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BARRIERS AND FACILITATORS IN ADOPTING PLANT-BASED DIETS: INSIGHTS FROM A CONSUMER SURVEY AND DIETARY RECALL IN KWAZULU-NATAL, SOUTH AFRICA

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ABSTRACT

Unhealthy, ultra-processed, and animal-based foods dominate diets in many populations, contributing to non-communicable diseases and environmental challenges, while plant-based diets (PBDs) offer healthier and more sustainable alternatives. Though there is a gradual transition to PBD, information regarding consumers' perception is required to address challenges associated with its adoption, and to sustain this dietary change. This study investigated the consumption patterns, barriers, facilitators, and nutrient adequacy of plant-based food (PBF) consumers in KwaZulu-Natal, South Africa. A cross-sectional online survey was conducted among 383 adults, complemented by a face-to-face interview with a subset of 91 participants for 24-hour dietary recalls recorded twice (one weekday and one weekend). The mean intake was used to determine nutrient adequacy based on estimated average requirements (EARs) and adequate intakes (AIs). While Statistical Package for Social Sciences (SPSS) version 29.0 was used to perform statistical analysis, dietary data was analysed using South African Medical Research Council (SAMRC) Food Finder version 3.0 software. Level of statisitical significance was set at $p<0.05$.The majority of participants were young adults (68.2%) with high school education (86.7%), and 78.1% identified as flexitarians, consuming PBFs two to three times per week, with plant-based burgers (58.5%) and sausages (41.5%) being the most preferred products. Health concerns (80%) and religious beliefs (37%) were the main motivators for PBF consumption, while high cost (58.5%) and limited variety (40.5%) were the major barriers. Dietary analysis revealed widespread nutrient inadequacies, particularly in energy, dietary fibre, zinc, folate, and vitamins D and B12, despite some participants using supplements. Men did not meet daily requirement of energy, dietary fibre, zinc, folate, niacin, vitamins D and B12 requirements, while women did not meet vitamins D and B12 requirements. The study highlights a growing shift toward flexitarian diets and an increasing demand for plant-based options but underscores the need for greater affordability, product diversity, and nutrition education to address nutrient deficiencies and promote sustainable dietary practices in South Africa.

Key words: Barriers, Facilitators, Food, Plant-based diets, Consumers, Adults, South Africa

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INTRODUCTION

Food is the most powerful lever to optimise human health and environmental sustainability. A large body of research has emerged on the environmental impact of various diets. Studies have shown that diets rich in PBFs improve health and promote a sustainable environment [1]. The PBFs encompass whole grains, fruits, vegetables, legumes, nuts, and seeds, and may additionally comprise more processed food items derived from these components. This has led to the emergence of diverse plant-based diets, including vegan, vegetarian, pollo-vegetarian, flexitarian, pescatarian, plant-based Mediterranean, and whole-food plant-based diets, each characterized by differing proportions of plant foods [2].

The transition from meat-based diet to PBD is driven by three main factors: the attempt to have a better lifestyle, the improvement of environmental sustainability, the prioritisation of animal welfare, and the reduction of food production costs associated with livestock farming [3]. Research has proven that diets restricting meat consumption and encouraging the consumption of PBD can improve general health by maintaining normal blood pressure, cholesterol levels, blood sugar levels, and body weight. Enhanced health conditions frequently result in a diminished chance of heart disease, diabetes, cancer, and other ailments [4, 5]. Plant-based diets may mitigate the risk of several aforementioned health issues and enhance longevity.

Cardiometabolic disorders, such as obesity, stroke, and heart disease, frequently arise from detrimental lifestyle choices that lead to elevated global mortality rates [4-6]. Presently, dietary patterns in developed as well as developing countries are defined by high levels of animal-based foods, which are associated with multiple negative health impacts and adverse environmental consequences [7]. Shifting towards greater consumption of PBF and diminishing reliance on animal-derived products is regarded as advantageous for human health, contributes positively to a more sustainable food system and aids in diminishing greenhouse gas emissions linked to food production [1].

The growing popularity of PBFs has resulted in the development of new products that will make the transition easier for consumers. However, ready-to-eat and ultra-processed foods dominate the South African food system, posing serious health hazards. Many omnivorous people have difficulties changing their dietary habits. People are also less likely to shift to PBF because they are concerned about their taste, texture, high cost, and insufficient nutritional value [3]. Finding lasting solutions to the problems facing public acceptance of PBDs and dealing with the health consequences of ultra-processed foods in developing countries like South Africa requires understanding consumers' perceptions of PBDs. However, considerable information gaps exist, particularly regarding consumer motivation and

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challenges to PBD adoption. There is little data availble in African contexts, especially South Africa, where cultural diversity, economic challenges, and dietary habits may influence distinct consumption patterns [3]. Secondly, there is limited knowledge regarding the actual nutrient sufficiency of South African consumers of PBF, particularly among groups shifting from omnivore to flexitarian or vegetarian diets. Third, while consumer perceptions of cost, accessibility, and product diversity are essential for sustained dietary change, actual data regarding these characteristics is limited in South Africa.

Addressing these deficiencies is crucial for formulating nutrition education, policy initiatives, and sustainable food strategies that are tailored to unique contexts. Therefore, this study was conducted to examine the consumption patterns, motivators, barriers, facilitators, and nutrient adequacy of plant-based food consumers in KwaZulu-Natal, South Africa. KZN, South Africa.

METHODS

Study design

In this cross-sectional study, quantitative data included a consumer survey to determine the consumption of PBFs and identify barriers and facilitators influencing the adoption of PBDs. Twenty-four-hour dietary recall was conducted to assess consumers' PBF intake following a PBD for the preceding twenty-four hours before the research visit.

Study Setting

The research was conducted in the province of KZN, the southeastern part of South Africa. The 2022 census report showed that South Africa has a population of 62,027.503. KZN is the country's second most populated province, with a population size of 12,423,907 [8].

Sample size determination

According to Taherdoost, to obtain a confidence level of 95% for a consumer survey of a population size greater than a million, a sample size of a minimum of 383 participants is recommended [9]. Therefore, 383 participants aged 18 years and above, residents of KZN, who purchased and consumed plant-based foods and gave informed consent, were recruited for this study.

Sampling technique

An online survey was conducted using convenience and snowball sampling to select the study participants for the consumer survey. Convenience and snowball sampling are used in a population study to cover a large number of people within a short period, to save the cost of contacting study participants face-to-face and to ensure study participants contributed willingly to the study at their convenience, not to intrude into their schedules and for initial participants to recruit others from their

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social networks [10]. Only individuals 18 years and above, who resided in KZN and were not sick, nor suffered from a mental disability on the day of administering the 24-hour recall, which could affect judgment for dietary recall, were eligible to participate in the survey.

Recruitment of participants for the survey was through the advert placed on the social networks, including Facebook™ (Durban Vegan Network Group), WhatsApp™, LinkedIn™ and Instagram™ groups, calling interested, eligible individuals who reside in the province of KZN, South Africa, to respond via direct messenger. The consenting participants were contacted using WhatsApp and electronic mail [11].

According to Statista, there were 23 million WhatsApp users in South Africa, making it a more representative social media platform to disseminate the questionnaire link. Participation in the survey was voluntary. The survey was designed with the consent information attached, and a tick box had to be selected to continue with the survey [11].

However, out of 383 participants, the 24-hour dietary recall was administered one-on-one to 91 participants who exclusively consumed PBFs and consented to face-to-face interviews. The 24-hour dietary recall survey was administered twice (during one weekday and one weekend day) to record the actual food intake and quantities consumed. The interviews were conducted at the participants' homes and offices as suggested by the participants.

Measurement tools

A self-administered questionnaire was developed based on a literature review to collect information on participants' socio-demographic characteristics and PBF consumption, and prepared in a Microsoft form, which allowed the participants to complete the survey successfully at a single opportunity. The questionnaire link was disseminated via social media platforms (WhatsApp and emails). During the dietary recall survey, a dietary kit with food models and measuring tools samples was used to help participants recall the portion sizes consumed and to ensure a record of the actual consumption of food intake and quantities.

Data quality management

The content validity of the questionnaire was assessed by the research team. A pilot test was conducted among ten plant-based consumers who were not part of the main study to examine the reliability and usability of the questionnaire and identify potential errors before the survey. The questionnaire used for the survey was revised based on the recommendations of the pilot study. The 24-hour dietary recall was executed by both the researcher and a trained research assistant to maintain quality and reliability. In addressing under- and over-reporting which could be associated

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with the self-reporting of dietary recall, interviewer-administered 24-hour dietary recall was conducted by the trained research team twice (one on weekday and one on weekend) with the use of food models to assist the participants to remember portion sizes, and the average intake of the two sets of the recall for the participants was used for the study. Participants were allowed to choose the time for the interview, sat in a comfortable sitting position and being in a good state of mind to ensure adequate recall.

Data analysis

Statistical Package for Social Sciences (SPSS) version 29.0 was used to analyse data. Descriptive statistics (such as means, standard deviations, frequency and percentage) and bimodal tests were performed at the level of significance of $p<0.05$. Dietary data were analysed using SAMRC Food Finder version 3.0. Then, the mean of dietary data was determined and used to further assess participants' dietary intake. The level of nutrient adequacy of participants' nutrient intake was established based on reference values of estimated average requirement (EAR) and adequate intake (AI) for each recorded nutrient.

The nutrient intakes were compared with dietary reference intakes (DRI) based on recommendations stated by the National Institute of Health and National Academies of Sciences, Engineering, and Medicine [12, 13]. Minimum recommended daily calorie intake of 2,200Kcal (9,204.8KJ) and 1,800Kcal (7,531.2KJ) for healthy, moderately active male and female adults was used as a cut-off point. The mean daily nutrient intakes for the two days were calculated. Percentiles of the mean intake were compared with the EAR.

The nutrient intake was compared to each nutrient's EAR/AI cut-off points. The prevalence of inadequate intake was thus estimated as the proportion of the sample with usual intakes below the median requirement EAR. The AI was used to assess the level of adequate intake of dietary fibre, calcium, fluoride, and vitamins D and K. The nutrient intakes were further divided into observations of five groups of size percentiles (10th, 25th, 50th, 75th, and 90th). This helped in determining the stage on the percentile at which the requirement is met by the participants to ascertain the prevalence of inadequacy.

RESULTS AND DISCUSSION

Demographic characteristics of participants

Three hundred and eighty-three (383) consumers participated in the online survey, of which 67.6% (n=259) of participants were women and 31.3% (n=120) were men. Most participants were young adults. The proportion of those who were between the ages of 25 and 34 years was 34.7% (n=133). One-third (33.5%, n=128) were between 18 and 24 years old. Nearly half of the participants were Indians (56.1%,

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n=215), 32.1% (n=123) were Black, 10.4% (n=40) were White, and 1.3% (n=5) were Coloured. Most participants (86.7%, n=332) had completed high school education, and the remaining participants (13.3%, n=51) reported having a tertiary-level education (Table 1).

The demographic characteristics of the participants showed that the younger adults, predominantly women, participated in the online survey. According to a study by Wenham *et al*., women contribute more to civic-related matters than men [14]. This buttresses that WhatsApp™ is still the most commonly used social media in South Africa [11].

Consumption trend of plant-based diets among participants

Table 2 shows the consumption trend of PBDs among study participants. A significant number of participants followed a flexitarian diet, 78.1% (n=299), p<0.001. A flexitarian diet has been found to focus on having a considerable amount of PBFs supplemented with meat, poultry or fish [2]. Finding the majority of the study participants on this type of diet suggests that PBF consumption is increasing in South African. The flexitarian diet is the least restrictive. It gives an opportunity for the transition from a high intake of a meat diet to a fully PBD. It also helps in addressing nutritional challenges associated with vegan or vegetarian diets [2, 15].

The global Meatless Monday campaign started in 2003 by the Johns Hopkins Bloomberg School of Public Health to reduce meat consumption by 15% to promote human and planetary health [16]. The campaign started in South Africa in 2011. In South Africa, retailers such as Checkers and Pick ‘n Pay, reported an increase in plant-based offerings to consumers due to the introduction and expansion of Meatless Mondays to more days in the week [17]. Furthermore, in an experimental study conducted by Pechey and colleagues, when the availability of meat-free meals on meal selection was altered, it was found that increasing the availability of meat-free options was effective at reducing meat selection and purchasing different ratios of meat to meat-free options [18].

Currently, in Australia, there is a trend towards flexitarian diets as consumers are looking to improve their health and reduce environmental impact [1, 3]. However, despite the wide recognition of Meatless Monday, the campaign has not yet been evaluated for perceived message effectiveness [19]. A study assessed the impact of health-focused and environment-focused messages from the Meatless Monday campaign among a sample of US adults. The study's findings indicated that compared to the control messages, both health-focused and environment-focused Meatless Monday messages resulted in significantly higher perceived message

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effectiveness. Additionally, these messages were associated with an increased intention among participants to reduce meat consumption [20].

Regarding the frequency of consumption of PBFs, 47% (n=180) of participants consumed PBFs between 2 to 3 times a week, 27.7% (n=106) of participants consumed PBDs daily, 17.2% (n=66) of participants consumed PBDs once a week, and 4.2% (n=16) of participants consumed PBFs once a month. The chi-square goodness-of-fit test showed that a significant proportion of participants (93.2%) consumed PBFs at least once a week, which included the sum of the following categories: once a week, several times a week and daily ($p<0.001$).

A significant number (63.5%) indicated that they spent at most R60.00 on plant-based products, $p<0.001$. Burger and sausage were the plant-based meat alternatives consumed by 58.5% and 41.5%, respectively ($p<0.001$). Having burgers and sausages as the top two plant-based meat alternatives preferred by consumers indicates that the two are the most common types of plant-based meat alternatives available in the South African market. These percentages indicate a substantial preference for plant-based foods that mimic the format of conventional meat products [19]. It also suggests that consumers may find familiarity and satisfaction in plant-based options that closely resemble traditional meat-based items' taste, texture, and appearance. Understanding these preferences is crucial for product development and marketing strategies in the PBF industry.

However, this trend is not limited to South Africa, where it was reported that meat substitutes contributed US$18.84m as revenue in 2024, and the market for meat substitutes is projected to grow by 15.85% from 2024 to 2029. Globally, the meat substitutes industry is projected to grow from USD 5.51 billion in 2024 to USD 9.99 billion by 2032 [21].

Reflecting this trend, plant-based burgers and sausages are also the top sellers in the US, bringing in a revenue of 283 million USD and 159 million USD, respectively [19]. Furthermore, some of the participants in this study indicated that they spent R60 on a plant-based product. In addressing concerns of affordability, the household affordability index shows that the cost of food in South Africa increased by 7.7% for major staples in 2023, reducing food diversity and increasing the number of people living in poverty, especially in KZN, with the household food basket being decreased by 0.3% [22]. Adopting PBDs in rural areas would cost consumers, on average, 69% more than what is currently being spent on food. In a study conducted by Pais and colleagues in Portugal, it was observed that plant-based consumers were found to spend less than their meat-based counterparts [23]. Moonaisur and colleagues analysed PBF products on supermarket shelves in South Africa and found that, generally, these foods were

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priced higher than the corresponding meat options [24]. This could be because PBFs are not yet fully established compared to meat foods in the markets in South Africa.

The finding shows that 69%, 48%, 43%, 32% and 17% of participants preferred sugar beans, lentils, chickpeas, soybeans and quinoa as plant protein, respectively. The level of significance was found only in preference for soybeans, sugar beans and quinoa ($p<0.001$) (table 3). In this study, quinoa was the least adopted plant-based protein. The use of quinoa (*Chenopodium quinoa Willd.*) as a source of protein for PBF is an emerging phenomenon because of its hypoallergenic protein, which is approximately 16% on a dry basis. Quinoa is also rich in essential amino acids, especially lysine, histidine and methionine, which most cereals and legumes lack [25].

Drivers of plant-based diet consumption among participants

Using the binomial test to assess if any response option was selected significantly more than others, a significant number of participants (80% n=307), $p<0.001$, reported that they consumed PBFs for health reasons, followed by 37% (n=142) who reported that they consumed PBFs due to religious reasons. Twenty-seven percent (n=103) of the participants indicated that environmental sustainability was a driver towards them moving towards PBFs, and 14% (n=53) selected animal welfare as a driver (table 4).

Plant-based diets are known to be effective in treating and preventing type-2 diabetes and cardiovascular disease [5]. This is due to their nutrient composition. Legumes, whole grains, nuts and leafy vegetables have lower amounts of simple sugars, saturated fat and sodium. They also help in preventing insulin resistance among people with diabetes [2, 5].

Furthermore, PBDs are cholesterol-free and are high in fibre [4]. A cross-sectional study was conducted in Australia among 679 consumers and nutritional professionals concerning perceptions and behaviour towards plant protein products. The study result showed that more than half (56.4%) participants adopted plant-based diets due to the associated health impacts [4. 5]. The detrimental effect of excessive meat consumption on health and the environment has caused the emergence of alternative sustainable protein sources and PBF products [5].

Barriers and facilitators influencing the choice of PBDs among participants

The findings of this study identified barriers that are associated with the adoption of PBDs. More than half (58.5%, n=224) of participants reported that PBFs were expensive ($p<0.001$), and 40.5% of participants (n=155) indicated that PBFs were limited and lacked variety. Regarding sensory acceptance, 24% (n=92) of

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participants indicated that PBFs had an undesirable texture, and 30% (n=116) suggested another barrier was the undesirable taste of the plant-based products. Regarding facilitators of PBF consumption, a significant 73.6% (n=282) stated that they preferred PBFs as it was healthier and, therefore, a preferred food choice, $p<0.001$ (table 5).

High cost and limited variety of plant-based products were major barriers to purchasing PBFs. An online survey conducted in Belgium reported that many participants had a negative association with PBFs due to the unpleasant taste [26]. Consumers perceived PBFs to be tasteless and boring with undesirable textures. Other challenges towards PBDs include food neophobia, difficulty in cooking and preparing them, and limited ingredient availability [3].

Individuals who aim to follow PBDs may encounter many obstacles, including social disconnection from friends and family. Plant-based diets have also been associated with deficiencies of certain essential nutrients. This makes them potentially harmful to pregnant women and the foetus, especially if the PBD is not supplemented with the necessary vitamins [27].

Nutrient adequacy of participants by gender

The findings from the repeated 24-hour dietary intake of participants are presented in table 6. Mean intake of carbohydrate, iron, selenium, thiamine and vitamin E exceeded the EAR/AI cut-off points among men. For women, mean intake exceeded the EAR/AI cut-off points for carbohydrates, vitamins C, E and K. None of the male participants met the requirement for energy, dietary fibre, zinc, folate, niacin, vitamins D and B12. None of the female participants met the vitamin D and B12 requirements.

Inadequate intake of energy (100.0%, 94.0%), protein (95.8%, 83.6%), carbohydrate (33.3%, 19.4%), dietary fibre (100.0%, 94.0%), calcium (95.8%, 89.6%), zinc (100.0%, 97.0%), phosphorus (83.3%, 76.1%), vitamin A (87.5%, 80.6%), vitamin C (79.2%, 56.2%), folate (100.0%, 97.0%), niacin (100.0%, 82.1%), thiamine (87.5%, 80.6%), and vitamin K (75.0%, 65.7%) was more prevalent among men than women, respectively.

However, inadequacy in iron (94.0%, 16.7%), selenium (88.1%, 75.0%), magnesium (97.0%, 95.8%) and vitamin E (61.2%, 54.2%) was higher among women than men, respectively. Figure 1 shows the supplements used by the study participants. The most widely used supplements were multivitamins (43.5%, n= 40) and vitamin B12 supplements (B12 injection (30.4%, n=28), B complex (20.7%, n=19) and neurobion tablets (5.4%, n=5).

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This observation is contrary to the findings of Kolahdooz, Spearing and Sharma, who reported that men had a higher mean intake of protein and vitamin A, and women had a higher mean intake of vitamins A and E in the survey conducted in the rural area of KZN, South Africa [28]. The micronutrients, especially iron, folate and calcium, are very essential for women of reproductive age to maintain good health status, replenish nutrient loss during menstruation and to enhance disease prevention [29].

Though a notable proportion of nutrients were consumed below the EAR by both males and females, despite the fact that the participants took supplements (figure 1). Both genders exhibited high levels of dietary inadequacy for most macronutrients and micronutrients, namely protein, dietary fibre, vitamin C, vitamin D, folate, vitamin B12 and zinc. Inadequacy of dietary iron was higher among women. However, a large proportion met the requirement for carbohydrates in both genders.

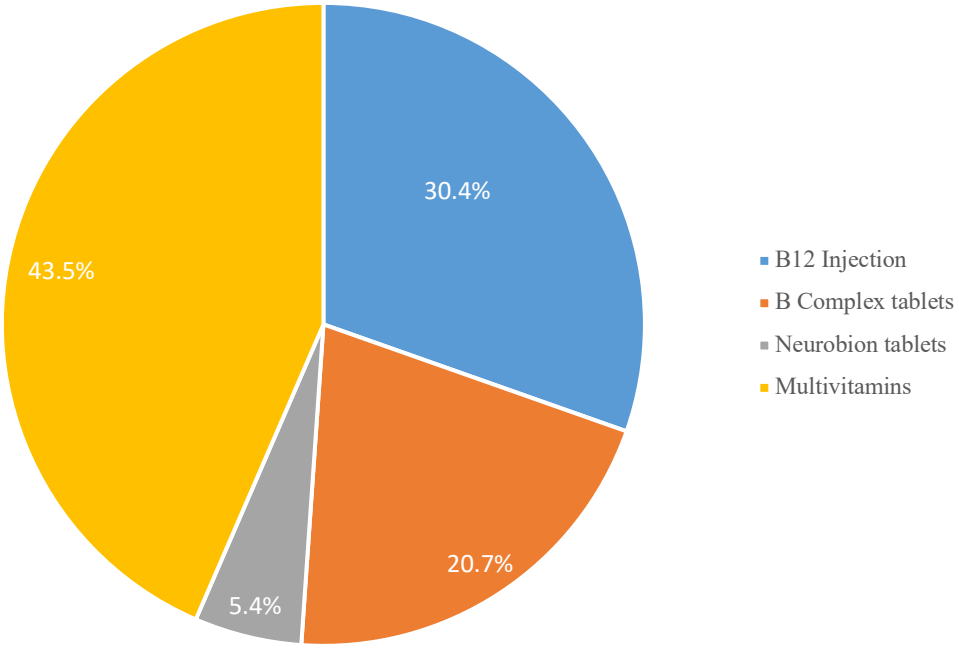

Figure 1: Supplements used by the study participants

Fulgoni and colleagues also observed a similar trend of micronutrient inadequacy among plant-based diet consumers in the United States [27]. Generally, PBFs are known to be richer in carbohydrates than high-quality protein when compared to animal protein and ultra-processed plant-based foods supply energy and high carbohydrates with low dietary fibre compared to minimally processed and natural PBFs [15, 18]. Despite this, the energy requirement was not met by the majority of the study participants. The amount of energy obtained by the consumers depends on the quantity of such PBFs consumed. Though more than half of the participants

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claimed to prefer soybeans as a source of protein, the majority of them did not meet the intake requirement for protein.

In a NuEva (Nutritional Evaluation) study conducted in Germany on the nutrient intake and nutritional status of vegetarians and vegans compared to omnivores, analysis of blood and urine samples revealed that the energy intake was lower in participants consuming PBDs, and the vitamin B12 index score of vegetarians was lower than that of omnivores [30]. The findings of this study are similar to Neufingerl and Eilander's report, who established a lower intake of vitamins B12, D, iron and calcium among consumers of plant-based diets [31]. Observation of our study suggests that the PBD consumers in KZN are experiencing micronutrient deficiency despite the intake of supplements by the participants.

The high prevalence of iron, folate, and vitamin B12 deficiency confirms the findings of previous studies, which have reported a high prevalence of anaemia in South Africa [32]. However, PBDs can be nutritionally adequate when they are well-planned and nutritionally balanced. To address this specific nutrient gap, plant-protein diversity and supplementation are crucial for PBD consumers.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

This study provides insights into the growing adoption of flexitarian diets and the factors shaping PBF consumption in KZN, South Africa. While consumers increasingly incorporate PBFs into their diets, the findings highlight persistent barriers such as affordability, product availability, and concerns over taste and texture. The observed nutrient gaps, particularly in vitamins B12 and D, iron, folate, and zinc, emphasise the importance of careful dietary planning and potential supplementation when following plant-based dietary patterns.

Given the cross-sectional nature of this study, causal relationships cannot be established. Future research should explore longitudinal patterns of PBD adoption, nutrient adequacy across different population groups, and the role of local food systems in shaping accessibility and affordability. There is also a need for intervention studies to evaluate the impact of nutrition education, product reformulation, and policy measures on consumer behaviour. Overall, the results point to opportunities for food producers, policymakers, and educators to support more balanced plant-based eating patterns in South Africa.

Strengths and Limitations of the Study

This study provides information on the consumption trend of plant-based diets the, and factors that are barriers and facilitators to adopting PBFs, and the nutrient adequacy of PBF consumers residing in KZN, South Africa. The study used a cross-sectional design. This did not give the opportunity to determine the cause-and-effect relationship of variables. The use of dietary intake alone as a means of assessing

participants' nutritional status without anthropometric evaluation might limit the evidence of the research findings. Lastly, the use of an online survey helped in ensuring the anonymity of participants, but it might not totally remove participants' bias, especially in terms of their biodata.

Ethical consideration

Ethical approval for this study was obtained from the Institutional Research Ethics Committee (IREC) with reference no. 148/21. Informed consent was obtained from the study participants before commencing data collection. Participants' anonymity was maintained by using a coding system to de-identify the participants' information. Digital recordings from the interviews used for quality and transcription were encrypted.

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Conflict of interest

Authors declare no conflict of interest

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Table 1: Demographic characteristics of participants

Demographic variables	Frequency (n=383)	Percentage (100%)
Gender		
Male	120	31.3
Female	259	67.6
Non-binary	4	1.1
Age group (years)		
18-24	128	33.5
25-34	133	34.7
35-44	62	16.2
45-54	42	10.9
55-64	18	4.7
Race		
Indians	215	56.1
Black	123	32.1
White	40	10.4
Colour	5	1.4
Education		
High school	332	86.7
Tertiary education	51	13.3

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Table 2: Consumption trend of plant-based diets among participants

Variable	Option	Frequency (n=383)	Percentage (100%)
Type of diet	Vegan	10	2.6
	Vegetarian	20	5.2
	Lacto-vegetarian	13	3.4
	Ovo-vegetarian	3	0.8
	Lacto-ovo vegetarian	11	2.9
	Pollo-vegetarian	2	0.5
	Pesco-vegetarian	5	1.3
	Flexitarian	299	78.1*
	Other	20	5.2
Frequency of PBF consumption	Once a month	16	4.2
	2-3 times a week	180*	47.0
	Once a week	66*	17.2
	Daily	106*	27.7
	Other	15	3.9
Amount spent on PBF products per day?	R20- R40	145*	37.9
	R41- R60	98*	25.6
	R61- R80	54	14.1
	>R80	86	22.5
Preferred formats of plant-based meat alternative	Burger	224	58.5*
	Sausage	159	41.5

*p<0.001

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Table 3: Preferred plant protein source by participants

Items	N (%)		p-value
	Yes	No	
Soybean	123(32.1)	260(68.9)	0.000*
Quinoa	65(16.9)	318(83.1)	0.000*
Lentils	183(47.8)	200(52.2)	0.414
Chickpeas	166(43.3)	217(56.7)	0.011
Sugar beans	265(69.2)	118(30.8)	0.000*

N- frequency, %- Percentage, *p<0.001

Table 4: Drivers of plant-based diet among participants (n=383)

Item	N (%)		p-value
	Yes	No	
Health benefits	307(80.1) *	76(19.8)	000[a]
Religious reasons	142(37.1)	241(62.9)	000[a]
Animal welfare	53(13.8)	330(86.2)	000[a]
Environmental sustainability	103(26.8)	280(73.1)	000[a]

N: Frequency, %: Percentage, *p<0.001

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Table 5: Barriers and facilitators influencing choice of plant-based diets

Statement	Response	N	%
Barriers			
Expensive	Yes	224*	58.5
	No	159	41.5
Limited variety	Yes	155	40.5
	No	228	59.5
Not readily available	Yes	69	18
	No	314	82
Not enough information available	Yes	58	15.1
	No	325	84.9
Undesirable texture	Yes	92	24
	No	291	76
Undesirable taste	Yes	116	30.3
	No	267	69.7
Facilitators			
Competitive prices	Yes	144	37.6
	No	239	62.4
Wide variety	Yes	107	27.9
	No	276	72.1
Healthier	Yes	282*	73.6
	No	101	26.4

*p<0.001

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Table 6a: Recommended Nutrient Intake, Mean, Percentiles and Prevalence of Inadequate Intake of Male Participants (n=24)

Nutrient/Calorie	EAR/AI*	Mean (SE)	Percentiles					Prevalence of inadequate Intake (%)
			10%	25%	50%	75%	90%	
Energy (KJ)	9,205	5,580.1(275.21)	3645.50	4556.88	5599.75	6344.88	7495.50	100.0
Protein (g)	56	35.3(2.39)	20.45	26.94	32.43	42.33	54.85	95.8
Carbohydrate (g)	130	153.2(6.59)	103.13	127.30	161.93	177.20	193.35	33.3
Dietary fibre (g)	38*	17.4(0.89)	11.98	13.23	17.30	20.55	22.52	100.0
Ca (mg)	800*	462.7(37.57)	215.25	355.38	426.50	571.88	723.00	95.8
Fe (mg)	8	10.8(0.75)	6.58	8.39	10.35	12.79	15.00	16.7
Se (µg)	55	63.9(18.63)	11.73	26.24	36.75	56.08	154.45	75.0
Zn (mg)	11	4.9(0.32)	2.61	4.02	4.66	5.60	7.48	100.0
Mg (mg)	420	181.9(15.79)	119.25	126.63	160.25	198.25	282.00	95.8
P (mg)	700	563.1(44.19)	339.50	458.38	496.25	635.50	947.75	83.3
Vitamin A (µg)	900	564.1(79.93)	163.25	289.75	436.00	754.13	1349.75	87.5
Vitamin C (mg)	90	86.5(7.94)	22.25	38.63	58.75	88.63	136.00	79.2
Folate (µg)	400	97.8(13.19)	33.07	41.68	84.81	160.32	183.34	100.0
Niacin	16	9.4(0.41)	6.28	8.00	9.35	10.73	12.20	100.0
Vitamin D (µg)	15*	1.8(0.32)	0.19	0.38	1.79	2.67	3.99	100.0
Vitamin B12 (µg)	2.4	0.6(0.11)	0.05	0.35	0.50	0.84	1.55	100.0
Thiamine (mg)	1.2	9.9(0.05)	0.60	0.67	0.85	1.02	1.27	87.5
Vitamin K (µg)	120*	115.9(25.02)	27.31	43.32	70.68	121.86	320.09	75.0
Vitamin E(µg)	15	15.5(1.76)	3.08	10.76	14.82	20.76	29.98	54.2

*AI = Adequate intake (IoM 2019); EAR- Estimated Average Requirement, SE- Standard error figures in bold type refer to the level where the EAR is met

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Table 6b: Recommended Nutrient Intake, Mean, Percentiles and Prevalence of Inadequate Intake of Female Participants (n=67)

Nutrient/Calorie	EAR/AI	Mean (SE)	Percentiles					Prevalence of inadequate Intake (%)
			10%	25%	50%	75%	90%	
Energy (KJ)	7,531	5,506.1 (161.37)	3706.10	4663.50	5332.50	6382.50	7105.20	94.0
Protein (g)	46	36.6 (1.19)	23.85	28.35	37.20	44.10	48.58	83.6
Carbohydrate (g)	130	165.1 (4.74)	114.78	137.55	164.20	194.95	221.91	19.4
Dietary fibre (g)	25*	17.52 (0.63)	11.03	14.00	17.25	20.00	23.32	94.0
Ca (mg)	900*	583.4 (50.76)	299.50	399.50	497.50	685.00	901.40	89.6
Fe (mg)	18	11.5 (0.68)	6.71	9.00	10.50	13.25	16.25	94.0
Se (µg)	55	39.6 (4.21)	14.26	24.35	32.30	42.35	65.67	88.1
Zn (mg)	8	5.2 (0.18)	3.21	4.16	5.29	6.18	6.82	97.0
Mg (mg)	320	175.9 (7.39)	105.30	124.50	168.00	209.00	271.10	97.0
P (mg)	700	563.3 (21.99)	320.50	429.50	552.00	688.50	812.70	76.1
Vitamin A (µg)	700	564.8 (55.10)	235.80	339.00	486.00	668.00	809.70	80.6
Vitamin C (mg)	75	75.4 (5.91)	28.40	41.00	68.00	91.00	143.20	56.2
Folate (µg)	400	131.1 (22.56)	21.33	48.25	88.20	146.80	189.37	97.0
Niacin (mg)	11	9.3 (0.35)	6.29	7.50	8.70	10.65	14.31	82.1
Vitamin D (µg)	15*	2.6 (0.22)	0.21	1.20	2.53	3.66	4.96	100.0
Vitamin B12 (µg)	2.4	0.8 (0.07)	0.19	0.40	0.80	1.25	1.55	100.0
Thiamine (mg)	1.1	0.9 (0.12)	0.57	0.69	0.86	1.05	1.21	80.6
Vitamin K (µg)	90*	132.4 (16.65)	29.96	40.61	65.89	230.14	373.11	65.7
Vitamin E(µg)	15	15.7 (2.30)	4.38	6.24	11.85	18.09	25.75	61.2

*I = Adequate intake (IoM 2019); EAR- Estimated Average Requirement, SE- Standard error figures in bold type refer to the level where the EAR is met

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