

## **Using photography to explore people with diabetes' perspectives on food environments in urban and rural South Africa**

### **Abstract**

Diabetes, a serious disease resulting in significant morbidity and early mortality, is currently on the rise globally. A major contributor to this observed increase in low- and middle-income countries, such as South Africa, has been the observed change in diet at the population level – a shift from a traditional diet, to one consisting of more energy-dense, processed foods, with more added sugar, salt and fat. Implicated in this degradation of diet are changing local food environments. Participant-generated digital photographs and facilitated focus group discussion-style workshops were utilised to better understand diabetic community members' perspectives on their food environments in both an urban and rural setting in South Africa, and what (and how) aspects of these physical environments influence their food acquisition behaviours and diet. Qualitative data were analysed using a deductive thematic analysis approach. The resulting predominant themes of accessibility, availability, and affordability are outlined and discussed. Findings from this study have implications beyond the self-management of diabetes and extend to the self-management and reduction of all diet-related NCDs.

**Keywords:** diabetes, food environment, diet, photo elicitation

### **Background**

Diabetes, a serious disease resulting in significant morbidity and early mortality, is a major global concern that is currently on the rise: global prevalence rates among adults have increased from 4.7% in 1980 to 8.5% in 2014 (Mathers & Loncar, 2006), with the World Health Organization predicting that by the year 2030, 366 million individuals will be living with the disease (Wild et al, 2004). Following the current trends of other non-communicable diseases (NCDs), this upsurge in diabetes has increasingly been observed in low- and middle-income countries (LMICs) (WHO, 2016). South Africa is no exception, with prevalence of type-2 diabetes (T2DM) in adults having risen from 5.5% in the year 2000, to an “unacceptably high” 9% in 2009 (Bradshaw et al, 2007), being the 4<sup>th</sup> leading underlying cause of death, contributing to around 6% of all deaths in the country (SSA, 2014).

A major contributor to this observed increase in diabetes (as well as other diet-related NCDs) in LMICs such as South Africa, has been the observed change in diet at the population level (Popkin, 2001). This change, dubbed the “nutrition transition”, is characterised by a move from traditional diets (i.e. those based largely on staple grains or starchy roots, legumes, vegetables and fruits but minimal animal foods) towards a “western” diet consisting of more energy-dense, processed foods, with more added sugar, salt and fat, and more foods of animal origin (Popkin, 1994).

Implicated in this degradation of diet are changing local food environments, defined here as “the interface that mediates one’s food acquisition and consumption within the wider food system... encompass(ing) multiple dimensions such as the availability, accessibility, affordability, desirability, convenience, marketing, and properties of food sources and products” (Turner, 2017). Although various factors at the individual, family, and community level affect what we eat, a growing body of research implicates a swiftly changing food environment dominated by the “western” diet as a primary contributor to the observed increasing levels of chronic diseases, over and above individual factors such as knowledge, attitudes, and behaviours (Story et al, 2008). Simply put: unhealthy food environments foster

unhealthy diets. The rise in food retail outlets vending the western diet in South Africa (Ledger, 2017) (Ronquest-Ross, Vink, & Sigge, 2015) (GRAIN, 2018) may be a key reason why the country is currently experiencing an increase in diet-related NCDs.

Consequently, there has been a call for the primary prevention of diabetes through multi-level interventions across the country (Bradshaw et al, 2007) (Story et al, 2008) (Ledikwe et al, 2006) (Pérez-Escamilla et al, 2012), including interventions that attempt to alter people's environments in a way that works towards achieving widespread reductions in the incidence and prevalence of the disease (Colagiuri et al, 2003). In order to best tailor such interventions, it is wise to first understand how environments play a role in shaping diet, especially from the perspective of those living in these environments/communities. To this end, this study aims to gain qualitative insights into how those self-managing their diabetes interact with, and navigate their local food environments in both an urban and rural setting; and more specifically, what (and how) aspects of these physical environments influence their food acquisition behaviours.

## **Methods**

The research outlined in this article was carried out as part of an ongoing larger, multinational study on diabetes self-management conducted in South Africa. This larger study, titled *People centred approach to self-management and reciprocal learning for the prevention and management of type 2 diabetes* (SMART2D) aims to strengthen capacity for T2DM prevention and management, partly by taking into account the need for both community perspectives and participation. SMART2D advocates for contextualization as a key factor in project implementation, recognizing the importance of understanding the environment in which participants function on a daily basis as key to intervention impact and sustainability (Saulnier, 2018).

To this end, the study outlined in this paper utilized participant-generated photographs and focus group discussion (FGD)-style workshops to better understand diabetic community members' perspectives on their food environments in both an urban and rural setting in South Africa. As a research methodology, a facilitated FGD is an ideal qualitative approach that can be used to gain in-depth understanding of a given social issue (Nyumba, Wilson, Derrick, & Mukherjee, 2018). FGD-style workshops were convened as part of this study in order to 1) introduce the aims of the study and train the participants in camera use, and 2) collect important relevant qualitative data / insights in order to compliment and provide context to participant-generated photographs. Participants were then asked to take photographs related to study research questions and what was discussed in the FGD-style workshop. The use of photographs in conjunction with more traditional qualitative methods like focus group discussions (also known as 'Photo Elicitation' (Harper, 2002)) has shown in a wide variety of studies to be effective in gathering information and views from participants regarding their lives in relation to a specific research topic – views which may have otherwise not be as easily communicated when using qualitative methods alone (Ali-Khan & Siryb, 2014) (Wall-Bassett, Robinson, & S, 2014) (Clark-Ibáñez, 2004) (Mondelco, 2013) (Snyder & Kane, 1990). It has also been demonstrated that this approach encourages more direct involvement by study participants in the research process, particularly in the gathering and interpreting of relevant data (Bignante, 2010).

## **Participants**

Urban photography study participants were recruited from the existing SMART2D study cohort based on existing SMART2D study participant eligibility criteria; i.e. male or female

adults aged 30-75 years old, residing in the selected areas for at least 6 months prior to study enrolment, being able to provide written informed consent, being the only person selected from the same household, and being diagnosed with T2DM. The urban study setting is a large, mixed housing (both formal and informal) 'township' situated just outside of Cape Town. The average household income in this setting is roughly a third of the Provincial average (UoS, 2017), making residents some of the poorest in the region. SMART2D study participants recruited from this area, and as a result the photography study participants, were considered predominantly low-income.

Rural photography study participants were sampled from a second study cohort in a rural site in South Africa in order to compare findings between these settings. This rural site was located in the predominantly rural Eastern Cape Province. Residents in the specific study setting are also considered to be predominantly lower-income and experience high rates of unemployment. This community is made up of a centrally located, 'downtown' area where the majority of services (including food retail) are located. The vast majority of residents do not live close to this space; rather, they live in more traditional, spread out 'homestead' living arrangements outside of the main town centre. This rural study cohort was part of a separate study titled the *Prospective Urban Rural Epidemiology* (PURE) study – a large prospective observational study designed to investigate the relative contribution of societal influences on individual lifestyle choices and cardiovascular disease risk factors in low-income and middle-income populations. PURE also recognises the importance and influence of local environments on health and related risk factors (Chow, et al., 2010). The sampling frame used for the PURE study is reported elsewhere (Teo et al, 2009). For the purposes of this study, a random list of diabetic PURE study participants was generated, and used to recruit rural participants. The same selection criteria were observed across the two study sites. The target sample size for each site was 10 participants.

### ***Procedures***

Before taking any photographs, participants took part in FGD-style workshops. One FGD workshop was convened per site and conducted in English as well as the local language (isiXhosa) by both [first author] and a local, trained group facilitator. A brief training on photographic techniques was also provided during these meetings and discussions held with questions being asked, and data gathered on the meaning and perception of food, places of daily food acquisition, and frequency of acquisitions. Key terms relevant to the study were also defined and discussed, including "food environment", which was broadly defined as community factors that directly relate to the availability, accessibility, affordability, desirability, convenience, and marketing of food. A training manual and slides, as well as a facilitation guide were used to guide the trainings and discussions that took place during the FGD workshops.

As part of the FGD workshops, participants were asked two key questions about their local food environment: 1) "What in your community makes it easier for you to eat healthy"; and 2) "What in your community makes it harder for you to eat healthy". Participants were issued with journals and responded to these questions by writing exhaustive lists in these journals and selecting the top two factors in answer to each question (total of four factors). Participants were then issued with digital cameras and provided training on how to use them. They were then asked to go out into their communities and take photographs that best represented these top factors (total of four photographs). Directly after taking the photographs in the communities, participants numbered them and assigned each a title and a caption these were recorded in their journals. Each title and caption described the contents of the

photograph and why the participant felt that this part of their local food environment either made it easier or harder for them to eat healthy. Journals were then returned to the researchers, at which point a brief discussion was had with each participant individually to review photographs, captions, and titles, and to clarify any discrepancies.

### ***Data Analysis***

Photograph titles and captions that were written in isiXhosa were translated into English, and then back-translated into isiXhosa. The resulting English texts were analysed using a theoretical, or deductive thematic analysis approach (Braun & Clarke, 2006) (Belon, Nieuwendyk, Vallianatos, & Nykiforus, 2016), in which the existing constructs of availability, accessibility, affordability, desirability, convenience, and marketing were considered. These constructs were based on an established definition of a food environment, more specifically the dimensions therein that mediate one's food acquisition and consumption (Turner, 2017). These constructs were used to not only guide participant discussion and photography, but also as guiding themes in the analysis process. Steps in the thematic analysis approach included: 1) familiarization with the data – data sets were read through multiple times to familiarize coder with the material; 2) coding – existing constructs/themes based on the above mentioned definition of food environments were coded for (the coder also made allowances for emergent themes); 3) searching for prominent themes – prominent themes were identified based on the frequency of which they were raised by the participants; and 4) reviewing identified themes – texts associated with themes, and the possibility of overlap between them, were reviewed and finalized, with some findings having relevance across more than one them (e.g. cost of transportation having relevance for both food access and affordability). Although the photographs themselves were not analysed as they were primarily intended to facilitate discussion and visually represent participant perspectives, they have been presented in the results section of this paper in order to provide context and illustrate study findings – photographs that were deemed most appropriate to this end were included.

Ethical clearance for this study was obtained through... Informed consent was sought and granted from each participant. Participants from both sites received refreshments and a small incentive for their participation.

### **Results**

In the rural site, 9 community members participated in the FGD-style workshop and subsequent photography activity, 8 of whom were female (participants R1-R9). These participants, as a natural reflection of the larger study cohort, were all older in age (50+). In the urban site 8 community members participated, all of whom were female (participants U1-U8) – these participants were also older in age (50+). The target sample of 10 participants for each sight was not achieved due to unforeseeable circumstances on the morning of the FGD workshops that prevented certain invited participants from attending. The overrepresentation of females in both groups was not intentional but was merely a reflection of the larger study samples. However, it is known that in these settings it is primarily women who make household food acquisition choices, and thus have to interact and familiarize themselves with their local food environments. This study did not attempt to take into account gender dynamics in these communities and participant households, but this important aspect should be considered in relation to study findings.

### ***Rural results***

The 9 rural participants produced a total of 17 titled and captioned photographs representing what in their communities makes it easier to eat healthy, and 18 representing the factors that make it harder. All rural participant feedback fell primarily into four themes: accessibility, affordability, availability, and desirability.

### *Accessibility*

During the FGD workshop, many rural participants discussed the problem of long distances to travel to access healthy foods. This theme was also a major point raised through their photographs and accompanying captions. Specific feedback focused primarily on long distances to local supermarkets and surrounding informal fruit and vegetable vendors, which were often the primary/only source of fruits and vegetables. One such participant (R8) said “The shops are very far from where I live. I don’t even have children to send to stores. It is very difficult for me to go to the shops on my own.” As part of this concern were the high costs of the often-multiple forms of public transportation needed to access these outlets. Participants also reported the somewhat long distances needed to access local “spaza” shops (smaller, convenience-type retail outlets, often run out of someone’s home) which, in most instances do not even stock healthy foods [see Figure 1].

[insert – Figure 1: 'Distance' (Rural) – here]

Additionally, almost all rural participants mentioned the household production of food (livestock and/or fruit and vegetable gardens) as either a positive or negative factor in their acquisition of healthy foods – positive, because home gardens allowed them to access healthy fruits and vegetables at very little expense, and household owned livestock gave them access to meat, milk, and/or eggs (for example, R6 said “Having a garden saves me a lot and it’s beneficial to me health-wise. In my garden I grow vegetables and peaches and that does not cost me.”); negative, because 1) of current drought conditions making it almost impossible to grow anything in their home gardens, and having a negative impact on livestock as far as milk and egg production goes (as well as death of cattle due to no “green grass” to eat), and 2) a lack of fencing around their gardens which would otherwise protect their crops from wandering livestock - Participant R7 had this specific concern: “I want to eat fresh vegetables from my garden. But I can’t grow them because my fence is broken, the horses and cattles can damage my garden easy.”

### *Affordability*

Although government grants were mentioned as assisting the participants financially, the high cost of healthy foods was still a concern. R8 said “Healthy foods are very expensive and because I cannot afford them I buy the most basic things even if they are not healthy.” Rural participants indicated that “specials” on certain food items, particularly at month-end helped greatly in acquiring healthy foods. More local retail options for food (primarily spaza shops) were reported as “very expensive” and as not stocking healthy items. Overall feedback suggested high levels of knowledge regarding where to shop for the best deals.

### *Availability*

As previously pointed out, supermarkets were almost always mentioned in a positive light, primarily because of their stocking of fruits and vegetables. However, some rural participants mentioned during the FGD workshops and as part of their extended lists of what hinders them from acquiring healthy foods, that rotten produce in these outlets was a concern. Spaza shops were always mentioned in a negative light by rural participants, primarily because they did not stock healthy items, but also because of the high cost of items stocked in these outlets –

“Our local spaza shops makes it harder for us to eat healthy because they sell unhealthy stuff. You can’t even buy fruit and veggies, they do not sell them at all” (R8).

### *Desirability*

In addition to (and often included in) the above outlined themes, a theme involving issues of “food safety” emerged from rural participant feedback. Although not included in their final list of the top two things in their local food environments that make it harder for them to acquire healthy foods, concerns were raised by multiple participants regarding the poor quality of produce available to them in both the supermarkets and local food retail outlets, as well as the fact that packaged products that are in their price range are often past their expiration dates, making them less desirable for consumption, but more affordable.

### *Urban results*

The 8 urban participants produced a total of 16 titled and captioned photographs representing what in their communities makes it easier to eat healthy, and 15 representing the factors that make it harder. All urban participant feedback fell primarily into four themes: accessibility/availability, affordability, convenience, and an emergent theme involving household dynamics.

### *Accessibility/availability*

Similar to those living in the rural setting, supermarkets were seen by the urban participants as an aspect of their food environment that made it easier for them to access healthier food options. The proximity of these food retail outlets to their homes, as well as the lower prices of healthier food options were given as the main reasons for this. Participant U5 felt this way, saying “It is easy for me to shop as I do not have to go to town as Shoprite, Goal and Boxer are nearby.” U6 said that “fruit and veg are always available (in these outlets)”.

Similar to the rural participants (although not raised quite as much) those living in the urban setting reported household food gardens as both a positive and negative aspect of their food environment. One participant (U1) reported that “It is easy to plant the food myself in my plot. I got plot at home.” However, most participants shared their concerns regarding the lack of space for gardening in their communities, as well as the unproductive land which did not allow them to grow produce.

The presence of multiple transportation options was mentioned as a factor that assisted urban participants in accessing food at malls and larger market places. However, the cost of this transportation was mentioned as a barrier to access by a number of participants – this seemed to be primarily for those who reported limited or no employment within the household.

Contrary to what was reported in the rural setting, informal food outlets (i.e. fruit stalls and spaza shops) were always mentioned as a factor that made healthier food options more available and accessible to participants in the urban setting [see Figure 2].

[insert – Figure 2: ‘Street vendor’ (Urban) – here]

### *Affordability*

Lack of employment and a steady income was raised multiple times by urban participants as a barrier to accessing healthy food. Primary concerns under this theme included the high prices of healthy food items, transportation costs to acquire these food items, and not being able to afford to maintain a garden to grow some of these food items. U5 shared that “It is

hard for me to eat healthy because I cannot afford to buy healthy food as it is expensive. I am unemployed.”

### *Convenience*

Fast food outlets (whether corporate or informal) were mentioned by a number of urban participants as something within their community that did not make it easy for them to eat healthy. Not only the presence of these outlets, but also the advertising of their food options, their low cost, and their convenience were all reasons given for this. Although these types of outlets were present in the rural setting, this was not raised by the rural participants as either a positive or negative aspect of their local food environment.

### *Household dynamics (emergent theme)*

Preparing and enjoying meals within the home was mentioned as something that both assisted, and hindered urban participants in eating a healthy diet. Some participants felt that they could control what went into the meals: U4 said: “What makes it easy, is when I cook, I am careful of the things I put in which are not recommended by the doctors and then I dish my portion aside so that it doesn’t get mixed with other people’s.” However, this was also mentioned as sometimes out of their control, especially when others prepared the meals. One participant (U2) pointed out that “At home we celebrate each ones birthday. We have cake, braai etc. which is not easy for me to say no to; the tempting nice food stimulates the need to eat”.

### ***Overall results***

Overall, it was clear during all interactions with participants from both sites that they shared a high level of knowledge and awareness regarding healthy food options. When asked to give examples of healthy food items available to them in their communities, the list included those recommended for consumption by local government authorities. Participants (predominantly those from the urban site) also pointed out that they were instructed to eat these foods by the healthcare professionals with whom they had interacted at their local healthcare facilities, especially in relation to their self-management of diabetes. However, this level of knowledge did not always seem to translate into healthy eating habits, primarily as a result of the themes outlined above. When asked what food means to them, common answers from the participants included “health”, “life”, “energy”, “home”, and “sharing”.

With regard to navigating their food environments, it was also apparent from very early on that the study participants were very aware of the cost of healthy and non-healthy food items, and which food retail outlet had the best prices at what times of the month. Most participants reported that they would shop at a supermarket once a month (usually at month-end when salaries and/or government grants become available) for staple and/or more bulk-type items; and then supplement these items on a more daily basis with purchases made at nearby spaza shops (although because of higher prices and lower quality food items at these retail outlets, purchases here were often only made when necessary).

### **Discussion**

#### ***The 3 A’s – Accessibility, availability, and affordability***

The accessibility, availability, and affordability of healthy food items were raised by participants at both sites as the major concerns related to eating a healthy diet as part of their

self-management of diabetes. The following four aspects related to these themes (and raised multiple times by participants) are worth touching on:

### *1. Supermarkets*

As supermarkets have become more and more commonplace in both urban and rural communities across South Africa (Battersby, 2017), the impact of their presence on local food environments, and more particularly the food security and health of those living in these communities has been debated: Some have argued that the introduction of these retail outlets into these environments/communities has been positive because of their ability to offer lower food prices and bring in fresher and safer food options (Reardon & Minten, 2011). However, others have pointed out that the larger unit sizes offered by supermarkets may be unaffordable for the poorest, and that these outlets are often situated in inconvenient locations (Battersby et al, 2017) – a concern raised by mainly the rural participants. Others have come to similar conclusions, particularly in urban settings: *“The distribution of supermarkets is shown to be highly unequal and the distance of low-income from high-income areas hinders access to supermarkets for the urban poor. ...supermarkets in low-income areas typically stock less healthy foods than those in wealthier areas and, as a result, the supermarkets do not increase access to healthy foods and may, in fact, accelerate the nutrition transition”* (Battersby & Peyton, 2014).

In this study, supermarkets were mentioned by the majority of participants as something that helped combat the barriers of accessibility, availability, and affordability. In some instances, particularly in the rural setting, participants spoke about supermarkets as the only place where they could purchase fruits and vegetables (however, issues of accessibility were still raised here).

### *2. Informal sector food outlets*

It was reported that the informal sector, primarily through spaza shops and table top-type vendors, played a major role in shaping participants’ food environments and subsequent endeavours to acquire healthy food items in both settings. In the urban setting, these retailers seemed to play a larger role in supplying healthier food options to participants; while in the rural setting, participants reported that these retailers were often too expensive and seldom stocked healthy food items. Consequently, both formal and informal retailers need to be considered as integral parts of South African food environments (particularly in urban settings) and as such, need to be considered as a key part of any food policy strategy (Pereira et al, 2014).

### *3. Fast food outlets*

Although not raised as a concern by the rural participants, the presence of fast food outlets and the advertising and low cost of their food options were raised by some of those living in the urban setting as a concern to their health. It has been demonstrated that along with the introduction of supermarkets and associated malls, fast food outlets are becoming more and more prevalent in low-income communities in South Africa, especially in urban environments (Battersby, 2017). Although not mentioned as a concern by the rural participants, at the time of this study there were 11 fast food outlets observed within the rural town centre, as compared to 3 observed in the immediate retail centre in the urban setting

(these observations were not made as part of the data collection process, but rather informally by workshop facilitators). It is also worth pointing out here that perhaps, because of the nature of the study sample (predominantly older, diabetic females) fast food outlets may not have been that prominent of a theme in the rural site (and maybe more of a theme in the urban) versus if the same questions were asked of younger individuals towards whom the fast food sector primarily markets.

#### *4. Household production of food*

Almost all rural participants mentioned the household production of food, whether a home garden, or the keeping of pigs, chickens, or cattle, as part of their food environment, and seemed to rely heavily on this as an accessible source of healthy food in their diets. Although mentioned a number of times by the urban participants, home gardens were not as prominent of a theme for them as it was for those living in the rural setting. Because of the nature of the sample, it is of course unknown if this would be as common of a theme, or as great of a concern with others (e.g. younger individuals or employed males).

A recent key review (Misselhorn & Hendriks, 2017) of sub-national food security research conducted in South Africa found that while the efforts towards the household production of food have “the potential to make some contribution to household and community food security, they require extensive and sustained inputs and/or support to do so”. Similar to the findings presented in this paper, authors of this recent review found factors impeding the creation and successful management of home food gardens included fragmented and inconsistent service provision, such as the distribution of tools without adequate training; difficulty accessing key inputs, like inadequate land and access to water; and cost-related limitations resulting in the inability to purchase seeds, protect gardens from local livestock, and secure enough water for irrigation purposes.

Regarding urban food gardens specifically, the review found mixed messages. Two studies stood out here: the first (Reuther & Dewar, 2006), conducted in peri-urban Cape Town concluded that, although urban agriculture holds potential livelihood benefits, long-term inputs needed to make it sustainable are unavoidable; and the second (Crush & Caesar, 2014), conducted in KwaZulu-Natal found urban agriculture made only a small contribution to food security, with only 11% of households citing agriculture as a regular food source. Additionally, a number of studies included in the review called for government to assist in meeting the challenges to urban agriculture by “delivering agricultural assets and land space as well as skills development, educational support, and the removal of institutional barriers” (Misselhorn & Hendriks, 2017). More research looking into the validity of home gardens as a means to improve levels of food security and nutrient intake in urban settings has been called for (Galhena et al, 2013) (Kang'ethe et al, 2007).

The challenges to maintaining a sustainable home garden reported by both rural and urban participants in this study are in line with findings from other studies dealing with other subsets of similar populations (Aliber & Hart, 2010) (Faber & Laurie, 2011) (PSC, 2008) (Misselhorn & Hendriks, 2017) and thus should be seriously considered from a policy and public health intervention perspective when addressing nutrition and health in South Africa.

Similar issues related to the accessibility, availability, and affordability of healthy food items have been reported by other studies conducted with other population groups in both urban and rural areas of South Africa over the years (Temple, 2009, 2010) (Love et al, 2001) (Faber & Laubscher, 2008): it seems that these barriers are still a reality faced by some of those residing in these settings today.

### ***External vs personal food environment***

In line with the aforementioned definition of food environments, i.e. the interface that mediates peoples' acquisition of foods within the wider food system (Turner, 2017), Turner et al. further define the food environment in a conceptual framework that outlines separate, yet inter-related domains of the food environment: 1) the "external food environment" (including all exogenous dimensions, such as food availability, prices, vendor and product properties, and marketing and regulation), and 2) the "personal food environment (including all endogenous dimensions such as accessibility, affordability, convenience and desirability at the individual level). Turner et al. point out that the two domains, and the dimensions within said domains, directly relate to, and influence each other, ultimately leading to food acquisition and consumption, and health and nutrition outcomes.

For example, and relevant to the findings of this study, Turner et al. point out that:

*"Availability refers to whether a vendor or product is present or not within a given context, and is included within the external food environment domain. Availability always precedes accessibility (i.e. a food cannot be accessible if it is not available). Accessibility is relative to individuals, and falls within the personal food environment domain. Accessibility is highly dynamic and can include distance, time, space and place, daily mobility, and modes of transport that collectively shape individual activity spaces."*

Also:

*"Prices refer to the cost of food products, and are included within the external food environment domain. Prices interact with individual purchasing power to determine affordability within the personal food environment domain... and... are sensitive to fluctuations in food availability and accessibility."*

Already pointed out as findings in this study are the concerns of accessibility, availability, and affordability in both the urban and rural settings. Although two of the three fall within Turner et al.'s "personal food environment" domain, they are all directly related to, and largely determined by exogenous, or external factors (i.e. accessibility determined by availability, and affordability determined by pricing). It is also worth noting here that certain aspects of accessibility, although placed in the "personal food environment" domain, are out largely of the control of the individual – for example, the distance between household and food retail outlet, or the public transportation options available to the individual and needed in order to access healthy foods. The exogenous dimensions of the food environment, i.e. those that determine the endogenous, are all largely determined and shaped by external factors such as private and public sector policies, and as such are "open" to change through targeted and well-informed intervention endeavours that attempt to alter the people's

environments in a way that works towards achieving widespread reduction in the risk of unhealthy food acquisition and resulting consumption patterns. However, having said this, the issues raised by participants in this study, as well as other studies that have come before, are complex in nature. Although government and the private sector have a pivotal role to play in addressing and rectifying some of these issues through well developed and effectively implemented policies and actions, a more systematic approach that takes this complexity into account is needed (e.g. one that considers household gender dynamics, as well as other social/cultural norms around food acquisition behaviours, food preparation, food consumption, notions of a healthy diet, etc.). Additional research that considers and explores this complexity is sorely needed.

### ***A note on photography as a research tool***

Utilizing photography in addition to focus group discussions proved to be an effective tool in helping the community members involved come to a better understanding of how different factors within their physical environment shape their food acquisition behaviours and ultimately their diets and health. It also proved effective in helping participants effectively communicate which of these environmental factors either hinder or facilitate their acquisition of healthy foods as part of their self-management of diabetes. Additionally, this methodological approach, particularly the FGD workshops, seemed to provide the opportunity and relatively safe space for participants to discuss their concerns regarding their diabetes and how best to self-manage the disease, particularly when it came to diet and the disconnect between the diet advice received from health care professionals and the reality faced on a day to day basis by the participants when trying to make healthy food choices.

### **Study limitations**

Due to the nature of the qualitative data collected, and the relatively small and specific nature of the study sample (i.e. older female diabetics), these findings cannot be generalised to the larger populations within the two study settings. However, study findings do serve to provide crucial insights into the perspectives of those navigating their food environments in an attempt to eat a healthy diet as part of their disease self-management strategies. Also, this study did not attempt to take into account gender dynamics in these communities and participant households, but this important aspect should be considered in relation to study findings and perhaps explored further through additional research. If this study was to be conducted again, greater consideration would be given to this in developing guiding questions and conceptual underpinnings.

### **Conclusions**

It appears that, from a diet perspective, the self-management of diabetes in these particular urban and rural settings is not a simple or easy endeavour, and that the environments in which these participants live play a critical role in shaping food acquisition behaviours, and ultimately health and nutrition outcomes. Levels of knowledge regarding healthy diets among study participants was high, and a general want to eat healthy was communicated; however, study findings indicate that local food environments did not facilitate the regular, easy access to desired healthy food items.

Although the study participants were quite unique (i.e. diabetic, older, almost all female), it is important to note that the findings presented here are not in that similar issues around the

accessibility, availability, and affordability of healthy food items in both urban and rural settings in South Africa have been reported by other studies with varying sample groups. It is clear that these issues persist and need to be addressed. Government has a key role to play in influencing these environments through targeted initiatives such as effective pricing policies, consumer subsidies, and support for locally-oriented agricultural initiatives, and by so doing improve individual and public health in these settings for all.

Findings from this study have implications beyond the self-management of diabetes and extend to the self-management and reduction of all diet-related NCDs.

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### **Figure titles and captions**

Figure 1: 'Distance' (Rural)

Caption: *“It is difficult for me to eat healthy because the stores are far. So I have to spend money on transport. The spaza shop do not sell healthy food. Even the distance to fetch water is too far.”*

Figure 2: 'Street vendor' (Urban)

Caption: *“I prefer to have a fruit and veg street vendor that makes it easy for me to buy vegetables in the street. It makes it easy for me to cook because I don't have to go to town to get vegetables. It is also good for people like me to have veggies for my health as I am diabetic.”*