guutuun, Sarveyii kana irratti hrimaachuuf walii galeera. Unkaa kana dubbiseera, gaaffii gaafachuuf carraa argadheera, deebis argadheera. Gaaffi dabalataa yoon qabadhe, eenyuun akkan qunnamuu danda’uu beekeera. Yoon barbaades “Unka walii galtee” kana fulduraaf koppii godhee kawwachuu ykn bifaa waraqaan piriintii godhee kawwachu akkan danda’aa. Sarveyii kana irraatti hirmaachuu yoon hin barbaannee, biroosera inteneetii koo cufeen ba’aa”

- ○ “Itti walii-galaa”

Cuunfaa bu’aa/argannoo qorannoo kanaa fudhachuu barbaaddaa?

- ○ Eeyyee >> waraqaa duwwaa irratti imeelii keessan bareessaa.
- ○ Lakki

Ulaagalee hirammannaf barbaachisan kan isin ilaallatu guutaa:

- ○ Hamba-galeessaa/baqataa kan Niwu Zilaandii baatii 6 fi isa ol jiraate/jiratte.
- ○ Niwu Zilaandii baqataa ta’ee/taatee kan seentee ykn karaa koolu-galtummaa UNHCR kan dhufte/dhufe, maatii ykn firaan spoonsarii kan dhufte/dhufe, kooluu-galtummaa asitti kan gaafate/gaafatte, kara spoonsarii Komunitii kan dhufee/dhuftee
- ○ Umrii waggaa 18 ol
- ○ Haadhaa, abbaa ykn guddistuu/guddisaa daa’imaa umrii baatii tokko fi walakkaa jalqabee hanga waggaa 16 gidduu kan taatee/ta’e

Appendix D. Invitation flyer for participants

Appendix E. Ethics Approval from Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology

D-88, Private Bag 92006, Auckland 1142, NZ

T: +64 9 921 9999 ext. 8316

E: ethics@aut.ac.nz

www.aut.ac.nz/researchethics

12 October 2020

Nadia Charania
Faculty of Health and Environmental Sciences

Dear Nadia

Re Ethics Application: **20/267 Parental vaccine hesitancy among former refugees in New Zealand**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application has been approved for three years until 12 October 2023.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.

7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.

AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through http://www.aut.ac.nz/research/researchethics

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat

Auckland University of Technology Ethics Committee

Cc: mulisasenbeta.2013@gmail.com; nick.garrett@aut.ac.nz