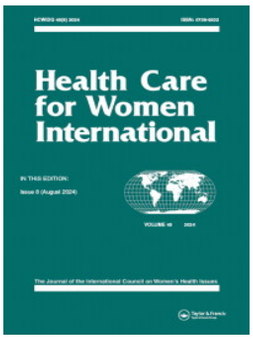

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Cross-cultural food practices and nutrition seeking behaviors among pregnant and postpartum Indian women living in Australia

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ABSTRACT

No research has explored the experiences of Indian women who become pregnant after they migrate to Australia, and how their existing traditions mix with their new environment and subsequently impact eating patterns. Semi-structured interviews were conducted with eleven women of Indian heritage who were living in Australia, and data were thematically analyzed. The researchers identified two main themes were identified (a) foods to eat and which to avoid, and (b) support networks and sources of health information during pregnancy. Women get advice and information from a range of sources and have diverse attitudes and beliefs about cultural food practices. that are both rigid and flexible, as well as traditional and contemporary.

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Migration is a complex phenomenon that affects millions of women around the world, and for those who fall pregnant in a new country, it can bring both unique challenges and vast opportunities. Women who migrate to a new country and then become pregnant are influenced by the culture and practices of both their home and new country when making food choices during pregnancy (de Diego-Cordero et al., 2021; Kurian et al., 2021; Withers et al., 2018). Maternal nutrition is critical to health and wellbeing, and over- or under-nutrition increases the prevalence of a range of negative health outcomes for both the mother and child (Carolan-Olah et al., 2015; Fair et al., 2020; Goldstein et al., 2017). Understanding the cultural food practices of migrant women during pregnancy has the potential to influence positive maternal and child health outcomes and strengthen the

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relationship between the women, her family, and the health care system (de Diego-Cordero et al., 2021; Ramulondi et al., 2021).

Indian-born immigrants are Australia's second largest migrant group, accounting for 2.8% of the population, with 710,000 arrivals in 2021 (ABS, 2021). Despite the large population of Indian Australians, little is known about the traditional or cultural food choices of pregnant women of Indian heritage while they live in Australia. As Australia becomes more culturally diverse, the development of culturally appropriate and evidence-based practice regarding maternal nutrition is increasingly important (Iradukunda, 2020).

A significant body of research has explored the health outcomes of Indian migrants in various western countries (Kadawathagedara et al., 2021; Yeasmin & Regmi, 2013), finding a higher prevalence of some non-communicable diseases such as type 2 diabetes (Anikeeva et al., 2010) and cardiovascular disease (Anand et al., 2013). There is also research exploring the diet of recent migrants in general, where researchers suggest that these women often adopt poorer quality diets of their new counties (Harley & Eskenazi, 2006; Lee et al., 2022), as well as research exploring food taboos and cultural food choices during pregnancy, postpartum, and while breastfeeding (Bhanbhro et al., 2020; Köhler et al., 2019). In a review that explored the impact of cultural beliefs on eating patterns and food practices among pregnant women, de Diego-Cordero et al. (2021) found that food restrictions based on family and cultural traditions were common during pregnancy. Other researchers have suggested that food beliefs and avoidance practices are related to concerns about miscarriage and stillbirth (D'Souza et al., 2016; Goswami & Thakur, 2019; Kaur & Kaur, 2021). There is no research, however, that has explored the experiences of Indian women who become pregnant after they migrate to Australia, and how their existing traditions mix with their new environment, and therefore impact eating patterns and dietary intake. This is important, as pregnant and postpartum women have a range of competing information sources available to them, and for migrant women undergoing dietary acculturation, attitudes and beliefs about cultural eating and food preparation practices are complex as they evolve and change while adapting to their new culture. Given that people from India are the fastest growing migrant population in Australia, this study seeks to explore dietary choices, knowledge, practices, and perceptions of a healthy diet during pregnancy by women of Indian heritage who were pregnant while living in Australia.

Background

Despite substantive progress in maternal nutrition in many low- and middle-income countries (LMIC), maternal under nutrition remains a

serious public health concern and women continue to have nutrition deficiencies through their reproductive years (Black et al., 2013; Victora et al., 2021). Poor nutrition is a significant contributor to poor health; it can increase the risk of non-communicable diseases, obesity and obesity related morbidity, and can markedly reduce life expectancy (Aiyar et al., 2021). Despite significant research and well-established evidenced-based interventions, limited progress has been made in reducing maternal undernutrition in the South Asia region (Bhutta et al., 2013; Torlesse et al., 2021; Wali et al., 2020).

While India has made some public health gains, like other LMICs, key indicators of health and wellbeing continue to lag. India is experiencing increasing rates of non-communicable diseases, accounting for over half of annual deaths (Kundu et al., 2018), and life expectancy at birth, and infant and maternal mortality rates below the global average and the average for the Southeast Asian region (Horton & Das, 2011; Subramanyam et al., 2010). While there has been an improvement in the mortality rate for children under 5 years, declining to 34 per 1000 live births, a rate that matches the global rate, it is still much higher than comparable countries, including China which has an under 5 mortality rate of 8 per 1000; and the level of stunting (height for age) and wasting (weight for height) continues to be very high, with 30.9% of children under 5 stunted in India—compared with 22% globally and 30.9% in the South Asian Region (WHO, 2021; Worldbank, 2023). The situation for women is also slow to improve; over half of women of reproductive age are anemic (Finkelstein et al., 2019; Nguyen et al., 2018; WHO, 2021), and are more likely to be impacted by non-communicable diseases and experience overweight or obesity (Kulkarni et al., 2017), and while it varies across the country, about 25% of women are said to be underweight and about 30% of women are overweight or obese (Al Kibria et al., 2019; Garg et al., 2010). Approximately half of pregnant women consume adequate quantities of protein and energy, and many consume under the recommended levels of a range of vitamin and minerals (Shankar et al., 2017). Suboptimal diets, early and multiple pregnancies, increased marketing and availability of unhealthy and inexpensive food, poverty, caste discrimination, and gender inequality, contribute to poor maternal nutrition in India (Ramakrishnan et al., 2012).

Food taboos or cultural food practices are common during pregnancy, postpartum, and while breastfeeding in many Asian countries (Bhanbhro et al., 2020; Köhler et al., 2019). Cultural food practices can be passed on from one generation to another (Iradukunda, 2020), with some practices considered unfit by one group can be declared acceptable for another (Meyer-Rochow, 2009; Santos-Torres & Vásquez-Garibay, 2003).

Among Indian women pregnant in India, food recommendations and restrictions are associated with culture and influence health status

(de Diego-Cordero et al., 2021). Unfavorable dietary habits during pregnancy are cautioned, believed to cause birthing complications, shoulder dystocia, abortion, subcutaneous and congenital disorders (D'Souza et al., 2016). Some groups prohibit or restrict certain foods such as fruits and seeds (pineapple, papaya, jackfruit, dates, and sesame seeds), some vegetables, condiments (jaggery, molasses, and spices), and animal products (fish, shellfish, kinds of meat, eggs, milk) (Chakrabarti & Chakrabarti, 2019; Goswami & Thakur, 2019; Meyer-Rochow, 2009; Mukhopadhyay & Sarkar, 2009). In many cultures, foods can be divided into 'hot' and 'cold' foods. Food that are thought to overheat the already 'hot' pregnant body, often labeled as bad or not beneficial during pregnancy (Banu et al., 2016; Chakrabarti & Chakrabarti, 2019; D'Souza et al., 2016), but are recommended to facilitate labor and during post-partum period to increase milk secretion. Foods rich in vitamin C, sour foods, and 'cold' foods are prohibited after delivery, as they are considered to cause complications for the newborn and difficulties in breastfeeding (Choudhry, 1997; Kaur & Kaur, 2021).

Some of these beliefs, practices, and taboos change after migration. Sathyamurthy and Raj (2012) compared traditional dietary beliefs and practices during pregnancy among Indian women in the USA with women in India. More women in India believed that 'hot' foods caused 'overheating' and miscarriage, while a significant proportion of migrant Indian women in the USA disagreed with these beliefs. Other researchers have explored the traditional dietary practices and eating habits of pregnant migrant Indian and South Asian women living in USA and Canada (Desai et al., 2021). Indian women living in Canada were found to have a range of cultural beliefs related to food and were also strongly influenced not only by their immediate family (Grewal et al., 2008), and their health beliefs, but also by cultural beliefs and practices, for example the belief that the consumption of some fruit could lead to a lighter-skinned baby (Higginbottom et al., 2016). Some researchers have explored the impact of acculturation of diet on health outcomes. The adoption of a Western diet has been found to increase the prevalence of obesity among migrant women (Satia, 2010; Varghese & Moore-Orr, 2002), with some researchers suggesting that communities who conserve and maintain traditional dietary habits are more likely to have better health outcomes when compared with those who acculturate (Iradukunda, 2020; Kadawathagedara et al., 2021).

Conceptual framework: the migrant suitcase

This research is underpinned by the conceptual framework of the migrant suitcase and acculturation, as a way to understand the cultural food practices of pregnant Indian women in Australia. Acculturation is a complex

process, whereby an individual from one culture adopts characteristics and ways of living from another culture (Harley & Eskenazi, 2006; Hazuda et al., 1988), the process occurs over time, and is different for different individuals and groups. The Migrant Suitcase is a metaphorical social remittance that describes how migrants bring different cultural norms, including food and eating practices when they move to a new country (Bailey, 2017). Social remittances can be inclusive of cultural norms and practices, identities, and social connections that influence changes to population social values and lifestyles. Notions of social remittances and the migrant suitcase can be used to explore individual and community links between food, sense of belonging, and reciprocal caregiving in a new environment. Fischler (2011) argues that migrants reconstitute their diasporic identities and values by sharing and consuming food from their homeland. Food has important cultural qualities that migrants bring with them. For diasporic communities, participation in traditional family rituals and ceremonies can promote social capital and serves as a place-making process (Bailey, 2017; de Diego-Cordero et al., 2021). Cultural practices such as fasting, food avoidance, and ceremonial consumption foster a sense of belonging among migrants, allowing them to feel secure as they settle into a new country (Desai et al., 2021). Levels and rates of acculturation and the notion of a migrant suitcase impact the information women receive when they are pregnant and what they do with this information, this research uses these notions to explore the experience of pregnancy in Australia of women of Indian heritage.

Method

We employed a qualitative descriptive approach informed by Constructivist Grounded Theory (CGT), using qualitative methods to explore the underlying factors that impact the contemporary lives of women of Indian heritage living in Australia (Charmaz, 2017). CGT enabled the inclusion of diverse, hard-to-reach populations, and allows the line of questioning to be changed or altered as needed in order for hypotheses to be developed from the data (Charmaz, 2017). A CGT approach enables the establishment of the interactive relationship between the researcher and participant. The researcher can evaluate how their preexisting assumptions, ideas, and identity influences their observations and conclusions brought to the research process (Mills et al., 2006). The qualitative descriptive approach enabled an exploration and description of the phenomenon (Kim et al., 2017). Qualitative descriptive studies enable insights about behaviors and knowledge to be gained though qualitative methods of data collection (Neergaard et al., 2009). This research was granted ethical approval by the xxx University Human Research Ethics Committee (2021-308).

Sample and recruitment

Recruitment was conducted between June and September 2022. The research team approached 45 stakeholders who were provided with a flyer with basic information about the study and a QR code and link to more information, and the study was advertised in person, on radio, in newsletters and noticeboards, and on social media (LinkedIn, Facebook, Twitter, Instagram, and WhatsApp). Stakeholders included cultural associations, local community and church groups, community centers, professional groups, pregnant women's and migrant women's groups, and playgroups based in Queensland, New South Wales, and Victoria were approached in person, by phone, and email to share the flyer on our behalf to recruit participants. Stakeholders were contacted by phone or email on multiple occasions, up to three contact attempts were made before moving onto alternative sources for recruitment. As a token of appreciation, participants were provided with a $25 gift card. Upon completion of the interview, study participants were asked to share study details with their social connections to recruit further participants. Data collection ceased when all avenues for recruitment had been exhausted.

Data collection

One-on-one, semi-structured interviews were conducted *via* Zoom. Interviews were conducted by a trained student researcher. An interview guide of twelve key questions was used. During the interviews, the researcher asked about food choices and avoidance during their current or most recent pregnancy as well as questions about clinicians' and family members' health advice. Participant demographic information was collected, including age, number of children, geographical location, and birth year, data on health status was not collected. To ensure data accuracy and to begin data immersion, interviews were recorded and audio-transcribed as soon as possible using Welder, an online audio and video transcription software.

Data analysis and interpretation

Qualitative content analysis was conducted to summarize participants' information (Neergaard et al., 2009; Sandelowski, 2000). The interview guide, informed by a review of the literature (Ramalho et al., 2015), served as an initial framework for deductive data analysis, with concepts also inductively derived from the interview transcripts. This process of modifying data analysis as new insights arise is a feature of qualitative content analysis, allowing the preexisting coding systems to be modified where

appropriate. Data analysis was guided by the approach set out by Miles et al. (2014).

NVivo version 12 was used to code the data, with the generation of initial data codes and a list of subcategorized themes concerning maternal food practices during pregnancy. Interview transcripts were read by the researchers prior to initial coding. Codes were given brief descriptions as prominent themes emerged from interview transcripts of the participants' responses (Braun & Clarke, 2006). The interview transcripts were coded according to the research questions. Regularly occurring concepts that were inductively derived from the data were also coded (Miles et al., 2014). Second-level coding was conducted as a way to develop a coherent synthesis of the data (Miles et al., 2014).

Results

Eleven women of Indian heritage who were living in Australia participated in an interview. Interviews were on average 25 min in length (range: 10–54 min). Participants were aged between 25 and 43 (average age 35) years and had migrated to Australia between nine months and fifteen years prior to the interview. Two women were pregnant at the time of the interview, three women were 1.5 to 3 months postpartum, the remaining women had older children. Ten participants were born in India, in the states of Maharashtra, Punjab, Rajasthan, Kerala, Tamil Nadu, and Delhi, and one was born in Kuwait to Indian parents before moving to the United Arab Emirates. Five participants currently worked in information technology, healthcare, the not-for-profit sector, management, or clerical roles; two participants were not employed and four preferred not to disclose their employment status.

Analysis of the interview transcripts, the researchers identified a range of experiences related to food choices and beliefs of women who are of Indian heritage but were pregnant while in Australia. Two main themes were identified 1) choosing which foods to eat and which to avoid as a part of their pregnancy diet, and 2) the support networks and sources of health information during pregnancy.

Pregnancy diet: food to avoid, food to seek out

Participants discussed a range of experiences they had with food while pregnant. This included foods they were advised to avoid and foods they were advised to seek out. Women avoided or sought out foods for both cultural reasons, often as advised by family members, and because they were advised by a health care professional to do so. Participants also discussed foods they ate to manage their own health and the health of

their child in utero, as well as foods and supplements that were rich in vitamins and minerals that they proactively consumed.

Women described being told to avoid eating specific foods because of a concern that these foods could lead to abortion, miscarriage, body inflammation or 'heat', and acid reflux. Foods to avoid included banana, pineapple, rockmelon, mangoes, dates, papaya, fenugreek, edible gum, red meat, eggplant, root vegetables, and starches. Women were generally advised to avoid these foods in the first three months of their pregnancy.

> With pineapple or raw papaya, there is some vitamin, or you can say, some type of enzyme in those that can lead to miscarriage. So, they [*friends and family*] advised us not to eat these two things because it may cause miscarriage (25 years, one child).

Certain foods, like fenugreek and edible gum, were also avoided during pregnancy, with concerns that they would result in inflammation and miscarriage. However, these foods were promoted during the postpartum period.

> There are a lot of traditional things that were mentioned to be avoided or something, like fenugreek seeds. So, fenugreek seeds are great for postpartum, but apparently, they're not good while you're pregnant (36 years, one child).

Red meat and fish were avoided as there was some concern that they would increase inflammation in the body.

> I didn't eat much red meat in my pregnancy either, because I felt like it gives my body more inflammation. If I eat red meat, I feel more inflamed. (…) I wasn't sure if I could eat some sort of fish because then I got to know that there's too much mercury in the fish (33 years, two children).

Bananas were considered a food that should be avoided because they pose a risk of early or preterm labor, with one woman saying she avoid them because when people eat them, they will 'go into labor early than their due date' (34 years old, one child). Another woman said that she was told to avoid bananas because they were considered a 'slippery item', and did so in her first pregnancy, but consumed them in her second pregnancy.

> I did not avoid the bananas because I love bananas. I had them during my second pregnancy, but the first one I did not (35 years, two children).

Women reported on the conflicting information they received about different foods and food groups. This included fruits like rockmelon, mangoes, and dates. Women reported receiving some information that said that these foods should be avoided during pregnancy, but at other times they received information that suggested that these foods could be safely consumed.

> They're saying that I should not eat pineapples and dates. I don't know why, but I never touched those… You know with the dates, it's a saying. I'm a nurse but I think that it is wrong. You need to eat a lot of dates with iron. Dates is very rich in iron you should be eating [*them*]. But I didn't want to take a risk. They say that dates are really hot for your body and it's more chances of abortion and miscarriages, so I did not touch it (39 years, three children).

Other foods were advised to be consumed carefully. Eggplant and some herbs were discouraged as potentially leading to miscarriage, while root vegetables like tapioca, and starches like dahl and lentils, were to be consumed carefully and with rice so as not to lead to bloating.

Some women avoided certain foods as a strategy to manage ongoing nausea, high blood sugar levels, and the development of gestational diabetes. Dairy, gluten-rich, and carbohydrate-rich foods like white and flat rice or poha, potatoes, refined carbohydrates such as sugar and white flour, traditional Indian sweets made from ghee, and curries were also avoided. A number of women said that a traditional Indian diet 'is not healthy…and it's all carbs and sugars and spices' (35 years, two children), with some women stated that the traditional Indian diet exacerbated their gestational diabetes or led to heartburn.

> Then there are some specific traditional Maharashtrian style curries which use coconut, fresh or dry coconut and some spices. And I come from a place where we eat heavily spicy, like pretty spicy food. It's quite hot. So, I really loved hot food previously, but especially with my first time I wanted to have when I tried making the same curry for myself, I was not able to digest it. I just started feeling sick (34 years, one child).

Takeaway or processed foods were also avoided. These foods were avoided not due to cultural beliefs but rather in making healthy dietary choices during pregnancy. Ready to eat foods such as microwavable rice was also perceived to be harmful to the body and unnecessary, with home prepared foods considered healthier.

> There are some specific foods like Pepsi and all those stuffs I never touched because I felt like it is not good for the child. So, nothing like cultural but it's just all these things that it's not good (39 years, three children).

Women spoke about consumption of additional calories during their diet to support their nutritional needs. Many women described experiencing cravings that exacerbated their physical health effects and adherence to cultural beliefs about food. All women tried to avoid over-eating as side-effects included bloating, weight concerns, and other health issues. Contrary to certain food aversions, eating acceptable foods and eating more frequently was also advised for a more comfortable labor and to improve overall mother and newborn health outcomes. As subsequent

pregnancies occurred, most women would eat in moderation and were more confident with their own food choices.

> Eat as much as your body allows, you know. She told me, if you eat large in quantity, then definitely you will feel bloated. So now I'm just taking small quantities of meal, but few times in a day, so I feel not hungry, not bloated. So now I can say I am coping up with my diet very well (25 years, one child).

Some women followed the Australian dietary guidelines to understand what they should eat or avoid during pregnancy.

> I also used to refer to the pregnancy fact sheets from the Royal Women's Hospital. So those were pretty handy in the initial stages as well. There were mentions of avoiding tahini and sesame seeds and homemade Mayonnaise, just because it has raw eggs and things like that (36 years, one child).

In general, a variety of fruit and vegetables, chicken and fish, and healthy fats like avocados and olive oil were freely consumed. Women were concerned with eating enough iron rich foods such as chickpeas and green vegetables, which were encouraged to be eaten at 'the end of the first trimester because their iron level will go down within the second trimester or third trimester' (25 years old, one child).

Some women experienced a conflict between cultural expectations of food choices during pregnancy, and what they consider to be 'right' in the Australian context.

> In our culture, a lot of ghee is given to pregnant ladies and even after they give birth, they are fed like tons and tons of ghee because they believe it has got good features, like good immunity, improves the immune system, it gives you strength and stuff. But I think in our culture, it's overfed to ladies. But I avoided all those even after I gave the delivery. They do say you should have this, but I did not because I'm in Australia (35 years, two children).

Women spoke about boiling spices like turmeric or haldi, black pepper, star anise, fennel, or ginger to drink to reduce inflammation, to aid digestion, and to resolve sleep issues. Women described avoiding red chili powder in food but consuming pepper to aid digestion.

> I cut down the spice a little bit so that I'm able to keep it like digested properly (34 years, one child).

Consumption of raw chilies was to be avoided as it would cause 'the baby to be dark' (34 years, two children). While saffron was added to milk by other women and drunk in the morning and at night. This was thought to give the child 'fair' skin.

> There is a food called I don't know that in Malayalam, we say kuṅkumappūv (saffron). I don't know what that is. It that makes your child look very, you won't have the

> dark skin. Your child will be very fair. So, my parents used to advise to drink that one (39 years, three children).

Pregnancy supplements such as Elevit (pregnancy multivitamin brand), iron, calcium, and vitamins B-12, C, and D were commonly taken by all the women. Other supplements taken included magnesium, zinc, probiotics, and n-acetylcysteine (NAC). Folic acid and iodine were recommended for healthy development of the infant neural tube, as described by one of the women. However, another woman described that iodine was usually not recommended to Indian women as 'we already have iodine in our daily meal' and 'is not as necessary as compared to folic acid' (25 years old, one child). Another woman identified vitamin D as an essential supplement, especially while living in cooler climates. Three women used Ayurvedic medicines like 'Kashayas'—a medicinal herbal drink consisting of black peppercorns, cumin, fennel, and coriander seeds - or used spices during their previous pregnancies for nausea, lactation or for general wellbeing.

> So, with my first, I didn't really take any herbal medicines. They did tell me that after giving birth, you can take an herbal powder, which is good for breast milk production, but we couldn't really find it anywhere locally, so I actually had to get a substitute. I just had the fenugreek tablets, which we get. It was like a multivitamin, which was a close replacement. Close substitute, yeah (34 years old, one child).

Social support and sources of health information during pregnancy

Women discussed the range of support networks they draw on to gather information and advice about their pregnancy. Networks included family, peers, and healthcare professionals. The relationships that were formed and the level of support provided varied among the women, leading to either strong positive connections or social isolation during this crucial time.

All women were living in Australia with their immediate family, typically their spouse and their children. Four women had relatives living in Australia and were able to draw on them for support, with the families of the remaining women were living in India. There were some cases where parents and parents-in-law were able to travel to Australia to assist with childcare and providing practical assistance.

> My mother-in-law, she was here, I have two kids. She did everything for me. She cooked food for me, she cleaned the house, she even washed my clothes. She looked after my baby (35 years, two children).

In addition to family, women spoke about having a good network of friends that 'look after each other' (33 years old, two children). While

other women said that when migrating to Australia, they did not 'have too many friends here' (34 years old, one child), and found it difficult to maintain their social connections in India. Some women spoke about loneliness and social isolation during their pregnancy, especially during the first few years after migration.

> Yeah, it was a bit hard. When you away from India, you don't have much support and you're a working woman, so it was a bit hard (39 years, three children).

Women spoke about how they source food or do their food shopping when pregnant, and how their networks supported them at this time. The women described craving 'typical Indian foods, which I really wish to eat' but could not find specific ingredients, and so they had to 'accept that those were not available' (39 years old, three children).

> My husband was with me, but there are certain foods which is not available, like typically Indian foods, so he couldn't help (39 years, three children).

Most women had a general practitioner and a midwife as well as seeing a dietitian during their pregnancy. Women also sourced other forms of allied health or alternative medicine support to affirm cultural beliefs and cross-cultural dietary habits.

> I saw acupuncturist as well. She gave me some herbs, some Chinese medicine for nausea. That actually helped me a bit. And acupuncture helped me a bit as well. Sometimes I feel like because I've been seeing a naturopath for a long time and I'm a firm believer of natural remedies before going to any doctor (33 years, two children).

Women sought health information and dietary advice during their pregnancy from family, predominantly their mothers, most of who lived in India, and friends, as well as healthcare professionals in Australia and in India. Women formed decisions on the validity of the information and their intention to adhere to the advice.

> I had quite a few friends who were pregnant around the same time. So, we would share notes and discuss what's good, what's not, and then sort of just share that sort of knowledge with each other and experiences. So that was quite helpful as well (43 years, one child).

Most of the women experienced social pressure during their pregnancies from their mothers and their family in Australia and in their home countries.

> My sister, she lived back in India as well. She did give me a lot of insight on pregnancy in general and what foods to avoid and eat. I think that stemmed again from the Indian cultural beliefs as well. So, it was pretty similar if my mum was not available, my sister used to pitch in, and my mother-in-law as well, she is a very into

ayurvedic, Indian medicine, so she did bring me some of the food that she thought was good for me (32 years, two children).

Following cultural dietary advice and health information from family members was stressful for some women.

I had a lot of pressure from family on what I should eat. Yeah, it was a war because I didn't want to eat what the Indian culture told me that's healthy to eat. I do not mind getting advice, but when it's so much of a pressure. You have to do this. You do that. …. It just made it so bad. My mother-in-law annoyed me so much that I decided not to speak much to family members (34 years, two children).

How health information was presented and acted upon, depended on the respect for the various positions within a family hierarchy.

It's a traditional thing in the family. They're supposed to eat certain things but obviously they were living back home there, and I was here. So just because someone was advised to do or eat certain things, they were doing it. They were not really questioning anyone (34 years, one child).

Women described listening to their mother regarding dietary advice, but not necessarily taking it. They often took some of the recommended ingredients while avoiding others. Women spoke about following health information and dietary advice along with their family as a main motivator during pregnancy to manage co-existing health conditions.

On one hand I had my mum, and here I had my husband. So, my husband is more of a health freak, I would say. He's very fit, active, and he eats very good food. So, it was it was him giving me the right information, giving me the same information that the dietitians had given me in terms of sugar and stuff because I had diabetes. And also, I had my father who actually has diabetes, and he has high blood sugar levels as well (35 years, two children).

In many cases, the women's relatives could not provide any reasons about why or why not specific foods should be consumed during pregnancy, other than saying that the food is healthy.

If someone would provide me any reason behind what their reasoning is, even they don't know most of the time. They really don't know the reason. I didn't really feel there was any truth behind all those things, so I didn't really follow them (33 years, two children).

In contrast, other relatives did not have specific cultural beliefs relating to the women's diet during pregnancy, encouraging frequent eating and to "eat whatever you like and don't be fussy or particular" (25 years old, one child). Initially, some women would follow familial health advice but then would then not adhere to it. Ongoing conflict and stress from multiple family members within the family hierarchy or deciding to integrate it with diverse health information received from other sources where "some

of which are Australian, some of which are international, some of which are from other parts" (34 years old, one child) resulted in noncompliance to the health information and advice.

> It's better to get listen to what we do in India, the cultural part, from the parents, from families, but then adapt it only if it suits ourselves because we are obviously living in Australia. But I just wanted to make sure I'm well informed. I just don't follow everything that's been told to me (34 years, two children).

The results revealed an intersecting relationship between informal and formal supports when some women discussed receiving health advice from family and friends who were also healthcare professionals. Most of their parents, parents-in-law, and other relatives were described as "quite educated" and "got a balance of modern sort of knowledge as well and then just sort of through experience, what's worked might not be traditional sort of advice as well" (43 years, one child). One woman also mentioned receiving mental health support from her sister, a psychologist, during her pregnancy.

> My husband's parents, they both are doctors. They live in India (and) they're both really good doctors. Yeah so, they had some suggestions (32 years, one child)

Women consulted with their healthcare professionals for health advice and information relating to dietary habits, and were often provided with a dietary chart, pamphlets, booklets or other resources, or meal plans at in-person or telehealth appointments. The main motivation for seeking health information and dietary advice was to manage health concerns such as gestational diabetes and to optimize overall maternal health outcomes. Most of the women discussed the contradicting health advice they received from Australian healthcare professionals and compared it with advice they received from healthcare professionals in their home countries. Very few felt that they received sufficient information that they needed during their pregnancy.

> I made sure because there were some things that the doctors in Australia didn't really understand when it comes to a very specific traditional thing. But back home in India, it's very like a big thing, like, oh, you are not supposed to do that (34 years, two children).

Women would explain their cultural beliefs to Australian healthcare professionals to dispel potential misconceptions about dietary practices and nutrition-seeking behaviors. It was apparent that some Australian healthcare professionals may not have an adequate level of cultural competency as "there were some things that the doctors in Australia didn't really understand" (25 years old, one child) regarding specific traditional practices. Notably, most of the women mentioned that "there was a

difference in how much to eat" (32 years old, two children) and that there was an emphasis on the quality of food rather than quantity, along with being encouraged to eat food items that were often culturally avoided, like shellfish and healthy fats like egg yolks.

When faced with contradicting health information, responses varied among the women. One of the women, a healthcare professional would conduct their own independent research to compare the health advice received from their family, as well as the Australian healthcare professionals, stating that she 'knew what the doctors know' (39 years old, three children). Given the women's perception of the healthcare professionals' significant expertise, some women felt unable to question or correct them, demonstrating the power dynamics within the patient-practitioner relationship.

> I didn't really argue, like, I didn't really say much because I feel like she's a dietitian. I feel like she might say like, you don't know, or how do you know? But I just feel in my gut, and I didn't really want it to make fuss. I'm not kind of a person who would confront. I would just back off and maybe look for another person or another doctor. But I wouldn't really confront. I had two appointments with her and none of her advice was beneficial (33 years old, two children)

Some of the women would reconcile and choose to adhere to Australian health information and dietary advice "than listen to any family member or any person who wouldn't have any knowledge about diet" (33 years old, two children) optimize their experiences during pregnancy and childbirth.

> I'll be very honest. It was really an eye opening because what the dietitians were telling me to eat was completely opposite to what my culture says to eat. So, I was getting two information, one from my mum and one from the dietitian. But I had to go with the dietitian, not with my mum, because otherwise I would have had challenges during the birth (35 years old, two children).

The level of care and health information received varied between the women's first and subsequent pregnancies. It was stated that healthcare professionals presumed participants knew what to do in the latter case. This made some women more likely to download mobile apps and undertake their own research to stay informed rather than relying on health professionals.

> So, you don't really ask your GP or your obstetrician what to do or what not to do or things like that. Even the midwives have been really helpful in telling how to go about or small, small things like should I be eating this, should I not be eating that? Because obviously with the second pregnancy, everyone assumes that you know everything because you have been through it, but then obviously carrying a child, you still feel that you don't want to do anything that will harm your child (34 years old, one child).

Women would also seek health information and dietary advice, using the Internet, mobile apps, social media, and other online platforms to

keep in contact with family and friends. They would speak to their family members and friends through phone and video calls or using mobile apps such as FaceTime and WhatsApp. One of the women would regularly meet her friends in person. Four women frequently used Google to choose what food items to eat and what to avoid during their pregnancies.

> Obviously, I did Google a lot of the food that I ate out, if it was, safe, for pregnancy, including like any other supplements that I was taking prior to giving birth (32 years old, two children).

Mobile apps such as BabyCentre, My Pregnancy, Ovia, and Asianparent were commonly used by these women and were either found independently through the app store on their phone or recommended by friends or healthcare professionals. Only two women did not use mobile apps. The women described trialing various apps prior to using up to three apps at any given time. Women were motivated by the applications' accessibility, useful information on subjects like exercise, labor, and breastfeeding advice, and ability to track their general measurements. Although the mobile apps were not used to track their diets, some women had used them to search for pregnancy-friendly recipes and food ideas.

> I think I use that app with my first pregnancy as well. So, I recommend that app as well because it gives you ideas of food like through your weeks, which are different meals during your every week of pregnancy. Smoothie ideas, all those things. So yeah, it's exciting. Every morning when I wake up, I open that up. Then I look at about baby development things, then about some they also have some articles that are good to read in pregnancy, like different types of information about food, about your safety, about your sleeping (25 years, one child).

Discussion

This study provides initial, in-depth findings about the dietary practices and experiences of Indian women living in Australia when they were pregnant. The researchers suggest, that like pregnant women in non-migrant groups, women in this study obtain advice and information about food choices during pregnancy from a range of sources including family and friends, healthcare providers, and the internet. Women had a range of attitudes and beliefs about cultural food practices, that were both rigid and flexible, and traditional and contemporary. Food choices and information gathering were influenced by a range of circumstances, including social support, access to healthcare, the integration of preexisting and emerging cultural beliefs and attitudes, and the accumulation of health information from family and friends and health professionals.

To understand the cultural food practices of pregnant Indian women in Australia, this research was underpinned by ideas of the migrant

suitcase and acculturation (Bailey, 2017; Harley & Eskenazi, 2006; Hazuda et al., 1988). The complex process of acculturation can be seen in the experiences of the women in this study when seeking to adhere to Australian dietary guidelines, follow advice from health care providers, and use the internet and phone apps to gather their own information. The women in this study also demonstrated the social remittance described by the metaphorical Migrant Suitcase. The cultural norms, including food and eating practices, were also reflected in the experiences of the women in this study. These conceptual frameworks reflect the individual and community links between food and a sense of belonging.

Like women in non-migrant groups (Debela et al., 2023), women in this study followed health advice and sought information from family and friends about their dietary choices, especially in their first pregnancy. This advice included what foods to avoid, the consumption of foods perceived as acceptable, and the use of vitamins and other supplements during and after pregnancy. Women compared and contrasted health information they received from family with the Australian dietary recommendations, advice from their healthcare professionals, and with what they knew from their own research on the internet or through smart phone applications (apps). These findings are consistent with numerous studies that have explored the difficulties in accessing relevant health information and service navigation, and how the expressed health needs of migrants are not prioritized in host countries (Grewal et al., 2008; Higginbottom et al., 2016; Quintanilha et al., 2019; Sathyamurthy & Raj, 2012). It also highlights the vast opportunity for delivering tailored and evidenced based nutrition education to women during pregnancy *via* smartphone apps and other platforms readily accessed by women during this time.

Women in this study relied first on informal support networks such as family and friends, to gain information on maternal nutrition and food practices. This is consistent with acculturation research finding that women often revert to traditional or familiar practices during pregnancy, a period that can come with great uncertainty (Desai et al., 2021; Gebregziabher et al., 2023). Previous research has found food taboos or cultural food practices are reinforced at two levels (Iradukunda, 2020). Firstly, at the community level they are reinforced and governed by elders, and by traditional and religious leaders, and secondly at the family level where key family members ensure taboos or cultural practices are exercised in the home (Arzoaquoi et al., 2015). We suggest that there is a third level that can be considered here, the level of the healthcare system. Women in this study were engaged with their healthcare provider, but often found that through their dismissal or disregard of the women's culture, traditional practices were further reinforced as a type of safety net. If maternal

healthcare providers, specifically those who play a critical role in shaping maternal nutrition and pregnancy diet, were engaged more with cultural and cross-cultural food practices, they would be able to better support migrant women in their food choices enabling the creation of greater trust and a stronger relationship between migrant women and the healthcare system. The present study contributes to the literature around the importance of the health system taking women's culture and traditions into consideration during the provision of maternal health care in order to minimize migrant women's distrust of the system and maximize health outcomes.

Women were motivated to optimize their diet to support their own wellbeing as well as their child. Understanding how best to harness women's motivation to eat well during their pregnancy is imperative for future maternal and child health-focussed interventions and delivery of nutrition education. Research suggests that culture is a key factor in food preferences among migrant women, with cultural influences shared from family members, friends, spiritual or religious practices, and from traditional health care workers (de Diego-Cordero et al., 2021). Effective strategies and culturally safe practices should be promoted in the Australian healthcare system by healthcare providers managing culturally diverse women during pregnancy, so that women, are ensured optional pregnancy nutrition and best maternal and child health outcomes.

Limitations

While there are clear, novel, and in-depth findings from this research, there are several limitations that need to be considered. Participants were from diverse regions of India, where there are different cultural traditions and practices, were pregnant or postpartum, and had been living in Australia for different amounts of time. This variation in sample means that there are other experiences that are not represented here, and the qualitative nature and small and diverse sample means that this research is not generalizable to all Indian migrant women in Australia. This study also lacks any form of triangulation. Although we found consistency across the data set and many women had similar experience, we could potentially followed-up with these women, their healthcare providers, or their family to further understand these experiences. Despite these limitations, a key strength of this study is the qualitative approach that included in-depth interviews for data collection, providing the opportunity for participants to meaningfully share their lived experiences during pregnancy. This was the first study in Australia to explore the cultural food practices of migrant women during pregnancy and as such this research provides novel and useful data addressing this issue.

Conclusion

This study provides useful information on how traditional and cultural beliefs influence food choices in migrant Indian women in Australia. Providing opportunities for pregnant and postpartum women to access culturally appropriate nutrition education and healthcare will lead to better outcomes during pregnancy, birth and postnatally, through improved dietary intake and a stronger relationship with health care providers. Future research should consider effective communication strategies that are both culturally appropriate and evidence based, and to build capacity in nutrition–specific cultural safety and competency among healthcare practitioners who interact with migrant women.

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