Food Choices and Eating Habits of Indian Migrants in New Zealand

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Abstract

Background: The migration of Indians is documented from 1769 to the present day in New Zealand. Migrants have been shown to provide significant support to the New Zealand economy and add cultural diversity to the country. The data from 2022 showed 4773 Indians migrants moved to New Zealand. Moving to a new country has certain challenges including housing, work, education, and health. In addition, there may be influences on dietary behaviour.

Aim: This study aims to understand the factors influencing the food choices and eating habits of Indian migrants in New Zealand.

Methods: This study consisted of two phases: (1) semi-structured interviews with 11 participants and (2) a questionnaire survey based on the findings of phase one explored how multiple levels influenced food choices and eating behaviour in 110 participants .

Results: In the study, it was found that higher food prices did not necessarily reflect the quantity and that ethnic foods were easier to access in urban areas, whereas religious and cultural factors heavily influenced food choices, while cooking skills also played a significant role. Those living with their partners or belonging to the same culture exhibited better eating habits. Long working hours including shift work was seen to influence the reliance on takeaways and poor eating habits. However, participants were generally open to adopting healthier lifestyles and exploring different food cultures.

Conclusion: The study found that factors influencing food choices were present across all levels of the ecological model for health promotion. The findings suggest that interventions must be comprehensive and address multiple levels of influence to be effective. Interventions that focus on only one level, or one factor, are likely to be ineffective. Additionally, interventions should be tailored to address the specific needs of the individual. According to the study, food choices and dietary patterns need to be viewed holistically. In addition to reducing barriers to these diets, interventions should increase access to healthy foods. Educating and motivating individuals about healthy eating options should also be undertaken as part of public health initiatives.

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Abbreviations

FCQ: Food choice questionnaire

NCD: Non-communicable disease

Chapter 1: Introduction

According to the 2020 data from Statistics New Zealand, about 240,000 Indians are living in New Zealand an increase of approximately 65,000 since 2001 (Shamubeel Eaqub, 2020). The decision to migrate can be motivated by the desire to increase income throughout one's life. On the other hand, there are other drawbacks of migration e.g. unskilled people migrating across different states within the country may earn very different wages from skilled migrants (Kennan and Walker, 2010). It is important to remember that as societies change, there is also a change in food availability and eating habits as well (Lang and Heasman, 2015). Migration as a whole often leads to changes in eating patterns, due to adaptations towards the host country's culture, but cultural identities related to festivals, religion and traditional foods are maintained (Satia, 2010).

In developed countries, traditional diets are replaced with a high intake of sugar and fat, as well as a low intake of nutrient-dense foods due to availability and types of food marketing (Kumanyika, 2005). The people of Indian descent are well known for their religious diversity, which influences what they eat due to dietary restrictions, eating habits and traditional foods (Mohamad Shahir, 2019). To achieve desired textures or tastes, Indians add unique ingredients (such as coriander seeds, tamarind, and garam masala) to their food while maintaining appropriate cooking techniques (such as fermentation) (Misra, 2011). However, migration may lead to changes in eating habits, food choices and even cooking methods resulting in changes to food quality due to reasons like migration-related stress, new socio-demographics, environment and availability issues (Satia-Abouta et al., 2002). Similarly to food choices, dietary acculturation can affect one's eating habits upon migrating by adopting the eating habits of an unfamiliar place, exposing migrants to food diversity (Satia, 2010).

Associating eating habits and food choices with environmental factors, such as sociocultural context and other policies, is an imperative function of the ecological model (Deliens et al., 2014, McLeroy et al., 1988). A multivariate analysis of neighbourhoods of different income levels, races, and ethnicities revealed distinct differences based on the policy level (affordability and availability) of the ecological model linked to access to food stores. (Powell et al., 2007). In addition to availability, another study presented findings that smaller food outlets have been found to provide more energy-dense processed foods (Morton and Blanchard, 2007). Furthermore, an examination of the socio-ecological model in the USA revealed that the availability of food outlets played a significant role

in determining food choices (Morland et al., 2002). In a study by Smith et al., (2004) it was found that dietary behaviour is an individual's intended function and it can be explained by attitudes, social influence and self-efficacy, which are based on the theoretical model.

The ecological model of health promotion

The use of this model has been demonstrated in some studies as an effective way of gaining and providing a deeper understanding of health behaviours, especially within the context of school-based health promotion programs (Golden and Earp, 2012, Moore et al., 2013). The model explains why a small change in the environment can affect people's behaviour and then recognizes that individuals are influenced by their environments at different levels (Fig.1), so changing the environment can be an effective way to promote healthier behaviours (McLeroy et al., 1988).

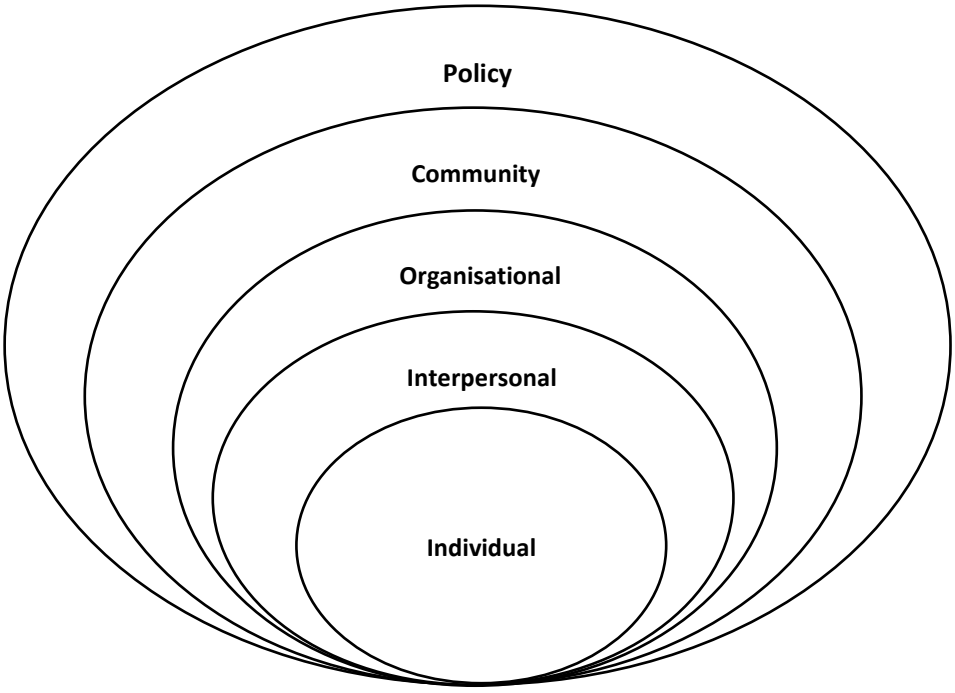

Figure 1. The theoretical framework of the ecological model for health promotion.

The individual level demonstrates one's behaviour related to decision-making based on one's knowledge, skills and attitude, all of which are determined based on a person's experiences (McLeroy et al., 1988). The interpersonal level is dependent on relationships with family, friends, work, colleges and other social networks that influence behaviour (Gottfredson, 1987). Similarly, the influences of surroundings, such as workspaces and classrooms, are also considered at the organisational level and it is through this level that positive changes can be brought to a person's well-being (McLeroy et al., 1988). Also, to understand how health behaviours are formed, the community level is a fundamental determinant of how people respond and what norms they adhere

to (Poux, 2017). The policy level includes policies that provide support for creating and maintaining a safe and healthy environment for both individuals and the larger social system (Home, 2020). As a result of this model, all levels support the understanding of the influencing factors and the development of strategies to support healthy behaviour. By using this model, it is possible to identify gaps in existing policies and programs as well as develop effective interventions aimed at understanding and addressing health issues holistically.

1.1 Research aims

This study aimed to identify the factors influencing Indian migrants eating habits and food choices in New Zealand by applying the ecological model of health promotion.

1.2 Research objectives

- To explore factors contributing to current food choices and eating habits.
- To use an ecological approach to understand the barriers and supports influencing food choices and eating habits in Indian migrants.
- To propose strategies aimed at improving food choices and eating behaviour among migrants.

1.2 Thesis structure

In this thesis, six chapters are presented. In the first chapter, a brief introduction to the migration process and the status of Indian migrants in New Zealand is provided. Furthermore, the introduction chapter explains the ecological model of health promotion levels and provides the aim and objectives of the study. In the introduction chapter, a table is provided that outlines the contributions to the research, giving a concise summary of the existing evidence that lends credibility to the study. The second chapter is a literature review. This provides an overview of the existing knowledge on topics such as migration, food choices, dietary restrictions related to religion and several other topics impacting the food choices of migrants. It is also used to identify research gaps. Literature reviews identify potential research data sources.

In chapter three, the study methods are described and illustrate both qualitative and quantitative approaches, as well as the methods used to recruit the participants and analyze the results. They also discuss ethical considerations. The fourth chapter is the results which include the results table

designed according to the ecological model of health promotion levels. It also includes results from semi-structured interviews in the form of themes and quotations. The quotations give qualitative insight into the experiences, views and perceptions of participants. This chapter adds evidence to the overall findings of the research. The fifth chapter of the thesis is the discussion section. The results are discussed using the levels of the ecological model of health promotion. The discussion considers the findings in relation to the literature. Additionally, it summarizes the main findings of the study. Finally, the conclusion chapter summarizes the main findings of the study, presents the research limitations and suggests ideas for future research. It concludes by summarizing the primary results of the study.

1.4 Contributions to research

Researchers	Contributions to this thesis
Ayesha Mushtaq Ahmed	Lead researcher, recruitment of participants, database collection, presentation of findings, information analysis, data interpretation, and conclusions.
Ravi Reddy	Main thesis supervisor and guidance with thesis design, data collection methods, presentation of results, interpretation of results, discussion, conclusion and revision.
Rozanne Kruger	Co-supervisor, guidance with revision of conclusion, introduction chapter, revision and discussion of results.
Ian laird	Co-supervisor, guidance with the writing of summary of literature review, conclusions and revisions of complete thesis draft.

Chapter 2: Literature Review

2.1 Global migration

Migration is the movement of people from a country or a border to an international destination according to the International Organisation for Migration (Vitorino, 2019). The migration process has been active throughout history, involving the movement of people between places on a temporary or permanent basis (Manning and Trimmer, 2020). Personal, political, environmental and social factors influence migration either voluntarily or by force (Segal, 2019). Specifically, motivators such as better education, freedom in western democracies, employment earnings, and better climate have been identified as levers for migration (Ip, 2011, Leuven and Oosterbeek, 2011, Kennan and Walker, 2010). Asia, USA and Europe have the highest percentage of international migrants, in comparison with the rest of the world (Liu and Leung, 2017). There is existing literature on migrant food consumption, which is influenced by or connected to the job, education, and health (Spitzer, 2011).

2.1.1 Indian migrants in New Zealand

Mahmud Qasim and Nasrin were the first Indians to arrive in New Zealand in the year 1769 embarking on a French ship from Pondicherry, India (Sekhar Bandyopadhyay, 2020). In the late 1890s, Abraham Singh & Co was found to be the first Indian business established in Wanganui, Indian settlers have since worked in a wide array of occupations and businesses, from grass cutting to fruit shopping to dairy farming and professional occupations (Leckie, 2007). Also, workers with good educational backgrounds from South Asian countries have been moving to New Zealand since the 1980s owing to successive governments' neo-liberal immigration policies (Bedford and Spoonley, 2014, Simon-Kumar, 2015). As a result of a government-led initiative after 1999 to select more skilled migrants, the number of arrivals from India increased from 1869 in 1999 to 6860 in 2002 (NZ.Stat., 2009). The trend was evident in 2009, when 53% of South Asian migrants held managerial or technical positions, despite living mainly in rentals and being among the lowest-paid migrants (Leckie, 2007). To the New Zealand statistics of 2016—2019, there has been a raise in approved student visas from 46% - 54% (NZ.Stat., 2019). Temporary migrant workers of Indian origin have rapidly increased in number from 2004 to 2019 (442 to 1,224,036) (Steward, 2020). According to the most recent net international migration statistics, around 4,773 Indians migrated to New Zealand in the year 2022 (Steward, 2023). Like several other migrant communities in New

Zealand, the Indian population is predominantly concentrated in Auckland (accounting for 65% of the Indian population), Waikato (7%), and Wellington (9%), even though they are present throughout the country, according to Raad (2020).

2.1.2 Effects of migration on the economy

One of the most common benefits of migration, aside from benefitting the economies of their host countries, is sending remittances to their family members back home (Swing, 2018). Migration-related payments, or remittances, are regarded as a significant development mechanism linked to the migration process (Swing, 2018). Host countries benefit from multicultural environments, resulting in numerous innovations shaped based on expanding diversity in knowledge, and skill sets (Niebuhr, 2010). There are many challenges faced by migrants while they are adjusting to a new place and this includes access to and availability of familiar food options and ingredients (Sassen, 2016).

2.2 Food choices

The combination of a range of factors can influence people to make over 220 decisions about what to eat or drink (Sobal and Bisogni, 2009). Individuals eating behaviour is significantly influenced by the types of foods they consume (Elisa De Marchi et al, 2016). These factors include wellness, emotional state, comfort, affordability, recognisability, societal norms, ethical and environmental considerations, and flavour when deciding what to eat (Steptoe et al., 1995, Pollard et al., 1998, Appleton et al., 2017, Renner et al., 2012, Đorđević and Buchtová, 2017). In addition, nutritional value, convenience and mood are the key factors driving food choices (Eertmans et al., 2006). Similarly to food choices, there are several factors influencing food purchases decisions such as hunger, gustatory perception, variety of food and standard of food (nutrition, sourcing, appearance, quality), cost factors, and social gatherings (Baldwin et al., 2011, Haghighi et al., 2012, Walter and Edvardsson, 2012, Gneezy et al., 2014, Pecotić et al., 2014, Andersen and Hyldig, 2015, Almohaimmeed, 2017).

Food choices are also influenced by beliefs, attitudes, and an individual's general understanding of food (Dimitri and Rogus, 2014, Spronk et al., 2014, Chung et al., 2019, Kulik et al., 2019, Melesse and van den Berg, 2021). It is however argued that knowledge alone cannot change food-related behaviour and that interpersonal, and societal factors need to be considered, but the study only included a sample of limited size and age (Nagy-Pénzes et al., 2020). A study found that family, belief-systems and cultural values influence self-acceptance and food choices throughout life, but it only used a snowballing approach to find appropriate peer-reviewed studies (Larson and Story,

2009). As part of people's individuality, psychology can also impact food choices or eating habits and a common example is the influence of social media on altering decisions related to food intake (Chen and Yang, 2014).

2.2.1 Psychological impact on food choices

The use of social media can have a powerful impact on dietary choices through photos, audio, and videos, establishing trust, however, individual choices vary from situation to situation (Tamby Chik et al., 2019). A product's visual appeal plays an important role in influencing a consumer's purchase decision and this is primarily influenced by the colour of the food, which in turn influences their emotional state and ultimately influences the taste of the food (Ketkaew et al., 2021). Aside from the impact of the olfactory system, texture-related genetic factors play an important role in food choices, as well as other elements of psychology, such as context, behaviour, cognitive function, and self-identity (Castellini and Graffigna, 2022).

The contextual domain refers to the environment in which the decision is made, such as a limited amount of time, adequate information, or a person's capacity to make a decision within that context (Evans, 2008). Where as the concept of ethical behaviour represents an anomalously rationalized aspect of our daily routines (Walker et al., 2010). Additionally, literature on psychology describes the mental state in which human actions involving eating are based on time-saving due to a lack of patience, leading to the selection of food close at hand (Chen-Bo and DeVoe, 2010). There is evidence that weak inhibitory control and cognitive biases driven by motivation are associated with unhealthful eating (Coskunpinar and Cyders, 2013). As a final consideration from a psychological perspective, the self-identity associated with diet is influenced by both internal and external factors (Rosenfeld and Burrow, 2017b). Moreover, self-identity variables reflect the flexibility of diet under some circumstances, while inspirations are motivated by morals or self-motivation, while the social variables are influenced by societal, ethnic, cultural, and religious norms (Rosenfeld and Burrow, 2017a, Rosenfeld and Burrow, 2018).

2.2.2 Food and religion

Self-identity can be greatly influenced by religious beliefs (Cohen, 2021). Food restrictions are often closely intertwined with religious beliefs and practices, for example, in Hinduism, vegetarianism is seen to respect all life and avoid violence (Dweba et al., 2018). In Judaism, keeping kosher is a way to honour God and follow his commands (Fischer, 2015). The religions of Islam and Hinduism place permanent restrictions on certain food consumption (Den Hartog et al., 2006). Hindus consider the cow to be the earth goddess and abstain from eating cows (Craig, 2010).

Furthermore, Hindus from the Brahmin caste do not consume onions or garlic and meat, and poultry symbolizing environmental, and soul purification (Misra et al., 2009a, Gopal, 2015).

Similarly, the Sikhism religion of India allows one to eat meat, and meat products except for cows and ritualistically slaughtered meat like halal and kosher (Johnson, 2022). Hindus believe that eating and drinking are connected to the physical body, wellbeing, good health, and hygiene/contamination, along with caste, status, sexuality and familial ties (Caplan, 2013). According to a report Indian vegetable consumption is close to 390 million, followed by Indonesia with 66.9 million, China and Pakistan with 51.9 to 33.2 million (Wan, 2018).

The Islamic religion permits the consumption of all vegetables, kosher, and halal meat, but prohibits alcohol, pork, blood, scavengers, and non-halal products (Den Hartog et al., 2006). Nevertheless, prohibited foods are considered lawful under extreme circumstances in Islam (Khalid et al., 2015). Muslims restrict eating foods consecrated to anyone other than God (Allah) and slaughtering animals in God's name is a ritual part of Islam (Denny, 2015).

It has been suggested that Muslim migrants can be distrustful and uncomfortable with ingredients and food cooked outside of their homes, which they consider Haram or unholy (Garnweidner et al., 2012, Terragni et al., 2014). As such, Muslim migrants prefer to purchase imported goods such as rice, spices and dried fruits from speciality halal fine food stores (Jacobus and Jalali, 2011).

In 2022, the global halal food sector reached approximately US$ 2,221.3 billion and by 2028 is forecast to reach US$ 4,177.3 billion, however, consumers may face difficulty finding halal-certified products due to the fragmentation of the halal food sector (Imarc, 2023). In kosher law, religious teachings and practices regarding food are implemented based on the rabbinic interpretations of the Bible, Talmud (codified oral law of the fifth century) and customs (Blech, 2009). Plants and certain animal products are accepted under kosher laws, and other significant issues related to ingredients/food are sodium caseinate, lactose, rennin, gelatine, vitamins, eggs, grape products, fruits, vegetables and Passover (a traditional Jewish festival) items (Regenstein and Regenstein, 1979). Certification of kosher foods is facilitated by registered kosher certifiers, such as Orthodox Union which also audit several food production operations for compliance, without compromising the availability (Fischer, 2015). All of these religious dietary norms may get influenced by observing and understanding the surrounding environment as the knowledge develops and evolves. (Mazzocchi, 2006).

2.2.3 Dietary-related knowledge in migrants

The level of health literacy among migrants may differ depending on their ethnicity (Davidson et al., 2010). Migrant Chinese and Indians in Canada have been shown to have nutritional knowledge gaps regarding cooking techniques and westernizing their diets (Varghese and Moore-Orr, 2002). It is common for migrants, including adults and youth, from Somalia, Mexico, Sudan, and Cambodia, to believe that food serves as medicine, providing them with adequate vitamins and minerals they need to remain healthy (Tiedje et al., 2014). According to Polish migrants living in Luton, a healthy diet is a diet consisting of food made from scratch by using the proper cooking techniques and using fresh ingredients (Czarnecka, 2019). A healthy diet consists of all food groups that are free of chemical additives as well as excess preservatives like salts, sugar, etc that alter the nutritional value of the foods (Amstutz et al., 2020).

Reading the labels of products is a method of finding out about their nutrients, dietary ingredients, and allergens (Lubman et al., 2012). However, consumers are not always able to understand the nutrition label due to factors such as language and font size, thus a better means of communicating the values is required (Hieke and Taylor, 2012). Existing research report that Libyan migrants living in Australia have 1.4 times more difficulty comprehending nutrition values, which may explain food insecurity in this community (Begley et al., 2019). In addition, it has been reported that Hispanic immigrants in the United States of America encountered language barriers when they attempted to use food labels and food education materials (Gans et al., 2003).

2.3 Challenges related to food and culture among migrants

Adapting to an unfamiliar food culture is fraught with anxiety, specifically food stress, as sometimes these changes eliminate traditional cooking traditions, which are in harmony with food preparation (Crockett et al., 2007, Ward et al., 2013). Factors such as physical characteristics, taste sensations, and sociodemographic characteristics, are affected by migration (Satia-Abouta et al., 2002). Furthermore, with cultural and religious concerns regarding food, migrants also face issues such as navigating a completely different food environment, migrants face numerous obstacles such as not knowing how the stores are laid out and confusion caused by unfamiliar food brands (Hadley et al., 2010, Kiptinness and Dharod, 2011, Mannion et al., 2014). It is difficult for new migrants to access affordable food due to a variety of factors, such as transportation costs, unacquaintedness with convenience stores, and limited access to affordable stores (Vahabi and Damba, 2013). It is possible for migrants who are used to shopping in small community stores in their native countries to feel overwhelmed when shopping in supermarkets in unfamiliar foreign settings (Terragni et al.,

2014, Njomo, 2012). This is further complicated by unfamiliar packaging, which may make it difficult for migrants to easily identify the food products of their choice (Wilson and Renzaho, 2015, Terragni et al., 2014).

Despite the availability of ethnic foods in big supermarkets in some countries, migrants prefer small local retailers because of their language, culture, and trust (Jacobus and Jalali, 2011). Besides ethnic foods, ethnic markets offer social events, cultural consultations, and information exchanges as well as a place for migrants to meet and make friends (Njomo, 2013). However, ethnic markets have reported a low quality of ethnic foods due to poor preserving techniques and the time it takes to reach receiving countries from supplying countries (Njomo, 2013).

2.3.1 Income status impacting migrants food choices and health

Financial status is a significant determinant of food insecurity for migrants (Hadley et al., 2010, Sanou et al., 2014, Vahabi and Damba, 2013), where migrants who face employment challenges may end up in low-paying jobs limiting their purchasing ability of desired food (Kiptinness and Dharod, 2011, Anderson et al., 2014). Those who migrate often find themselves unrecognized by the locals and their credentials ignored by the locals or have no job experience in the country of their destination (Junankar and Mahuteau, 2005). Due to the added mental strain from household management, including cooking, as well as financial responsibilities, women are more likely to experience food insecurity than men (Grimaccia and Naccarato, 2020). Poor income status is further exacerbated by the practice of sending remittances back to their families in their countries of origin (Sassen, 2016). There is evidence that along with food insecurity migrants may also tend to experience issues with mental health (Duffy and Zizza, 2016). Research in the United States of America among low-income Sudanese migrants found that high-cost micronutrient-rich food products were replaced with low-cost, highly processed foods (Anderson et al., 2014). This type of diet change leads to increased energy and fat consumption due to a lack of variety in the diet, resulting in obesity, type 2 diabetes, heart conditions, and other nutritional issues (Schönfeldt and Hall, 2012).

The low income of many migrants exposes them to health risks determined by their genetics, which could be avoided if social programs were more effectively implemented for them (Girard and Sercia, 2013). Studies reveal that because of insecurity regarding food among migrant societies, many migrants become dependent on assistance programs for social welfare (Jacobus and Jalali, 2011, Anderson et al., 2014, Dharod et al., 2011). These assistance programs differ from place to place, with some offering financial assistance to unemployed migrants, whereas others offer food

assistance, however, this does not resolve the food insecurity within migrant. Evidence shows that 55% of the migrant group that received a monthly benefit, stated that it was not sufficient to last a whole month, thus making the migrant group susceptible to food insecurity (Jacobus and Jalali, 2011, Vahabi et al., 2011).

2.4 Traditional eating, and cooking practices

The way Indians cooked and ate changed slowly due to the invasion by the Mughals, followed by European colonization, compared to the Vedic times (Antani and Mahapatra, 2022). In addition, Indians are embracing western ways of eating with cutlery rather than with the traditional practice of eating with hands (Hegde et al., 2018). As a result of modernization, there has also been a decline in traditional and cultural cooking practices (Pingali et al., 2019). Ancient cooking methods such as utilizing earthenware, clay pots, gold, silver, iron, brass and copper cookware have declined over the past few decades (Trivedi et al., 2017). Indian cooking includes a variety of methods and has a long history and involves germination, fermenting, roasting, frying and pressure cooking (Otemuyiwa et al., 2018).

A popular feature of Indian cuisine is the wide range of spices, millet and herbs (Pingali et al., 2019). Indians also rely heavily on fermented foods, for example, rice and lentil batters, which are an integral part of south Indian cuisine, considered rich in nutrition, as well as beneficial to health (Sarkar et al., 2016, Achaya, 2009). It is reported that sprouted foods have been considered a popular healthy snack in India for many years (Mirwais et al., 2016). Cereal fermentations are well known as a staple food and an important part of Indian cuisine, grains like rice, ragi, wheat, barley and pulses undergo fermentation to be prepared, as well as being cultivated since the Indus Valley civilization (Samanta et al., 2011). Another staple food is curd, which is created by fermenting cow's milk and inoculating it with cultures of curd in a warm environment, the probiotic properties of this food make it popular among Indians (Asit, 2010). The paste of fermented fish (Tungtap) is frequently eaten in Meghalaya (A north-eastern state of India), as well as dry fish mixed with salt (fermented in an earthen pot for a week) that is eaten as a pickle (Thapa et al., 2004). Indian street food is also famous for the sand roasting technique (Jogihalli et al., 2017) and the demand for roasted grains, nuts and cereals has increased in India because it is regarded as healthy, inexpensive and oil-free food items (Sharanagat et al., 2018, Jogihalli et al., 2017). Several of these traditional cooking methods are used in Indian festivals for the goodwill and betterment of devotees who offer food offerings, although the level of religious values varies based on environmental influences (Cohen, 2021).

2.5 Dietary adaptation among migrants

Migrants prefer to stay connected with culture and tend to include traditionally rich foods in community gatherings and events (Azar et al., 2013). However, migration necessitates acculturation with the host country's culture (Kizgin et al., 2018). In Australia, migrants made changes to their diet due to access, to increasing starchy, meat-based products, with fewer fresh fruits and vegetables (Saleh et al., 2002). It is important to note that although migration does not necessarily have an adverse impact on the health of migrants, there are instances where migrants may struggle to maintain good health conditions during their migration. Such circumstances may lead to health issues later on. (Harding, 2003). Food neophobia is another phenomenon that develops in migrants, particularly recent migrants (Dovey et al., 2008), where the fear of trying new foods develops as an adaptive response to the consequences of a lack of cultural food availability (Sarin et al., 2019, Hazley et al., 2022, Quick et al., 2014).

Migrants acceptance of their host country's food culture is affected by migration, with terms such as "our food" and "their food" used to describe the food culture of both countries (Garnweidner et al., 2012). Different tastes and distrust of unfamiliar foods can all contribute to one's denial, leading to the disapproval of a country's food culture (Vahabi and Damba, 2013). In a study of Norwegian migrants, it was found that migrants sometimes viewed host country food more as a snack than a meal because of nutritional deficiency, flavourlessness and lack of satisfying food culture (Vue et al., 2011, Garnweidner et al., 2012). In addition, Spanish and Portuguese migrants in Canada have reported unsatisfactory views about traditional Canadian food (Vahabi and Damba, 2013). Similarly, Sudanese migrants in Canada have reported having excluded a large range of food items from their diet because they perceived host country foods as high in fat content (NCDs) (Mannion et al., 2014).

The transition to a new diet presents challenges among migrants who are more rooted in their cultural habits due to emotions, traditions and familiarity (Mycek et al., 2020). Language barriers and labelling conventions can hinder access to traditional foods as migrants may use different names for certain food items or ingredients (Rosier, 2012). Muslim migrants may find it difficult to choose affordable halal products, especially those without additives like mono, and di-glycerides because of limited language skills (Dharod et al., 2013). It has been reported that Libyan migrants in Australia (Begley et al., 2019) and Hispanic migrants from the United States (Gans et al., 2003) encountered language barriers in comprehending nutritional values in local food labels.

While migrants face barriers in accessing traditional flavours and ingredients, they make adjustments with similar local ingredients to maintain traditional flavours, eating habits, and cultural traditions (Berggreen-Clausen et al., 2021). In a study, it was found that Indian migrant workers and students commonly indulged in processed foods, but the study relied on unrandomized samples, limiting its applicability to the entire population (Jonnalagadda and Diwan, 2002). However, many studies compare varying levels of ethnic minorities food intake with those of a majority ethnic group, in the migrated country (Jenum et al., 2012, Jenum et al., 2005, Tillin et al., 2005). Evidence also shows that migrants consume fewer traditional foods, such as beans, lentils, cereals and grains, because they consume more processed foods (Talegawkar et al., 2016, Misra et al., 2009b). Furthermore, Migrants have adapted to include local quick meals such as pizza, meat luncheons and sausages in their diet instead of making traditional meals by themselves (Rico-Campà et al., 2019). Therefore, there is evidence to suggest that adaptations to processed and fast food-rich diet is associated with health problems, especially non-communicable diseases among migrants (Gee et al., 2006, Renzaho et al., 2008, Abate and Chandalia, 2007). Identities and tastes are cited as two driving factors in a different model developed by Koctürk-Runefors (Kocktürk-Runefors et al., 1991).

2.6 Cooking at home

A constant change has taken place in eating habits since the 20th century, with people spending less time in the kitchen preparing meals (Warde et al., 2007, Soliah et al., 2012). Cooking at home isn't a hassle for migrant women in New Zealand, though the food may not taste the same as in their homeland (Longhurst et al., 2009). The act of cooking meals can be a useful tool for developing self-reliance (Szabo, 2014). One's ability to prepare food is an indication of one's self-sustenance, as well as one's ability to manage one's food habits effectively and this might vary from person to person (Simmons and Chapman, 2012). A better understanding of cooking techniques, practices and habits has increased the prevalence of home cooking in conjunction with healthy eating habits (Wolfson and Bleich, 2015). Every culture has noticed a decline in its ability to cook since the advent of processed foods (Worsley et al., 2015b) . Despite evidence that home-cooked meals are much healthier with health benefits, migrants still have difficulties with access due to limited time or availability causing them to rely on processed foods (Jones et al., 2014).

2.6.1 Barriers to cooking at home

It was found in a study based on photo-elicitation that individuals do not cook because of a lack of time and easy access to food, however, a go-along interview should have provided additional

insight into the study findings (Mills et al., 2017). A person's living situation can influence his or her mood when cooking (Wolfson et al., 2016). Planned meals may not be a problem, however, meal preparation, including cooking, is difficult for those working full/part-time since fatigue levels are higher, not to mention fatigue is associated with low energy levels (Storfer-Isser and Musher-Eizenman, 2013).

Researchers suggested that entire cultures have undergone substantial changes in their ability to choose and cook (Lang and Caraher, 2001). The level of cooking skills has also been reduced in a similar manner (Beck, 2007, Worsley et al., 2015b). Accordingly, prior research indicates people who regularly cook at home and incorporate a significant level of culinary skills tend to make better food choices and consume better nutrition (Wolfson and Bleich, 2015, Chen et al., 2012, McGowan et al., 2017). According to several studies, domestic food preparation takes up less time in households (Pettinger et al., 2006, Soliah et al., 2012). The lack of time is a major barrier to preparing home-cooked meals, followed by cleaning chores, washing used appliances, lack of equipment in the kitchen, and exhaustion from cooking (Soliah et al., 2011, Walter et al., 2010). There is evidence suggesting that the increased accessibility of ready-to-eat processed foods has reduced the need to cook at home (Monteiro et al., 2013, Moodie et al., 2013, Monteiro et al., 2010).

However due to the inability to cook or with low cooking skills, quick and easy foods have been shown to be consumed more frequently (Van der Horst et al., 2011). Research conducted in Europe found that only 30% of a household's overall food expenditure was spent on ingredients for cooking from scratch, while the rest was spent on ready meals and meals consumed in restaurants (Daniels and Glorieux, 2015). Moreover, another study found that only 20% of Belgian households spend most of their food expenditures on fresh ingredients, the rest consuming fresh food in combination with some type of convenience item (Daniels et al., 2015). .

2.7 Summary

The literature review provides brief details about migrations and their causes, followed by the current trend of Indian migration to New Zealand. Literature-based evidence on migration benefits for migrants and host countries was also found. Details on extrinsic and intrinsic factors affecting food choices and eating habits in foreign countries were also explained. In addition, their relationships to personal identity, attitudes and religious norms are provided. Also, the literature review chapter presented evidence and findings from previous literature on migrants challenges. Based on the literature review, key findings included the role of religious and cultural values in

food choice. It was also identified that religious laws play a significant role in migrants lives and food choices. Other findings were also associated with barriers to navigating the local food market, income status barriers, and organisational barriers that affect food choices and eating habits among migrants.

The literature review identified gaps that could be addressed via semi-structured interviewing combined with an open-ended questionnaire to gain in-depth information about the factors contributing to barriers to cooking. According to many researchers, knowledge alone cannot change dietary patterns, therefore, it makes sense to include a question related to this in the questionnaire and utilize a larger sample size to have accurate results. There was also a gap identified in research utilizing unrandomized samples and identifying the overindulgence of Indian migrant workers and students in processed foods. However, a randomized sample size would provide more reliable results and enable the current research to draw more accurate conclusions in this study.

Based on the findings and gap in the literature, the next set of chapters aimed to utilize mixed-method research enabling to study of small and big sample groups and comparing the factors influencing food choices and eating habits among Indian migrants in New Zealand. In addition to literature identifying themes related to extrinsic and intrinsic factors, the study further utilizes the ecological model for health promotion programs model to identify influential factors at different levels.

Chapter 3: Methodology

This chapter highlights the methodology used for data collection and analysis. A detailed explanation of data collection methods, participant recruitment and data analyses are provided. Ethical approval was granted from the Massey University Human Ethics Committee: Northern application NOR 22/06. Participants involved in the research were given the information sheet and explanations when required for the study before signing the consent form.

3.1 Qualitative Research

3.1.1 Study design:

An observational study design using qualitative research methodology was employed. Semi-structured interviews were conducted to allow an in-depth exploration of the perceptions, attitudes and personal experiences related to food choices and eating habits among Indian migrants in New Zealand. The qualitative research design allowed for the identification of themes emerging from the data (Malterud, 2017), and it generated rich information based on the experiences of participants (Sandelowski, 2004).These interviews were conducted by the lead researcher Ayesha Mushtaq Ahmed who is of Indian descent and culturally knowledgeable. Interview questions included an open-ended questioning technique for investigating the influences on the choice of food and eating habits. Furthermore, the nature of the questions proposed was on exploring any changes post migration e.g. adaptations to New Zealand food culture, religious acceptability, influences on work patterns of eating and a host of other questions (see interview guide in Appendix C). Demographic details of participants were asked such as duration of stay in New Zealand, age, marital status, current living status and current occupation as a part of data collection (refer to Table 3).

3.1.2 Participants:

Indian migrants residing in the whole of New Zealand were eligible for participation based on the inclusion criteria, and migrants not of Indian ethnicity were excluded from the study based on the exclusion criteria. The recruitment criteria did not include any age or gender restrictions.

3.1.3 Recruitment:

Recruitment was conducted using snowball sampling techniques (Siddiqui et al., 2016) through networks between the community organisations facilitated between the 1st of June through the 30th of June 2022. Flyers were distributed through Indian associations and social media platforms, such as Facebook and word-of-mouth. Recruitment did not concentrate on a specific city but instead included the entire of New Zealand. The lead researcher joined the Facebook pages of various Indian communities in New Zealand to seek permission to advertise. The Facebook page administrators were contacted and described the study and its benefits to the Indian community. Following the inclusion and exclusion criteria (Indian migrants in New Zealand), twelve migrants were selected to participate based on the exclusion and inclusion criteria. Participants were interviewed until the point of saturation was attained. Additionally, participants email addresses and contact information were exchanged, information sheets were sent, and consent was sought via Email, Facebook Messenger and WhatsApp.

3.1.4 Data collection:

Following the rules of COVID-19, the implication of maintaining social distance for this research method was considered under all circumstances. Furthermore, isolating from carrying symptoms or being affected by COVID-19 was meant to be implied in such circumstances. To ensure the safety of both researchers and participants, strict adherence to the COVID-19 protocols was followed throughout the research process. Interviews were postponed when the participants showed any sign of the virus and were conducted after the person had recovered. This allowed for the interviews to be conducted in a safe and comfortable environment. Therefore, semi-structured interviews were conducted over mobile calls or via Zoom calls to avoid face-to-face contact. Interviews were scheduled at the participants convenience and took between 15 and 20 minutes to complete. To maintain confidentiality, the interviews were conducted without the presence of anyone else. Interviews were conducted in English since all participants had fluent English skills as they had completed their education in English standards and all participants worked in a variety of professional fields in New Zealand. Data collected through interviews determined the point of data saturation (Alam, 2021) to be the 12th participant, since no new findings were found in participants from 10th interview. One interview was omiited from the final analyses as this participant has been in New Zealand for more than 10 years. The focus was to concentrate on recent migrants (less than 5 years since arriving in the country). All interviews were audio recorded using a laptop and stored

on a password-protected computer. Interviews were transcribed (verbatim) manually by the lead researcher Ayesha Mushtaq Ahmed.

3.1.5 Data analysis:

The identification of themes was done by using the software NVivo (NVivo 12 pro, QSR International Pty Ltd., Daresbury, Cheshire, UK). The thematic analysis method eased and supported the study by identifying, analysing and interpreting qualitative data, and also supported dividing large amounts of data into simple and clear categories. The thematic analysis included six phases namely familiarizing, generating initial codes, searching for themes, reviewing themes and defining and naming themes (Kiger and Varpio, 2020, Braun and Clarke, 2012). Firstly audio files were transcribed into text (verbatim) format to read and get familiarized with the data, and then again based on that the data were categorised and analysed appropriately. Getting familiar with the data set was the first step in thematic analysis, which required repeated readings to get more understanding of the next step of generating codes (Braun and Clarke, 2006). After the familiarizing step, initial codes were generated using NVivo software to bifurcate the data and the data were labelled, and appropriate notes were made for the next step.

The coding structure was developed based on the multiple levels of the ecological model of health promotion (McLeroy et al., 1988). In the second phase, codes were generated rather than themes, breaking down the data into smaller pieces, making it easier to identify and analyse key themes after familiarizing oneself with potential data items, questions, and connections between them (Boyatzis, 1998). After coding the data, various patterns were identified and grouped into different themes. Codes were analysed to identify broader themes within the coded and collated data (Braun and Clarke, 2006). Even though themes were main headings with a set of codes in them, they were set in order with the previous and next themes making a flow of themes. Despite the theme's independence, they were linked together as an analytical story that makes sense to make it easy for the reader to understand (Braun and Clarke, 2014).

The accuracy of the themes was then reviewed and compared four times with the data to identify any missing information. The first and third reviewing was done by the lead researcher and the second and final review was completed by the primary supervisor (Ravi Reddy). Also, the reviewing and comparing were done to ensure that it fits correctly, data between themes must also be distinct, aside from commonality and coherence so that the themes have different sets of codes in them and this also helped make efficient and concise theme mapping (Attride-Stirling, 2001, Braun

and Clarke, 2006). After they were given names to define and understand the name the revised thematic map encompasses all coded data, the first analysis level was completed (Braun and Clarke, 2006). At level two of the 4th step (reviewing themes), it was determined whether the data map represents the whole data set accurately and whether individual themes fit within it, completing the whole of the fourth set (Braun and Clarke, 2006). Next, a list of themes were made, and they were given names to define and understand the name and theme of the analysed data. As part of step 5, each theme was described and defined, along with a reason why it is relevant to the larger study question and then analysed themes are explained by a coherent narrative (Braun and Clarke, 2006). Lastly, a report was prepared as a continuous analysis based on the identified analysis, the report was generic, concise, relevant and interesting for the reader to follow. Analysis and interpretation were not presented as a 'separate stage', but rather as a continuation of analysis and interpretation. The first set of coding included up to seven themes namely: Deciding when and what to eat; Food familiarity; Cooking methods; Outside food; Eating habits; Adapting new habits post-migration and needed dietary requirements in New Zealand. Due to uncommon links with the primary themes, they were further subdivided into five themes namely: Deciding when and what to eat; Eating takeaways or dining out; Missing regional food items; Requirements and time management to cook. The first two revisions of themes were completed by the lead researcher Ayesha Mushtaq Ahmed. Finally, based on the primary researcher's review (Ravi Reddy), the codes were recommended to be consolidated and reduced to four themes namely: pricing (high costs), Availability of food items, Cultural and family influence and Influence of food environment (Refer fig 2 “emerged themes”).

3.2 Quantitative Research

3.2.1 Study design:

An anonymous online questionnaire survey was conducted with a purposive sample of Indian migrants to collect data on their food choices and eating habits. Following the semi-structured interviews, an adapted version of the FCQ questionnaire was developed, along with their theoretical connections. Approximately 10 minutes were required to complete the questionnaire, and participants were entered into a draw to win one of two $50 gift cards.

Table 1. Theoretical framework and linked questions

Theoretical framework levels	**Linked Questions**
Individual	*It is important to me that the food I eat on a typical day* is familiar to me.
	It is important to me that the food I eat on a typical day is what I usually eat.
	It is important to me that the food I eat on a typical day Is easy to prepare.
	It is important to me that the food I eat on a typical day keeps me alert and awake.
	It is important to me that the food I eat on a typical day provides health value.
	It is important to me that the food I eat on a typical day taste good.
	I eat home-cooked food.
	I eat takeaway food.
Interpersonal	*It is important to me that the food I eat on a typical day* is the food that my friends or family eat.
	It is important to me that the food I eat on a typical day is available at my work or normally eaten by my workmates.
Organisational	Work Patterns and job demands influencing food choices.
Community	*It is important to me that the food I eat on a typical day* is food that caters to my religious beliefs (e.g., Halal, vegetarian, etc.).
	It is important to me that the food I eat on a typical day is similar to the food I used to eat in India.
Policy	*It is important to me that the food I eat on a typical day* is easily available in shops and supermarkets.
	It is important to me that the food I eat on a typical day is not expensive.

3.2.2 Ethical approval:

Ethical approval was granted from the Massey University Human Ethics Committee: Northern application NOR 22/06.

3.2.3 Participants:

India-born migrants residing in New Zealand regardless of gender, religion, or length of stay were eligible to participate. Exclusion criteria included participants who were of Indian origin but born in New Zealand.

3.2.4 Recruitment:

One hundred and ten participants were recruited through social media platforms in the Indian community from October 10th to November 17th, 2022. A study-related advertisement was also distributed for a display to Indian store owners in Sandringham, Auckland.

3.2.5 Data collection and measures:

An adapted version of the food choices questionnaire (FCQ - 36-item) (Steptoe et al., 1995) was used to collect data. The adapted version was informed by the findings of the semi-structured interview phase of this research. Amendments to the original FCQ included items related to health, similar food items to India, takeaway, catering to religious beliefs, and home-cooked meals (see Appendix D).

Demographic information included visa status, employment status, length of stay in New Zealand, and current living situation. Online anonymous data was collected, using the Qualtrics XM platform **(**"Qualtrics", an SAP America Inc. company). The survey food choice-related items were measured on a 5- point scale ('Never - everyday' and 'disagree - agree'), open text fields (refer to table 2) and could be completed in approximately 10 minutes. Participants were offered to seek summary results by contacting the researcher should they wish to.

Food Choice Questionnaire (FCQ)

The questionnaire was adapted from the 36-item validated questionnaire developed by Steptoe et al (1995). Each item in the questionnaire is classified based on nine factors, including health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical considerations.

Amended questionnaire

According to the preliminary phase findings, the questionnaire format was updated, and new questions were added to the survey. Questions were added related to the factors of ethics, concern, religion, and familiarity (which were not included in the FCQ) as per the findings of the semi-structured interviews. The new questions from these factors were if it is important to me that the food, I eat on a typical day based on the options "is available at my work or normally eaten by my workmates", is the food that my friends and family eat; is available at my work or normally eaten by my workmates and is food that caters to my religious beliefs (e.g., Halal, vegetarian, etc.).

Table 2. Online survey questionnaire (see Appendix D)

Item	Scale
I eat home-cooked food.	• Never • Once a week • 2-3 times a week • 4-6 times a week • Daily
I eat takeaway food.	• Never • Once a week • 2-3 times a week • 4-6 times a week • Daily
My work pattern and job demand influence what I eat.	• Strongly disagree • Somewhat disagree • Neither agree nor disagree • Somewhat agree • Strongly agree
It is important to me that the food I eat on a typical day: a) is similar to the food I used to eat in India. b) keeps me awake and alert. c) is what I usually eat. d) is food that caters to my religious beliefs (e.g., Halal, vegetarian, etc.). e). is the food that my friends and family eat. f). is available at my work or normally eaten by my workmates.	• Strongly disagree • Somewhat disagree • Neither agree nor disagree • Somewhat agree • Strongly agree
It is important to me that the food I eat on a typical day: a). is easy to prepare. b). tastes good. c). is not expensive. d). provides health value (low calories, low in fat, high in fibre, etc.). e). is familiar to me. f). is easily available in shops and supermarkets.	• Strongly disagree • Somewhat disagree • Neither agree nor disagree • Somewhat agree • Strongly agree

Chapter 4: Results

This chapter will present the findings of the current research. The findings of the qualitative study (semi-structured interviews) are presented first, followed by the findings of the questionnaire survey. For each stage, a demographic overview of the participants recruited is provided.

4.1 Semi-structured interviews

Twelve participants were interviewed until the point of data saturation was determined by the eleventh participant. Due to the extended duration of one particular participant's stay in New Zealand, exceeding 10 years, their interview was excluded from the final analyses. As the aim was to focus on individuals who are considered recent migrants, those who have resided in the country for less than 5 years since their arrival. Eight males and three females made up the sample. Selected participants had been in New Zealand for a period of 3 to 5 years (2017-2022). All the participants were from different parts of India and worked in different fields refer the Table 3 below for more details.

Table 3. Socio-demographic details

Socio-demographic details of participants	
Age range	25 – 43 years male and 26 to 45 years female
Professional area	Healthcare; food service industries; finance; information technology
Stay duration in New Zealand	3, 4 and 5 years
Indian region locations	Kerala (southwest corner of India) Punjab (northwest region of India) Mumbai (west coast of India) Bangalore (southern part of India) Bengal (north-eastern part of India) Hyderabad (south-central India) Chennai (south-east part of India)
New Zealand locations	Hamilton (Waikato region) Auckland (north-central North Island) Palmerston north city (South-East of the North Island) Christchurch (eastern South Island)

Range of religion	Hindu, Muslim, Christian

4.1.1 Emerged themes

According to Figure 2, the semi-structured interviews revealed many themes and sub-themes which illustrate the level of ecological models for health promotion (McLeroy et al., 1988). These themes indicate the need for multi-level resources and support. Moreover, the data suggest the need for tailored interventions that address the specific needs of communities.

1.0. Pricing (high costs)

2.0. Availability of food items

2.1 Regional food availability

2.2 Food culture adaptations

2.3 Substitution of cultural foods

3.0. Cultural and family influence

3.1 Religion-based food acceptability

3.2 Barriers to cooking traditional food

4.0. Influence of food environment around and in the workplace.

4.1. Reasons for takeaways food dependence

4.1.1 Takeaway food variety

4.1.2 Time of work influencing food choices and eating habits.

Figure 2. Emerged themes

Theme – 1.0: Pricing (high costs)

Healthy food (including ethnic food) items, such as vegetables, were reported to be costly. This makes it difficult to determine the actual cost of the edible portion, which is why it may appear to be more expensive than it is.

"I'll tell you don't get "Thurai" (ridged gourd) vegetable here and if you get then it's nearly $40/kg here, and after you peel it off and after de-seed then everything you hardly get is only 40% of the vegetable which is expensive here."

It was found that the cost of healthy food is much higher than the cost of unhealthy fast food. It is also reported that even with extra income/job it would be difficult to eat healthily, leaving no option but to choose the less expensive option.

"Food is not cheap ... if I had not been investing in food, I would have had a Ford Ranger… even if I was just on two jobs it would be an issue to buy healthy foods. In New Zealand sometimes food items are very expensive. I have seen people relying on McDonald's as they get cheap food, like why would you buy a fish for $11 when McDonald's serves you a fish burger for $2 or $3."

Theme – 2.0: Availability of food items

Participants mentioned that food availability means being able to buy ethnic-based and familiar foods at a lower price and in closer areas. Due to the scarcity of certain food items in small towns in New Zealand, participants cited availability as an issue, as well as travelling long distances to buy monthly supplies.

"Out of all the problems it is finding an Indian grocery store in small towns".

"We would have to travel for around 1 to 1 and half hours or more, from Hanmer Springs to get our food groceries monthly or sometimes when required, which are mostly available in cities."

Sub-theme 2.1: Regional food availability

Participants report that the availability issues of regional food products have been consistent over time and the pandemic has only had a limited impact on the availability of imported food items.

"I don't see any drastic changes over time in terms of food choices it's just the availability of your regional food whether it is in Indian or Sri Lankan shops or something like that, and also due to supply chain issues because of the pandemic you might find it difficult to find the exported foods."

"Some foods we get only in India."

Participants located in the Urban areas were shown to have access to a wide variety of familiar and local Indian food items. However, word of mouth and social media have proven to be the most effective tools for finding out where some of them can be found.

"I Nearly find 90% to 95% of foodstuff…"

"I know a Sri Lankan shop and the owner of the shop where we get a lot of Indian things like parathas, kokopu, rice flour and all…"

For participants staying in rural areas, there aren't many Indian regional food stores as reported.

"But at least in Auckland when you have good Indian restaurants quite a few good restaurants where you can go and have proper Indian food, so you don't miss that much but you know in Nelson which is a very small place it's difficult to find Indian food items, we had to travel far to get them."

"I can cook Indian dishes myself here, but it depends on if all the ingredients are available…. most of the time ingredients can be found in different ethnic stores, you know like the Asian ones, and then also in Sri Lankan food stores, it's all about knowing the places to find them."

Participants report that Indian restaurants here don't offer the same variety of flavours and textures as home country restaurants.

"You should visit Bangalore and see how authentic they taste"?

"If you can go to Bikaner or you can get Pani-puri over there, but they are just packaged ones and the taste isn't even close to what we get in India..."

Furthermore, participants reported that, as a result of the limited supply of these ethnic festival-based vegetables, they compromise values relating to Indian traditions and food culture.

"For the festivals like Onam we require a wide variety of vegetables, so the menu starts from papad, dry pickle and a variety of semi gravied vegetable sides and at that time most of the people buy those vegetables and there is only limited stock which makes it more difficult to purchase those vegetables."

When participants were asked what changes could be implemented in New Zealand, they provided several suggestions related to easy access to food depots. Similarly, they called for Indian restaurants to be more diverse in terms of regional cuisine.

> *"That's one thing that you feel it's difficult and like there can be like small depots in every town or every city making this easily accessible. So, it will be helpful for all Indian people."*

Sub-theme 2.2: Food culture adaptations

Following migration to a new country, participants became aware of the food and beverage culture being different and based on what was available, they learned to accept the new culture.

> *"Because you know it is not that you have Indian tea stalls each and everywhere here you know, it is more about cafes which is why I have started liking having more coffees."*

> *"After coming here my dietary lifestyle is changed as I have started having more fruits and vegetables and I have also started losing weight."*

Participants showed keen interest in developing healthy eating habits and report migration provided access to healthier options.

> *"One of the primary reasons is because in India most of the fruits like apple are contaminated with pesticides so we were hesitant to have fruits there, but after coming here, the quality of food and all this is very good so generally, we as a family got more attracted towards buying more fruits and vegetables."*

> *"I just want to have a balanced diet to be conscious of what I am eating right but currently and I'm not conscious of what I'm eating and I'm only conscious of my hunger, but I am working towards this change."*

Sub-theme 2.3: Substitution of cultural foods

Food items from different Indian regional cultures were discussed, some not available in New Zealand. It has been noted that participants have shown a willingness to substitute local Indian-region food items for healthier items found in New Zealand despite the lack of availability of these items post-migration. Additionally, participants stated that they could easily substitute locally available items for Indian dishes.

"..Chole(chickpea) grounded, dried and powdered kind of thing you get in Bengal or Bihar named Satu, that keeps you full for a longer time, and it gives you a lot of energy and helps with your gut health because it not available here I use protein powder instead as this also provides similar advantages."

"Indian food, in general, is very healthy and nutritious you know, even the snacks if you see are made from Besan (gram flour), or you know even home-made chips like banana chips you see.."

Participants were shown to be relying heavily on frozen foods due to availability as shown earlier and the high cost of healthy food options (ethnic food and local produce as well).

"We are forced to cook frozen vegetables as they are the only option over here and frozen items have many varieties as well, we are consuming majorly frozen items here instead of fresh ones like in India, other than that there are no issues."

"If you take a drumstick, either because it is frozen for a long time it just doesn't cook properly, I have tried cooking a few times, but I failed every time, so I completely took it out of my diet."

Theme – 3.0: Cultural and family influence

Participants have shown an intense connection to food based on their familial influences which have influenced their eating habits as well.

"I have been growing with this food since my childhood. So, I crave that... and I know I have been always like an assistant to my mom. She cooks phenomenally and I have been always following her, so keeping a bit of this and that on my head when I cook."

"Well, I am vegetarian and the reason being that in my family we have only eaten vegetarian food, so I was conditioned to have vegetarian, so after coming here of course there are a lot of fewer choices here when we go out to restaurants and all."

Furthermore, participants have also shown that they want to stay connected with their communities.

"I did my research before coming here and we do have an Indian community out here. We had an Indian community in Nelson also well there are lots of migrants now in Nelson."

Participants even after staying connected to their communities yet were seen to adapt eating habits and food choices with whom they were in contact regularly.

"... I stay with flatmates and we all are Indians, we all are Hindus and we eat vegetarian food and as flatmates, we help each other with cooking and cleaning dishes ...not that our food tastes great but we tend to enjoy what we can cook...since I have been staying with them I have started eating more ghee, which I never use to before and I also like the taste now, it makes the food taste even better, we always have it with most of our meals it is just there on the table always.."

Sub-theme 3.1: Religion-based food acceptability

Religion was seen to play a significant role in participants decision-making about what foods to choose. Muslim participants had difficulty accepting food at any restaurants because they were not sure if they were halal compliant. Because of this, they were sceptical about choosing food items.

"Even to have the fish and chips you know it's so difficult to look for halal-compliant places due to the fear of cross-contamination."

"One of our Muslim friends over here recommended a restaurant that made it easy for us to accept food at a particular restaurant as lots of people from our community place their trust in this place and that is the reason, we went for them."

Participants were seen as comfortable sharing space (in terms of living) with people who share their values and beliefs about food. Sadly, a similar reason prevents Hindus from opting for vegetarian options throughout New Zealand, as not many restaurants seem to offer a vegetarian variety on their menus. Hindus who stick to their beliefs find it difficult to eat outside.

"Because they cook vegetarian and I can eat, and basically like I'm quite lucky that people who I'm sharing the place with they all were my classmates back in India as well. Yeah, they all come from the same cultural and religious background."

"We have only eaten vegetarian food we are from the Brahmin religion, so I was conditioned to have vegetarian, so after coming here of course there are a lot of fewer choices here when we go out to restaurants."

Sub-theme 3.2: Barriers to cooking traditional food

Post-migration participants reported developing cooking skills. It seems participants got support from family back home (pre-migration) in cooking and maintaining a household, but post-migration they are on their own, which allows them to practice cooking on their own.

"Initially, when I started cooking, I was not good at cooking and the taste was not good as well."

"So, I've learned the cooking after coming to New Zealand because earlier I was staying with my family, so there was never really full-fledged cooking over there by me."

It has been noted that not all enjoy cooking and that some cannot cope with their hunger, resulting in them eating unhealthy foods.

"I'm not a great cook I cook to survive."

"I never knew how to cook so I started learning cooking after coming here and always situations in life have made me survive even on biscuits, Maggi or even Coca Cola to be honest."

Theme - 4.0: Influence of food environment in and around the workplace

Workplace atmosphere especially working with diversity has been shown to influence food choices or eating habits as per the reports. This influence helped participants to indulge in different communities.

"So mostly those two days we colleagues will go and have lunch at some place, and I like to, you know, kind of rotate between all the available options like one day if it's Indian, one day it's Thai or one day Vietnamese so we are used to trying different cuisines as my colleagues are from these places."

Whereas on the other hand, it was found working remotely can be a great way to save time on commuting, but it can also disrupt a person's daily routine related to eating habits.

"Because I don't go to the office daily, especially since the pandemic, I can work with my office laptop from anywhere, so this disturbed my daily routine … I don't eat breakfast, I just ate lunch directly because I can sleep in more and get up late, rather than waking up early and going to the office."

Sub-theme 4.1: Reasons for takeaway food dependence

Eating food in restaurants or takeaways is associated with limited time but also with availability. Additionally, other factors like low cooking skills were reported to be the reason for dependence on takeaway foods.

"There are a lot of fast foods that have come up, but fast foods are not healthy, so I feel there must be more options on salads and vegetarian options I can say. I know there are already, but I feel more options are better in restaurants."

"Once again, you know If you are in a time crunch you just want to go and grab something from the takeaway."

Participants have reported fatigue as the factor to prevent them from cooking meals at home, especially after work hours. It is clearly understood that those with working status have lower energy levels after work, which can even affect their mood.

"When I'm at home I don't feel like cooking because I am so tired, and I would prefer to do other things."

"You know who wants to come back from work and make food? So yeah, we buy it from outside, but then again it also depends on if I am in the mood to cook…"

"It's still something which we make some kind of a quick fix like, you know, just a burger or sausage roll or something like that."

Participants did not enjoy eating out but only choose to have it due to limited time related to working. The range of eating out was reported mostly more than twice a week.

"It's mostly at least once a week, or sometimes if I'm tired after my shift and sometimes I don't cook, it's twice a week sometimes."

"I eat from outside probably two days a week. Not more than that, it's just on the weekends…"

"About takeaways would say recently about 3 days at least and mostly for dinner."

Despite their lack of confidence in the quality standards of restaurants or takeout, participants relied on takeout or outside food due to their limitations in cooking skills.

"I am not a great cook you know… I try making good food, but it never tastes good that's why I go buy food from outside, I know they are not very good for my health, but I think it is okay, at least I can eat food, which makes me feel good, I mean the taste is a lot better than what I make. "

Sub-sub-theme 4.1.1: Takeaway food variety

Variety was stated to be important, especially when buying groceries or making food at home. It showed that variety allows participants to make better food choices, including western and traditional dishes.

"I have been to other places, but I didn't find any variety over there but at one particular shop, I get a variety of options and that is one thing, and I think that's the main breaker for me."

"Sometimes I want the variety and sometimes it's not traditional every day, but Some days it's the traditional flat bread and egg, which is called 'Anda paratha' in our language, or again sometimes it's you know if we want a change, we have French toast with Maple syrup or honey."

Sub-theme 4.2: Time of work influencing food choices and eating habits

Eating habits were seen to be highly influenced among participants due to the work culture and other factors related to work timings, availability, and convenience. It is understood that participants busy lifestyles do not allow for the time necessary to prepare a meal from scratch due to their busy working schedules. Instead, they rely on convenient options like pre-made frozen meals and use ingredients that are already available.

"It's like if you are in a hurry and when there's no time and you need to be at a work meeting, you just have some cereal or cornflakes, or oats…. and we just microwave the oats for a couple of minutes and then have it with some honey or some chopped fruits."

It is further relayed that there have been drastic changes in pre and post-migration eating habits due to work timings.

> *"We used to have late dinners at 9 or 9:30 or even 10ish because people used to come back around 8:30 pm from the office. So, dinner would be late for us, I have noticed that sometimes we had at 11 pm or even midnight."*

> *"I don't have time to make the flour into the dough and make rotis from scratch because of limited time here. I just get a frozen bread meal and make a bit of salad. Just chop green tomatoes, potatoes, onions, green chillies, yeah, white onion, red onion, onion, whatever comes in the hand. Just mix it along with a bit of curd."*

There was another set of experiences expressed where they struggled with eating timings post-migration and developed irregular eating habits, especially those staying by themselves alone.

> *"Yeah, so my timings have changed and even my meals have changed earlier it used to be proper 3 meals but now I only do 2 meals and I just need some snacks or maybe junk food in between just to ensure that I'm not feeling hungry. That is the one big change."*

Whereas some participants reported no changes at all.

> *"...generally I don't eat outside even back in India I didn't. I prefer mostly eating at home so here it's the same even when I'm working…. in my free time, I prepare meals and set for the days I can't cook. I just eat whatever I make, so that habit hasn't changed."*

Participants with shift working hours showed how long and tiring these work schedules are, leaving them with little time or energy to cook meals during the day. As a result, they are often forced to develop unhealthy eating habits such as skipping or delaying meals or even relying on pre-cooked dinners at work.

> *"So firstly, as I am a shift-based worker, I work 7 days a week like 18 hours shift a day… I come back home and then I might or might not cook but yeah, I think dinner is a definite meal I have but yeah lunch sometimes I miss it."*

> *''Because of the work session starting at around 12 in the noon, I cannot eat then, so I just drink coffee it gives me the kick to work… I think 12 is too early for me to*

have lunch here so the session ends around 2:30ish, so it's only after that I have my lunch.''

4.2 Questionnaire survey

A total of 110 Indian migrants living in New Zealand participated in this research (Table 4). Most of the participants were male between 35-44 years old (55%), married with dependents (66%), permanent resident or citizen (80%), employed full-time (87%) and have been in the country for more than 5 years (67%). As a result of the food choice questionnaire survey findings, the questions and their results can be categorized according to multiple levels of influence. Table 5 provides a summary of the survey results. This allows insight into the most common factors that influence food choices across multiple levels of influence.

Table 4. Demographics

Gender	***N***	**%**
Male	67	61
Female	42	38
Non-binary/third gender	0	0.00
prefer not to say	1	1
Age(years)		
18 – 24	5	4.5
25 – 34	36	33
35 – 44	60	54.5
45 – 54	9	8
55 – 64	0	0.00
Living status		
Married or in a partnership with dependents	73	66
Not married or not in a partnership with dependents	9	8
Married or in a partnership without dependents	18	16
Not married or not in a partnership without dependents / single	10	10
Years of stay in New Zealand		
Lesser than 3 years	17	16
3 – 5 years.	19	17
More than 5 years	74	67
Visa type		
Work visa	18	16
Student visa	1	1
Permanent resident	41	37
New Zealand Citizen	47	43
If other, please specify below	3	3
Employment status		
Employed full-time with no shift work	80	73
Employed part-time with no shift work	7	6.2
Employed full-time with shift work	16	14.5

Employed part-time with shift work	7	6.3
Professional sector		
Health care and social assistance	14	13
Retail trade	6	5
Manufacturing	19	17.2
Agriculture, forestry, and fishing	1	1
Transport, postal and warehousing	3	3
Construction	6	5.4
Education and training	6	5.4
Information media and Telecommunications	23	21
Administrative	5	4.5
Accommodation and food services	5	4.5
other, please specify*	*22*	20.00

** other, please specify professional sector areas Homemaker, Real Estate, Insurance, Software Engineering, Information and Technology, Facilities Management, Full-time Mother, Customer service officer, Project Management, Public sector, Laboratory Technician and Community development.*

Table 5. Food choice questionnaire (FCQ) survey results

Individual level					
	Never	*Once /week*	*2-3 times/week*	*4-6 times/week*	*Daily*
I eat home-cooked food	1 (0.91%)	4 (3.64%)	10 (9.09%)	45 (40.91%)	50 (45.45%)
I eat takeaway food	9 (8.18%)	55 (50%)	41 (32.3%)	3 (2.7%)	2 (1.8%)
It is important to me that the food I eat on a typical day:	*Strongly disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*Strongly agree*
food is familiar to me	1 (0.9%)	13 (11.8%)	16 (14.5%)	40 (36.3%)	40 (36.3%)
is what I usually eat	0 (0%)	10 (9%)	20 (18%)	60 (54.4%)	20 (18%)
is easy to prepare	6 (5.45%)	5 (4.55%)	12 (10.91%)	42 (38.18%)	45 (40.91%)
keeps me alert and awake	4 (3.64%)	5 (4.55%)	27 (24.55%)	48 (43.64%)	26 (23.64%)
provides health value (low calories, low in fat, high in fibre, etc.)	2 (1.82%)	4 (3.64%)	17 (15.45%)	41 (37.27%)	46 (41.82%)
taste good	1 (0.91%)	1 (0.91%)	6 (5.45%)	37 (33.64%)	65 (59.09%)
Interpersonal level					

It is important to me that the food I eat on a typical day:	*Strongly disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*Strongly agree*
is the food that my friends and family eat.	5 (4.55%)	20 (18.18%)	20 (18.18%)	43 (43.09%)	22 (20%)
Organisational level					
It is important to me that the food I eat on a typical day is available at my work.	*Strongly disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*Strongly agree*
	24 (21.82%)	29 (26.36%)	32 (29.09%)	19 (17.27%)	6 (5.45%)
my work pattern and job demands influence what I eat	19 (17.27%)	20 (18%)	16 (14.55%)	43 (39.09%)	12 (10.91%)
Community level					
It is important to me that the food I eat on a typical day	*Strongly disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*Strongly agree*
is food that caters to my religious beliefs (e.g., Halal, vegetarian, etc.)	11 (10%)	16 (14.55%)	10 (9.09%)	29 (26.36%)	44 (40%)
is similar to the food I used to eat in India.	4 (3.64%)	18 (16.36%)	22 (20%)	50 (45.45%)	16 (14.55%)
Public Policy level					
It is important to me that the food I eat on a typical day	*Strongly disagree*	*Somewhat disagree*	*Neither agree nor disagree*	*Somewhat agree*	*Strongly agree*
is easily available in shops and supermarkets.	3 (2.73%)	6 (5.45%)	14 (12.73%)	41 (37.27%)	46 (41.82%)
is not expensive	3 (2.73%)	10 (9.09%)	14 (12.73%)	43 (39.09%)	40 (36.36%)

Individual-level influencing factors

The taste good factor had the highest percentage (93%) of the participants showing agreement (strongly and somewhat disagree) to be an influencer to choose of food they make on a typical day and only 1% of disagreement was identified stating that this is not a significant influencer. Results showed that home-cooked food was eaten by 86% of participants (4-6 times per week to daily) and the other highly preferred (82%) option to eat was to rely on takeaways which ranged between once a week to twice or thrice a week. Around 80% of participants agreed (strongly and somewhat disagree) to choose food on a typical day that is easy to prepare. Another highly preferred factor under this level was choosing food to eat based on its health value where 80% (strongly and somewhat disagree) of the participants valued this factor on daily basis.

Interpersonal-level influencing factors

It was found that 63% of the participants agreed (strongly and somewhat disagree) that they ate food that their friends and family choose to eat, and in contrast, 22% of participants did not agree (strongly and somewhat disagree) to this factor influenced their daily choice of food eaten.

Organisational-level influencing factors

Almost 50% of participants agreed (strongly and somewhat disagree) that work patterns and job was seen to influence their choices of food and eating habits with 35% of participants disagreeing (strongly and somewhat disagree) with this influencing factor. Also, 48% of participants disagreed (strongly and somewhat disagree) that they would choose to eat food based on whatever is available at work, followed by only 23% of participants who agreed (strongly and somewhat agree) to this factor.

Community-level influencing factors

Around 66% of participants agreed (strongly and somewhat agree) that they would choose food that is catered for their religious beliefs on daily terms with only 24% of participants disagreeing (strongly and somewhat disagree) with this factor. Almost 60% of the participants agreed (strongly and somewhat disagree) that they choose food based on the similarity of food they use to eat in India followed by 20% disagreeing (strongly and somewhat disagree) with this.

Public policy level influencing factors

Around 80% of participants agreed (strongly and somewhat disagree) that they prefer to eat food that is easily available at the market this is a significant factor at this level. Again, the cost was also driven by what participants choose to eat where around 75% of the participants agreed to this makes an impact on the choice of food they make.

Chapter 5: Discussion

This chapter provides a summary of the main findings from the semi-structured interviews and questionnaire survey. This is followed by a discussion of the research findings about wider literature and the ecological model for health promotion. There is then an analysis of the implications of the findings. Finally, the limitations and strengths of the current study, as well as recommendations for future research, will be discussed.

Table 6. Theoretical framework with levels and themes

Theoretical Framework	
Level	**Themes**
Individual	Knowledge, attitude, skills, belief
Interpersonal	Family, friends, social network
Organisational	Workplace
Community	Cultural values, norms, built environment
Public Policy	Affordability (pricing), availability

5.1 Summary of the main findings of the semi-structured interviews and questionnaire survey

Ethnic food items were found to be in short supply, especially during the festive season, particularly in small towns. Healthy alternatives have been substituted for ethnic food items when ethnic foods aren't available. Cultural upbringing and familial influences on eating habits and food choices also played a significant role. The religious beliefs of many participants dictated where they bought their food, which limited their choices.

Participants who stayed with their partners or those with similar cultures and beliefs ate culturally appropriate meals whilst maintaining healthy eating habits. It was noted that participants are interested in adopting healthier lifestyles and experiencing New Zealand's food culture. Cooking skills significantly influenced food choices. Upon migration, some people develop cooking skills while others learn convenient quick fixes such as take-outs and easy-to-prepare meals. Furthermore, it was found that individuals in culturally diverse work environments chose foods and cuisines from

different cultures because of the working environment. The long work hours also contributed to fatigue in the participants, which caused them to rely on takeouts more than twice a week. The shift workers developed unhealthy eating habits, such as eating only one meal per day. Participants with full-time employment without shift work reported healthier eating habits.

The questionnaire survey found that 93% of participants agreed that taste was a driver of what the participants ate. Almost 86% preferred to cook their meals 4-6 times per week, and 82% preferred to take out food weekly once to 2-3 times a week. Other key findings from the questionnaire survey were that 80% of participants chose food that is easily available in shops or supermarkets, and 75% ate food that is not expensive. Other factors from the interpersonal and community levels were that 63% of participants agreed they would eat the type of food their family and friends eat, and 60% agreed they would choose similar food to the type they eat in India. Finally, an important finding was the preference for food that was religiously influenced and around 66% of the participants agreed with this factor.

5.2 Multi-level influence

Individual-level

As part of the ecological model for health promotion (McLeroy et al., 1988) participants reported factors such as their cultural upbringing, preferences and knowledge influencing their food choices and eating habits. It was found that participants diet is influenced by a variety of factors, such as the level of food restrictions associated with the religion they follow. Similar to social identities formed through family, peers, and culture, food identities are formed through beliefs, values, and preferences, although dietary patterns are the result of both individual and social factors (Chuck et al., 2016, Yun and Silk, 2011).

Religious laws related to food were another issue identified among participants which were preventing them from being open to all food-related options in the host country, for instance, participants practising Islamic religion were not trusting restaurants serving fish due to the fear of cross-contamination with non-halal food items thus limiting their options to buy. However, there are quite a few halal-compliant food options across New Zealand classified into three categories namely Halal outlets certified by FIANZ, Muslim-owned food shops (claimed to be halal friendly), and vegetarian (not halal or Muslim owned, claimed to be pure vegetarian) (Rutherford, 2020).

Most of the participants (66%) agreed that religious beliefs influenced their food choices, but some participants (19%) disagreed. In certain cultures, religion influences the types of food that are

acceptable, such as Islam and Hinduism, which place strict restrictions on the consumption of certain types of food items (Den Hartog et al., 2006). There were also reports in this study of emotional attachments to certain foods made in participants homes in India, for instance, one participant had a deep emotional attachment to the food he made with his mother during his childhood. It is through these sensory experiences that the sense of belonging is revived and a deep sense of attachment to home is maintained (Low, 2005). The participants believe that culturally rich food is high in nutrition, and this gives them another reason to preserve their preferences. Migrants like to remain close to their heritage by including foods from their culture (Azar et al., 2013). Indian regional food item “Satu” (grounded chickpea flour), which was eaten for its ability to keep the eater fuller for longer, improve gut health and for its protein content. There was an identical finding in the questionnaire survey, in which 80% of participants considered nutrition content when making food choices daily, showing the knowledge in this community on food choices is adequate. Most Indian cuisines are either vegetarian, vegan, or gluten-free, contributing to their versatility also Indian cuisine is full of herbs and spices giving it several advantages known to possess medicinal properties(Lakshman, 2023). Participants with poor cooking skills tended to indulge in instant noodles, biscuits and energy drinks like Cola, which shows an easy-fix attitude and addresses limited food preparation skills. It is possible to prepare nutritious meals with proper guidance, practice, and knowledge, and by upskilling this ability, the capacity to plan food budgets and prepare nutritious meals could be maximized (Terragni et al., 2020). The participants also reported selecting food that is easy to prepare to overcome limited cooking skills and tiredness due to work fatigue. Further supporting the results easy-to-cook options, store proximity, and takeaways options can influence a person's decision about what to eat in terms of convenience (Barreiro-Hurlé et al., 2010, Urala and Lähteenmäki, 2003).

The taste was found to influence 93% of participants food choices. These findings build on existing research stating that genetic characteristics, cultural upbringing, ethnicity, personality, and environment influence food choices and consumption, resulting in varying taste preferences (Chamoun et al., 2018, Barragán et al., 2018, Feeney et al., 2011). The perception of food by an individual depends on olfactory as well as gustatory mechanisms, as well as factors such as culture, genetics and geographical climate (Ventura and Worobey, 2013, Pollan, 2014). In this study, most of the participants stated that their food choices were based on familiarity, which is supported by the majority of participants (72%) and this is likely because people are generally more comfortable with familiar foods. Similar findings were found through the semi-structured interviews where food based on religious acceptance was prioritized showing this as a familiar practice they observed

throughout their upbringings. There is evidence that during the initial stages of moving to a new country, migrants rely on familiar home-country food items (Thomson and McFeeter, 2019, Southcombe, 2007).

Results of the current study showed that mood can influence food choice as 67% of participants agreed to choose food based on the level of alertness and awareness it provides. This supports previous study findings that food preferences are linked to mood consistently and predictably and also suggests mood can be a powerful predictor of food preferences (Leigh Gibson, 2006). There has also been evidence that the consumption of nutrients and food is associated with changes in brain activity that affect mood and behaviour (Zagon, 2001).

Participants reported the adoption of good eating habits as a result of migration, such as consuming more fruits and vegetables, and over 80% of the survey participants selected food based on health-related criteria. However, a recent study of South Asian migrants in New Zealand, reported a decrease in fruit and vegetable consumption and an increase in dairy product consumption (Parackal, 2023). Around 73% of participants agreed their choice of food is based on what they usually eat, and this result suggests that people tend to stick to their habits when it comes to food choices. As a way of remaining engaged with their culture, migrants often include traditional meals as part of all general community gatherings (Azar et al., 2013).

Interpersonal-level

The participants have reported that their eating habits and food choices are altered by who they spend most of their days with, for instance, participants who lived with a flatmate have developed eating habits and food choices they never expected. Peer influence impacts lifestyles and eating habits, and people mimic their friend's behaviour more than their spouse's, irrespective of whether it is towards healthy or unhealthy eating habits or food choices (Bibeau et al., 2012, Christakis and Fowler, 2007). Participants stated that there were some recipes that they never tasted like what their mothers made back home, despite trying the same dishes in Indian restaurants or at festival gatherings and this shows the level of family influence in this community. This is because each family has their unique preferences when it comes to spices and flavours, and recipes are passed down through generations showing that each family's cooking has its distinctive flavour and taste (Ramachandran, 2010).

Around 59% of participants agreed that their food choice and eating habits are influenced by what their friends and family eat, and this suggests that social pressure plays an important role in how

people decide what to eat. The people around a person have a great deal of influence over their mindset related to their dietary habits, especially those that are influenced by their interpersonal contacts (Intiful et al., 2021). A growing body of research indicates that social influences play a significant role in the development and maintenance of obesity due to powerful and pervasive influences on eating (Higgs and Thomas, 2016). It was also found that 55% of participants somewhat disagree that they make their food decisions based on what is available at work or what their colleagues consume, suggesting that people are making conscious decisions about their food choices during work hours. However, employees who were exposed to healthy food options at work were more likely to make healthy choices (van der Put and Ellwardt, 2022).

There was also a finding that approximately 87% of participants relied on takeaway foods, ranging from once a week to twice or three times per week. Social media has also been shown to play a role in influencing the eating habits of individuals, by creating a sense of confusion between food that is socially desirable and traditional eating (Malorgio et al., 2008). It is possible that participants felt that the home-cooked food offered/advertised on the Indian migrant Facebook pages has a great way of communicating with the seller and buying food products at better prices (Ladhari et al., 2019).

Organisational-level

Participants relayed that takeaways were easier to prepare and more convenient than home-cooked meals, especially for those with limited time and culinary skills. Additionally, certain factors (red meat, processed meat, alcohol) were found to be associated with working hours (Sam et al., 2019). Work-related fatigue influenced the lack of home cooking and the development of eating habits such as skipping meals and overindulging in high-energy snacks. A busy schedule can lead to fatigue and strain, leaving the employee feeling overwhelmed, unable to take care of their own food needs, disrupting regular meal patterns, and feeling pressed for time (Devine et al., 2009). Almost 50% of participants strongly agreed on work patterns and job demands influencing eating habits and food choices. Working employees often adopt eating habits that provide them with a quick burst of energy while saving time at lunch (Devine et al., 2003). Furthermore, inflexibility of working hours, as well as unpredictable work hours, were also identified as preventing individuals from being able to consume healthy foods (Welch et al., 2009).

Community level

At this level, it was found that participants remained deeply attached to Indian culture and traditions and that they consider family perspectives and ideas when choosing food items, especially during special occasions like festivals. This connection is observed to be a result of the migrants desire to connect to their cultural roots and celebrate their traditions in the new country they were living in (Azar et al., 2013). However, participants also reported that even when ethnic foods were unavailable or limited, they were still able to create traditional foods by substituting ingredients. This finding is supported by research looking into Ghanaian migrants in the UK, where the use of traditional spices was maintained with adaptations with UK-based ingredients (Osei-Kwasi et al., 2017).

The Participants have reported both positive and negative impacts, including staying connected to cultural festivals and people of similar backgrounds, as well as struggling to manage their homes on their own. Indian communities aim for harmony through interdependent relationships across all aspects of life, such as household management, career choices, and marriage selection as well (Chadda and Deb, 2013). As a result of sharing space with people from similar cultural backgrounds, participants developed a sense of community, and their food choices also changed based on their surroundings, as one participant chose coffee instead of tea due to availability. In multicultural societies, researchers have found that western food customs are easy to adopt, resulting in food items being substituted after migration (even in the early stages of migration) (Reddy and van Dam, 2020).

Public policy-level

In general, healthy foods, like vegetables (including ethnic-based food), were reported to cost more and food security depends greatly on the cost and affordability of food, which determines the food choices made (Pitt et al., 2017). Around 75% of the questionnaire participants agreed that the cost of the food products influenced their food choices with it. Migrants especially those from lower-income backgrounds have less access to resources, making it harder to purchase traditional and locally produced foods with hiked prices (Deng et al., 2013). It was reported that the availability of healthy food options (including ethnically based food items) was limited in small towns where there are few shops and options to buy. Around 79% of the participants (strongly and somewhat) agreed that the availability of food items greatly influenced their daily food choices and eating habits. The availability of certain types of food products nearby can influence food consumption choices, but

this can be a concern for people who have limited access to healthy food options as they may suffer adverse health consequences (Renzaho and Burns, 2006, Njomo, 2013, Sanou et al., 2014). According to the recent reports of the Indian high commission in New Zealand, the Indian food industry is experiencing rapid growth (11% of total goods imported) in New Zealand, indicating that it is an increase in the Indian food market (Pardeshi, 2022). This could offer more options and greater access to Indian food however the knowledge to access depends on person to person.

5.3 Summary

It was confirmed by this study that eating habits and food choices are influenced by many factors, including expectations about taste as well as societal influences, religion, culture, and food availability.Religious catering knowledge was commonly influenced at the community level. The participants preferred to maintain their community environment through various means, including traditional or ethnic-based food choices since they can foster a sense of belonging and togetherness. Participants food choices and eating habits were also impacted by organisational factors. At this level, fatigue was associated with long working hours which affected negatively the choice of food and eating habits among participants. These findings demonstrate that multi-level influences play a significant role in food choices among Indian migrants in New Zealand.

Chapter 6: Conclusion

This study is an exploratory cross-sectional study that uses the ecological model of health promotion (McLeroy et al., 1988) as a framework to explore the factors that influence Indian migrants food choices and eating habits. The aim of the research was to explore the factors that influence Indian migrants eating habits and food choices in New Zealand according to the ecological model of health promotion. The first objective of the study was to explore factors contributing to current food choices and eating habits, particpants were interviewed using open-ended questions which were designed on the levels of an ecological model of health promotion. As previously reported in the literature, a number of external and internal factors are found to influence food choices and eating behaviour (Steptoe et al., 1995, Pollard et al., 1998, Appleton et al., 2017, Renner et al., 2012, Đorđević and Buchtová, 2017).

The second objective of this study was to identify and understand barriers and supports of factors influencing migrants food choices and eating habits through an ecological approach. In order to identify this objective, both qualitative and quantitative methods were used. Using qualitative methodology, participants were interviewed and their responses were transcribed. This resulted in the generation of themes that helped in understanding the barriers to influencing food choices and eating habits. Based on the results of interviews, a questionnaire survey was conducted to collect information regarding the work environment, religious catering foods, familiarity and range of takeaways available during the week. The final objective was to propose recommendations for improving food choices and eating habits among Indian migrants in New Zealand.

To accomplish this, the most prevalent barriers to food choices and eating habits in New Zealand were identified through the study methods and outcomes. Using each level of the ecological model for health promotion, barriers have been categorised. Several influencers have been identified at the individual level, including cultural upbringing and tastes, knowledge level, cooking skills, etc. Participants have reported a variety of influencers at the individual level. A similar pattern has been observed at the interpersonal level, in that participants develop eating habits based on who spends the most time with them. It has been shown that time is limited at the organizational level because of the workload and work patterns among participants. This is to prepare healthy meals or make better choices. Moreover, ethnic food shortages have been found to be a barrier to healthy eating at the community level. The participants further expressed at a policy level that the most significant

barrier to choosing locally produced and ethnic foods is the high cost. In addition, they expressed the lack of traditional foods in small towns.

This chapter further provides a brief of the study out come. Individual-level influences such as taste preference, cooking ability, health consciousness and convenience were reported as drivers of food choices and eating habits. It has been demonstrated that participants adapt their eating habits and food choices based on their relationships with those they spend most of their time with. In addition to demonstrating the influence of the people around them, it is also worthwhile to note that peer influence, even if it is not direct, can influence eating habits. Besides experiencing new food cuisines while out with colleagues from different cultures, participants also enjoyed discovering new flavours of foods.

New Zealand provides a wide variety of Indian traditional foods, particularly in urban areas, whereas this is not the case in rural areas. Food shortages, however, were a concern for participants during Indian festivals. A change in food choices has led to increased awareness of local food availability and local produce. Participants food choices and eating habits were influenced by organisational and policy levels, including work patterns, food costs, and availability of cultural and religious-specific food. In order to develop effective strategies to promote healthy eating, it is necessary to recognize the interplay between multiple levels of factors. When seeking lifestyle changes, interventions must be designed at all levels of the ecological model of health promotion. This would ensure that people can establish sustainable dietary patterns that will benefit their health.

6.1 Strengths and limitation

In this study, both qualitative and quantitative methods were employed to evaluate factors influencing eating habits and food choices at all levels, including interpersonal, organisational, community, individual, and policy levels. Similarly, the quantitative method used a 36-item food choice questionnaire, and the results were displayed by categorising the theoretical framework levels. With a focus on Indian migrants eating habits, these findings offered insight into an understudied community in New Zealand. This study offers a perspective on the difficulties they encounter in preserving cultural eating habits while settling into a new environment. Through interviews and surveys conducted among a diverse range of Indian migrants, the study captures a valuable view of the influences shaping food choices and eating habits.

The limitation of the study was that the sample size of the study was relatively small, it is possible that the results of the study may not be representative of the population. Further research with a larger sample size is needed to draw more accurate conclusions.

6.2 Recommendations and future research

- **Community gardens**

Community organisations can develop cultural community garden programmes to address the shortage of ethnic foods during festivals. Additionally, increasing ethnic-based trade at Sunday markets once a week in smaller towns may make ethnic food items more readily available and help address the shortage of culturally specific vegetables. By implementing such programmes, ethnic foods may become more easily accessible in small towns, offering a solution to this issue.

- **Dietitian engagement in the community**

To improve the nutritional knowledge and eating habits of the Indian community, dietitians and nutritionists could collaborate with Indian associations to offer free health-related workshops. These workshops could cover topics such as healthy eating, nutrition, and exercise, as well as offer educational and practical cooking sessions. By providing these resources, the Indian community may become more knowledgeable about nutrition and healthy eating habits, including the ability to prepare healthy foods with or without ethnic ingredients. Moreover, workshops could offer guidance on improving overall health through lifestyle changes. Overall, this collaborative effort could lead to improved health outcomes within the Indian community.

- **Raising awareness on healthy eating**

One approach to overcoming obstacles to healthy eating among recent Indian migrants could be to leverage advertising channels in cultural events and online platforms, such as migrant Facebook groups. This would be particularly effective during the early stages of migration, by raising awareness about health and wellness and reducing food insecurity. Another potential avenue is for radio stations to create dedicated programs that educate listeners about nutrition and health while facilitating interaction and providing advice on healthy eating practices. The study also found that work patterns and job demands negatively affect participants food and eating habits decisions. In this regard, public health dietitians with a willingness to volunteer can contribute by establishing

fun activities and quizzes at work related to healthy eating and by providing access to healthy quick and easy options on a weekly to monthly basis.

According to the results of the study, the Indian community lacks knowledge about how to find religiously compliant food supplies and their availability in New Zealand. To address this issue, religious organizations and groups are encouraged to create guides to assist people in locating religiously compliant food. These guides should include information on where to purchase, how to prepare, and how to store such food items. Moreover, religious associations should provide access to cost-effective and culturally appropriate recipes.

- **Future research**

To develop effective strategies for managing temporary food shortages in small towns in New Zealand, future research could focus on identifying ways to cope with such shortages caused by ethnic or general reasons. This may involve exploring factors such as sourcing food from other regions, promoting the use of locally available food sources, and educating individuals on effective methods for storing and preserving food. Through further investigation, it may be possible to develop practical solutions for managing food shortages in small towns.

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Appendices

Appendix A: Phase one consent form

Investigating Food Choices vs Eating Habits in Indian Migrants in New Zealand

I have read or have had read to me in my first language, and I understand the Information Sheet attached as Appendix A. I have had the details of the study explained to me, any questions I had have been answered to my satisfaction, and I understand that I may ask further questions at any time. I have been given sufficient time to consider whether to participate in this study and I understand participation is voluntary and that I may withdraw from the study at any time.

1. I agree/do not agree to the interview being sound recorded.
2. I agree/do not agree to the interview being image recorded.
3. I agree to participate in this study under the conditions set out in the Information Sheet.

Declaration by Participant:

I _____hereby consent to take part in this study.

Signature: _____ Date: _____

Appendix B: Participant information sheet – interviews

Investigating Food Choices vs Eating Habits in Indian Migrants in New Zealand

Introduction:

This study is postgraduate research under the supervision of Senior Lecturer Dr Ravi Reddy, Assistant Professor Ian Liard, and Professor Rozanne Kruger. This research is a baseline study focusing on exploring food choices and eating habits among Indian migrant workers residing in New Zealand.

Project Description and Invitation:

This research is designed to understand the factors influencing food choices and eating habits in Indian migrant workers.

Participant Identification and Recruitment:

Recruitment of the eligible participants will be based on inclusion /exclusion criteria. This research will include two phases:
Inclusion criteria:

- Indian migrant in New Zealand.

Key exclusion criteria:

- Migrants not born in India.

Project Procedures:

Phase 1: 8--12 participants will be interviewed via Zoom to explore what factors influence participants food choices. The interviews will take about 20 minutes to complete. Each participant will receive a $ 10 (koha) grocery voucher as an appreciation for time.
Phase 2: Questionnaire survey (developed based on phase one's interview outcome), an anonymous online questionnaire Will be completed by eligible participants who agree to participate in this

research. The questionnaire should take on average about 10 minutes to complete. Each participant goes into a draw to win one of two $50 vouchers.

Data Management:

The data will be stored in password-protected university computers/one Massey collaboration site and supervisors alone will have the access to the collected data. Data will be destroyed after 5 years from the completion of this research. Furthermore, participants identities will be deidentified when submitting the thesis to the university.

Participant's Rights:

Participants will be under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any question that you don't intend to share information about.
- Participants can review and edit the transcript and are allowed to withdraw from the study at any stage of the study up until the completion of the interview.
- Ask any questions about the study at any time during participation.
- Provide information on the understanding that your name will not be used unless you give permission to the researcher.
- Participants will be given the opportunity to receive a summary of the project findings on completion of this research if they wish to.
- Before recording the participants interview, written consent will be required.

Project Contacts:

Please feel free to contact the researchers if you have any queries regarding this study.

1. Ayesha Mushtaq Ahmed (Student researcher):

   Phone: +64 211506068

   Email: A.M.Ahmed@massey.ac.nz

2. Dr Ravi Reddy (Supervisor):

   Phone: +64 92136910

   Email: R.Reddy@massey.ac.nz

Committee Approval Statement:

This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application NOR 22/06. If you have any concerns about the conduct of this research, please contact A/Prof Fiona Te Momo, Chair, Massey University Human Ethics Committee: Northern, telephone 09 414 0800, x 43347, email: humanethicsnorth@massey.ac.nz.

Appendix C: Interview schedule

1. How do you decide on what foods to eat? Does your decision depend on your mood, familiarity, nutrient value etc.?

2. Would you prefer Takeaways over homemade meals? If yes, how often and why?

3. Do you find changes in your eating habits after migrating to New Zealand? can you explain more about this?

4. Where do you generally shop for regular food supplies? Why do you prefer to shop there?

5. Do you find all the familiar food items in New Zealand that you would like to eat? if not, have you found a substitute for your familiar foods? if yes how is this food item as a substitute?

6. What would you prefer to eat when you are at work? Could you discuss why and what types of food items you will consume at work?

7. Do you experience any differences in your traditional cooking techniques post-migration? Can you explain to what extent there are changes, if any?

8. Have your eating habits like timings, eating on the go, skipping meals etc., changed after moving to New Zealand? if yes, how or to what extent?

9. What type of changes would you expect in New Zealand to have easy access to Indian Traditional food products or ingredients?

Appendix D: Questionnaire

Q1. Gender

☐ Male ☐ Nonbinary/ third gender ☐ Female ☐ Prefer not to say

Q2. Age

☐ 18-24 ☐ 24-34 ☐ 35-44 ☐ 45-54 ☐ 55-64

Q3. Current living status

☐ Married or in a partnership with dependents ☐ Married or in a partnership without dependents

☐ Not married or not in a partnership with dependents ☐ Not married or not in a partnership without dependents

Q4. Years of stay in New Zealand

☐ Lesser than 3 years ☐ 3 - 5 years ☐ More than 5 years

Q5. Type of visa holder

☐ Work visa ☐ permanent resident ☐ Student visa ☐ New Zealand citizen

If other, please specify,_____

Q6. Employment status

☐ Employed full-time with no shift work ☐ Employed full-time with shift work

☐ Employed part-time with no shift work ☐ Employed part-time with shift work

Q7. Professional sector

☐ Health care and social assistance ☐ Retail trade ☐ Manufacturing ☐ Construction

☐ Administrative ☐ Agriculture, forestry, and fishing ☐ Transport, postal and warehousing

☐ Information Media and Telecommunications. ☐ Education and training ☐ Accommodation and food services If other, please specify,_____

Q8. **I eat home-cooked food**

	Never	Once a week	2-3 times a week	4-6 times a week Daily	Daily
How often	☐	☐	☐	☐	☐

Q9. I eat takeaway food.

	Never	Once a week	2-3 times a week	4-6 times a week Daily	Daily
How often	☐	☐	☐	☐	☐

Q10. My work pattern and job demand influence what I eat.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Disagree-agree	☐	☐	☐	☐	☐

Q11. It is important to me that the food I eat on a typical day:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
a). is easy to prepare.	☐	☐	☐	☐	☐
b). tastes good.	☐	☐	☐	☐	☐
c). is not expensive.	☐	☐	☐	☐	☐
d). provides health value (low calories, low in fat, high in fibre, etc.).	☐	☐	☐	☐	☐
e). is familiar to me.	☐	☐	☐	☐	☐
f). is easily available in shops and supermarkets.	☐	☐	☐	☐	☐

Q12. It is important to me that the food I eat on a typical day:

	Strongly disagree	Somewhat disagree.	Neither agree nor disagree	Somewhat agree	Strongly agree
a) is similar to the food I used to eat in India.	☐	☐	☐	☐	☐
b) keeps me awake and alert.	☐	☐	☐	☐	☐
c) is what I usually eat.	☐	☐	☐	☐	☐

d) is food that caters to my religious beliefs (e.g., Halal, vegetarian, etc.).	☐	☐	☐	☐	☐
e). is the food that my friends and family eat.	☐	☐	☐	☐	☐
f). is available at my work or normally eaten by my workmates.	☐	☐	☐	☐	☐