Research article

Modern vs traditional indigenous diet preference in Gauteng region, South Africa: A public health concern?

Alex D. Tchuenchieu Kamgain [a,b,*], Eridiong Onyenweaku [a], Hema Kesa [a,**]

[a] Food Evolution Research Laboratory, School of Tourism and Hospitality, University of Johannesburg, South Africa
[b] Centre for Food, Food Security and Nutrition Research, Institute of Medical Research and Medicinal Plants Studies, Cameroon

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ABSTRACT

The prevalence of non-communicable diseases still represents a public health concern in South Africa, of which eating habits are some of the main risk factors. A modern diet consisting of the consumption of highly processed foods high in fat, salt and caloric sweeteners and low in fibre is recognised as unhealthy. This study was conducted to assess the penchant of the population for these types of foods rather than traditional indigenous foods known to be healthier. This research was undertaken in the Gauteng region, which is the most urbanized province in the country. This study consisted of a quantitative research survey conducted in 2019 with 1527 participants (Asians, Black, Coloured, Indians and White) aged 18 and above who had lived in the province for at least two years. The results revealed that 30–40 % were neutral on the issue. Despite half (54.4 %) indicating that it was good to mix traditional and modern foods, a clear preference for modern food was noticed for 35.7 % of respondents, with 32.2 % reporting not being concerned that traditional foods have been replaced by modern foods. The traditional indigenous food consumption (TIFC) appeared to depend on monthly total household income, residential area, and settlement category. Participants with specific economic comfort consumed less. Race and number of people in the participants' households also significantly affected the TIFC (p < 0.05). Participants of white ethnicity and those living in a household of a maximum of 02 people displayed the lowest TIFC. In comparison to those who strongly disagree, participants with a neutral opinion about the idea of mixing eating habits were also the most neutral concerning preference for a modern diet (OR: 10.95, 95 % CI 7.00–17.12) and nutrition transition (OR: 14.66, 95 % CI 9.09–23.64). Sensitisation about healthy eating habits among the identified at-risk and target groups is undoubtedly a need in the region to avoid a resurgence of modern diet-related diseases.

1. Introduction

The prevalence of non-communicable diseases (NCDs) in South Africa has not decreased in the last two decades. According to the World Health Organization, they accounted for 39 % of total deaths in 2000 and 51 % in 2019 [1]. NCDs are chronic illnesses generally of prolonged duration, including cardiovascular diseases, type 2 diabetes mellitus, cancers, chronic respiratory diseases such as asthma, and mental health disorders. These diseases are considered another burden on South Africa (SA), a country already highly

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* Corresponding author. Food Evolution Research Laboratory, School of Tourism and Hospitality, University of Johannesburg, South Africa.
** Corresponding author.
E-mail addresses: kamgaina@uj.ac.za (A.D. Tchuenchieu Kamgain), hemak@uj.ac.za (H. Kesa).

concerned about infectious diseases, maternal and child health, and injury-related diseases [2]. NCDs are known to be caused by a combination of modifiable and non-modifiable risk factors, including metabolic, genetic, behavioral and socio-environmental factors [3]. Behavioral risk factors (unhealthy diet, physical inactivity, tobacco use and alcohol abuse) have been associated with the rise of NCDs in South Africa [4]. Poor diet is a considerable risk factor for NCDs. Quantifying the overall impact of poor dietary habits on NCD mortality across 195 countries in 2019, GBD 2017 Diet Collaborators found that improving diet could potentially prevent one in every five deaths globally [5]. Diets low in fruits, vegetables, legumes, whole grains, nuts and seeds, milk, calcium, fibre, seafood, omega-3 fatty acids and polyunsaturated fatty acids were indicated as key NCD risk factors, as well as diets high in red meat, processed meat, sugar/sweetened beverages, trans fatty acids and sodium.

As in many other countries, the urbanisation and industrialisation of SA are associated to a nutrition transition, characterised by people changing to diets of sugar-sweetened beverages, processed and packaged food (fast foods), including edible vegetable oils, animal source foods, and added caloric sweeteners, with limited vegetable consumption, commonly known as a Western or modern diet, yet unhealthy [6–8]. This change in food consumption patterns has been observed since 1994, with urbanisation affecting food availability, accessibility and choice. Nevertheless, South Africa possesses indigenous foods which consist of grain crops (Pearl Millet, Sorghum, Cowpea, Bambara groundnuts, Mungbean), vegetable crops (Cleome, Amaranth, Blackjack, Jews mallow, Cassava, Amadoumbe) and fruits (Marula, Red milkwood, Mobola plum, Wild medlar, Num-num, Kei apple, Natal orange), which have been the basis of the country's traditional indigenous diet. The nutritional and health benefits of each of these foods have been widely reported [9]. One could, therefore, question the place of such indigenous foods in the South African population's contemporary eating habits. Focusing on the Gauteng region, which is the most urbanized region in SA, this study was designed to assess the penchant of the population to consume modern foods instead of a traditional, potentially healthier indigenous diet. This investigation was initiated by a study in this specific region titled Knowledge, Perception and Consumption of Indigenous Foods [10].

2. Methodology

A quantitative research survey was conducted from August to November 2019; 1527 volunteer respondents from different areas in the region took part in the study. The fieldwork was done in the East Rand, Johannesburg CBD, Johannesburg North, Johannesburg South, Lanseria, Lenasia South, Pretoria, Soweto and the West Rand. As criteria for inclusivity, participants had to be aged at least 18 and living in the Gauteng province for at least two years. They were informed about the goal of the study and their right not to participate.

The questionnaire regarding this research work consisted of two main sections. The first section aimed to collect the socio-demographic data of respondents (gender, race, age, education level, household size and income per month, area of residence, and corresponding settlement). The second section comprised three multiple-choice statements: "*I prefer modern food to traditional food*", "*I am not concerned that traditional foods have been replaced by modern foods*", and "*It is good to mix traditional and modern foods*". Participants had to answer by indicating Strongly Agree, Agree, Neutral, Disagree or Strongly Disagree.

The questionnaire was drafted in English and first piloted with 25 respondents to ensure the validity and reliability of the

Table 1
Sociodemographic characteristics of the studied population (n = 1527).

Variable		Frequency	Percentage	Variable		Frequency	Percentage
Gender	Female	917	60.1	Total household income per month after tax	Less than ZAR 500	22	1.4
	Male	610	39.9		ZAR 500–ZAR 999	19	1.2
					ZAR 1000–ZAR 1999	43	2.8
					ZAR 2000–ZAR 2999	92	6.0
Race	Asian	39	2.6		ZAR 3000–ZAR 4999	173	11.3
	Black	442	28.9		ZAR 5000–ZAR 9999	275	18.0
	Coloured	330	21.6		ZAR 10,000–ZAR 14,999	262	17.2
	Indians	303	19.8		ZAR 15,000–ZAR 24,999	202	13.2
	White	413	27.0		ZAR 25,000–ZAR 34,999	176	11.5
					ZAR 35,000–ZAR 44,999	105	6.9
					ZAR 45,000–ZAR 54,999	68	4.5
Age	18–25	429	28.1		ZAR 55,000+	90	5.9
	26–35	411	26.9				
	36–45	312	20.4				
	46–55	232	15.2	Residence area	Peri-urban	371	24.3
	56–65	100	6.5		Rural	110	7.2
	66+	43	2.8		Urban	1046	68.5
Education level	Grade 0–7	29	1.9	Settlement category	Former border or homeland towns	36	2.4
	Grade 8–12	557	36.5		Informal settlement	165	10.8
	Tertiary Education	941	61.6		Suburb/Edge city	863	56.5
					Township (Kasi)	463	30.3
People in the household	1–2	267	17.5				
	3–5	869	56.9				
	6 or more	391	25.6				

instrument, as executed in previous studies [11,12], and no changes were recorded. The survey was administered by trained interviewers who explicitly explained to participants what they should understand by "modern diet" and "traditional indigenous diets", as defined above. The study was approved by the Research Ethics Committee of the University of Johannesburg, ethics clearance number 2019STH012 (April 10, 2019). Informed consent was obtained from each participant after the research objectives had been explained. The collected data remained strictly confidential and anonymous.

Data regarding modern food preference (first statement) and concern about nutrition transition (second statement) were first converted into numerical values (1 for Strongly Agree; 2 for Agree; 3 for Neutral; 4 for Disagree; and 5 for Strongly Disagree). Hence, the traditional indigenous food consumption (TIFC) score of each participant was estimated by adding the value they had obtained through their answers to the two statements. Accordingly, the minimum score was 2, and the maximum was 10.

The statistical analysis was performed using the *Statistical Package for Social Sciences* (*SPSS*) version 27 (IBM *SPSS* Statistics, Chicago, IL, USA). Descriptive statistics were conducted. The association between TIFC scores and participants' socioeconomic characteristics was assessed using a multinomial logistic regression, with the TIFC scores above 5 being categorized as high. A multinomial logistic regression analysis was also performed to estimate the association between the answers to the statement "*It is good to mix traditional and modern foods*" and the opinions on modern food or nutrition transition. We either considered it negative (for those who answered Strongly Agree and Agree), neutral (for those who answered Neutral) or positive (for those who answered Strongly Disagree and Disagree). A p-value below 0.05 was considered significant.

3. Results

Table 1 presents the socio-demographic characteristics of this study's participants. Women accounted for 60.1 %. The black, white, coloured and Indian populations were the most represented, with the Asian population representing only 2.6 %. Ages mostly ranged between 18 and 65 years; only 2.8 % of participants reported being older than 65. The majority of the respondents had either a tertiary (61.6 %) or a secondary (36.5 %) education level. People living alone, with someone or in a family (or group) took part in this study and belonged to different socio-economic categories. Indeed, the monthly total household income ranged from below ZAR 500 to ZAR 55,000 (ZAR 1 = USD 0.054 = EUR 0.049). These participants resided in urban (68.5 %), peri-urban (24.3 %) or rural (7.2 %) areas. All settlement categories were represented (suburb, township, informal settlement and homeland towns).

Fig. 1 shows the general opinions of the participants on the three tested statements; 30–40 % had a neutral opinion regarding those statements. A preference for a modern diet was expressed by 35.7 % of people, while 27.7 % were opposed to it. Up to 32.2 % of respondents reported concern that traditional foods had been replaced by modern foods, and 27.4 % were not concerned. Further, half of the participants (54.4 %) indicated it was good to mix traditional and modern foods, with 20.9 % even strongly agreeing. Only 14.8 % of participants were opposed, and 5.4 % strongly disagreed.

Table 2 highlights the TIFC scores based on the respondents' preference for modern food. While gender, age, and educational level did not show a significant influence, other sociodemographic factors were found to be significant in determining the score (p < 0.05). The data suggests that race plays a role in determining the TIFC score, with black and coloured people having the highest mean scores. However, statistically, it was found that Asian and Black people had twice the chance of having a TIFC score above 5 (OR: 2.53, 95 % CI 1.17–5.47 and OR: 2.23, 95 % CI 1.6–3.09, respectively). The number of people in a household was also found to have a significant impact on the score, with the score increasing as the number of people in the household increased. Additionally, the data suggests that participants with a higher monthly income tend to have a lower mean TIFC score than those with a lower income. On the other hand, people with a monthly income below ZAR 55,000 were found to be the majority of those who had a high TIFC score. Participants living in suburban or edge cities had the lowest TIFC scores, while those from rural areas had the highest. In fact, within the rural sub-population, the number of high TIFC scores was found to be three times more important than in other areas (OR: 3.47, 95 % CI 1.81–6.63).

Tables 3 and 4 present the variation of interest in mixing traditional and modern food, depending on respondents' preference for
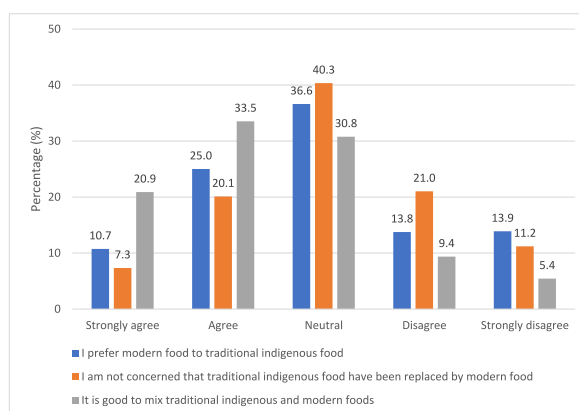

Fig. 1. Opinion of the participants regarding the three statements.

Table 2
Variation of traditional indigenous food consumption score within the sociodemographic variables.

Variable		Score				High TIFC score (score >5)			
		Mean	Standard deviation	Minimum	Maximum	Odd Ratio (OR)	Confidence Interval (95%CI)		p-value
Gender	Female	6.08	1.912	2	10	0.99	0.79	1.24	0.71
	Male	5.98	1.920	2	10	1			
Race	Asian	5.89	1.807	2	10	2.53	1.17	5.47	0.02
	Black	6.51	1.870	2	10	2.23	1.6	3.09	0.00
	Coloured	6.02	1.852	2	10	1.12	0.81	1.55	0.49
	Indians	5.98	1.911	2	10	1.03	0.76	1.41	0.84
	White	5.60	1.922	2	10	1			
Age	18–25	5.90	1.781	2	10	1.20	0.60	2.41	0.62
	26–35	6.19	1.888	2	10	1.52	0.75	3.06	0.24
	36–45	6.35	1.975	2	10	1.65	0.81	3.37	0.17
	46–55	5.84	1.964	2	10	1.13	0.55	2.32	0.74
	56–65	5.63	2.135	2	10	1.01	0.46	2.21	0.99
	66+	5.65	1.837	2	10	1			
Educational level	Grade 0–7	6.55	2.759	2	10	0.72	0.32	1.62	0.42
	Grade 8–12	5.97	1.837	2	10	0.79	0.62	1.01	0.06
	Tertiary Education	6.06	1.929	2	10	1			
Number of people in the household	1–2	5.86	1.862	2	10	0.67	0.47	0.95	0.02
	3–5	5.98	1.896	2	10	0.91	0.69	1.19	0.49
	6 or more	6.28	1.974	2	10	1			
Total household income (after taxes) per month	Less than ZAR 500	6.18	2.015	2	10	1.61	0.83	3.12	0.67
	ZAR 500–ZAR 999	6.37	2.499	2	10	1.39	0.82	2.35	0.00
	ZAR 1000–ZAR 1999	6.84	1.799	2	10	2.12	1.20	3.75	0.04
	ZAR 2000–ZAR 2999	6.28	1.963	2	10	1.34	0.75	2.41	0.00
	ZAR 3000–ZAR 4999	6.49	2.036	2	10	0.94	0.49	1.81	0.16
	ZAR 5000–ZAR 9999	6.20	1.851	2	10	2.09	1.25	3.51	0.22
	ZAR 10,000–ZAR 14,999	6.16	2.040	2	10	2.27	0.72	7.23	0.01
	ZAR 15,000–ZAR 24,999	6.03	1.740	2	10	1.61	0.83	3.12	0.33
	ZAR 25,000–ZAR 34,999	5.78	1.711	2	10	1.39	0.82	2.35	0.86
	ZAR 35,000–ZAR 44,999	5.52	1.744	2	10	2.12	1.20	3.75	0.01
	ZAR 45,000–ZAR 54,999	5.16	1.890	2	10	1.34	0.75	2.41	0.16
	ZAR 55,000+	5.34	1.775	2	10	1			
Residential area	Peri-urban	6.24	2.120	2	10	1.09	0.82	1.45	0.57
	Rural	6.62	1.292	2	10	3.47	1.81	6.63	0.00
	Urban	5.90	1.877	2	10	1			
Settlement category	Former border or homeland towns	6.28	1.846	3	10	0.60	0.28	1.28	0.19
	Informal settlement	6.58	1.967	2	10	1.04	0.67	1.60	0.87
	Suburb/Edge city	5.74	1.880	2	10	0.70	0.51	0.95	0.02
	Township (Kasi)	6.38	1.870	2	10	1			

modern food and concern about nutrition transition, respectively. Participants interested (Agree and Strongly Agree) in mixing were more likely to have a neutral opinion on modern food (OR: 8.95, 95 % CI 5.70–14.05 and OR: 4.38, 95%CI 2.72–7.03, respectively) or a positive opinion (OR: 7.84, 95 % CI 5.17–11.88 and OR: 4.72, 95%CI 3.06–7.26, respectively). They appeared more neutral about nutrition transition (OR: 11.38, 95 % CI 7.03–18.43). Participants with a neutral opinion on the idea of mixing eating habits appeared likely also to be neutral concerning modern diet preference (OR: 10.95, 95 % CI 7.00–17.12) and concern about nutrition transition (OR: 14.66, 95 % CI 9.09–23.64). In the sub-populations of those who disagreed with the idea of a mixture, solely the preference for a modern diet significantly (p < 0.05) determined this opinion, albeit with a lower odd ratio (2.6, 95 % 1.63–4.12). Participants in this group were more neutral about nutrition transition (OR: 2, 95%CI 1.13–3.52).

4. Discussion

Despite traditional eating habits consisting of indigenous foods generally described as healthier than the modern/Western diet of processed foods [13,14], one should not forget exceptions like the traditional Eastern European diet, which has been described as unhealthy [15]. In the case of South Africa, the country possesses a wide variety of indigenous foods, including grain crops (Pearl Millet, Sorghum, Cowpea, Bambara groundnuts, Mungbean), vegetable crops (Cleome, Amaranth, Blackjack, Jews mallow, Cassava, Amadoumbe) and fruits (Marula, Red milkwood, Mobola plum, Wild medlar, Num-num, Kei apple, Natal orange), of which the nutritional and health benefits have been comprehensively reported [9].

Table 3
Variation of interest in mixing traditional and modern eating habits with the initial preference for modern food in the studied population.

Opinion on "It is good to mix traditional and modern foods"	Sub-population	n (%)	Odd Ratio (OR)	Confidence Interval (95% CI)		p-value
Strongly Agree	Positive opinion on modern food	118 (7.73 %)	4.72	3.07	7.27	0.00
	Negative opinion on modern food	109 (7.14 %)	2.95	2.03	4.28	0.00
	Neutral opinion on modern food	92 (6.02 %)	4.38	2.73	7.04	0.00
Agree	Positive opinion on modern food	196 (12.84 %)	7.84	5.17	11.89	0.00
	Negative opinion on modern food	128 (8.38 %)	3.46	2.40	4.99	0.00
	Neutral opinion on modern food	188 (12.31 %)	8.95	5.70	14.05	0.00
Neutral	Positive opinion on modern food	142 (9.30 %)	5.68	3.71	8.69	0.00
	Negative opinion on modern food	98 (6.42 %)	2.65	1.81	3.87	0.00
	Neutral opinion on modern food	230 (15.06 %)	10.95	7.01	17.12	0.00
Disagree	Positive opinion on modern food	65 (4.26 %)	2.60	1.64	4.12	0.00
	Negative opinion on modern food	50 (3.27 %)	1.35	0.88	2.07	0.16
	Neutral opinion on modern food	28 (1.83 %)	1.33	0.76	2.35	0.32
Strongly Disagree[a]	Positive opinion on modern food	25 (1.64 %)	1.00			
	Negative opinion on modern food	37 (2.42 %)	1.00			
	Neutral opinion on modern food	21 (1.38 %)	1.00			

[a] Defined as reference category.

Table 4
Variation of interest in mixing traditional and modern eating habits with food transition concern in the studied population.

Opinion on "It is good to mix traditional and modern foods"	Sub-population	n (%)	Odd Ratio (OR)	Confidence Interval (95% CI)		p-value
Strongly Agree	Concern about food transition	100 (6.55 %)	3.57	2.35	5.43	0.00
	No concern about food transition	126 (8.25 %)	3.41	2.36	4.91	0.00
	Neutral about food transition	93 (6.09 %)	5.17	3.12	8.56	0.00
Agree	Concern about food transition	146 (9.56 %)	5.21	3.48	7.81	0.00
	No concern about food transition	161 (10.54 %)	4.35	3.04	6.22	0.00
	Neutral about food transition	205 (13.43 %)	11.39	7.03	18.44	0.00
Neutral	Concern about food transition	98 (6.42 %)	3.50	2.30	5.33	0.00
	No concern about food transition	108 (7.07 %)	2.92	2.01	4.24	0.00
	Neutral about food transition	264 (17.29 %)	14.67	9.10	23.64	0.00
Disagree	Concern about food transition	47 (3.08 %)	1.68	1.05	2.68	0.03
	No concern about food transition	60 (3.93 %)	1.62	1.08	2.44	0.02
	Neutral about food transition	36 (2.36 %)	2.00	1.14	3.52	0.02
Strongly Disagree[a]	Concern about food transition	28 (1.83 %)	1.00			
	No concern about food transition	37 (2.42 %)	1.00			
	Neutral about food transition	18 (1.18 %)	1.00			

[a] Defined as reference category.

In this study, 30–40 % of respondents appeared neutral about the three statements: (*"I prefer modern food to traditional food"; "I am not concerned that traditional foods have been replaced by modern foods"; and "It is good to mix traditional and modern foods"*). This percentage represents a significant proportion of the population that needs to be convinced of the importance of traditional indigenous foods in their diets. When considering the values describing a preference for modern food (35.7 %, with 27.7 % opposed) and concern about nutrition transition (32.2 %, with 27.4 % opposed), one can indeed predict a continuous increase in the prevalence of non-communicable diseases in the region, in the upcoming years, if nothing is done to curb that preference. In this sense, the promotion of an intermittent diet could be useful in progressively changing minds, as more than half of the participants (54.4 %) indicated that it is good to mix traditional and modern foods, and 20.9 % even strongly agreed.

Gewa et al. [16] stated that the consumption of indigenous foods has decreased over the years. Indigenous foods are seen as old-fashioned because the older generation prepares such foods while the younger generation has access to a large range of modern food. Urbanisation plays a major role in the decrease in the consumption of indigenous foods [17]. This aspect was broadly confirmed in this study, whereby monthly income, residential area, and settlement category significantly affected the traditional indigenous food consumption score. Averagely, the higher the economic category of the respondents was, the lower their TIFC score was. The residential areas and settlement categories of the participants significantly determined their answers to the three statements. People living in urban and rural areas were, respectively, those with the highest and lowest preference for modern food and concern about nutrition transition. They were also respectively the most and least opposed to the idea that it was good to mix modern and traditional foods. These observations were also made when comparing those living in Edge cities and informal settlements, respectively. A high consumption of fast foods in the high socioeconomic category has already been reported [18]; this includes people of a certain age and educational level. Globally, these observations corroborate those of Ajaero et al. [19], who noticed a higher prevalence of NCDs among people residing in urban areas in South Africa.

Age categories above 45 years showed a higher proportion of people with a preference for modern foods and less concern about nutrition transition. This finding is valid, especially for white and coloured people with monthly incomes above ZAR 35,000 and residing in urban areas/suburbs (data not shown). Indeed, race was also shown to have a significant effect on this traditional indigenous diet consumption score. The white race showed the lowest TIFC score, and the black race was among the highest. The Asian, Indian and coloured racial groups were in between. The European origin (mainly Dutch and English) of the white sub-population might explain the TIFC score observed. It is important to notice that Coloured is the official term for mixed-race people in South Africa, the intermediate group between whites and blacks representing the majority. A national survey conducted by Steyn et al. [18,20] found that Blacks and Whites were the highest consumers of street foods (mostly fruits) and fast foods, respectively. However, fast food consumers had a higher dietary diversity score compared to street food consumers. This might explain why Blacks are more concerned about diet-related diseases, as they were reported as the top soft drink and savoury snacks consumers, while Whites were the lowest. Besides, the number of people with whom the participants live significantly influenced their food preferences and opinions on diet alternance. In contrast to participants living in a household of six persons or more, those living alone or with only one person showed a higher preference for modern food and were the most opposed to diet alternance. This finding somewhat confirms that social isolation and living alone negatively affect healthy eating and the frequency of shopping [21,22].

The non-significant effect of the gender, age, and educational level factors might be an indicator of a widespread lack of sensitisation among the whole population. Due to limited knowledge and decreased use, there is a deficit of knowledge about the variety of edible indigenous foods and the varieties being consumed [23]. The majority of the respondents believed it was good to mix traditional foods with modern foods. This viewpoint could be (positively) exploited when promoting indigenous foods. Matenge et al. [24] argue that nutrition transition and urbanisation have played a role in influencing the mixing of traditional foods with modern foods. It can also be a strong contributor to dietary diversity. In this study, a large proportion of the participants appeared neutral about mixing modern and traditional indigenous food being a good practice, but when considering the odd ratio in the sub-categories, this sub-population had a higher preference for a modern diet and was more neutral to nutrition transition. Therefore, they should be considered the target populations for effective sensitisation in the Gauteng region.

4.1. Limitations

This research work is a preliminary study, considering the number of respondents from particular sub-groups. Indeed, the small number of participants from the Asian population group and the low representation of the people and rural residents constitute a limit. Furthermore, the questionnaires were mainly distributed in urban public areas. A residual limitation could be the age category in the study, i.e., the research was conducted in areas where the youth (18–35 years old) congregate, such as malls, parks, etc. However, this study already provides an overview of the food preferences of the main sub-populations living in the Gauteng region and might thus be used as a base for intervention strategies.

5. Conclusion

This study shows that a preference for a modern diet in the Gauteng region is still high, yet people are also quite interested in an intermittent modern/traditional indigenous diet. Increased education and awareness campaigns are necessary, especially among the identified high-risk and target groups, for a sustainable reduction of diet-associated diseases.

Ethics statement

This study was reviewed and approved by the Research Ethics Committee of the University of Johannesburg, ethics clearance number 2019STH012 (April 10, 2019). Written informed consent was obtained from all the study participants.

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Data availability statement

Data will be made available on request.

CRediT authorship contribution statement

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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