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ARTICLE

The opinion of KwaZulu-Natal dietitians regarding the use of a whole-foods plant-based diet in the management of non-communicable diseases

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Background: International studies have highlighted the benefit of using a whole-food, plant-based diet (WFPBD) in the prevention and treatment of non-communicable diseases (NCDs). It is imperative to gather the opinions of dietitians on this diet, in order to assess whether it is a suitable treatment option for the prevention of NCDs in South Africa.
Objective: The aim was to determine whether dietitians would use a WFPBD to address NCDs, by assessing their opinions on the benefits and barriers of this diet.
Methods: A cross-sectional study, using an online survey of dietitians who are practising in KwaZulu-Natal ($n = 101$).
Results: Dietitians who work for the government were significantly more likely to have patients with NCDs referred than dietitians in private practice. The subjects reported that the training surrounding WFPBD was inadequate at university level; however, a significant sample was confident about prescribing this diet and they were interested in improving their knowledge on this topic. The strongest perceived benefits of a WFPBD were its association with improved fibre intake and the reduced consumption of saturated fats. The strongest barriers against prescribing a WFPBD were the lack of public awareness concerning the diet and personal preference for the consumption of meat and animal-sourced foods.
Conclusion: Although the general opinion of a WFPBD was positive, the perceived barriers indicated suggest that this diet may be difficult to implement for the management of NCDs, particularly in the poverty-stricken areas of South Africa.

Keywords Dietitians, plant-based diet, KwaZulu-Natal, non-communicable diseases, vegan diet

Introduction

The nutrition transition defines the shifting dietary patterns that have occurred around the world, resulting in the increased consumption of foods that may increase the risk of non-communicable diseases (NCDs).[1] A Western diet, which is broadly defined by a high intake of refined carbohydrates, added sugars, fats and animal-sourced foods, is the driving force behind the transition.[2] In South Africa (SA), there have been an increasing number of deaths resulting from NCDs. This is largely lifestyle-related and may be prevented by interventions that target modifiable risk factors, such as diets.[3,4] In 2015, NCDs formed 60.0% of the top-ten natural causes of death, which is an increase from 52.7% in 2014.[5] Reportedly, 62.5% of the female population and 48.0% of the male population were affected .[6] By comparing data in two studies that addressed dietary changes in SA between 1975 and 2005, it was noted that the movement into an urban environment has resulted in the change to a diet consisting of snack foods, fast- and convenience foods.[7] Therefore, rapid urbanisation as experienced in SA contributes to an increased intake of total energy, fat and saturated fats, animal-source protein and larger portion sizes, which has adverse effects on diet-related diseases, such as NCDs.[8]

A PBD, by definition, is a diet that is low or absent in animal products, low in fat and cholesterol, and high in fibre.[9] By replacing the current dietary trends with more plant-based foods, it is possible that this will decrease the rapid rise in NCDs that is currently being experienced in the world. There are different forms of PBD, including veganism and the whole food plant-based diet (WFPBD), encouraging the consumption of vegetables, fruits, pulses, seeds and nuts. While veganism does not differentiate between the consumption of natural and processed foods, the WFPBD specifically encourages the consumption of natural and minimally processed foods, namely whole foods. Therefore, a vegan diet may not be healthy, due to a possible increased intake of processed foods.[10] While there are many health benefits of a WFPBD, the vitamin B12, iron, calcium and vitamin D levels may be at risk, due to the reduced animal-derived products in the diet. For the purposes of this study, the term WFPBD will be used to define a vegan diet that encourages whole, plant-based foods and that discourages meats, dairy products, eggs and all processed and refined foods.[10]

There is a lack of South African-related literature regarding WFPBDs. It is essential that health professionals provide solutions for our health epidemic that are affordable and sustainable, and that protect against NCDs.[11]

As healthcare providers who are in the front-line of food and nutrition recommendations, it is the responsibility of dietitians to promote the health and well-being of their patients, while keeping up to date with scientific evidence.[12] According to the Health Professionals Council of South Africa (HPCSA), the purpose of the nutrition professional is to 'use appropriate policies, programmes and nutrition principles to prevent, treat and manage nutrition-related diseases'.[13] The scope of a dietitian includes applying evidence-based food and nutrition principles in practice, as well as applying information, communication and education, to empower lifestyle change in individuals and communities.[9,13] In order to maintain and enhance the quality of practices in the dietetic profession, measuring opinions on emerging scientific-related nutrition topics may encourage and support the expansion of knowledge of the professional

dietitian. In this instance, measuring the dietitians' opinions of a WFPBD may encourage further research into the topic.[14]

Understanding the reasons for adopting a WFPBD, or resuming a meat-eating diet, is important for clinicians, as a WFPBD can only be clinically useful if it is acceptable to patients.[14,15] The aim of the study was, therefore, to determine whether dietitians would use a WFPBD to prevent and treat NCDs, by measuring their knowledge, attitudes and opinions regarding the benefits and barriers of the diet.

Methods

Study population

Registered dietitians (RDs) working in KwaZulu-Natal (KZN) were used as the population group in this study. The Protection of Personal Information (PoPI) Act does not permit the sharing of personal details when an individual belongs to an organisation. For this reason, personal access to the mailing list of HPCSA-registered dietitians was not permitted. The Association for Dietitians in South Africa (ADSA) is the professional organisation of RDs in South Africa. The association produces a weekly newsletter that is deemed to be more appropriate to use, as the personal data of members remain protected. In 2017, 162 dietitians were registered with the ADSA in KZN and these dietitians were used as the population group for this study.[16] In order to be representative of the ADSA population, a statistician was consulted to determine the number of subjects that are required for a study sample, and a sample of 114 was calculated.

Study design and methods

A quantitative, cross-sectional study, using an online survey, was used for this study which took place in KZN, South Africa. To date, there has been no study that has looked specifically at the opinions of dietitians on a WFPBD. Because of this shortfall, the questionnaire was adapted from other studies that addressed the opinion of dietitians on other health-related topics.[17–21] Likert-scale responses were used, using a scale of 1–5, where 1 indicated 'strongly disagree' and 5 indicated 'strongly agree'. The questionnaire was made up of four parts, which addressed the demographics and patient profiles, their knowledge and attitudes towards a WFPBD, the benefits of a WFPBD and the barriers to a WFPBD. The survey was sent out on two occasions, via a weekly newsletter, to all KZN dietitians registered with the ADSA.

Statistical analysis

All data from the completed online surveys were transferred onto an Excel spreadsheet (Microsoft Corp, Redmond, WA, USA). The data were analysed, using the IBM SPSS database (IBM Corp, Armonk, NY, USA). Descriptive statistics, such as means and standard deviations, were used for all Likert-scale responses. A binomial test was used to determine whether a significant proportion of the respondents selected one of two possible responses in the 'knowledge' and 'attitude' sections of the survey. This test was predominantly used to determine whether the subjects were of the opinion that the diets in question were nutritionally adequate. A one-sample *t*-test was used to determine whether a mean score was significantly different from a scalar value, in all Likert-scale questions in the 'benefits' and 'barriers' sections of the questionnaire. An independent samples *t*-test was run to determine whether there was any significant difference between the two population means. In particular, this applied to the area of work in the 'demographics' section of the questionnaire, to determine whether there was any significant difference between the patients seen in the private and government sectors. A factor analysis was run in the 'benefits' section of the results to determine if there were any latent factors underlying the benefits. This was done using the Kaiser–Meyer–Olkin test for sampling adequacy, as well as Bartlett's test of sphericity. The statistical significance was measured as $p < 0.05$.

Ethical considerations

Ethical approval was applied for and obtained from the Biomedical Research Ethics Committee (BREC) of the University of KwaZulu-Natal, Reference Number BE289/17. The gatekeepers' permission was obtained from the ADSA, in order to use the newsletter for the distribution of the survey.

Results

Demographics

A total of 101 respondents completed the questionnaire. This number comprised 96 females (95.0%) and 5 males (4.9%), with a mean age of 31.87 (SD 7.372) years. The sample was represented by 44.6% ($n = 45$) government-employed dietitians and 47.5% ($n = 48$) private-practice dietitians (PPDs), and the remaining sample comprised 7.9% ($n = 12$). These subjects, who will be referred to as 'other', worked in combination with government or private practice, and also as academic, food service, lactation counselling, medical and pharmaceutical representatives. Government dietitians were significantly more likely to receive referral of patients with cancer, NCDs, HIV/AIDS and TB, liver disease and renal disease, compared with non-government dietitians ($p < 0.05$).

Knowledge and attitudes regarding a WFPBD

Dietitians were asked to choose a definition of a vegan diet and the correct response was provided by 99.0% of the sample ($n = 100$). The definition was expressed as follows: 'A diet that excludes meat, poultry, fish, dairy products, eggs, gelatine, and other foods of animal origin.' The term 'whole-food, plant-based diet' was familiar to 52.0% of the 100 respondents who were familiar with the term 'vegan diet'. For the remainder of this 'attitudes' section of the survey, only responses of those who reported being familiar with the term WFPBD were analysed ($n = 52$). Subjects were presented a list of foods and asked to identify which foods made up a WFPBD. The results of this can be seen in Figure 1 where 50–100% of the sample reported that vegetables, fruits, legumes, nuts and seeds, whole grains, natural nut butters and coconut/olive oil make up a WFPBD. This is an indication that dietitians have a good level of knowledge regarding plant-based foods. However, honey, a food of animal origin, was reported to be part of a WFPBD, which reflects a misunderstanding of the diet.

The sample ($n = 52$) were asked to indicate their agreement that a WFPBD could be nutritionally adequate. No significant agreement or disagreement to this statement was found ($M = 3.17$, SD 1.043). While a significant number of dietitians felt that they were not well trained in PBD at university level ($M = 2.08$, SD 0.947, $p < 0.05$), there was significant agreement with the statement 'I am interested in improving my knowledge on WFPBD' ($M = 4.08$, SD 0.987).

Opinions regarding the benefits and barriers of a WFPBD

In terms of their opinion on the benefits of and barriers to a WFPBD, mean scores greater than 3 indicated a higher frequency

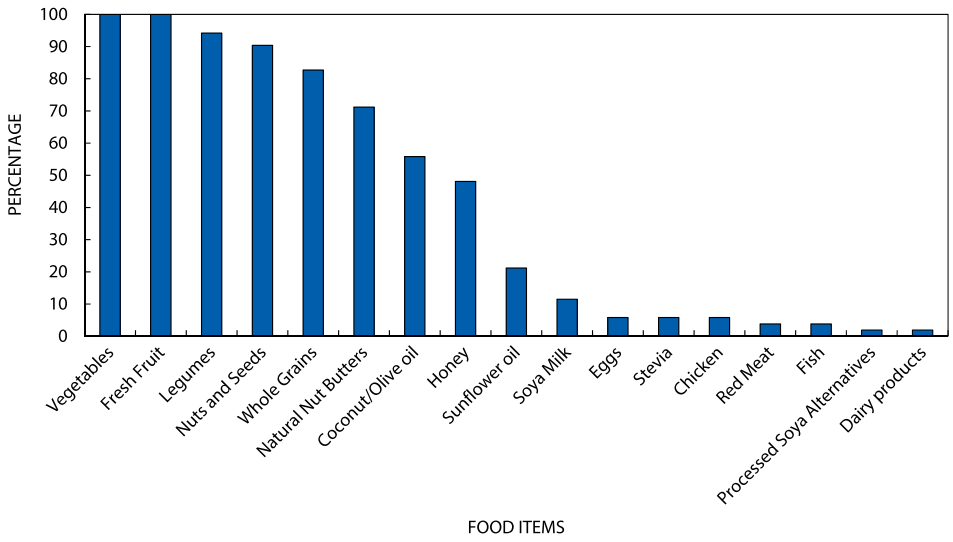

Figure 1: Identification of minimally processed, plant-based foods by sample ($n = 52$).

of respondents in agreement with the statements, and mean scores of less than 3 indicated their disagreement with the statements. The results are summarised in the next two sections.

Perceived benefits of a WFPBD

The strongest perceived benefits of a WFPBD were reported in the following statements: 'It is associated with an improved fibre intake' ($M = 4.46$, $t(100) = 22.830$, $p < 0.05$) and 'It encourages a lower saturated fat intake due to reduced animal products' ($M = 4.20$, $t(100) = 14.816$, $p < 0.05$). The strongest disagreement was found in the statements 'It is an easy diet to follow' ($M = 2.27$, $t(100) = -7.603$, $p < 0.05$) and 'It is a suitable option in low-income households' ($M = 2.58$, $t\ (100) = -3.630$, $p < 0.05$). All the significant results relating to the agreement and disagreement with the statements are reported in Table 1.

A factor analysis was applied to the available data and two underlying factors were derived, which accounted for 54.3% of the variability in the data. These factors were labelled: 'Health Benefits' and 'Personal Benefits'. A one-sample *t*-test showed that there was significant agreement ($M = 4.13$) that there were health benefits associated with a WFPBD, namely $t(100) = 20.198$ ($p < 0.05$), while there was significant disagreement that there are personal benefits ($M = 2.80$, $t(100) = -2.945$, $p = 0.004$). These measures showed reliability by using Cronbach's alpha ($\alpha > 0.7$).

Table 1: Agreement and disagreement of subjects regarding the perceived benefits of a WFPBD

Statements	Mean	SD	*p*-value	*t*
It is associated with improved fibre intake	4.46	0.641	<0.001	22.830
It encourages a lower saturated fat intake due to reduced animal products	4.20	0.813	<0.001	14.816
It is associated with a reduced risk of constipation	4.19	0.703	<0.001	16.984
It is associated with a lower cholesterol intake	4.10	0.755	<0.001	14.628
It reduces the risk of diseases of lifestyle	4.02	0.678	<0.001	15.118
It encourages an increased consumption of vitamins and minerals	3.79	0.941	<0.001	8.455
It improves energy levels	3.19	0.731	0.011	2.587
Meals are quick to prepare	2.68	0.905	0.001	−3.519
It is a suitable option in low-income households	2.58	1.151	<0.001	−3.630
It is an easy diet to follow	2.27	0.968	<0.001	−7.603

**p*-values in bold represent significance.

Perceived barriers to a WFPBD

The strongest reported barrier was that 'There is not enough awareness around whole-food, plant-based diets for the public' ($M = 4.06$, $t(100) = 12.945$, $p < 0.05$). This was followed by 'People prefer to consume meat and animal by-products' ($M = 4.04$, $t(100) = 13.981$, $p < 0.05$). There was significant disagreement with the statements, 'The diet is not filling enough' ($M = 2.38$, $t(100) = -7.403$, $p < 0.05$), and 'The diet lacks variety' ($M = 2.71$, $t(100) = -3.213$, $p = 0.002$). All significant results relating to the agreement and disagreement with the statements are reported in Table 2. No significant agreement or disagreement was found with the statements 'There is not enough protein in the diet' and 'The meals are difficult to prepare'.

Discussion

The study was completed by 101 respondents, which is less than the suggested target sample of 114 calculated by the statistician. A low response rate from South African and international dietitians has been reported.[22,23]

While the majority of the sample were familiar with a vegan diet, only half were familiar with the term WFPBD. This is perhaps due to 'vegetarianism' being such a broad term that encompasses so many different definitions.[24] Education and prescribing information on a variety of diets is an important part of a dietitian's job, and the results of this study show that three-quarters of this sample felt that they did not receive sufficient training on a WFPBD at university level. As dietitians are in the forefront of providing nutritional expertise, this emphasises the importance of continued professional education based on new scientific evidence.

The health benefits of a WFPBD were reported to be significantly more important than the personal benefits of this lifestyle, which

Table 2: Agreement and disagreement of subjects regarding the perceived barriers to a WFPBD

Statements	Mean	SD	*p*-value	*t*
There is not enough awareness around whole-food, plant-based diets for the public	4.06	0.822	<0.001	12.945
People prefer to consume meat and animal by-products	4.04	0.747	<0.001	13.981
The diet is difficult to follow in a social setting	3.95	0.829	<0.001	11.520
There is resistance from friends and family to follow the diet	3.86	0.800	<0.001	10.816
Ready-to-eat, plant-based meals and snacks are not easily accessible	3.74	0.966	<0.001	7.726
There is not enough information about the diet	3.50	0.879	<0.001	5.661
The diet may cause indigestion, bloating, gas or flatulence	3.27	0.871	0.003	3.086
The diet lacks variety	2.71	0.898	0.002	−3.213
The diet is not filling enough	2.38	0.847	<0.001	−7.403

**p*-values in bold represent significance.

reflects the fact that the sample population were experts in nutrition. The current study suggests that dietitians perceive the costs and suitability for low-income households as barriers in recommending the WFPBD for preventing and treating NCDs. This has been an important area of study in South Africa. With 65.0% of the KZN population living in poverty, it was noted that poverty and high levels of food insecurity are the biggest barriers to the application of food-based dietary guidelines, and it may therefore also be a barrier to consuming a WFPBD.[25,26] It has been noted that individuals with higher education, status and income have a higher intake of fruit and vegetables, therefore this diet may be more accepted by middle- to high-income groups in South Africa.[19] Changing to a healthier diet in rural communities would cost, on average, 69.0% more than the unhealthy food choices that are currently being made.[27] While the cost of healthy food is one factor to consider, the availability of these foods is another. The majority of the South African rural population may not have access to foods such as fruits, vegetables and wholegrain foods, as stores may stock only limited amounts of these products.[28] The cost factor of travelling to a local supermarket, as well as the ability to store these food items appropriately, may act as barriers to the adoption of this lifestyle. Education on the diet and creating cost-effective methods of making this lifestyle sustainable is important. The challenge, therefore, is how to improve dietary diversity whilst ensuring that foods are both affordable and accessible in all communities. These foods also need to be acceptable and incorporated easily into the diets of all social groups.

Conclusion and recommendations

While dietitians agreed that health benefits are associated with the WFPBD, there are barriers that cannot be overlooked when applying it to the South African context. This includes the perceived affordability of the diet and the perceived suitability of this diet in low-income communities. Further research into the acceptability and public perception of this diet may be worthwhile, as South Africa is a country that encompasses many different ethnic groups. Research on this topic has grown, as more studies are being conducted to show the benefits of a WFPBD in the prevention and treatment of NCDs. Although South Africa is made up of diverse cultures, with the background and socio-economic status of many people differing,[25] it is vital that dietitians stay up to date with emerging topics of interest and that nutrition education is constantly updated and in line with global trends. This should be introduced into the study curriculum and presented incontinued professional development programmes nationwide, to increase dietitians' knowledge and awareness. There has been an international shift toward the consumption of WFPBDs. While the broader health and environmental benefits of shifting to a WFPBD are not the focus of this study, it is acknowledged that this diet does not only benefits an individual's health status but also has potential for reducing hunger by increasing the global food supply and reducing wastage of natural resources, particularly water.[29]

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