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WORKING PAPER

FOOD SYSTEMS AND DIET-RELATED NCDS IN CAPE TOWN, SOUTH AFRICA

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This is the first in the project's working paper series. For more information about the project and its publications, see https://www.africancentreforcities.net/programme/nourishing-spaces/. We welcome comments and suggestions. Please direct them to the author: hunterjo@gmail.com

The project (Urban Food Systems Governance for NCD Prevention in South Africa, Kenya and Namibia. IDRC Project # 108458) argues that there is a rising burden of non-communicable diseases across Africa that is being driven in part by increasing consumption of unhealthy diets (ultra-processed and fast foods). Unhealthy diets are becoming more available because food systems, especially in urban parts of Africa, are changing rapidly as a result of urbanization and globalization. This project proposes 'urban-scale research' for addressing diet-related non-communicable diseases in six urban sites – two cities each in South Africa, Kenya and Namibia. Ultimately, the project aims to support local governments and community stakeholders in each study site to utilize the knowledge generated from this research to develop local action plans and interventions that will help to reduce the burden of food-related non-communicable diseases.

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Introduction

The aim of this working paper is to offer insight into the lived experience of changing food systems and diet-related non-communicable disease (NCDs) in a low-income neighbourhood in peri-urban Cape Town. The lived experience of changing food systems is central to understanding local contexts, a focal point for reducing incidence and improving experiences of diet-related NCDs, and a lever for action. This analysis represents part of a broader three-year Nourishing Spaces study.

Through a participatory research process engaging local government officials and community food system stakeholders, Nourishing Spaces analyses data on diet-related NCDs; conducts research on food systems, consumption and NCDs (and the relationships among them); and examines the governance arrangements underpinning existing dynamics. It seeks ultimately to present two policy and governance approaches to prevent NCDs, firstly to capacitate local government to develop interventions to create generative urban food systems, and secondly to test the viability of neighbourhood-centred Food Systems Committees. The Nourishing Spaces project sites are neighbourhoods in Cape Town and Kimberley (South Africa), Windhoek and Oshakati (Namibia), and Nairobi and Kisumu (Kenya). The choice of primary and secondary cities was motivated by differential rates of nutrition transition and food systems change across Africa, with South Africa being particularly far along in this transition.

This working paper represents an overview of the findings from our analysis, with a particular focus on potential for policy that is responsive to the types of issues driving diet-related NCDs. We first provide background on local food systems and diet-related NCD contexts both internationally and in South Africa. We then detail the methods used and describe the research sites. The description of key findings is structured as a brief overview of common foods consumed, analyses of perceptions of 'choice' within the food system, experiences of changing urban infrastructure (including electricity and transportation), the context of rural-urban migration, experiences of diet in relation to health, and perspectives on health within the neighbourhood. Finally, we consider how this analysis relates to existing policy.

Background

The burden of diet-related NCDs is increasing in low- and middle-income countries (LMICs), predominantly in urban areas. Changing food systems – in particular the globalisation of food systems and the increased consumption of animal products, processed food, and fats – are perceived to contribute to these disease trends (Monteiro, Levy, et al., 2010; Monteiro, Moubarac, et al., 2013; Popkin, 2002). Understanding the trends of increasing NCDs in the context of changing food environments is important in designing better international, national, and municipal-level policies.

Changes in the food environment contribute to unhealthy diets and NCDs. However, not everyone living in an unhealthy food environment has an unhealthy diet, and not everyone who has a seemingly unhealthy diet becomes sick or experiences a significant decline in their quality or length of life as a result of their diagnosis. Rather, the health implications of food environments are shaped by a more complex set of circumstances. Some of these are intuitive: individuals' consumption practices depend on their financial situation, access to cooking space and fuel, transportation, and access to prompt, appropriate, preventive and curative healthcare. These factors fit within the broad frameworks of the social determinants of health (Marmot, 2008) and the ecological model for food environments (Story, et al., 2008). More detailed local understanding of individual and household experiences of food and NCDs, and the broader economic context in which this food system operates, are all important to identifying and leveraging local opportunities for better urban policy. To this end, this working paper focuses on the results of qualitative investigation into changing diets and perceptions of health in Masiphumelele, a low-income neighbourhood in Cape Town.

Contexts for diet-related NCDs in Cape Town

Obesity

Rates of obesity correspond to increases in NCD burden at the population level, including cardiovascular disease and diabetes (Kruger, Venter and Vorster, 2001; Kruger, Puoane, et al., 2005). Obesity and associated NCDs are prevalent among all population groups in South Africa, including the poor. Some 41% of black women, 31% of white women, and 46% of coloured women are obese (Statistics South Africa, 2017). These rates may be even higher for peri-urban black populations. A study based in Khayelitsha, a peri-urban area of Cape Town, found that 53% of women were obese and an additional 25% were overweight based on body mass index (BMI) calculations (Malhotra, et al., 2008).

Non-communicable diseases

In 2009, Mayosi et al. highlighted the quadruple burden of disease in South Africa, emphasising the emergence of NCDs amongst poor people living in urban settings. In this article, the authors emphasised the pressure that NCDs place on the health system, as well as on poor households in urban settings. This burden of disease is partly attributable to changing diet. Mayosi, et al. (2009:3) argue that, while there is need for better information, 'there is sufficient evidence for governments and society to take action on the basis of three principles: to improve the conditions of daily life, to tackle the inequitable distribution of power and wealth, and to strengthen the ability to monitor population health'. In other words, enough is known about the burden of NCDs to motivate for better, more equitable living conditions in South Africa.

Food insecurity

According to research that took place in 2008 using the Household Food Insecurity Access Prevalence indicator, only 15% of residents in three low-income areas of Cape Town were found to be food secure, with 5% mildly food insecure, 12% moderately food insecure, and 68% severely food insecure (Battersby, 2011a). This data also showed that almost 49% of the population ate foods they did not want to eat, or did not consume the food they preferred (Battersby, 2011b). Using a different tool, the South African National Health and Nutrition Examination Survey (SANHANES-1) found that over 32% of urban informal residents experience hunger. Moreover, South Africa is one of the 20 countries worldwide with the highest burden of undernutrition (Bryce, et al., 2008), and was ranked 146th out of 192 countries in the Global Nutrition Index (Rosenbloom, et al., 2008). Food insecurity in the form of hunger and obesity, as well as its implications for health, should be key policy concerns in South Africa, particularly in urban centres.

Responses to diet-related NCDs

Despite the significant body of evidence showing the impact of food environments on diet and NCDs, responses typically do not include specific attention to upstream determinants, where diet is central to improving health, particularly in low-income settings. Moreover, obesity is seldom considered a specific outcome of food insecurity. The limitations of common dietary interventions that revolve primarily around education are repeatedly raised in the literature, both in a global context, such as among low-income residents of Nova Scotia, Canada (Travers, 1996), and in South African contexts (Temple and Steyn, 2011). The gap between professional recommendations and patient realities is often wide (Travers, 1996). Travers (1996:552), writing over 20 years ago, said that: 'As part of a move toward a reduction in nutritional inequities, the discourse must be changed'. However, there is little evidence that discourse has changed. Ndinda, et al. (2018) reviewed the South African literature in relation to NCD responses, and described the growing recognition and attention they are receiving. However, this attention has not been supported by multisectoral policies.

In the South African context, Temple argues that evidence of the success of health promotion efforts to improve diets are minimal, and that the

most practical way to make healthier diets affordable is to intervene and manipulate food prices via subsidies and taxation (Temple and Steyn, 2011). However, the focus of policy and programmatic interventions in South Africa, as they are globally, remains to improve diet and combat increasing rates of obesity through education, with key messaging revolving around personal decisions to increase activity and improve diet (Western Cape Government Health, 2014). Writing about South African's progress on achieving the millennial goals, Chopra, et al. (2009) wrote of the challenge of reorienting the health system post-apartheid, and the difficult task of opposing potentially harmful corporate interests in South Africa, notably Big Tobacco and Big Pharma. They argued at the time that most successful programmes post-apartheid had arisen from centrally directed regulatory and structural interventions, In this light, it is important to understand diet-related NCDs within their broader economic context.

Changes in urban food systems

The South African food environment has changed rapidly post-apartheid. This mirrors broader global trends framed as the nutrition transition and characterised by increases in consumption of animal products, soy, and fat (Popkin, et al., 2012). The post-apartheid food system has been shaped by trade liberalisation (Greenberg, 2017), and the growth of processed commodities has been significant. Igumbor, et al. (2012) highlight the role of Big Food and Big Drink in the South African consumer market, and the dominance of a few key companies in processing and retail, which are disproportionately shaping the national food environment. In particular, the rise of supermarkets in cities such as Cape Town seem to have had an important impact on the foods that are accessible, available, affordable, and acceptable to the urban population (Battersby and Peyton, 2014).

The changes in the food system indicate the overall dominance of economic interests, where food is primarily valued as a commodity. While this problem is by no means uniquely South African, in the South African case it is woven into the history of apartheid, the mining economy, and the strategic disconnection between people and their land, and therefore between land and agricultural practices (Cousins and Scoones, 2010). Rather than this connection being restored post-apartheid, the current trajectory involving the rapid growth of large supermarkets further alienates rural smallholders and small traders (Tsheola, 2014).

Civil society organisations play key roles in shaping food security efforts through food system interventions in the form of food banks, community gardens, and activism. McLachlan and Landman (2013) argue that realising the right to food, which is enshrined in the South African Constitution, requires the collaboration of government, civil society, and businesses. They also suggest that a historical lack of collaboration among government departments has slowed efforts to improve food security. Thow, Greenberg, et al. (2018) detail the challenging lack of coherence in economic, food security, and nutrition policy objectives as a major issue shaping the food system. In particular, given that food has long been perceived as a tool for economic growth, trade and health interests may be at odds with one another at the national level.

The role of rural-urban migration

Rural-urban migration has meant that some migrants have experienced particularly rapid changes in their food environments. As such, low-income residents of urban spaces – many of them migrants from rural areas within South Africa – may have experienced food shortages in their lifetimes and now have dramatically increased access to high-calorie foods. Historical shortages of food shape how individuals metabolise excess calories and increases individuals' NCD risk (Stanner, et al., 1997; Yajnik, et al., 2003). At the epigenetic level, bodies remember hunger, even of previous generations (Painter, et al., 2005; Stanner, et al., 1997). Previous experience of hunger is also central at an emotional level as individuals navigate an apparently more abundant foodscape. This physical and emotional response to rapidly changing food environments means that at least some rural-urban migrants may be particularly vulnerable to obesity and its associated risk of morbidity, due to the relationship between previous (including intergenerational) food shortages and obesity (Stowers, 2012).

The roles of spatial transitions in changing diet and NCDs

In the South African context, economic policies have resulted in the widespread availability of affordable and palatable highly processed foods. As a result, food insecurity often manifests in the form of low dietary diversity and disproportionate consumption of cheap but nutrient poor sources of energy. Drimie. et al. (2013) found that dietary diversity was particularly low in urban informal areas in Johannesburg, South Africa. In Cape Town, Temple and Steyn (2011) observed that cookies, sugar, margarine, and oil were among the cheapest sources of energy. A wide range of healthier food choices was nearly always available, yet nutrient-dense foods such as lean meats, fish, fruit, and vegetables cost more than processed food products (Igumbor, et al., 2012). One study of food choices in rural areas found that while 'healthier' foods were available, they were 10–60% more expensive than other, less healthy calories. However, the distinctions in this study were typically between more and less healthy versions of relatively processed foods (Temple, et al., 2011). The affordability of healthy food has been shown to be of concern in multiple studies (Jacobs, 2009; Schönfeldt, et al., 2013). However, the categorisation of what constitutes 'healthy' food remains challenging and perhaps does not lend itself to straightforward analysis. When naming policy opportunities to increase access to healthy foods, Thow, et al. (2017) suggested mechanisms for increasing fruit access including interventions targeting farmers, the shaping of urban spaces, and the incentivised sale of fresh fruit and vegetables by street vendors.

At the same time, access to healthy food may not be the only important factors shaping diet and NCDs. The concept of the food desert, which relates obesity and NCDs to unhealthy food environments, has been important in expanding the discourse of diet-related NCDs beyond knowledge and choice. It has also been widely critiqued, for example in conflating supermarkets and food access and failing to acknowledge the economic drivers of access to healthy foods (Battersby, 2012, 2019), and in not clearly differentiating between access and utilisation of healthy foods (Bridle-Fitzpatrick, 2015). However, the concept does provide an entry point to take a more systemic and political approach to food access. That is, if healthy food is not available within an individual's immediate neighbourhood, it may be more difficult to access (McClintock, 2011). The concept of food swamps has been introduced to suggest that the easy availability and affordability of highly processed, salty, or sugary snacks in the food environment, even when unprocessed foods are available, also contributes to unhealthy diets (Bridle-Fitzpatrick, 2015; Fielding and Simon, 2011; Luan, et al., 2015).

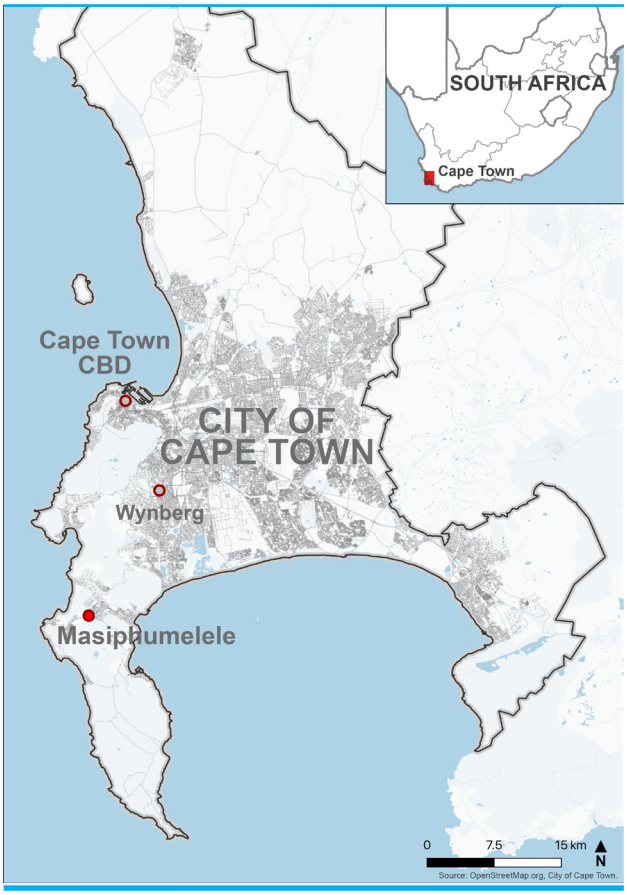
These approaches have limitations as they do not always emphasise the importance of other dimensions of access to food, which has been highlighted in the South African case (Battersby, 2012). The foodways literature has added to this framing by emphasising that it is not only supply-side challenges that shape diet-related NCDs (Alkon, et al., 2013). Rather, foodways cast light on 'the cultural and social practices that affect food consumption, including how and what communities eat, where and how they shop, and what motivates their food preferences' (Alkon, et al., 2013:27). In fact, the findings of this report are very consistent with the findings of Alkon, et al.'s (2013) findings based in Oakland and Chicago in the USA: that individuals shopped beyond their immediate neighbourhood for better quality and price; and that individuals had significant knowledge about healthy foods. Alkon et al. (2013) emphasise that, to achieve food sovereignty, it is vital for residents to actively engage economic systems and spatial planning.

In this working paper we will also highlight participants' descriptions of hunger, energy, and competing economic priorities. In particular, we are interested in how local, neighbourhood-scale experiences of the food system may help to craft better policy, planning, and programming at the urban scale, while recognising the importance of multiple scales of policy intervention.

Motivation for the approach used in this working paper

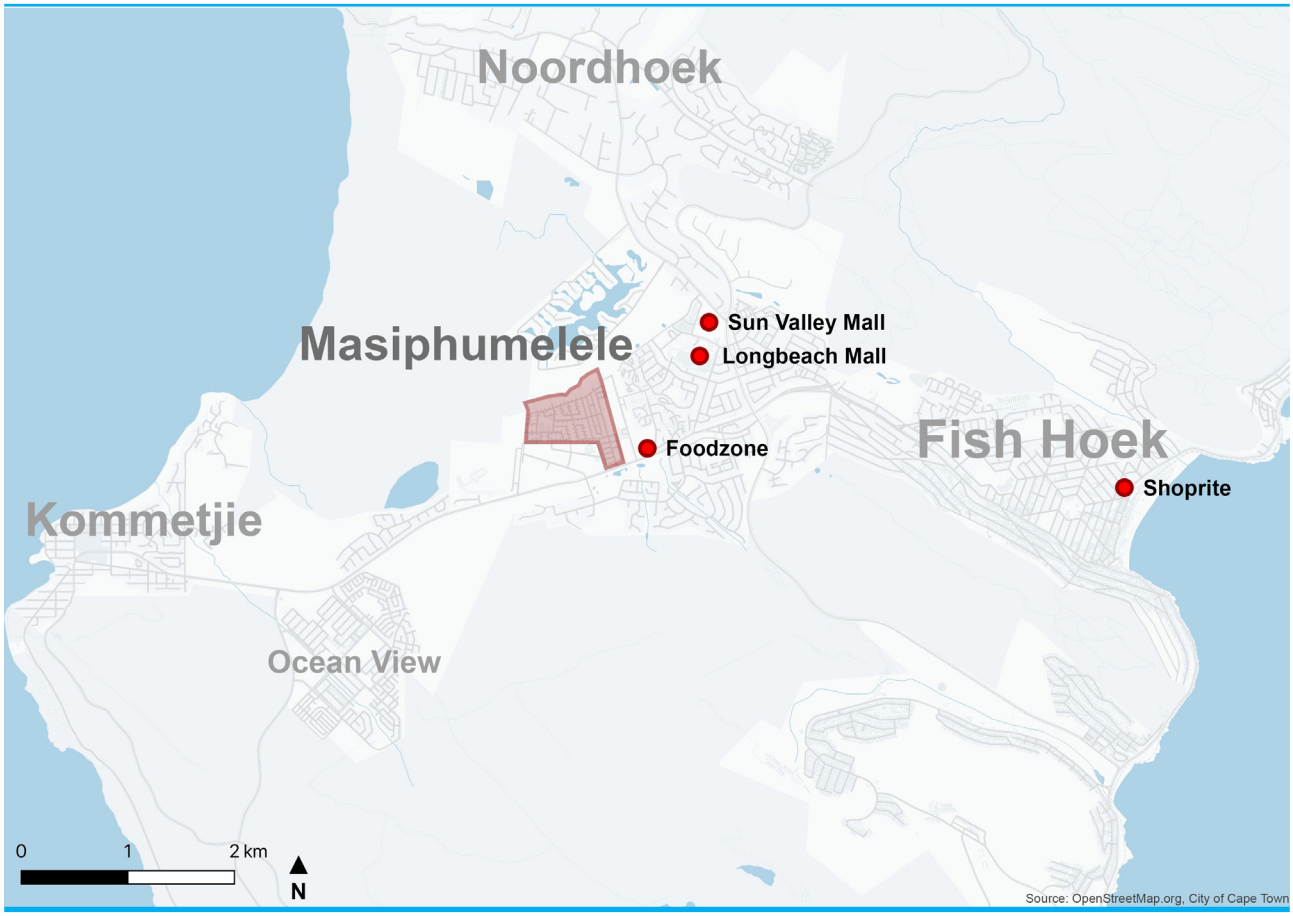
An ecological model provides a way of looking at the household experience of food environments, and exploring in detail localised perspectives on the food that is consumed and the ways these foods might better contribute to good health (Story, et al., 2008). Given the dynamism of the food environment in both space (rural-urban migration) and time (changing urban retailer landscape), we also wanted to understand how individuals experienced changing food environments. The goal of this research is not to categorise dietary norms and beliefs as right or wrong, or practices as high-risk or low-risk. Rather, the goal is to understand the contexts and circumstances in which diets may be healthy or less healthy, given the broader contexts in which people live, move, and seek healthcare. These choices are also gendered, and women continue to navigate food environments on behalf of the family. Our research focused on women and the experiences of the household, and therefore does not reflect on the experiences of single men.

The ecological framework is mirrored in the methodology selected for this study. Individual interviews offer insights into individual motivations, as well as how the level of the individual relates to or considers other levels of the framework. Focus-group discussions help to make more explicit the household interactions that drive food choices. We know that people eat differently alone compared to when they are with family or friends (Hetherington, et al., 2006; Sobal, 2006). The ways that communities discuss and understand food is likely to offer different insights to those gained through individual interviews.



MAP 1 (above): Masiphumelele, Cape Town

MAP 2 (below): Local food environment for residents of Masiphumelele



Neighbourhood spatial context: Masiphumelele

Fieldwork took place in Masiphumelele, a predominantly isiXhosa speaking low-income neighbourhood in Cape Town that was officially designated as a township or area for formal housing for black South Africans during apartheid. Comprising brick houses and backyard shacks, as well as an area of only shacks, Masiphumelele has a smaller population and covers a much smaller physical space than many other townships in Cape Town. According to 2011 census data, 27% of Masiphumelele's residents live in formal dwellings (City of Cape Town, 2013). However, in the past eight years, the size of the township's informal wetlands area has grown considerably. Masiphumelele is located 30–40 minutes' drive south of Cape Town's central business district (Map 1). It is surrounded by middle-class and upper-class neighbourhoods, where many residents are employed in low-skilled work including domestic labour, services, and construction. Other low-income areas in the South Peninsula are Ocean View (formerly designated a coloured township), and Redhill (an informal settlement). The total population is informally estimated to be at least 40 000 people, in a space originally anticipated for approximately 4 000. Housing availability is vastly outstripped by demand due to geographical and other constraints. Given the chronic pressure for housing, shacks have been constructed in an informal settlement adjoining the formal township land. These shacks stretch out onto wetlands, which are congested and flood in winter. Moreover, most brick houses were built in the 1990s and granted to longstanding black residents of the Noordhoek valley, who are now in their sixties and seventies. While these houses have been a tool for building wealth by renting out backyard shacks, they are now frequently a shared resource for multigenerational family networks.

The neighbourhood's immediate food environment is dominated by small corner shops or spazas (predominantly owned by Somalis or Ethiopians) selling basic groceries, including a small range of fresh fruit and vegetables, shelf-stable staple foods (rice, beans, instant noodles), and a wide variety of drinks. Street stall vendors sell fresh fruit, fresh and dried vegetables imported from neighbouring Mozambique and Zimbabwe, and cooked meat. Fried chips and *amagwinya* ('fat cakes' or fried dough) are available for sale from early in the morning.

People travel out of the immediate neighbourhood for work, school, and grocery shopping (Map 2). Beyond the neighbourhood, large supermarket chains are an important part of the broader food environment. Adjacent to Masiphumelele is a mid-sized independent supermarket and a butcher. About three kilometres away, two large shopping malls (Long Beach Mall and Sun Valley Mall) are where most Masiphumelele residents do a 'big shop' at least once a month. These malls have anchor grocery stores where South African Social Security Agency (SASSA) grants can be accessed, as well as banks, clothing shops, and restaurant chains. About five kilometres away, Fish Hoek's main road has additional branches of the major grocery stores and fast-food outlets. There are no large fast-food outlets within the townships themselves. Masiphumelele residents also travel closer to the city centre for work, including Wynberg, where there is a large butchery. While the physical proximity of food vendors is important to how Masiphumelele residents eat, food choices are also shaped by employment, life experiences, and perhaps most importantly by income.

In her 2018 master's thesis, Rommelman found that the self-rated level of food security in Masiphumelele (n=411) had a mean food security index of 5.44 on the Food Insecurity Experience Scale (a continuous scale from 0 to 8). In contrast to Battersby (2011), Rommelman found that there was a minimal difference in food security between female-headed households and male-headed households, and that 39.9% of households reported experiencing hunger in the past 12 months. Participants described some interesting perceptions of what is healthy; for example, they juxtaposed smoothie (healthy) and pie (unhealthy). Rommelman also found that healthy food was perceived as a privilege, whereas fast food was perceived to be affordable. Lastly, participants in her focus groups expressed the sentiment that produce available on the streets of Masiphumelele was of second-rate quality and likely to be rotten.

Methods

Several qualitative methods were used in gathering data for this report, including three-part oral histories with 21 people, and nine focus-group discussions with a total of 57 individuals. The researchers also referred to broader ethnographic work in Masiphumelele that has taken place since August 2016.

Sampling and research team

Prior to conducting field research, a core three-person research team was established comprising Jo Hunter-Adams; an experienced focus group moderator; and a bilingual English-isiXhosa, Masiphumelele-based research assistant. Meetings were held with non-governmental and faith-based organisations in the area, and these connections were used to obtain a convenience sample. The project was then nested within a broader study of urban food systems in relation to NCDs.

Oral histories

Hunter-Adams conducted three interviews, spaced about one week apart, with 19 individuals, and an additional three individuals had one interview each. Findings from the 21 participants were included in the analysis. A focus on nutrition education in South Africa, driven by the professional voice, tends to view individuals as patients. In contrast, by placing the individual voice at the centre of the research, they become the lead actors in the narrative, and their negotiations with their environment take centre stage (Benson and Nagar, 2006). Drawing on oral history methodologies the researchers created an interview guide that built a timeline of food experiences and interactions. In so doing, they could build up a picture of changing food experiences (and food environments) over time. While viewpoints were solicited on perspectives of health and wellness, and ways to achieve health, the goal was not to identify dietary misconceptions. Rather, the purpose of the in-depth interviews was to elicit perspectives related to changing food environments.

Focus-group discussions

Nine focus groups offered collective perspectives on food experiences in Masiphumelele. These group perspectives tended to evoke a different conversation than the individual interviews; participants discussed food issues with each other, rather than primarily with the moderator, who had a different background and experience to the participants. Nine focus-group discussions were conducted, each with between six and ten individuals.

Ethnographic methodology

The interpretation and analysis of oral histories and focus-group discussions in this working paper is supplemented by ongoing ethnographic research in the area of food, including attending health-oriented gatherings, starting and maintaining school vegetable gardens, and shopping in the neighbourhood in which fieldwork was conducted. It has also included observation of school lunch preparation and interactions focused on other feeding programmes.

Language

Hunter-Adams conducted oral histories in English and a colleague conducted focus groups in English. Where participants preferred to communicate in isiXhosa, a Xhosa field worker was present to help with interpretation. All oral histories and focus-group discussions were professionally translated (where applicable) and transcribed. They were then checked for quality of translation and quality of transcription.

Analysis

Codebook and coding software

A thematic analysis was conducted by creating a codebook in HyperRESEARCH based on themes that emerged from the literature, interviews, and focus groups. The research questions and sub-questions provided a loose starting point for coding. Each code was annotated with a description, so that a different researcher would be able to take the codebook and identify similar themes. Hunter-Adams coded all in-depth interview transcripts and focus-group notes and transcripts. Themes and definitions were discussed with research colleagues before settling on the kinds of meaning and understanding that best captured the voice of participants.

Ethics

The research protocol complied with the Declaration of Helsinki (2013). This study was approved by the Human Research Ethics Committee of the University of Cape Town, Faculty of Health Sciences (098/2016). Written informed consent included an outline of the purpose of the research, risks and benefits, and the opportunity to opt out before or during the interview. Participants had several opportunities to opt out. In-depth interview and focus-group discussion participants received a gift card of ZAR50 (≈USD4) as a thank you for their time. Participants also received a snack and a drink during interviews and focus groups. Transcripts were blinded and both audio and written transcripts were kept securely in password-protected electronic format.

Key findings

This section will discuss, in general terms, the types of food that were considered affordable, nourishing, and available in Masiphumelele, although the methodology did not lend itself to quantify the frequency of consumption. This information was primarily gathered from the perspective of women, who were shopping either for themselves or for their families. The majority of women, who did not have access to cars, typically described doing shopping for staple foods soon after receiving money from work or social grants. For most people, this was a large, monthly shopping trip by minibus taxi to the local mall to buy maize meal, rice, tea, coffee, sugar, oil, potatoes, onions, and carrots (and perhaps cabbage). On this monthly shop, individuals might also buy pasta, soft drinks such as Coke, breakfast cereals such as Weet-Bix or Morvite, creamer, spices such as Aromat, and meat. This large monthly shop was supplemented by smaller shopping trips to spaza shops or street vendors within the township to buy soft drinks, yoghurt, instant noodles, small quantities of fruit and vegetables, bread, etc. Frozen meat was also purchased at a medium-sized independent supermarket bordering the township. Frozen chicken portions were a popular purchase and perceived to be cheaper than buying fresh chicken at the large supermarket chains. Animal products (particularly chicken) were perceived to be readily available and more affordable than in the Eastern Cape, whereas vegetables and fruit were perceived to be of lower quality and more expensive. Some street foods, particularly braai meat, were perceived to be too expensive for women and seen to cater primarily to taxi drivers and wealthy men. However, other prepared foods such as hot chips and *amagwinya* were described as filling and affordable given the satiety they offered relative to other foods. Cooked sheep's heads were described as more occasional treats. While participants described trips to fast-food outlets such as KFC, McDonalds, and Spur, these seemed to occur about once a month at most, rather than being frequent occurrences. For women, soft drinks such as Coke were also weekly or monthly treats, rather than daily indulgences. Other celebratory foods included chips and cake, sometimes consumed at monthly or quarterly parties, with alcohol. Later sections will discuss perceptions of specific types of foods in terms of sugar, meat, and fat content, particularly in relation to their health implications.

Consumption choices

When discussing both past and present food consumption, choice was not a primary lens through which participants understood their diet. Rather, participants described food in terms of the prevailing norms among their peer group. This tended to be understood through the lens of availability, with some recognition of agency. Agency was invoked particularly when describing body weight and NCDs, and the challenges people faced in following the nutritional advice provided at clinics. The next section will frame choice in the contexts of mobility and rapidly changing food environments (in both space and time). Here, the availability of foods relative to previous availability played an important role in shaping how individuals navigated current food choices.

Mobility and migration

Consistent with the demographics of Masiphumelele, many participants had moved to Cape Town from the Eastern Cape. Moving from rural areas to the township also marked an important shift in diet for many participants. However, unlike mobility across national borders, moving from the Eastern Cape to Cape Town was not necessarily a single event, and individuals identified with multiple homes simultaneously. Participants moved between spaces – for example, their children may reside in the Eastern Cape with grandparents, but move to Cape Town to attend high school. Many participants financially supported families, including extended family, in the Eastern Cape, which meant that their income needed to stretch beyond the requirements of the immediate household.

Some foods were typically less available in the Eastern Cape, including meat and yoghurt. However, participants described these foods becoming more available over time as the nutrition transition spread across the province. While individuals may spend time in the Eastern Cape and have family that still reside there, this narrative should not downplay the many years many individuals have spent living in Cape Town and their ties to the city. Those living in the original government-subsidised Reconstruction and Development Programme (RDP) houses may have spent almost 30 years living in Masiphumelele. Most brick houses in Masiphumelele were built early in the township's history. As such, living in an original RDP house signalled that an individual had spent many years in the township, and most home owners interviewed in this study were older people whose income was primarily derived from backyard shack rental. Interviews and focus groups with these individuals helped us to build a picture of changes that had occurred in the township and the food environment over time. For example, older women remembered travelling to Shoprite in Fish Hoek to get monthly staples, and having little access to soft drinks or alcohol compared to the present, due to a lack of spaza shops or shebeens.

Foods travelled between Cape Town and the Eastern Cape through informal channels. For example, due to demand and preferences, some foods (including white maize) were brought from the Eastern Cape to be sold in the township. Similarly, some tinned and processed foods (for example, breakfast cereals) were taken back to the Eastern Cape. However, participants commented that the need to transport food was now less common due to the spread of large supermarket chains and spaza shops in the Eastern Cape. The food environments of the two spaces therefore interact and impact each other. However, wild greens that were commonly consumed in the Eastern Cape are seldom consumed by Masiphumelele residents. While women in their fifties and sixties remembered gathering wild greens from suburban gardens soon after migrating in the early 1990s, this practice seems to have phased out. The bitterness of wild greens meant that, over time, they had become unpalatable to younger people, and gradually became less common in diets.

In addition to those who had moved to Masiphumelele from the Eastern Cape, Malawians and Zimbabweans form an important minority in the township. As in many other townships, Somalis are the primary owners of

spaza shops, but they are a very small minority in the township as a whole. Malawians and Zimbabweans seek out vegetables that are not available in Cape Town supermarkets and, owing to this demand, vegetables such as cassava (manioc), ground nuts, and other root crops are imported from Mozambique and Zimbabwe and sold by street vendors. Leafy greens are also grown in Cape Town specifically for Zimbabwean and Malawian residents. While individual interviews did not include non-South Africans, broader ethnographic immersion did.

Participants' linked their descriptions of current dietary choices to their past, and to lack of dietary diversity and choice in their homes the Eastern Cape.

> *[These days] we are thinking about the menu and then I know today I can cook what, but in the Eastern Cape, everyday samp and umphokoqo [pap and sour milk].* (Participant, Focus group 6)

Apart from a lack of variety, participants described experiencing an overall lack of food in the Eastern Cape.

> *It did happen because we could stay two days without food, ja that was the very difficult time of my life but we believed. What kept us going is that we believed that one day God will come to us.* (Phumla, 40)

In the context of this hunger, participants remembered being sent to neighbours' houses to borrow food or to eat a meal. This context provides a backdrop for participants' current focus on maintaining satiety or a feeling of general fullness.

'Full stomach'

For many participants, their choice of food focused on whether the food was perceived to produce satiety.

> *Sometimes we don't even count how many bread we eat, you just want to be full, that's the main thing we eat because we want to be full. I am not eating because I want to be healthy.* (Participant, Focus group 4)

> *Like to eat smiley [sheep's head] in the morning, because there is a lady selling smiley there. Can you borrow me a smiley, mama, I will pay you on Friday? Then I eat early in the morning.* (Participant, Focus group 1)

> *And there is a place around the corner selling chips, then you wake up you go there you buy [hot] chips you eat, you didn't even eat your cereals in the morning.* (Participant, Focus group 1)

> *And that potato chips can make you full from the morning until 13 o'clock.* (Participant, Focus group 1)

This ability to gauge how long a food could keep you full was insightful in that food was prioritised for its ability to maintain satiety throughout the day. Many participants seemed to describe such a cost-benefit analysis.

The invocation of 'cultural' preference for a full stomach suggests that foods perceived to be healthy tend not to be perceived as filling. It also suggests that participants saw this as a collective rather than individual or household value.

> *I think the things are very expensive now, we want to eat healthy food but they are very expensive, but now we just eat food to make our stomach full … we want to eat healthy food but we don't have what we got to make our stomach full.* (Participant, Focus group 5)

> *It's a cultural thing and also now, we are used of eating, your stomach must be full even if you mix what with what, your stomach must be full so that you can work.* (Participant, Focus group 4)

> *We eat as Africans, we eat for a stomach to be full for this thing of healthy food, it's light, it's gonna make you eat every day, even for that in-between snack thing we don't have money for that. If I eat samp I am full the whole day, this healthy food is very light for us, normally they say if you eat rice don't eat potatoes.* (Participant, Focus group 4)

Here, samp is implied to be unhealthy and combinations of starches or carbohydrates are perceived to be unhealthy. However, they are also described as important tools to maintain satiety during long days away from home. The perceived dichotomy between healthy and filling foods has potential effects for health, and will be explored in greater depth in the section on perceptions of NCDs.

Financial access to food

Participants attributed absolute lack of food choice (in the form of hunger) to a lack of money. Participants who were connected to church communities, or who knew about the needs of their neighbours, did make an effort to support hungry neighbours.

> *We put money together and then give it to her because most of the days she goes hungry and then now we try to prevent that, we give her something every week.* (Phindiwe, 34)

Cases of hunger among neighbours were mostly women with no income [grant]. Participants seemed to find out about hungry community members indirectly, and hungry participants found it difficult to ask others for help directly.

> *Especially now (I don't have food), because it's almost the end of the month … I was ashamed because I was to borrow the money from my friend, then she didn't come with the money, then I was so ashamed to call her and ask 'Where, where!?'* (Noliswa, 41)

Participants explicitly identified hunger as an urban phenomenon.

> *Here you can even go to sleep without eating any food just because we do not have money.* (Thembi, 30)

> *But what I notice now if you going home, you only go to town to buy rice, everything, mealie meal, veggies are there in the garden, even now we are hungry. That is why we want to go home to the Eastern Cape, there is no hunger there, we are hungry here.* (Participant, Focus group 2)

An outlying perspective among individuals who seemed to have limited food choices, and even hunger, was to describe these as a result of de-prioritisation of food in light of competing priorities. For example:

> *I didn't buy much food because I was crazy to do my hair on my own money … buy clothes, all those things.* (Akhona, 40)

Accessibility of fruit and vegetables

Participants remembered vegetables as highly accessible in the past, where they consumed them free from the garden. In contrast, fruits and

vegetables in Cape Town were seen as expensive and of uneven quality, and it was perceived as largely impossible to grow vegetables in cramped township spaces. This section documents examples of this contrast. Most families remember growing at least some vegetables (cabbages, leafy greens, tomatoes, pumpkin, butternut) and fruit (peaches, apples) when they lived in the Eastern Cape:

> *You get green vegetables for free, we grow vegetables in the garden, we eat the green vegetables from the garden, you don't stress about what you are going to eat.* (Participant, Focus group 6)

> *Everything that we ate was good, the spinach, and cabbage and also green beans because we were planting them. We were doing planting in the rural areas. We also planted apple trees. Everything that we ate was grown from the garden and the greens that grow naturally without planting them. We were eating and it was nice, not what we are eating nowadays.* (Alice, 48)

Narratives of past consumption were not explicitly described as a choice, but in terms of inevitability (i.e. this is what we ate because this is what everyone ate; this is what was available). A meshwork of memories, age at migration, and food experiences in rural areas, all seem to intersect in the context of township experience in Cape Town. Participants did not describe food in Cape Town in terms of choice or that 'what we are eating nowadays' is not 'nice'. Rather, food was seen in terms of the juxtaposition of expense and the types of food available in the city.

Participants juxtaposed the ready availability of vegetables and fruit in the Eastern Cape with having to actively think about where to get these items in Cape Town and how to pay for them.

> *Here in Cape Town you must always think about where you going to get cabbage. … Because everything is expensive now, food, everything, mmm. But at that time everything was cheaper and it was originals. Now everything is expensive and … maybe fake … But that time we used to, to get originals, fresh ones from the gardens you see.* (Akhona, 40)

Here, 'fake' was juxtaposed with 'originals'. The qualities of 'original' food were that it was not subject to a market economy and was free (the significant input of labour by older women to grow food remained unacknowledged), that it was fresh, and that the ingredients and qualities of the food were perceived as fully known. In contrast, 'fake' food was a term used for products of the food system, including ultra-processed food, and frozen chicken that may be brined or otherwise processed. This term was not used to explicitly refer to vegetables. Individuals juggled multiple, potentially contradictory, thoughts on the authenticity of food depending on their needs and situation. For example, a mother held in tension positive memories of the foods of her childhood with a positive perception of some processed foods such as Weet-Bix or highly sweetened yoghurt.

The perceived decline in accessibility and quality of fruit and vegetables connected to broader narratives around the urban environment as 'all about the money'. This sentiment meant that erecting a shack would generate more income than investing comparable space in vegetable production. For example, one participant initially wanted to grow vegetables, but financial considerations outweighed this motivation.

> *But now, at my home, at my backyard, I said I'm, I am going to, not to put a shack, I'm going to make a, a garden. But you know what I did? I just wanted a quick money, I just hey, I need somebody to put a shack here, I put a shack.* (Participant, Focus group 6)

As such, growing food or accessing fresh vegetables could not be disentangled from financial considerations in an urban context.

Sentiments focused on the changing availability of vegetables are intertwined with nourishment. The rural areas of the Eastern Cape, where many participants grew up, was seen as very fertile and verdant.

> *Because here it, it's a sand and then that side the soil is so fertilised.* (Participant, Focus group 1)

In contrast, Cape Town homes and living conditions were described as crowded and unhygienic. This sentiment around vegetables seemed to compound the sense that fruit and vegetables were expensive. They were not only proportionately expensive relative to income in the Cape Town food system, but also perceived as being grown in unfertile, potentially contaminated soil.

> *No I think the food is fine, but there are a lot of germs because planted things are planted on the sand that is dirty and other people pee and poo on it, they don't give it respect, so that thing brings germs especially here at Masiphumelele. And the other that you also must to get used to, is washing your vegetables before cooking them because you can never be healthy if you did not wash them.* (Buhle, 44)

Fruit and vegetables were seen as expensive within the current food system.

> *Mmm, now the problem, the veggie is too much expensive.* (Participant, Focus group 3)

> *I must always have R10 to buy cabbage … I am HIV-positive. When I have R50 I must think about buying healthy foods, like carrots and fruits. I don't usually eat fatty foods as per doctor's instruction.* (Participant, Focus group 6)

Participants sometimes presented a contrasting narrative, explaining how they accessed fruit and vegetables regularly through informal street vendors.

> *The fruit is cheap at the moment, whatever fruit is on season. Like if it's orange season so you find that orange are cheaper, I buy a bag of oranges. Or maybe if it's banana season, you find that you can get a big bag of banana maybe for R5 something like that. There is this people now selling fruit, they come with a bakkie, then you can get a big bag for R5, so I can buy different fruits, maybe apples, pears, bananas or whatever.* (Participant, Focus group 5)

Participants also described accessing fruits and vegetables monthly by purchasing potatoes, onions, and butternut/carrot/sweet potato combos at the mall (Fruit & Veg City/Food Lover's Market):

> Participant 1: *The healthy food needs a lot of money.*
>
> Interviewer: *Okay, do you want to name some, the food that cost a lot of money but healthy?*
>
> Participant 2: *The veg.*
>
> Participant 1: *It's veg, it's expensive.*
>
> Participant 3: *We used to buy spinach for R2, but now it's R8 or R11 and cabbage is R20.*
>
> Participant 4: *It is rotten veggies.*
>
> Interviewer: *The cheap ones are rotten?*

Participant 4: *Yes, it's better for us to go to Food Lover's, but sometimes we don't have that money.*

(Participants, Focus group 9)

Narratives around vegetable quality and expense were consistently emphasised; it was not enough for vegetables just to be physically present in the food system. For participants who had eaten high quality fresh vegetables when they lived rurally, it was not that they found vegetables unpalatable or did not know how to cook them – rather, it was the combination of quality, expense, and palatability relative to other foods that had become more available, most notably animal-based products.

Consumption of animal-based products

The palpable sense of peer pressure to eat food that demonstrated urban identity and consume what was formerly unavailable was frequently expressed. In particular, meat and dairy were emphasised as readily accessible in Cape Town.

> *Even here, even the other people, they laugh when you, if you just eating the, the junk food, the, the natural food like in Eastern Cape, they can laugh on you to say ooh, this one it's the home, it's the home lady, it's because you eating those old stuff thing … eh, they were saying it's a junk food but it's the really right food that food. This food we were eating now, it's junk food, it's because you can't eat without meat.* (Phumla, 40)

Whereas previously meals primarily consisted of starch and vegetables, the range of acceptable meals shifted during migration, changing food systems to the point where the main meal of the day needed to include meat. The strongly phrased judgements of this transition to 'junk' food spoke to changing perspectives on nourishment. Meat seemed to be perceived as quick and easy to cook, and an ostentatious display of urban identity, rather than being nourishing in and of itself. Here, cheaper ingredients required more skill to make them palatable. The concept of not being able to eat without meat seemed to be a common narrative strongly shaped by peer pressure. One woman who was interviewed said that she cooked meat all the time because her mother-in-law wanted meat with every meal. However, the mother-in-law lamented that she was always eating meat because her daughter-in-law loved meat. The result was that a lot of meat was consumed, despite its significant cost and an apparent openness to vegetarian meals. Clinical advice was insufficient to shift this pattern because it was shaped by household dynamics rather than individual beliefs.

While meat was particularly emphasised, the consumption of other previously inaccessible foods included processed dairy products. A 34-year-old woman who had lived in Cape Town for five years said that, in Cape Town, she '*can eat nice Ultramels (custard), yoghurt, everything, ja*'.

Changing household composition and processed food

Consuming processed foods sometimes occurred in the context of being alone in a new space. A participant described eating alone in the evening, which she shared was also a result of not having any cooking equipment:

> *I was already in the house, staying alone with the house so, so I used to eat junk food because I don't know what to buy, ja. Maybe in the evenings a packet of chips, yoghurt, and chocolate, I went to bed.* (Phindiwe, 34)

In the context of mobility, it was not only that the food environment had changed, but also that individuals arrived in Cape Town alone rather than as a family unit. Instead of eating meals in a family setting, participants described eating meals alone

> *There is also yogurt that comes in a pack of 49, you get those ones and you know when you feel bored you just go to the fridge and get one and eat it without counting how many yogurts you have eaten.* (Funeka, 40)

Where supermarkets are slightly further away, or cooking supplies are not readily available, somewhat familiar yet highly processed foods seem to play an important role in individuals' initial acclimation to a new space. This theme of meals consumed alone seemed to have important implications for overall diet, and was also impacted by the availability of refrigeration.

Alcohol consumption

Participants described the importance of alcohol consumption in the community, which had an impact not only on household budget, but also on sugar and meat consumption. For example, participants described drinking alcohol with two-litre soft drinks, and being unable to track their meat consumption when they were drunk.

> *Like on Fridays when they get paid, sometimes some old ladies visit us when she will buy that fried meat from there … some sausages and wings … she buys that fried meat from the stand. We eat some fat meat, so you can't know whether we eat a lot of meat on that day because you are drunk.* (Participant, Focus group 8)

> *Whenever they drink, they always want Twizza (soft drink), that two-litre.* (Participant, Focus group 8)

Discussion about alcohol consumption was also central to meat and soft drink consumption. For many people this took place in the context of month-end celebrations, rather than being weekly or more frequent. Participants also affirmed high levels of alcohol consumption among men, and felt that unemployment played an important role.

> *There is most unemployment here … and people are suffering you know, and most of them, they are going to the taverns to find the, the, the alcohol to get … something on the stomach.* (Thembi, 30)

Some participants had lived in Masiphumelele since it was first established, which meant they had memories of much quieter times, when there were just two shebeens (informal bars) open only one or two nights per week.

Experiences of urban systems

Contrasts and adjustment for rural-urban migrants

In the previous section, the food system was described in terms of significant shifts in food utilisation: a decline in vegetable and an increase in processed and animal-based foods. Specifically, these changes were shaped by changes in quality, cost, and shifting access to shops.

> *When I started to come to Cape Town in 1991, I started to be happy because I can eat. I remember eating eggs the way like I don't know, I used to buy six eggs, half a dozen, and sometimes I'll boil them, sometimes I'll put them in lots of oil and fry them, sometimes I will scramble them and I, I will each as much as I want. Meat, I, I remember there used to be a chicken, the whole chicken, I used to eat the whole chicken because I was staying alone and the, by not knowing that I'm, I'm interrupting my health or something.* (Participant, Focus group 3)

> *It was different from what we ate and drank there. When we came here in, when I came here in Cape Town it was big different and I saw soft drinks like Coke or Sparletta … they [my children] grew up eating yoghurt … what, what, what …*

things I never saw before. I don't know in case of the health, I'm not sure, but what I believe, old people are stronger than the new generation, I'm not sure it's about eating habits. (Lindelwa, 59)

While changing affordability and household composition played an important role in shaping the utilisation of food and dietary changes, participants' sense that 'old people are stronger than the new generation' linked to a broader range of factors. In the following sections we will consider the role of housing, energy, and transportation in shaping food access.

Urban housing

Participants' experiences of housing, or cramped geographical space more generally, were referenced in relation to growing food. Growing food was impossible given the preference for renting out space. More broadly, perceptions of space and the best use of space spoke to an urban focus on money. Experiences of lack of money seemed to present as a more urgent need than lack of vegetables; indeed, vegetables were always available to purchase.

We don't have gardens. You know what we do? Instead of the garden we put the shack, because we need the money, it's all about money. And another thing here there is a lot of sand, so the plants or the veggies won't grow properly, and the yards are not big, and there is not enough space and no water here. (Participant, Focus group 2)

I'm staying in the wetlands, wetlands shack-shack-shack, no space to do any plough there, the dogs will pee all over that thing [laughter], so we don't have a space. (Participant, Focus group 3)

However, the role of housing went far beyond issues of growing vegetables. Space was generally very constrained, meaning that food storage was limited and kitchens were often makeshift. Given the high density of backyard shacks in many parts of Masiphumelele, the heat generated by indoor cooking is significant and there is little outdoor space in which to cook. Foods were often refrigerated to prevent pests, but there was no refrigeration available in the wetlands areas. The next section looks at changes in fuels used for cooking and the availability of electricity for refrigeration.

Fuel availability and cost

Participants described the transition from growing up in rural areas of the Eastern Cape cooking outside with wood, to cooking with paraffin (in the Eastern Cape and in Cape Town), to sometimes cooking with electricity in the present day.

When using a wood fire outside in the past, participants described their mothers, aunts, or themselves cooking all the food for the entire day.

We would cook a lot of samp, a big pot for samp, and then we will eat that samp with that with that milk coming from that cows, the whole day eating that samp. (Participant, Focus group 4)

We are going to eat the whole day that food. (Mthobeli, 66)

Wood was a free resource in the Eastern Cape, but collection involved a lot of labour and was potentially dangerous. Daughters described their mothers showing them how to collect wood from the forest. It was framed as a chore performed by girls and women.

When your mother told you to, to do the housework, she will always go with you, like if she goes to the thing to take some wood to the mountain, to the forest, she will go with you and show you how to pick up wood from the trees. (Lindelwa, 59)

Fetching wood, and sometimes also water, were framed as ways people in the Eastern Cape stayed fit and healthy.

You just go the field and collect the wood and then make, to make a fire and cook … that's why we are fit! (Participant, Focus group 6)

The water, we are fetching the water [from] far rivers, and the wood is far, that's the part of the exercise there, yeah. (Participant, Focus group 6)

While participants described electricity being available in their rural area in the present day, there was some discussion about whether electricity was too costly for anything other than lighting. A lack of money was related to a lack of employment in specific rural areas.

They still cook outside, even there's, because there's electricity now, but they cook outside … Maybe it's their custom, or they [are] used to it? Where I, where I'm coming from I don't think it's enough, because most of people they just using for lighting only, not cooking, because put kettle, then it be too much. Because if the, if the, there's a less job there, people are not working because there's a few farmers around us. (Phindiwe, 34)

A number of older residents who described moving into the area during apartheid, before Masiphumelele was incorporated as a township, said they cooked with wood on their arrival due to lack of money.

You know that there was no money during those days, you go to the veld and look for iinkuni (firewood) to make fire, the wood and then you cut. Just imagine you are busy up there then comes a big snake. You see [laughs] and you have to run. You get the firewood and tie it with a rope, then you put it on your head, even from Fish Hoek. (Participant, Focus group 2)

Participants typically described the transition from wood to paraffin in terms of convenience. Rather than having to spend hours collecting wood, preparing a fire, and cooking food, paraffin was close to instant.

It was easy because you would put it there and pump it and then cook. (Mthobeli, 66)

Compared to paraffin, the labour of collecting wood became a chore to be avoided whenever possible. However, paraffin involved a cost and was therefore not always available when households ran out of money. In the absence of fuel, plain bread became an even more important staple food. Although easier to use than wood, there were occasional paraffin shortages in winter and it was sometimes too expensive for households to afford, especially at the end of the month. Paraffin shortages demonstrated a broader sense of suffering, both in the Eastern Cape and in Cape Town, as it represented the lack of an essential item.

My father used to buy the 25 litre of paraffin. He didn't want us to go to fetch some wood. He buys the wood and also the paraffin, and we were suffering when he died. (Nomthandazo, 34)

Paraffin was perceived to affect the taste of food and the transition from paraffin to electricity was generally thought of as an improvement, albeit an expensive one.

I use the electricity stove because I have it now, I cook inside, it's much easier. (Akhona, 40)

> *It [electricity] was better, then I started to see that electricity's expensive, you must buy almost every week.* (Noliswa, 41)

While electricity was generally seen as a better fuel than paraffin, maintaining consistent access to electricity depended on consistent access to money. As with paraffin, participants described sometimes running out of electricity.

> *The stove hasn't got that, that smell of paraffin you know, but sometimes it's the same because we running out the, the paraffin at that time and now we run out the electricity you see?* (Alice, 48)

Although electricity was available in much of Masiphumelele, there were areas where residents could not access electricity lines. While participants described the effect of cooking with paraffin on the taste of food, they did not describe the potential effect of indoor paraffin use on air quality or on general health, despite often cooking in confined spaces. The use of liquefied petroleum gas (LPG) cylinders seemed to be becoming more popular as an option, particularly given paraffin shortages and the expense of electricity. While LPG cylinders were seen as potentially cheaper and more efficient in the long term, they involved a start-up cost (a cylinder deposit), and it was challenging to transport full 9 kg gas cylinders by minibus taxis, which seldom dropped people close to their homes. Street-food vendors continued to use wood for cooking (typically scrap wood collected from different parts of the immediate neighbourhood and beyond). The safety dimension of using wood was a legitimate concern as it is often painted or treated, making it potentially carcinogenic.

Running out of fuel (including paraffin and electricity) affected the consumption of food and the ability to prepare cooked meals, particularly in the week before pay day. The cost of electricity was an important broader concern for those living in backyard shacks as landlords typically do not determine units of energy use. This tends to make calculating consumption complex for the owner and expensive for backyard shack tenants. The sense that tenants are being taking advantage of by landlords seems to lend itself to overconsumption and individuals wanting to feel they are using their share. This leads to more expensive electricity and water bills, which perpetuates the cycle. Dependence on electricity is accentuated by refrigeration, where food can spoil if the electricity supply is not maintained. However, the high cost of electricity could negatively impact on diet as a relatively high proportion of monthly income is spent on electricity rather than food.

Using electricity as a primary fuel was seen as a marker that one was coping, whereas purchasing paraffin in lieu of electricity was considered embarrassing.

> *There is a lot of peer pressure here, you have to meet the standard here. If I decide that this month I am not going to buy electricity, I am going to buy paraffin, then I think again. They going to gossip about me, she doesn't afford electricity [laughs].* (Participant, Focus group 6)

The negotiation between paraffin and electricity spoke to the dynamic of renegotiating what was seen as acceptable in the city. Electricity use was also very important in shaping diets in the city because it enabled refrigeration, which was described as an important driver of meat consumption.

> *You know long time ago we didn't have fridge, we didn't even have a electricity here, we only buy and cook the meat same day. But now you have a big fridge, you put a meat there, a whole lot of meat for, for the whole month and then you eat meat every day. I don't think it's healthy.* (Lindelwa, 59)

> *I had electricity in 2005. I bought the fridge in 2006 and then my life started changing because we are buying some meat and we put it on the fridge and also the veggies we put it on the fridge. Even the left overs we didn't throw it away, we just take it and put it on the fridge. My life was changed.* (Nomlango, 55)

> *We would buy it sometimes [in the Eastern Cape], when we had money. We didn't have electricity and refrigerators. When we pass town, we would come back with a plastic bag or two.* (Akhona, 40)

The cost of electricity was also described as a reason not to cook meals similar to those cooked over the fire in the Eastern Cape (e.g. pumpkin or butternut with samp).

> *Even the mielies, if you cook mielies it take lots of electricity.* (Phumla, 40)

With the transition to electricity, participants described being able use multiple pots at the same time or using a microwave oven. Some participants felt this changed their diets and increased their overall food consumption:

> Participant: *Most of the time, here everything was electricity stove, so we used two to three pots.*
>
> Interviewer: *Okay, and did that affect how you ate?*
>
> Participant: *We used to eat a lot, especially breakfast, fried eggs, I enjoyed doing that … Sometimes if you feel like doing something maybe warm in the microwave that was quick, so yes, so we eat much, much more.* (Akhona, 40)

Lastly, national electricity shortages disproportionately affect low-income neighbourhoods like Masiphumelele. Recent two-hour rolling electricity outages frequently resulted in electricity faults from overloaded electricity outlets, meaning multiple 12- or even 24-hour blackouts over several weeks. These outages result in loss of income for businesses, but also mean that refrigerated foods spoil and that individuals cannot cook. Where electricity is a fixed cost linked to shack rental, individuals also pay for electricity that they may not actually use. While it is possible to purchase meters for individual shacks, and at times this was pursued as an option, the underlying issue is that demand for housing greatly outstrips supply. Landlords tend to have extensive demands made on their own income and rely heavily on rental income, which means that backyarders are not in a position to negotiate a fair exchange for utilities, particularly electricity.

Transportation

The monthly pay cycle influenced shopping habits and most participants described making one large shopping trip at the end of the month (potentially unlike in other townships).

> *We have the money only in month end. We go to shops to do the big shop for the whole month and when something is finished then we go to the spaza shops. When the electricity is gone we buy candles.* (Participant, Focus group 2)

Participants described walking or taking a taxi to the mall and getting a minibus taxi home. There was affirmation that individuals were purchasing combos (bundled staples) at month end from Food Lover's Market.

> *You'll see if you go to Long Beach Mall, the taxis full of combos, potatoes and squash and butternuts, so they realise that vegetables are good to their meals.* (Participant, Focus group 3)

Walking rather than taking a taxi to the mall was perceived as a way of saving money on transportation and improving health.

> *Like walking instead of taking taxis. Even when you have a car, don't drive a car to go to the mall, just leave the car and walk, you'll save.* (Participant, Focus group 3)

Shopping habits were therefore also shaped by transportation costs. The cost of taking a minibus taxi to the nearby shopping malls was carefully weighed. Women described walking to the mall and returning in minibus taxis. For some, the combos offered by spaza shops were more convenient and the same price as going to Pick 'n Pay or Shoprite, and avoided transportation costs. Another study in Masiphumelele, using a case study approach, also found that individuals tended to do one large monthly shop (Hoang, 2017).

While vegetables were cheaper at Food Lover's Market, participants described the combos available there in detail. They carefully considered the costs from many different angles, including the shelf life of the food and if it needed to be refrigerated. Those who travelled for work described specific shops – notably a butchery that was on their route and enabled affordable meat purchases. More recently, a butcher has opened close to Masiphumelele, which may also shift buying patterns.

While travel around the southern peninsula was considered normal, our fieldwork has not included many people who frequently travel beyond this area. Despite the relatively short distances, travel around the local area sometimes involved daily hitchhiking due to the absence of transportation infrastructure. This could be time-consuming, unpredictable, and tiring. Participants tended to frame their transportation choices in terms of the cost of taxis to Fish Hoek or the mall, rather than in terms of time.

Refrigeration

Beyond electricity used for cooking, the use of electricity for refrigeration was frequently described in the narratives of changing consumption patterns. These involved the increased consumption of meat and the ability to refrigerate soft drinks at home.

> *We were eating the meat now because when you have a fridge you make sure that you have everything. Like when you are bored you just take meat and cook it in the micro oven and continue with other things, but you are still going to cook later. Ja, the life was change you know, because when we are started to buy a fridge and the meat was always available you know. And if you want to eat meat even each and every time, you just put the piece on the microwave and it will be fine. And then even at supper you can cook again the meat. We eat it all the time.* (Funeka, 40)

This transition was linked to perceptions of health.

> *No I don't know, maybe it's because of moving from something to another like we can no longer eat food without meat, and also drinking cold cool drinks. Ja, I think it was because we are used to eat more meat you know and the, also drinking the cold drink, the cold one, from the fridge one, ja, I think it was started to make me uncomfortable[unhealthy].* (Funeka, 40)

> *But now you have a big fridge, you put a meat there, a whole lot of meat for, for the whole month and then you eat meat every day. I don't think it's healthy.* (Lindelwa, 59)

Daily consumption of meat was frequently described as unhealthy. Some individuals even described personal feelings of discomfort, which they linked to meat consumption. While refrigeration meant that meat was much more accessible, the quality of frozen meat in spaza shops was perceived as 'not fresh'. Those who did not buy enough meat for the whole month during their monthly shop, purchased meat at shops within Masiphumelele. Here, the turnover of meat was much slower and the meat was frozen. Purchasing chicken, despite feeling it was of lower quality, was economically motivated.

> Participant: *The thing I was talking about, you prefer to buy that small tray, that small tray it stays there, for three to four months in the fridge, it's long, it's not fresh. Maybe it doesn't smell nice.*
>
> Interviewer: *But you still buy it?*
>
> Participant: *Maybe we don't have that thirty something to buy a nice chicken.* (Participant, Focus group 8)

This was contrasted with meat consumption in the Eastern Cape, where chicken was perceived to be fresh. Refrigeration was again linked to other themes, such as the quality of the chicken and the frequency of consumption.

> *And also the meat, the chicken that we eat there is coming from the shops, it's not fresh, it stays for a long time in the fridge. And even when those chicken, when they grow up, they've got something that they give those chicken, some to grow up fast, and it's different from the chicken in Eastern Cape. We didn't eat meat every time like here, we ate meat once a month.* (Participant, Focus group 9)

Meat consumption, particularly in the Eastern Cape, tended to be communal due to a lack of refrigeration. Refrigeration has allowed for individual consumption. Whereas previously, meat consumption involved sharing resources and building neighbourhood bonds, this was no longer necessary.

> *So even if is having the lot of meat he can put it, she can put it in a fridge instead of eating everything, calling the people to come and … to come and help her eat.* (Phumla, 40)

Refrigeration also allowed for the consumption of leftovers and for individuals to cook less frequently.

Health status and diet-related health outcomes

In this section we will focus on perspectives of health in relation to NCDs. Four main points are highlighted in relation to perceptions of diet-related health outcomes. Firstly, there is a strong sense of increasing issues with NCDs and that diet contributes to this shift. Previous emphasis on having a 'full stomach' may inadvertently contribute to worsening diet and health in urban settings. Secondly, high blood pressure and diabetes are particular concerns, and while diet was perceived as a key contributor to NCDs, stress and other environmental factors were also seen as important. Thirdly, clinical advice focused almost entirely on dietary restraint, which meant that participants had a high level of responsibility but tended towards self-blame. Fourthly, increased meat consumption was perceived as a key driver of increased NCDs, whereas participants seemed to be less aware of sugar consumption, and particularly of 'hidden' sugar (sugar added to processed foods) as a driver of NCDs.

General awareness of diet and worsening health status

Life in the city was presented as unhealthy, specifically in comparison to grandparents' and parents' lack of NCDs. Participants were highly aware of the ways their diets seemed connected to diabetes and high blood pressure.

> *Food is not healthy, fish and chips and KFC, all those fat and Coke. We just eating what you want to eat and we don't last long. Our parents went to, are reaching 80 years, we just, we struggle to go for 50 because of the, the things that we eat.* (Participant, Focus group 3)

> *I don't think the food we eat now is health[ier] than the food people ate before, because the people who were there that time, they stay longer than us, and they were healthier than us, and I never hear my granny got sugar diabetes and high blood pressure until she died.* (Participant, Focus group 1)

> *Like 20 years back, when a person has high blood, you would only find that in older people. But now I don't know what changed, we are unhealthy and you would find the 27-year-old that has chronic diseases the older ones has, even diabetes.* (Participant, Focus group 1)

Participants emphasised a narrative of health connected to specific foods, highlighting a proactive view of nourishment and health, where taste, belonging, and health were linked.

> Participant 1: *That time we never got sick, we were strong, no sicknesses.*
>
> Participant 2: *No diabetes. You know … the melon was the reason.*
>
> Interviewer: *Watermelon?*
>
> Participant 1: *Melon not the watermelon.*
>
> Interviewer: *The fruit?*
>
> Participant 1: *Ntyabontyi (yellow melon), the way you cook it, we call it ntyabontyi. You cut it and then slice it, then peel those … yeah you put it in a pot, cook it there, then when it's ready you take the mealie meal, mix it like that then make pap. When you finish with that you can put sugar for the taste, very nice, yes.*
>
> (Participants, Focus group 2)

Participants gave examples of relatives who had lived to old age without NCDs.

> *The sister of my father … she's not even having diabetic and the high blood, but now is, is 98, mmm, is very old.* (Mthobeli, 66)

Maize meal and samp, often spoken of negatively as 'starch', were perceived as unhealthy when consumed without any other foods. Frequent consumption of vegetables, coupled with low consumption of oil, butter, and meat, was perceived as healthy. However, given the constraints described in earlier sections, few participants self-identified as consuming a lot of green vegetables.

Consumption of food that was perceived as unhealthy or linked to NCDs was explicitly described in terms of treating oneself after a long month of work.

> *Because of our, of the disease that we have like blood pressure and, and sugar, so the, the doctors force them to do, they give you the paper, you must eat this if you want to manage your blood pressure. And sometimes I do say and sometimes I need the junk food to thank me because I work hard for the long whole month. I must have KFC today, it's a pay day.* (Funeka, 40)

For this participant, 'thanking herself' was linked to specific foods that were also considered unhealthy. Experience of doctor's recommendations tended to be conveyed very briefly: that a doctor gave a specific directive and they sought to comply.

> *When I found I'm diabetic so I'm not drinking Coke anymore because the doctor said I must not drink the Coke.* (Participant, Focus group 6)

Yet these interactions did not convey the breadth and contexts of food consumption. One participant described the 'olden days' and wove in experiences of nourishment in the context of eating for a 'full stomach':

> *I think as for food in the olden days, the food that we ate, although it was not luxury food, it was good healthy food because it was mostly vegetables, starch and vegetables. We didn't eat to feel satisfied, we ate to sustain our bodies, so that we can be healthy. We heard that mentality that this portion will keep me until the next meal, but now we eat for fun. Stress food is easily accessible, it is expensive but it's easily accessible, which results in the diseases like the high blood, the diabetic, mostly eat the unhealthy stuff that affects our health.* (Participant, Focus group 5)

The theme of eating for a 'full stomach' persisted in descriptions of current motivations for food consumption in Masiphumelele. However, given the broader socio-economic context and a rapidly changing food environment, the motivation of having a 'full stomach' was experienced in a very different way. The concept of 'stress food' was also a very important narrative, reflecting the nuance of attempting to have a 'full stomach' in the high-stress context of the township.

Food was also expressed as an important theme in relation to TB and HIV treatment.

> *For me food and veg and fruit, because when you cannot eat treatment without food, when you eat treatment without food, you are going to die. It's better to eat first, even if you've got a mealie meal, you can make pap in the morning and late. I know to eat treatment at the clinic I was struggling, because I wake up early in the morning, supposed to eat treatment early at the clinic everyday so I was struggling, I was only buy Morvite [instant sorghum porridge] and go to clinic and then early. That is why I say for me it's only food first.* (Participant, Focus group 6)

While there was pronounced overall discussion of the role of certain foods as drivers of NCDs, actual consumption frequency of these products (Coke and other carbonated drinks/soda, KFC/Hungry Lion) was less clear, and seemed to be occasional – once a week or once a month, rather than daily.

Concern about diabetes and high-blood pressure

There was a particularly strong awareness of, and broad-ranging concerns about, high blood pressure and diabetes in their families and neighbourhood. Cancer was another, albeit less pronounced, theme.

> Interviewer: *In your families, in your community, what sort of diseases do people have?*
>
> Participant 1: *High blood, TB [tuberculosis], it's a lot, HIV, diabetes.*
>
> Participant 2: *My mom now is sleeping in Living Hope, she is diagnosed with cancer, and she has about few weeks she can die any time.*

Interviewer: *Sorry to hear that.*

Participant 3: *Mine is living in diabetic, high blood. I think Friday she phoned me she is in Eastern Cape, she said I am in hospital, they are busy with a drip, all those things her sugar is up, the high blood also is up. And then I asked her, did you stress? Who stressed you? She said nothing, but all the time she just think of us.*

Participant 4: *Like my mom she has a big lump on her back, and sometimes she has got high blood and it's arthritis, she has a sore knees, she is using the table now.*

(Participant, Focus group 2)

I have a sister-in-law that has diabetes and high blood pressure, and she was told not to eat fatty foods and not to take too much sugar. It's not easy, and so she is weak. Her life is hard. (Participant, Focus group 6)

They described receiving advice from clinics on how to adjust their diets to manage NCDs.

Participant: *Ok, I've got sugar, I'm diabetic.*

Interviewer: *Sugar diabetes. You're a diabetic, ok.*

Participant: *Yeah, but the doctor said I mustn't eat some meat, uhh, a skin for chicken.*

Interviewer: *Chicken, ok, you are not allowed to eat skin, yeah?*

Participant: *And then don't eat (not) too much sugar, don't eat too much salt and the [pause] oil.* (Participant, Focus group 8)

I asked [the clinic staff] the cause of high blood and they say it's because of eating fats and eating anything … food that is not healthy. They said if I eat meat, I must measure with a box of matches, three pieces if I eat chicken and two pieces if I eat red meat. There must be no fats in my food. (Nontasassa, 60)

While clinicians explicitly linked high blood pressure and diabetes to diet, participants also described disease in relation to broader lifestyle contexts.

It [high blood pressure] never existed back then, but now it's very common. Even the youngsters and kids are diagnosed with it ... It's the type of food and the lifestyle that people live. Take my daughter for instance, she started working at the age of 18 because we didn't have money to send her to school, she had to work, she eats whatever she wants with her money and she does the things that people her age are not supposed to do, and she eats the food that she is not supposed to eat. Like the boys and girls that smoke, consume alcohol, they end up being diagnosed with high blood pressure. (Nkosazana, 53)

Participant: *I think the high blood pressure is, is the way the people they eat, that's the cause of the high blood pressure and diabetic… I think the important thing that people can eat, it's the vegetables, not lot of starch, starch is not good for their health.*

Interviewer: *Do you eat a lot of greens?*

Participant: *I like it … if I've got money I buy it.* (Thembi, 30)

High blood pressure and diabetes were seen as extremely widespread and have been experienced very personally by most participants.

My brother had it, but he passed away last year, he had high blood pressure and diabetes. But my older sister has high blood and also my other brother and then me. My other sister that I come after does not have. Yes my families have got the, the high blood pressure because my brother was died with the sugar diabetes and the high blood pressure, and also my older sister that has got a sugar, a high blood pressure, and also me too. (Buhle, 44)

Self-control as a key response to managing NCDs

Participants experienced cycles of scarcity and plenty and, when they felt they had choices, they emphasised pressure to demonstrate self-control. Participants generally did not suggest making fruit and vegetables cheaper. There was little criticism of the food environment, perhaps because fruit and vegetables were always present in some form.

Now I try to control myself. (Participant, Focus group 3)

I know what is good, I'm just being naughty. (Participant, Focus group 3)

I like the Coke before, but now I, I see my stomach is very big [laughter] because of Coke, so I drink water instead of Coke [laughter]. (Participant, Focus group 3)

An important dimension of the notion of restraint related to the disdain of the 'home lady' (rural woman), who purportedly did not need to show restraint described by more 'urban' residents, and was seen as naturally preferring mielie pap, samp, beans, and green leafy vegetables. Describing the challenge of showing restraint seemed in itself to be a marker of urban identity.

It was hard to, to adopt the style of, of Cape Town. It's because the other people they were thinking oh this, this lady, this little lady it's a, it's a home lady, it's because she don't know this and that and that, you know! (Mthobeli, 66)

This notion of restraint speaks to the unintended consequences of the dominant narrative experienced in clinical settings. Having frequently heard and understood very basic clinical dietary advice, the failure to implement it was often seen as a personal failure. The presence of external stressors in relation to NCDs were discussed extensively, yet according to participants were never raised in clinical settings.

Perceptions of meat and sugar consumption in relation to NCDs

Increased meat consumption was the most emphasised dietary change in relation to NCDs. It seemed symbolic of the broader experience of new foods, where there was a sense that a previous experience of scarcity somehow drove overconsumption in the urban context.

I think, but most of them they say because back there in the Eastern Cape, they used not to eat a meat and meat was scarce, and then we are now in Cape Town, working, so [they say] 'We can eat meat Monday to Sunday and this is my money that buys it, so you have nothing to say'. (Phindiwe, 34)

It is just the meat they eat, so they end up getting gout. So it's just too much meat and the hypertension is more and diabetes as well, that's what affecting the health. (Participant, Focus group 1)

The consumption of meat in the city is framed as being shaped by previous experience, and the food environment itself is shaped by demand for that which was previously inaccessible. For example, street stalls have a variety of offal available, which is characteristic fare of the urban poor and represents a major signifier of changing livelihoods in Cape Town. The fact that so many participants felt they consumed too much meat, despite feeling that it was dangerous, careless, or imprudent to do so, seemed symbolic of a dominant narrative of the city as risky and vice-ridden.

Increased meat consumption was combined with that of soft drinks, which were perceived as 'rich food'.

> *I like to eat the meat, the rich food. Before we make a juice, buy Oro Crush, Oros, and then make a drink, but now we buy Coke [laughs], all the stuff.* (Nkosazana, 53)

Sugar consumption tended to be described primarily in the context of adding sugar to mielie pap, tea, and coffee, and was actually mentioned more in relation to life in the Eastern Cape, where it was seen as an added ingredient to foods when it was available. In Cape Town, there were frequent mentions of 'fizzy drinks'.

> *Then last year I got sick, I went to False Bay [hospital]. They told me that I must stop to eat spicy foods and those drinks, those fizzy drinks that I like, but I can't stop, but I am trying now.* (Participant, Focus group 6)

> *I also drink fizzy drinks because it is there. I don't always have juice which is good for my health, so I just have to drink the fizzy drinks.* (Participant, Focus group 6)

However, when questioned further, participants' consumption of Coke was not necessarily as frequent as it first seemed.

> Interviewer: *What, what? Did you just buy Coke yesterday?*

> Participant: *Yes … yes, because yesterday it was my son's birthday.* (Noliswa, 41)

For others, purchasing Coke occurred at the end of the month during the monthly 'big shop', rather than being a more frequent purchase, and consumption was described as 'special' rather than normalised.

A few foods with lots of added sugar were perceived to be healthy choices. This included replacing mielie pap with highly processed breakfast cereals, or purchasing sweetened yoghurt for young children. In general, participants did not recommend that educational interventions in the community focus on sugar and highly processed foods. Rather, participants suggested the need to educate others on the dangers of meat and oil, and the overconsumption of starchy foods.

The point here is not to articulate whether people are correct or incorrect in their narratives, but to note what was dominant and where there were silences – for example, where sugar added to breakfast cereals or yoghurt is potentially invisible because it is perceived as a healthy food. Participants also felt that fruit juice was healthy, which is important because it indicates that individuals may mistake highly sweetened fruit juice as a healthy choice, which it is not. In these examples, South Africans seem to be following a similar trajectory to urban communities around the world. While the ingredients and processing of foods may be similar worldwide, the context and conditions of nourishment are highly contextual.

Discussion: Linkages to urban policy

In this section, we will discuss key findings in relation to potential policy interventions. Given that diet-related NCDs have complex aetiologies, policy must consider unintended consequences and the broader context in which unhealthy diets emerge. While this complexity makes good policy design challenging, the economic burden of diet-related NCDs may be a powerful motivation for policy action. An ecological framing helps to show how non-food related interventions may impact on diet and diet-related NCDs. Given these contextual factors, we suggest that dietary advice, particularly in short clinical appointments, may not be an effective tool for improving diet. Rather, policy to increase vegetable consumption, including subsidisation or earmarking of sin taxes, may help to address diet-related NCDs. However, this approach would not address the broader issues related to cooking space, preparation time, or cooking fuel. As such, constructing or supporting food-sensitive local-government policy interventions that support the availability of additional time, cooking space, or cooking fuel, may all be important in addressing diet-related NCDs.

NCDs have complex aetiologies

NCDs have complex aetiologies that do not lend themselves to simple interventions. The growing field of epigenetics is uncovering the significance of early development on the long-term risk of NCDs (Gabbianelli and Damiani, 2018; Heerwagen, et al., 2010). Microbiome research is revealing the complex ways that the bacterial environment plays a role in health, both in terms of acute illness and how acute illnesses in childhood maps to development (Turnbaugh, et al., 2006). In this context, the cramped environment of many peri-urban spaces seems inevitably unhealthy. The role of stress is a causal factor in many NCDs, including all cardiopulmonary disease (Fricchione, 2018). Whereas our results show the isolation of many individuals in Masiphumelele, the literature focuses on the long-term value of family meals on weight and wellbeing (Chan and Sobal, 2011; Eisenberg, et al., 2004). This complexity does not mean that interventions are impossible, but that measuring the impact of complex interactions is difficult. For example, long-term fruit and vegetable consumption has fairly consistent positive associations with several NCDs (Farvid, et al., 2018; Hartley, et al., 2013; Mamluk, et al., 2017; Wang, et al., 2016). While the complexity of NCDs makes gathering evidence for simple dietary interventions difficult, there is evidence of an urgent need to prioritise diet-related NCDs, and momentum from multiple sectors to help drive this priority setting.

Economic effects of NCDs

Policy that highlights the economic costs of diet-related NCDs may provide traction for spending focused on improving food environments. The economic burden of NCDs in South Africa are considerable and on the rise (Mayosi, et al., 2009). This burden includes costs to the health care system, the workplace, households, and individuals. The Organisation for Economic Co-operation and Development (OECD) estimates that, in the Western Cape, 'loss in household spending from obesity is between R423.5 and R590.5 billion' (Markle and Van der Lingen, 2018). As has been demonstrated in the robust body of work on the socioeconomic determinants of health (Marmot, 2008), the household burden of disease can contribute to cyclical and intergenerational poverty. The long-term cost of disease should be weighed against the cost of potential interventions, particularly in motivating for the subsidisation of fruit and vegetables in certain settings, and for the infrastructure needed to supply unprocessed foods (including refrigeration, quality of water, and energy provision). In a document published by the Western Cape Government's Department of the Premier, several measures responded to the nutrition transition at provincial level (Markle and Van der Lingen, 2018). These included sanitation, interventions focused on the first 1 000 days of a child's life, programmes to encourage exclusive breastfeeding, school feeding programmes, and fiscal measures, including taxes on unhealthy foods and subsidies for healthy foods (Markle and Van der Lingen, 2018).

Ecological perspectives on diet

In urban settings such as Masiphumelele, it is apparent that many factors, past and present, affect utilisation and individual and household diets. On the one hand, this makes it difficult to outline clear policies that respond to unhealthy diets or unhealthy food environments. Increasing access to certain foods may not map to increased utilisation. This suggests the need for careful examination of the unintended and intended experiences of health policies. Nevertheless, lack of financial margin impacts on many of the factors shaping poor diet and shapes lived experience profoundly.

The displacement of minimally processed foods by ultra-processed packaged foods represents a multi-layered loss – of growing food, buying food locally, and cooking forging social bonds between and within families – as well as driving up rates of NCDs. It is apparent from our research that stress makes poor diets more likely and compounds the health effects of poor diets. This finding is consistent with the work of Smit, et al. (2016), set in Khayelitsha, Cape Town, where limited economic opportunities were found to be related to high levels of depression and stress, making healthy lifestyles very difficult in this environment. Our research also suggests that hunger, concerns about diet and access to food, and concerns about NCDs, all compound cycles of stress. As such, multiple poverty-alleviation approaches may improve diets and health. For example, the child support grant is one important, but very circumscribed, safety net that may be carefully expanded at the national level as a tool to improve diet-related NCDs. The potential of non-food related interventions is an important area of further study. For example, while central to the diets and health of many township residents, the costs and time of getting to and from work did not factor into the stories of most participants because they worked locally. Nevertheless, the broader context of utilisation, as shaped by time, household structure, precarious livelihoods, and space, are all vital to understanding diets in Masiphumelele.

Dietary education: effectiveness and consequences

In our research, dietary knowledge was relatively plentiful, but not necessarily applied due to circumstances. The application of dietary knowledge was perceived as impractical due to cost and communal food preparation (i.e. the inability to cook individual meals). It also involved overly narrow interpretations of dietary advice – for example, the representation of 'salad' or other foods associated with wealthy white people rather than their own household culinary history and tradition. While the Sunday meal was full of nourishing and colourful vegetables, it was not perceived primarily in terms of health, but in terms of social connectedness, nourishment, and tradition spanning generations.

Dietary advice, particularly provided in clinical settings, may seem to be an affordable policy approach. However, the unintended consequence of this dietary advice seemed to be the displacement of deeper understandings of nourishment and a distrust of physical cues. In an attempt to simplify dietary advice, participants were sometimes highly adherent to specific rules received in clinical settings, while not necessarily aware or adherent to broader contexts of good diets. For example, participants may misinterpret the need to have 'lighter' meals and consider breakfast cereal or yoghurt as 'light'. Or they might develop disordered eating patterns by skipping meals to feel more adherent to clinical advice. Given that clinical encounters were brief and could not cover all dietary themes, the consequence was lopsided and selective application of certain advice, as well as a sense that clinicians had unrealistic perspectives on their lived experience.

Vegetable consumption

Increasing access to high quality fresh fruit and vegetables may represent one promising policy approach to NCD prevention, including cardiovascular disease (Hartley, et al., 2013), type 2 diabetes (Mamluk, et al., 2017), and certain cancers (Farvid, et al., 2018; Wang, et al., 2016).

Low consumption of vegetables in poor urban areas of South Africa may be shaped by lower quality and higher prices in urban areas, and the increased time and skill needed to prepare vegetables. As perishable goods, there is also a greater risk of food waste. In the context of a school feeding programme, where vegetables were high quality, easily accessible, and there was space and time allocated to their preparation, learners consumed and enjoyed daily vegetarian stews. The elements of quality, affordability, and time/energy/cooking space were all important to vegetable consumption. Quality and affordability are both within the overall domain of food systems, whereas time/energy/cooking space all fall in other areas of policy intervention. Whereas food policy is currently framed as a response to a lack of economic or physical access to food, it should also be understood in terms of the types of infrastructure that drive the utilisation of certain foods.

Participants most often named price and financial constraints as the key factors driving non-utilisation of fresh fruit and vegetables. While a key factor, price is also relative, and was considered in terms of potential waste and contribution to satiety. The quality of vegetables was intertwined with price, particularly for women who had previously accessed 'free' fresh vegetables from the garden. While these vegetables involved significant inputs of labour, the fact that vegetables were not perceived to be a commodity, or a consumer good, influenced willingness to purchase. As such, supporting access to vegetables, while supporting farmers to grow higher quality vegetables, may be vital in increasing urban vegetable consumption. While VAT exemption is one approach to making specific foods more accessible, it is apparent that this has not done enough to improve fruit and vegetable utilisation among the urban poor.

Participants had the perception that the vegetables available to them were less fresh, less nutritious, and of lower quality than those in the Eastern Cape. The quality of vegetables available in townships in relation to consumption may be an important area of policy intervention. Township vendors typically make use of secondary markets, selling produce that is perceived to be of lower quality when they reach market, which is often due to cold chain and transportation issues. While this system diverts potential waste from the city's food hub, Cape Town Fresh Produce Market, it also has potential ripple effects on the food system and on the health of low-income communities. Participants talked about the quality of vegetables available from street vendors and of those sold in larger stores. This implied that freshness and quality involved not only whether vegetables were close to expiry, but also whether they seemed to be nutritious in a broader sense. Participants were also concerned about the quality of the soil in which vegetables were grown. In the southern peninsula, small-scale farmers sometimes bypass the food hub by selling directly to the public, to smaller shops, or to Food Lover's Market. However, few small-scale farmers sell directly to Masiphumelele stall owners. Facilitating alternative supplies of very fresh, high quality produce may be important to increasing consumption.

Peri-urban housing: time, energy, space

In this context, improving diet involves grappling with urban design, including the location of low-income housing opportunities, the availability of kitchen space and cooking fuel, and transportation infrastructure. Increased meat and bread consumption was driven by the relative ease of preparation and palatability compared to vegetables. Subsidising cooking fuel, improving transportation infrastructure, or even the creation of communal cooking spaces, may all be cost-effective and helpful in specific local contexts. Given the complexity of time, energy (both human energy and cooking energy) and cooking space, there are also significant benefits to policies that support school feeding schemes.

Conclusion

Dietary information in clinical settings needs to be carefully constructed in the context of lived experience, but this is very difficult given the limitations of the government health service and social services. This suggests that a wider set of responses is required. These responses must be cognisant of the health system, and responsive to both the food environment and the broader urban experience. These responses must acknowledge and validate lived experience.

The narratives of research participants demonstrated that food consumption practices are not simply determined by income poverty, or a lack of knowledge, or even what is available in the immediate food environment, although these remain crucially important. Food consumption is informed by a set of wider negotiations around access to services and infrastructure. This suggests that, if food and nutrition security are to be enhanced in the interest of reducing the burden of NCDs, it will be necessary to expand strategic responses to include housing access and quality, access to basic infrastructure (housing, water, sanitation, electricity) and infrastructure costs, transportation, and zoning. It is the contention of the Nourishing Spaces project that these state-provided services will be most impactful in the lives of the poor if they are informed by a deep understanding of how households negotiate their access and utilisation.

References

Alkon, A.H., Block, D., Moore, K., Gillis, C., DiNuccio, N. and Chavez, N. (2013). Foodways of the urban poor. *Geoforum*, 48, 126–135.

Battersby, J. (2011a). The State of Urban Food Security in Cape Town, Urban Food Security Series No. 11, AFSUN. Canada: Queen's University.

Battersby, J. (2011b). Urban food insecurity in Cape Town, South Africa: An alternative approach to food access. *Development Southern Africa, 2*8(4), 545–561. https://doi.org/10.1080/0376835X.2011.605572

Battersby, J. (2012). Beyond the food desert: Finding ways to speak about urban food security in South Africa. *Geografiska Annaler, Series B: Human Geography*, 94, 141–159. https://doi.org/10.1111/j.1468-0467.2012.00401.x

Battersby, J. (2019). The food desert as a concept and policy tool in African cities: An opportunity and a risk. *Sustainability, 11*(2), 458.

Battersby, J. and Peyton, S. (2014). The geography of supermarkets in Cape Town: Supermarket expansion and food access. *Urban Forum*, 1–12. https://doi.org/10.1007/s12132-014-9217-5

Benson, K. and Nagar, R. (2006). Collaboration as resistance? Reconsidering the processes, products, and possibilities of feminist oral history and ethnography. *Gender, Place and Culture: A Journal of Feminist Geography, 13*(5), 581–592. https://doi.org/10.1080/09663690600859083

Bridle-Fitzpatrick, S. (2015). Food deserts or food swamps? A mixed-methods study of local food environments in a Mexican city. *Social Science & Medicine, 142*, 202–213.

Bryce, J., Coitinho, D., Darnton-Hill, I., Pelletier, D., Pinstrup-Andersen, P. (2008). Maternal and child undernutrition: Effective action at a national level. *Lancet, 371*, 510–526. https://doi.org/10.1016/S0140-6736(07)61694-8

Chan, J.C. and Sobal, J. (2011). Family meals and body weight. Analysis of multiple family members in family units. Appetite, 57(2), 517–524. https://doi.org/10.1016/j.appet.2011.07.001

Chopra, M., Lawn, J.E., Sanders, D., Barron, P., Karim, S.S.A., Bradshaw, D. … Coovadia, H. (2009). Achieving the Health Millennium Development Goals for South Africa: Challenges and priorities. *Lancet, 374*(9694), 1023–1031. https://doi.org/10.1016/S0140-6736(09)61122-3

City of Cape Town. (2013). C*ity of Cape Town – 2011 Census Suburb Masiphumelele*. Available at: http://resource.capetown.gov.za/documentcentre/Documents/Maps%20and%20statistics/2011_Census_CT_Suburb_Masiphumelele_Profile.pdf [accessed 10/2020]

Constitution of the Republic of South Africa. Available at https://www.justice.gov.za/legislation/constitution/SAConstitution-web-eng.pdf [accessed 10/2020]

Cousins, B. and Scoones, I. (2010). Contested paradigms of 'viability' in redistributive land reform: perspectives from southern Africa. *Journal of Peasant Studies, 37* (February 2015), 31–66. https://doi.org/10.1080/03066150903498739

Drimie, S., Faber, M., Vearey, J. and Nunez, L. (2013). Dietary diversity of formal and informal residents in Johannesburg, South Africa. *BMC Public Health, 13*(1), 911.

Eisenberg, M.E., Olson, R.E., Neumark-Sztainer, D., Story, M. and Bearinger, L.H. (2004). Correlations between family meals and psychosocial well-being among adolescents. *Archives of Pediatrics & Adolescent Medicine, 158*(8), 792–796. https://doi.org/10.1001/archpedi.158.8.792

Farvid, M.S., Chen, W.Y., Rosner, B.A., Tamimi, R.M., Willett, W.C. and Eliassen, A.H. (2018). Fruit and vegetable consumption and breast cancer incidence: Repeated measures over 30 years of follow-up. *International Journal of Cancer, 144*(7), 1496–1510. https://doi.org/10.1002/ijc.31653

Fielding, J.E. and Simon, P.A. (2011). Food deserts or food swamps? Comment on 'fast food restaurants and food stores'. *Archives of Internal Medicine, 171(*13), 1171–1172.

Fricchione, G.L. (2018). The challenge of stress-related non-communicable diseases. *Medical Science Monitor Basic Research, 24*, 93.

Gabbianelli, R. and Damiani, E. (2018). Epigenetics and neurodegeneration: Role of early-life nutrition. *The Journal of Nutritional Biochemistry, 57*, 1–13.

Greenberg, S. (2017). Corporate power in the agro-food system and the consumer food environment in South Africa. *The Journal of Peasant Studies, 44(*2), 467–496.

Hartley, L., Igbinedion, E., Holmes, J., Flowers, N., Thorogood, M., Clarke, A. … Rees, K. (2013). Increased consumption of fruit and vegetables for the primary prevention of cardiovascular diseases. *Cochrane Database of Systematic Reviews*, (6).

Heerwagen, M.J., Miller, M.R., Barbour, L.A. and Friedman, J.E. (2010). Maternal obesity and fetal metabolic programming: A fertile epigenetic soil. *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology, 299*(3), R711–R722.

Hetherington, M.M., Anderson, A.S., Norton, G.N.M. and Newson, L. (2006). Situational effects on meal intake: A comparison of eating alone and eating with others. *Physiology and Behavior, 88*(4–5), 498–505. https://doi.org/10.1016/j.physbeh.2006.04.025

Hoang, T.C.P. (2017). *Food Consumption Patterns Throughout the Month: Case study of Masiphumelele* [Directed Study Project]. University of Cape Town.

Igumbor, E.U., Sanders, D., Puoane, T.R., Tsolekile, L., Schwarz, C., Purdy, C. … Hawkes, C. (2012). 'Big food', the consumer food environment, health, and the policy response in South Africa. *PLoS Medicine, 9*(7), 1–7. https://doi.org/10.1371/journal.pmed.1001253

Jacobs, F.T. (2009). The status of household food security targets in South Africa. *Agrekon, 48*(4), 410–433. https://doi.org/10.1080/03031853.2009.9523834

Kruger, H. S., Venter, C. S., & Vorster, H. H. (2001). Obesity in African women in the North West Province, South Africa is associated with an increased risk of non-communicable diseases: the THUSA study. *British Journal of Nutrition, 86*(6), 733-740.

Kruger, H. S., Puoane, T., Senekal, M., & Van Der Merwe, M. T. (2005). Obesity in South Africa: challenges for government and health professionals. *Public health nutrition, 8*(5), 491-500.

Luan, H., Law, J. and Quick, M. (2015). Identifying food deserts and swamps based on relative healthy food access: A spatio-temporal Bayesian approach. *International Journal of Health Geographics, 14*(1), 37.

Mamluk, L., O'Doherty, M.G., Orfanos, P., Saitakis, G., Woodside, J.V., Liao, L.M. … Kee, F. (2017). Fruit and vegetable intake and risk of incident of type 2 diabetes: Results from the Consortium on Health and Ageing Network of Cohorts in Europe and the United States (CHANCES). *European Journal of Clinical Nutrition, 71*(1), 83.

Markle, A. and Van der Lingen, D. (2018). *FuturesCape Policy Brief: Double burden of malnutrition*. Western Cape Government: Department of the Premier.

Marmot, M. (2008). Closing the gap in a generation. *Health Equity Through Action on the Social Determinants of Health*, 246. https://doi.org/10.1080/17441692.2010.514617

Mayosi, B.M., Flisher, A.J., Lalloo, U.G., Sitas, F., Tollman, S.M. and Bradshaw, D. (2009). The burden of non-communicable diseases in South Africa. *Lancet, 374*(9693), 934–947. https://doi.org/10.1016/S0140-6736(09)61087-4

McClintock, N. (2011). From industrial garden to food desert. *Cultivating Food Justice: Race, class, and sustainability*, 89.

McLachlan, M., & Landman, A. P. (2013). Nutrition-sensitive agriculture–a South African perspective. *Food security, 5*(6), 857-871.

Monteiro, C., Levy, R., Claro, R., De Castro, R. and Cannon, G. (2010). *Increasing consumption of ultra-processed foods and likely impact on human health: Evidence from Brazil. 14*(1), 5–13. https://doi.org/10.1017/S1368980010003241

Monteiro, C., Moubarac, J., Cannon, G., Ng, S.W. and Popkin, B. (2013). Ultra-processed products are becoming dominant in the global food system. *Obesity Reviews, 14*(November), 21–28. https://doi.org/10.1111/obr.12107

Ndinda, C., Ndhlovu, T. P., Juma, P., Asiki, G., & Kyobutungi, C. (2018). The evolution of non-communicable diseases policies in post-apartheid South Africa. *BMC public health, 18*(1), 956.

Painter, R.C., Roseboom, T.J. and Bleker, O.P. (2005). *Prenatal exposure to the Dutch famine and disease in later life: An overview* (Vol. 20). https://doi.org/10.1016/j.reprotox.2005.04.005

Popkin, B.M. (2002). Part II: What is unique about the experience in lower- and middle-income less-industrialised countries compared with the very-high income industrialised countries? The shift in stages of the nutrition transition in the developing world differs from past experiences. *Public Health Nutrition, 5*(1a), 205–214. https://doi.org/10.1079/PHN2001295

Popkin, B.M., Adair, L.S. and Ng, S.W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews, 70*(1), 3–21. https://doi.org/10.1111/j.1753-4887.2011.00456.x

Rosenbloom, J.I., Kaluski, D.N. and Berry, E.M. (2008). A global nutritional index. *Food and Nutrition Bulletin, 29*(4), 266–277.

Schönfeldt, H.C., Hall, N. and Bester, M. (2013). Relevance of food-based dietary guidelines to food and nutrition security: A South African perspective. *Nutrition Bulletin, 38*(2), 226–235. https://doi.org/10.1111/nbu.12027

Smit, W., De Lannoy, A., Dover, R.V., Lambert, E.V., Levitt, N. and Watson, V. (2016). Making unhealthy places: The built environment and non-communicable diseases in Khayelitsha, Cape Town. *Health & Place, 39*, 196–203.

Sobal, J. (2006). Individualization of eating. *Appetite, 47*, 400. http://dx.doi.org/10.1016/j.appet.2006.08.058

Stanner, S.A., Bulmer, K., Andrès, C., Lantseva, O.E., Borodina, V., Poteen, V.V. and Yudkin, J.S. (1997). Does malnutrition in utero determine diabetes and coronary heart disease in adulthood? Results from the Leningrad siege study, a cross sectional study. *BMJ (Clinical Research Ed.), 315*(7119), 1342–8. https://doi.org/10.1136/bmj.315.7119.1342

Statistics South Africa (2017). https://www.statssa.gov.za/publications/Report%2003-00-09/Report%2003-00-092016.pdf

Story, M., Kaphingst, K.M., Robinson-O'Brien, R. and Glanz, K. (2008). Creating healthy food and eating environments: Policy and environmental approaches. *Annual Review of Public Health, 29*(1), 253–272. https://doi.org/10.1146/annurev.publhealth.29.020907.090926

Stowers, S.L. (2012). Ecology of food and nutrition gastronomic nostalgia: Salvadoran immigrants' cravings for their ideal meal. *Ecology of Food and Nutrition, 51*, 374–393. https://doi.org/10.1080/03670244.2012.696008

Temple, N.J. and Steyn, N.P. (2011). The cost of a healthy diet: A South African perspective. *Nutrition, 27*(5), 505–508. https://doi.org/10.1016/j.nut.2010.09.005

Temple, N.J., Steyn, N.P., Fourie, J. and De Villiers, A. (2011). Price and availability of healthy food: A study in rural South Africa. *Nutrition, 27*(1), 55–58. https://doi.org/10.1016/j.nut.2009.12.004

Thow, A.M., Greenberg, S., Hara, M., Friel, S., Du Toit, A. and Sanders, D. (2018). Improving policy coherence for food security and nutrition in South Africa: A qualitative policy analysis. *Food Security, 10*(4), 1105–1130. https://doi.org/10.1007/s12571-018-0813-4

Thow, A.M., Schönfeldt, H., Viljoen, A., Gericke, G. and Negin, J. (2017). Policy for the complex burden of malnutrition in Africa: A research agenda to bring consumers and supply chains together. *Public Health Nutrition, 20*(6), 1135–1139.

Travers, K.D. (1996). The social organization of nutritional inequities. *Social Science & Medicine, 43*(4), 543–553. https://doi.org/10.1016/0277-9536(95)00436-X

Tsheola, J. (2014). Global agro-food governance, supermarket chain expansionism and household food insecurity in rural South Africa. *Mediterranean Journal of Social Sciences, 5*(8), 656–665. https://doi.org/10.5901/mjss.2014.v5n8p656

Turnbaugh, P.J., Ley, R.E., Mahowald, M.A., Magrini, V., Mardis, E.R. and Gordon, J.I. (2006). An obesity-associated gut microbiome with increased capacity for energy harvest. *Nature, 444*(7122), 1027–31. https://doi.org/10.1038/nature05414

Wang, T., Cai, H., Sasazuki, S., Tsugane, S., Zheng, W., Cho, E.R. … Xiang, Y.-B. (2016). Fruit and vegetable consumption and risk of gastric cancer: A prospective nested case-control study in China, Japan and Korea. *Cancer Research 2016, 76*(14 Suppl): Abstract 1735.

Western Cape Government Health. (2014). *Healthcare 2030: The Road to Wellness*. Cape Town.

Yajnik, C.S., Fall, C.H.D., Coyaji, K.J., Hirve, S.S., Rao, S., Barker, D.J.P. … Kellingray, S. (2003). *Neonatal anthropometry: the thin–fat Indian baby. The Pune Maternal Nutrition Study*. 173–180. https://doi.org/10.1038/sj.ijo.802219