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Factors influencing fruit and vegetable intake among urban Fijians: a qualitative study

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ABSTRACT

Low fruit and vegetable intake is an important risk factor for micronutrient deficiencies and non-communicable diseases, but many people worldwide, including most Fijians, eat less than the World Health Organization recommended amount. The present qualitative study explores factors that influence fruit and vegetable intake among 57 urban Fijians (50 women, 7 men) of indigenous Fijian (iTaukei) and South Asian (Indian) descent. Eight focus group discussions were held in and around Suva, Fiji's capital and largest urban area, which explored motivation for eating fruit and vegetables, understandings of links to health and disease, availability and sources, determinants of product choice, and preferred ways of preparing and eating fruit and vegetables. Data were analysed using thematic content analysis. Regardless of ethnicity, participants indicated that they enjoyed and valued eating fruit and vegetables, were aware of the health benefits, and had confidence in their cooking skills. In both cultures, fruit and vegetables were essential components of traditional diets. However, increasing preferences for processed and imported foods, and inconsistent availability and affordability of high-quality, low-priced, fresh produce, were identified as important barriers. The findings indicate that efforts to improve fruit and vegetable intake in urban Fijians should target the stability of the domestic fruit and vegetable supply and access.

Keywords: Fruit and vegetables, Food choice, Qualitative research, Pacific

INTRODUCTION

Fruit and vegetable (F&V) consumption is associated with reduced risks of micronutrient deficiencies (Fulton, Cardwell, McKinley, & Woodside, 2011) and non-communicable diseases (NCDs) (Wang et al., 2014), and may protect against weight gain (Ledoux, Hingle, & Baranowski, 2011). However, most of the world's population eat less than recommended amounts, and populations in low-income countries have the lowest F&V consumption (Hall, Moore, Harper, & Lynch, 2009; Lock, Pomerleau, Causer, Altmann, & McKee, 2005). The most recent global burden of disease analysis estimated that 4.9 million deaths per year were attributable to low fruit intake and 1.8 million were attributable to insufficient vegetable intake (Lim et al., 2012).

Pacific Islanders have low F&V intake (C-POND, 2014). Throughout the region, extensive dietary changes are occurring, characterised by a shift away from relatively healthy traditional diets towards increased consumption of imported and processed foods low in fibre and high in refined carbohydrates, fat, and salt (DiBello et al., 2009; Hughes & Marks, 2009; Hughes, 2003). Research has shown a more 'modern' dietary pattern to be associated with increased prevalence of metabolic syndrome in Pacific Islanders (DiBello et al., 2009) and the ongoing dietary transition has contributed to dramatic rises in prevalence of obesity and NCDs, creating major health and economic challenges (Anderson, 2012; DiBello et al., 2009; Maharaj & Reddy, 2012). Since 1980, mean body mass index (BMI) has increased more in the Pacific Islands than in any other world region (Finucane et al., 2011). In Fiji, 75% of women and 59% of men now are overweight or obese, only 15% of adults meet the national recommendation of five servings of F&V per day, and 10% consume no F&V (Snowdon & Tukana, 2013).

Most previous research exploring barriers and facilitators to F&V consumption is from the US and Europe (Krølner et al., 2011; Rasmussen et al., 2006; Shaikh, Yaroch, Nebeling, Yeh, & Resnicow, 2008; Yeh et al., 2008). Evidence from other parts of the world, including the Pacific Islands, remains limited. To our knowledge, the only in-depth qualitative study of F&V choice with consumers from the region was conducted by Hartman et al. (2013) and focused on a small sample of New Zealand university students. The authors found taste, health awareness, peer influences, availability, and affordability to be important determinants of F&V consumption. Analyses of household income and expenditure surveys have also identified cost as a key barrier to F&V intake in Vanuatu (Jones & Charlton, 2015). More information from the Pacific Islands is needed to inform the development of effective policies and programmes to increase F&V consumption (Hartman et al., 2013; Snowdon, 2011). Documented ethnic differences in dietary habits and cooking practices within Pacific populations suggests a benefit to conducting research with different groups (Metcalf et al., 2008). The present study explores factors that influence F&V intake among urban Fijians of indigenous (iTaukei) and South Asian (Indian) descent.

METHODS

Focus groups with urban Fijians were used to explore competing influences that affect F&V consumption. Eight groups were conducted in July and August 2012: four with iTaukei participants and four with Indian participants. Data collection ceased when saturation appeared to have been reached.

Adults aged 18 years and older were recruited via existing religious and community groups in the Suva-Nausori corridor, Fiji's capital and largest urban area. This approach was chosen to

ensure participants in each focus group were familiar with each other and shared a common language and ethnicity. Initial groups were identified through the National Food and Nutrition Centre's community networks, with a primary focus on women's groups due to women's central role in food purchasing and preparation in Fiji (Schultz, Vatucawaqa, & Tuivaga, 2007). Snowballing led to suggestions for additional community groups. Focus group selection aimed to balance ethnicity and geography (urban and periurban). For each community group, contact was made first with the leader or, when none existed, a selected representative. For participating community groups, a recruitment session was held where the study was explained in English, Fijian, and Hindi.

In total, 50 women and 7 men took part, over half (n = 30) were iTaukei. Sessions lasted about an hour and were held at the community groups' normal meeting sites. No compensation was given, but refreshments were provided. All participants provided written informed consent.

The primary facilitator (EHM) led the discussions in English, with a co-facilitator repeating questions in the appropriate local language, as necessary. All facilitators were trained in focus group methods and the study objectives. Participants were encouraged to respond in the language in which they were most comfortable.

Draft focus group questions were compiled by EHM following a search of the literature on factors salient to F&V consumption (Krølner et al., 2011; Rasmussen et al., 2006; Shaikh et al., 2008; Yeh et al., 2008). The other researchers reviewed the questions and made changes as needed. The topic guide explored motivation for eating F&V, availability and sources of F&V, determinants of product choice, and preferred ways of preparing and eating F&V. A pilot focus

group was held in April 2012 and helped refine the topic guide and identify culturally-appropriate and contextually-relevant wording for questions.

The focus groups were audio-recorded with participant consent, transcribed verbatim, and translated into English, if required. Translations were verified by a second person fluent in the language. Transcripts were analysed using thematic content analysis, with a mixture of inductive and deductive coding, to identify emerging themes guided by a template approach (King, 2004). A provisional template was created of deductive themes which were broad, overarching, and relevant to the study questions and food choice literature (Brunsø, Fjord, & Grunert, 2002). Two researchers (EHM and PV) independently read the transcripts, applied this template to a subset of the data, and discussed the coding scheme and emerging themes. A revised template was then applied to all transcripts by EHM. As coding proceeded, additional themes emerged. NVivo software (version 9.2; QSR International, Australia) was used to organise the transcripts and aid the analysis.

This study was conducted as part of a larger project that aims to identify opportunities to increase demand for, and improve supply of, local F&V in Fiji. Ethics approval was obtained from the London School of Hygiene and Tropical Medicine and the Fiji National Research Ethics Review Committee.

RESULTS

F&V as part of culture and traditional diets

Participants of both ethnic communities reported that traditional dietary patterns influenced F&V intake. Within iTaukei culture, leafy greens often complemented root crops, meat, and fish in meals and, in the Indian community, vegetables were prepared daily in curries. For Hindus, a vegetarian diet was typically observed several days each week and for extended periods during religious functions. Both ethnic groups ate fruits as breakfast foods, snacks, and desserts.

> "We can't keep eating meat without vegetables. There will also be green leafy vegetables cooked along with it. And the fruits are used in the morning." (iTaukei woman)

Most participants were aware of population-wide dietary changes and high penetration of local markets by imported and processed foods. Discussions with participants of both ethnicities indicated that traditional foods are still commonly consumed at home and are valued for special events and holidays, but are now often combined with imported or processed foods. Some described growing preferences, particularly of children and adolescents, for eating "junk" foods, such as crisps, pizza, and burgers, over traditional meals prepared with local ingredients. It was felt that young people also favoured imported fruits.

F&V are understood to be part of a healthy diet

Participants understood that F&V are essential components of a healthy diet. Some articulated the importance of F&V to prevent micronutrient deficiencies and diet-related NCDs. Their knowledge of health benefits of F&V came from government campaigns and advice of older community members. Certain F&V were valued for specific health benefits and as traditional medicine, such as leafy green vegetables for prevention of anemia and papaya as a digestive aid. There was no discussion of the role of F&V in weight management. However, participants acknowledged the high rates of chronic disease in Fiji and some believed that this was associated with moving away from traditional diets.

> "Now it is noticed that there is a lot of high blood pressure, diabetes… heart attack, kidney failure and lungs, this is simply because we are not using or not taking a lot of locally produced food, like the vegetables. We eat a lot of processed food from the shop." (iTaukei woman)

A small number of participants from both ethnic communities discussed health concerns related to intake of certain F&V, for example, due to concerns about pesticide contamination.

> "I've noticed that most of the farmers they are using a lot of chemical on chauraiya (amaranth leaves). Once I bought it from the market and brought it [home and] we could smell the chemical… so from that time I [have] refused to eat chauraiya. Before, it used to be my favourite." (Indian man)

A few participants said that buying from familiar, trusted vendors was important in reducing their risk of consuming contaminated F&V.

Family preferences as a barrier to F&V intake

The most frequently discussed influences on food purchased and consumed were family taste preferences. While most participants liked to consume a wide variety of F&V, they often described their children's preferences as more limited. Most mothers felt responsible for providing their children with the opportunity to eat F&V and were aware that dietary habits acquired in childhood track into adulthood.

> "It's all upon the mothers to teach the children [about healthy eating] at home. The type of vegetables and fruits you give them, they'll eat it. If you won't – if you just force them or just give them the junk foods – they'll just be trained on that." (Indian woman)

However, some felt conflicted about providing F&V versus foods they knew their children would eat.

> "Sometimes if they don't like [the vegetables we prepare] then they don't eat well and then we have to combine and give them some other kinds of food, like cereal... so that their stomach are full when they go out to school." (Indian woman)

Inconsistent availability and affordability as barriers to F&V intake

F&V were most frequently obtained from the local market and cost was a key purchasing consideration. Participants considered local F&V to be affordable when in plentiful supply. They discussed various supply factors that affected F&V prices, including seasonality and natural disasters. Inconsistent availability and volatile prices of local F&V emerged as key barriers to intake. For example, prior to the focus group research, heavy flooding had damaged much of Fiji's papaya supply and many participants discussed how this influenced them.

> "[Papaya is] very expensive. We can't afford it. At FJ$4 we can buy four loaves of bread… [Our choice of]…food crops - like vegetables - go according to resources that we have." (iTaukei woman)

Some participants purchased local F&V in bulk when in season and preserved them at home to mitigate supply and price fluctuations. However, participants also noted that increased F&V imports have meant that certain items, such as apples and carrots, have year-round availability. A few participants believed that F&V prices were increasing over time, but F&V were recognized as being less expensive parts of the food budget than meat and processed foods.

Many participants discussed limiting their major market shopping to once weekly at weekends and used other commercial and subsistence approaches mid-week to supplement extra F&V. Purchasing F&V from door-to-door vendors, roadside stalls, or mini-markets was common for both ethnic groups. Door-to-door vendors were used as a low cost, convenient means of acquiring F&V.

As another strategy to save money, many participants, especially those living in peri-urbans areas, described growing their own F&V in small-scale homestead gardens and sharing produce with friends and family.

> "We've got a little piece of land outside from our housing land... When we haven't got the money [to go shopping], we just go to the plantation and pull the cassava plant and the leaves and we cook it and prepare for dinner or for lunch." (iTaukei woman)

According to participants, iTaukei plots were more likely to include root vegetables and their greens, while Indian gardens commonly contained a range of F&V, including aubergine, chilli, amaranthus greens, and papaya. For participants residing in central Suva, lack of access to land made home production more difficult and increased reliance on markets.

Convenience is not a major barrier to F&V intake

Food preparation was not considered an important barrier to F&V intake. Irrespective of ethnicity, women appeared capable and confident in cooking a variety of vegetable dishes and described spending a considerable amount of time each day on meal preparation. Few participants mentioned purchasing prepacked and prepared fresh vegetable items. However, products that required little or no preparation – particularly fruits – were valued for their ability to be eaten anywhere and carried to school by children.

Perishability was an important consideration in food choice, as people wanted to buy foods that would "last a whole week". Because most fresh F&V retailed in Fiji's markets are sold in heaps (piles), participants described seeking out heaps in which products were at varying degrees of ripeness.

Quality as an important facilitator of F&V choice Perceptions of product quality appeared to be a major factor in food choice. Fresh F&V were overwhelmingly preferred to frozen or tinned options, but participants said that consumption was mediated by availability and affordability. When shopping, participants would often visit multiple retailers in order to get the desired "value for money", with value assessed in relation to quality and quantity.

> "Sometimes, we plan to go and buy vegetables from the market... But then it also takes time to look around. If I go there, [it takes me] almost an hour… to go stall to stall and, mostly, I see maybe some of those vegetables that are appealing. So I say, 'Okay' and then I buy it. [However, sometimes,] there some vegetables you see, you want to buy it but then you see the condition of it and don't think of getting it. " (Indian man)

Product quality was most commonly described in terms of appearance. In all groups, participants discussed the importance of freshness and ripeness to product choice, both of which were inferred from colour and firmness, and related to perishability, taste, and healthfulness.

> "[The] first thing I see [is] the colour... [the cabbage] has to be green… Secondly, I see the freshness - you know, we see sometimes they [harvest] these vegetables the day before and they want to sell it the next day. And the third thing: the price." (iTaukei woman)

For fruits, sweeter varieties were preferred. Participants said that they could distinguish these varieties based on the shape or origin of the fruit.

Some focus group discussants also associated characteristics of the supply system with enhanced value – particularly product origin and the retail setting. A few participants said that they believed local produce was safer and preferred to buy Fijian-grown products as a way to support the local economy, "spend the money inside". Several people felt that buying straight from the farmer helped reduce cost. In one group, participants related that they associated the atmosphere created by retailers with product healthfulness and that this impacted their purchasing decisions.

> "When you see rubbish laying carelessly, you know, at the vendor's [stall], I don't buy from [them]. And if I see flies and stuff like that, and when they put it on the floor, [I don't buy it]… because it's unhygienic with the dust." (iTaukei woman)

DISCUSSION

226 This study examined factors that influence F&V consumption among iTaukei and Indian urban
227 Fijians. The findings complement existing research exploring influences on F&V intake, which
228 mostly comes from high-income countries (Krølner et al., 2011; Rasmussen et al., 2006; Yeh et
229 al., 2008). Regardless of ethnicity, participants had positive perceptions of F&V in the diet,
230 confidence in their preparation skills, and awareness of health benefits associated with F&V
231 intake. However, aspects of the food environment, including inconsistent access to high-quality,
232 low priced, fresh F&V, were recognised as important barriers.

233 Plant-based dishes were identified as a core component of traditional meals prepared at home for
234 both main ethnic groups. While parents emphasized the importance of including F&V in family
235 meals and snacks and encouraging their consumption, they related that this can be challenging
236 because many children preferred imported or processed foods. The perceived generational
237 differences in food preferences and declining interest in traditional cultural foods discussed by
238 participants in this study have been documented elsewhere (DiBello et al., 2009; Ferzacca,
239 Naidoo, Wang, Reddy, & van Dam, 2013; Kuhnlein, 1996). For instance, in American Samoa
240 and Samoa, DiBello et al. (2009) found older adults to be more likely to eat a traditional diet
241 dominated by starchy vegetables, seafood, coconut, and domesticated pig compared to younger
242 adults. Trends toward more 'modern' diets are likely to contribute significantly to the rising
243 burden of NCDs, suggesting a need for accelerated action targeting young people's food choices
244 in Fiji. This study did not collect data from children or adolescents, however, qualitative studies
245 in other settings suggest that taste and convenience are particularly important to their food
246 choices (Krølner et al., 2011). Interventions that provide parents with new ideas for ready-to-eat
247 F&V snacks and strategies to incorporate additional F&V in meals could help increase children's

248 F&V intake, but further evidence on specific barriers and facilitators to F&V consumption
249 among young people in Fiji is needed.

250 Access to affordable and culturally acceptable produce is an essential precondition to F&V
251 intake in any population, and poor access is consistently identified as a barrier to healthy diets
252 (Hartman et al., 2013; Jago, Baranowski, & Baranowski, 2007; Krølner et al., 2011; Rasmussen
253 et al., 2006; Yeh et al., 2008). A recent study from Vanuatu, found that most urban households
254 could not afford to buy enough local F&V to meet dietary recommendations (Jones & Charlton,
255 2015). Our study adds to this literature by highlighting complexities that may be more
256 pronounced in low resource settings and for remote, import-dependent economies. Of significant
257 policy relevance, it provides qualitative information on how the South Pacific's largest urban
258 population is affected by and copes with food price fluctuations.

259 Across the Pacific region, urbanization and rapid food supply changes have resulted in unique
260 challenges to food and nutrition security as populations adopt more westernized diets (DiBello et
261 al., 2009; Hughes & Marks, 2009; Hughes, 2003). In Fiji, urban residents grow just 5% of the
262 food they eat, compared to 35% for rural residents (Narsey, 2011). However, we found high
263 involvement in home F&V production among urban and peri-urban participants except for those
264 who lived in central Suva and lacked access to agricultural land. This suggests a need for
265 strategies specifically targeted at helping urban residents develop skills and self-efficacy in
266 growing food in small spaces, such as in pots and small raised beds. School-based gardening
267 schemes provide one possible platform for engaging youth in urban food production.

268 In Fiji, NCDs are recognized as threatening the nation's health and development, resulting in a
269 high level political commitment to improving diets (Snowdon, Waqa, & Raj, 2015).

Government initiatives promoting healthy eating focus on local food production and consumption (WHO, MOH, & NFNC, 2013) and appear to have contributed to urban adults' awareness of the health benefits of F&V. However evidence of effectiveness of nutrition education programmes on health behaviours in the region remains limited (Hughes & Lawrence, 2005).

This study also provides evidence on the ways in which urban Fijians evaluate the quality of F&V. Consumers use product colour and firmness to infer freshness and ripeness, which they associate with taste, perishability, and healthfulness. Participants preferred sweeter varieties of fruit and F&V with longer shelf lives. This information can be used to inform nutrition-oriented development of the food supply system.

There are limitations to this study. Participants were recruited through existing social groups and the perspectives of members of those groups may differ from the perspectives of non-members. With the exception of age, no exclusion criteria were specified. Further, some participants may have been reluctant to candidly share their experiences because they did not want to draw attention to themselves or be perceived as different from peers or friends. However, recruitment purposively sought a diverse sample of participants in order to capture a variety of opinions, and the established dynamics of the groups may have facilitated deeper levels of discussion and ultimately a richer understanding of factors influencing F&V intake (Mackay, 2012). Information on participants' personal characteristics and detailed exploration of individuals' health knowledge and behaviours may have enriched data analysis, but were not collected as part of study. Another possible limitation is that most participants were midlife and older, and many said that they grew up in rural areas. Future research should explore the influences on F&V intake among young adults, adolescents, and children, particularly those growing up in urban

293 settings, where homestead food production is more limited and access to imported and processed
294 foods has greater influence.

295

296 **CONCLUSION**

297 This study identified important factors influencing F&V intake by iTaukei and Indian urban
298 Fijians. We found that, irrespective of ethnicity, urban Fijians enjoyed and valued eating F&V
299 and were aware of the health benefits, but availability and affordability were perceived as
300 important barriers. The findings suggest that public health interventions to increase F&V intake
301 in Fiji should focus on improving the stability of the domestic F&V supply and increasing the
302 feasibility of small-scale gardening in urban areas. Further public health efforts are also needed
303 to increase the appeal of F&V relative to processed foods.

304

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