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Article Title: Dietary Regimens of Athletes Competing at the Delhi 2010 Commonwealth Games

Authors: Fiona E. Pelly and Sarah J. Burkhart

Affiliations: School of Health and Sports Sciences, University of the Sunshine Coast, Maroochydore, Queensland, Australia.

Running Head: The dietary regimens of athletes

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Dietary regimens of athletes competing at the Delhi 2010 Commonwealth Games

Fiona E. Pelly\textsuperscript{a}

Sarah J. Burkhart\textsuperscript{a}

\textsuperscript{a}School of Health and Sports Sciences
University of the Sunshine Coast
Maroochydore, Queensland, 4558, Australia

Corresponding author: fpelly@usc.edu.au (Fiona Pelly)

Not for publication:

Phone: + 61 5430 2898
Fax: +61 7 5459 4880

Running title:

The dietary regimens of athletes
Abstract

The aim of this study was to investigate the dietary regimens reported by athletes competing at a major international competition and report whether these were based on nutrient composition, religious beliefs, cultural eating style, food intolerance or avoidance of certain ingredients. A questionnaire was randomly distributed to 351 athletes in the main dining hall of the athletes’ village over the three main meal periods during the Delhi 2010 Commonwealth Games (23rd Sept – 14th Oct, 2010). The majority (n=218, 62%) of athletes reported following one or more dietary regimens, with 50% (n=174) following a diet based on the nutrient composition of the food. Significantly more athletes from weight category and aesthetic sports (28%, p=0.005) and from power/sprint sports (41%, p=0.004) followed low fat and high protein regimens respectively. Other specialised dietary regimens were followed by 33% of participants, with avoidance of red meat (13%), vegetarian (7%), Halal (6%), and low lactose regimens (5%) reported most frequently. Significantly more athletes from non-Western regions followed a vegetarian diet (p<0.001), while more vegetarians reported avoiding additives (p=0.013) and wheat (p=<0.001). A Western style of eating was the most commonly reported cultural regimen (72% of total with 23% from non-Western regions). Those following a Western diet were significantly more likely to report following a regimen based on nutrient composition (p=0.02). As a high proportion of athletes from differing countries and sports follow specialised dietary regimens, caterers and organisers should ensure that adequate nutrition support and food items are available at similar events.

Key words: Dietary regimen, athlete, Commonwealth Games, culture, performance, nutrient composition
Introduction

It is well established that dietary intake can play a significant role in sports performance and post-exercise nutrition recovery (Rodriquez, DiMarco & Langley, 2009), which has led to specific evidence-based guidelines for eating before, during and after competition (for example; Rodriquez, DiMarco & Langley, 2009; Burke, Hawley, Wong & Jeukendrup, 2011; Jeukendrup, 2011; Stellingwerff, Boit & Res, 2007; Slater & Phillips, 2011). However, performance-based eating is not always the primary focus of an athlete. Other factors, such as therapeutic requirements, religious beliefs, cultural background, personal preferences (e.g. avoidance of red meat) or aesthetic qualities such as taste (Nestle, Wing, Birch, Di Sogra, Drewnowski, Middleton, et al, 1998) and familiarity (Kittler, Sucher & Nahikian-Nelms, 2012) also influence an athlete’s food choices. Therapeutic conditions such as coeliac disease or a food allergy may restrict menu options while the consequences of choosing the wrong food may be of greater concern to the athlete than eating for performance. Culture has also been described as one of the most significant influences on an individual’s food choice (Nestle et al, 1998; Dindyal & Dindyal, 2004) and is commonly linked to religious beliefs that may centre on the preparation (e.g. the slaughtering of animals), or avoidance of certain foods (e.g. swine or by-products of pork), or fasting periods (e.g. Ramadan) (Kittler et al, 2012). Vegetarianism may also stem from religious beliefs (Kittler et al, 2012), or alternatively an individual may avoid animal products for health or ethical reasons (Fox & Ward, 2008), or simply personal preference (Hoek, Pieternel, Stafleu & de Graaf, 2004; Lea & Worsley, 2001). Depending on the level of acculturation (the acquisition of new beliefs, behaviours and attitudes in line with a new culture after moving to a new country) (Kittler et al, 2012), an individual may follow all, or only some cultural or religious dietary practices (Dindyal & Dindyal, 2004).
At major international competition events, such as the Commonwealth and Olympic Games (CG and OG), athletes from a range of countries live in a purpose built village and eat the majority of their meals in a large communal dining hall. To date, there has been a focus on evaluating broad opinion of the food provision and nutrition support, with little emphasis on the specific needs and preferences of the individual athlete. Although food provision has been rated highly at this (Burkhart & Pelly, 2013), and previous major international events (Pelly, 2007; Pelly, O’Connor, Denyer & Caterson, 2011), requests for specific food items which are commonly related to individual dietary preferences have been reported (Burkhart & Pelly, 2013), suggesting a shortfall in the provision of specialised items. Past competition events have focused on catering for Halal, vegetarian and vegan items in particular (Pelly, O’Connor, Denyer & Caterson, 2009). Despite this, there is little evidence to what extent athletes at these events follow these and other individual dietary regimens.

As the CG and similar events cater for a large volume and diversity of athletes (eg. Delhi 2010 CG’s included 4352 athletes from 71 nations competed in 17 sports (The Commonwealth Games Federation, 2011), both caterers and support staff (coaches, trainers, dietitians and medical staff) can benefit from knowledge of the number and characteristics of athletes following specific dietary regimens in order to provide a more appropriate range of specific menu items that meet cultural needs, budgetary constraints and sustainability guidelines. Hence, the aim of this study was to investigate the various dietary regimens (based on nutrient composition, therapeutic requirements, religious beliefs, cultural eating style or personal preference) reported by athletes competing at the Delhi 2010 CG’s and describe differences across sports and countries.
Methods

Survey instrument

A questionnaire previously developed to investigate the dietary behaviours of athletes and nutrition support provided at the Sydney 2000 OG and Melbourne 2006 CG (Pelly, Inge, King & O’Connor 2006) formed the basis for data collection. Further detail on this instrument and the content evaluation process may be found in Burkhart & Pelly (2013). The questionnaire contained 25 questions, divided into 4 broad topic areas. Two sections were designed to assess athletes’ dietary regimens as outlined below.

Participant characteristics

Participants were asked to provide demographic information including gender, date of birth, country of origin, country representing, postcode/zip code, native language and level of education. Previous experience competing at a Commonwealth or Olympic Games and living in an athlete’s village, as well as stage of competition (more than two days before competition, day before event, day of event, between events or event completed) was also investigated.

Style of eating and reported dietary regimen

To obtain information on cultural style of eating, participants were asked to indicate their usual style(s) of eating categorised into Western (based on the eating styles of Australia/New Zealand, British Isles, and North America), and Indian, Asian, African, Pacific Island, Mediterranean, South American, and Middle Eastern, and any dietary regimens they followed grouped into the following categories: 1) diets based on the energy or nutrient composition of the food (high/low carbohydrate, high/low protein, low fat, low sodium and high fibre, or other); and, 2) Specialised regimens: allergy/avoidance (wheat dairy, nut or gluten-free, no/low lactose, no spices and no additives, or other), vegetarian, vegan or red
meat avoiders, religious beliefs (Halal, Kosher, Christian, Catholic, or other), and other dietary regimens (low glycemic index and diabetic).

**Participant selection**

The target population were athletes competing in the 2010 Delhi Commonwealth Games (n=4352) living within the athletes’ village, and eating meals within the main dining hall. Nutrition kiosk staff distributed the questionnaire to athletes over the three main meal periods of breakfast, lunch and dinner throughout the games period (23rd September – 14th October, 2010). Athletes were approached to take part in the research, and therefore the sample was based on the convenience and availability of individuals at each meal period; however, in an attempt to recruit a range of participants, the questionnaire was distributed to a variety of athletes representing various regions and sports. Although the majority of the Commonwealth nations speak English as a first language, athletes who were not fluent in English were unable to take part (n=2). Athletes who had previously completed the dining hall questionnaire were excluded from completing it on a second occasion. Athletes needed to be over the age of 16 years to participate unless they had consent of a parent or guardian. Ethics approval was granted by the University of The Sunshine Coast Human Research Ethics Committee.

**Data analysis**

The participants were classified into sports groups (weight category, endurance, racquet, power/sprint, team, aesthetic and skill) based on the physiological needs of their sport and a region category (Australia and New Zealand, British Isles, Canada, SE Asia and Pacific, India and Sri Lanka, Caribbean and Africa) based on country location\(^1\). The results were analysed with Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL. Version 19, 2011). One questionnaire was received with more than five unanswered

\(^1\) For further detail on classification refer to Burkhart & Pelly, 2013.
questions and was excluded from analysis. Depending on the normality of data, associations were calculated with the Chi-Square statistic, Kruskall-Wallis ANOVA and Mann-Whitney U tests. Significant confounders (sport and region) were identified with analysis of covariance (ANCOVA) within parametric data. Statistical significance was set \textit{a priori} at \(p<0.05\). Post hoc analysis was calculated with Bonferroni for significant relationships in order to determine the location of the effect, based on \(p\)-values adjusted for multiple comparisons across region, sport and regimen. Data is presented as frequency and proportion of relevant category.

\textbf{Results}

\textit{Participant characteristics}

A total of 351 athletes (183 males, 52%; 166 females, 48%; mean age 24 ± 6 years) competing at the Delhi CG returned completed questionnaires. This represented 8.1\% of the target population (n=4352), and included a broad representation of athletes across countries (n=53, 75\% of all competing nations) and all CG sports (n=17, 100\%)\textsuperscript{2}. There was a significant association between gender and vegetarianism with females more likely to report following this type of dietary regimen (\(p=0.014\)). There was no association between gender and age for any other dietary regimen.

\textit{Reported style of eating and dietary regimen(s)}

A Western style of eating was reported to be the most popular cultural dietary regimen (n=249, 72\% of all participants) with half (n=175, 51\%) of all respondents reporting that they only follow this style of eating, including 23\% (n=40) from non-Western regions. An additional 21\% (n=74) reported following a Western and at least one other style of eating (Asian, Pacific Island, Indian or African), while 28\% (n=93) reported following a style other

\textsuperscript{2}For full demographic information refer to Burkhart & Pelly, 2013
than Western, which included African (n=31, 33%), Indian (n=20, 24%), Asian (n=17, 17%), Pacific Island (n=13, 14%), Mediterranean (n=5, 5%), South American (n=5, 5%) and Middle Eastern (n=2, 2%). Style of eating generally represented the region the athlete came from (Figure 1).

The majority (n=218, 62%) of all participants reported following one or more dietary regimens related to religious beliefs, allergen/avoidance, vegetarian/vegan, diabetic, low glycemic index, or energy/nutrient composition (low energy, macronutrient composition, high fibre and low sodium) of their food (Table 1). A total of 154 (71% of the total following a regimen) reported following more than one regimen concurrently. Of the 218 on dietary regimens, 33% (n=73) were vegetarian or meat avoiders, 28% (n=62) avoided certain food components such as gluten or nuts, and 19% (n=41) followed religious regimens. The highest proportion of athletes reporting a religious regimen followed a Halal diet (n=22, 52%). Religious regimens were significantly associated with avoiding food additives (p=0.002). In addition, 5 athletes (from Australia, Kenya, Niue, Scotland and Tonga) reported following a gluten free dietary regimen.

A low fat diet (n=36, 20%), and high protein diet (n=31, 17%) were the most commonly reported regimens based on nutrient composition (Table 1). High fibre, low sodium and low energy diets tended to be followed in conjunction with other nutrient-based regimens. Those who reported being vegetarian (n=47, 65%) or avoided allergens (n=49, 79%), were significantly more likely to follow a regimen based on the nutrient composition of the food than those who did not (p=0.003 and p=<0.001 respectively). While a higher proportion of vegetarians (n=48,66%) reported not avoiding allergens, there was an association between vegetarians and avoiding additives (p=0.013) and wheat (p<0.001). Athletes who reported following a Western style of eating (n=161, 65%) were also
significantly more likely to report following a dietary regimen based on nutrient composition than those following a non-Western style (p=0.020).

**Associations between reported dietary regimen(s), region and sport**

After accounting for confounders, significant associations between both region and sport, and some of the reported dietary regimens were identified (Figure 2). Athletes from the non-Western regions of Africa, the Caribbean, India and Sri Lanka, South East Asia and the Pacific Islands (n=52, 31%) were significantly more likely (p<0.001) to report following a vegetarian/vegan dietary regimen than athletes from Western regions (n=7, 4%). Similarly, athletes from weight category sports (n=18, 42%) were more likely to follow a vegetarian/vegan dietary regimen than athletes from most other sports (p=0.003). Athletes from Australia and New Zealand, South East Asia and the Pacific Islands (n=12, 10%) were more likely to follow a low or no lactose diet (p=0.003) than others, while religious dietary regimens were more likely to be followed by athletes from Africa, India and Sri Lanka, South East Asia and the Pacific Islands (n=33, 23%) than athletes from other regions (p=<0.001).

A higher proportion of endurance athletes (n=43, 54%) reported following diets based on energy or nutrient composition in comparison to others, although athletes from weight and power/sprint sports (n=58, 65%) were significantly more likely (p=0.001) to report following a regimen based on nutrient or energy composition than athletes from skill and team sports (n=29, 31%). Power/sprint athletes (n=19, 41%) were significantly more likely to follow a high protein diet (p=0.004), while athletes from weight and aesthetic sports (n=19, 28%) were more likely to report following a low fat regimen than athletes from other sports (p=0.005). High fibre dietary regimens were reported by athletes from all sport categories except skill sports, with the majority reported by athletes competing in racquet (n=10, 6% of those following a regimen based on energy and nutrient composition), endurance (n=9, 5%), weight category (n=8, 5%), and power/sprint events (n=7, 4%). Low sodium diets were
reported by athletes from all sports except those competing in aesthetic events. A representation of the energy and nutrient composition based dietary regimens by sport is provided in Figure 2.

Discussion

The Delhi 2010 CG provided the opportunity to investigate the dietary regimens reportedly followed by internationally competitive athletes. While we recognise that this is a small sample of the entire athlete population, it provides unique data across a broad range of cultural groups and sports that has not previously been reported in the literature. Our results indicate that the majority of athletes reported following one or more dietary regimen of some nature, with the largest proportion related to the nutrient composition of the food. Although limited data are available on the specialised dietary regimens reported by athletes at similar events, a comparison to a sample of athletes visiting a nutrition desk at the Sydney 2000 Olympic Games would suggest that there has been an increase in the proportion of athletes following a specialised dietary regimen over the past decade (16% in 2000 to 33% in 2010) (Pelly, 2007). While variation in the demographic characteristics of participants in each sample may account for these differences, previous reports on the scope of nutrition consultations and information provided by experts within the dining hall over the past decade suggests that there are a significant number of athletes with specific dietary needs which require specialised catering (Pelly, 2006). An increase in the proportion of athletes following specialised dietary regimens may be due to several factors including, but not limited to, an awareness of the impact of diet on health and performance (Rodriquez, DiMarco & Langley, 2009), an increase in diagnosed clinical conditions which require a therapeutic dietary regimen (CDC, 2009; CDC 2011), a number of diets becoming more socially popular (for example gluten free diets), and a greater diversity of athletes competing at this type of event. Anecdotally, through communication with caterers and dietitians working in this
environment, it is apparent that there is increased demand for specialised food to meet the demands of athletes and other patrons.

The increase in the number of representative nations, particularly from less industrialised countries, and their associated culture and beliefs, may account for a higher proportion of athletes who report following specialised dietary regimens at the Delhi CG’s. We found athletes from non-Western countries were more likely to report following a diet based on religious beliefs (predominately Halal) or a vegetarian diet, which in some cases linked back to religion. For example, a high proportion of the Indian population follow the Hindu religion and as part of their beliefs consider the cow a sacred animal that cannot be slaughtered and consumed (Kilara & Iya, 1992). African athletes, in particular, were more likely to follow a vegetarian diet, similar to results from other competition events that suggest that these athletes rarely eat meat based meals (Pelly, 2007). The high incidence of vegetarianism at this event may not necessarily be reflective of all major competition as the cultural mix at the Delhi CG’s included a high proportion of Indian and African athletes. Furthermore, athletes from Western regions may have decided to follow a vegetarian regimen once in the village as the predominant meat sources were buffalo and goat, both less familiar to a Western style of eating.

A high proportion of athletes from our sample reported following a Western style of eating, although close to a quarter (22%) of athletes from a variety of regions across the world exclusively followed a cultural style of eating representative of their country. Furthermore, results from a study on the same cohort indicate that athletes made specific requests for culturally relevant items to be included on the menu (Burkhart & Pelly, 2013) suggesting that the menu may not have been adequate to meet their needs. Therefore, it would be prudent for caterers to include an adequate representation of a broad range of cultures when planning the menu. Interestingly, we also found that athletes who reported
following a Western style of eating were significantly more likely to report following a specialised dietary regimen or one based on the energy or nutrient composition. It is feasible that athletes from Western regions may have a better knowledge and awareness of performance nutrition and the macronutrient content of foods, which may be indirectly associated with their level of education. Although African athletes in our sample reported a significantly lower level of education than other regions, it may be feasible that athletes from African and other non-Western regions place more importance on following a diet based on religious beliefs than the macronutrient content of their diet. Investigation of the reasons why individual athletes follow specific dietary regimens is warranted.

Interestingly, we did not find any relationship between gender or age and reported dietary regimens, with the exception of females and vegetarianism. This is supported by evidence from the non-athletic population that suggests that females report greater incidence of vegetarianism than males (Hoek et al, 2004). We also expected to find that dietary regimens based on nutrient composition or other factors would be followed by a higher proportion of females given that, for the same cohort, we found that females place more emphasis on nutrition factors in influencing their food choice (unpublished data). Furthermore, previous studies have shown that females value the provision of nutrition information more than males (Guthrie, Fox, Cleveland, & Welsh, 1995; McLean-Meyinsse, 2001; Wang, Fletcher, & Carley, 1995). Our results may be related to the particular sample of athletes that participated in this study and we suggest that further studies with larger samples of both male and female athletes would be of benefit.

It is apparent from our results that dietary regimens that involve avoiding particular ingredients or components of food, in particular gluten or wheat, are becoming increasingly popular amongst athletes. We found that five athletes from a sample of 351 (1 in 70) reported following a gluten free diet, in comparison to 2 athletes in a sample of 414 (1 per 200) at the
Sydney 2000 OG (Pelly, 2007). In addition, we found that 15 individuals from a range of regions reported avoiding wheat. Although there is currently no research available on the incidence of coeliac disease in athletes, it has been reported that 1 per 133, 1 per 100 and 1 per 251 cases have been reported in the United States, United Kingdom and Australia, respectively (Fasano, Berti, Gerarduzzi, Not, Colletti, Drago, et al., 2003; Cataldo & Montalto, 2007). Interestingly, a higher incidence (approximately 1 case per 18 people) has been reported in the Saharawi people from North Africa (Lionetti, Favilli, Chiaravalloti, Ughi, & Maggiore, 1994), which may explain the higher rate in our culturally diverse sample. There is also evidence for increased diagnosis of coeliac disease and wheat intolerance internationally (Mancini, Trojan & Mancini, 2011; Telega, Rivera Bennet & Werlin, 2008; Lohi, Mustalahti, Kaukinen, Laurila, Collin, Rissanen, et al., 2007). The increase of reported gluten free diets is supported by the number of enquiries (n=64) about the provision of gluten free items received by dietitians located at the nutrition kiosk in the dining hall at the same event (unpublished data), however, it is not clear whether these athletes are following a gluten or wheat free diet due to appropriate diagnosis of coeliac disease or wheat intolerance, or simply by choice. Furthermore, we found that athletes from South East Asia, the Pacific Islands, and Australia and New Zealand were more likely to report following a diet containing no or low lactose. This is not surprising as Asian populations have been reported to have a higher prevalence of lactose intolerance (Scrimshaw & Murray, 1998).

Specific dietary practices tend to be associated with certain sports (Grandjean, Ruud & Reimers, 2001), and therefore we expected to observe relationships between sport and dietary preferences, particularly those related to the energy or nutrient content of the food. Across all entire cohort, the most commonly reported nutrient-based dietary regimens were low fat (20%) and high protein (17%) diets, with athletes from power/sprint sports and those competing in aesthetic or weight category sports more likely to follow a high protein diet or
low fat diet respectively. This is not surprising given the emphasis that power/sprint sports tend to place on protein (Phillips, 2004; Tscholl, Alonso, Dolle, Junge, & Dvorak, 2010; Ronsen, Sundgot-Borgen, & Maehlum, 1999), and the focus aesthetic or weight category sports place on body weight (Hassapidou & Manstrantoni, 2001; Loucks, 2004; Morton, Robertson, Sutton, & MacLaren, 2010). Similarly, a sample of weight category athletes competing at the Sydney OG were more likely to report following a specialised diet than endurance, power/skill and team sport athletes (Pelly, 2007). We also found that athletes from weight category sports were more likely to avoid allergens or other constituents. Although not significant, a higher proportion of athletes from weight category sports reported following a vegetarian dietary regimen, or a diet where white meat was consumed, but not red which may be due to a belief that this will limit their overall fat and total energy intake.

In general, athletes from endurance sports were more likely to follow a diet based on the nutrient composition of the food than other athletes. This may be due to more established guidelines for macronutrient intake to enhance performance in endurance events (Grandjean et al, 2001; Maughan, 2002). Previous studies suggest that endurance athletes are more focused on the long term health implications of what they consume, read more widely on the topic of nutrition, and are more likely to be involved in food preparation (Burke, Gollan, & Read, 1991). Furthermore, elite endurance athletes have been shown to be more likely to consume carbohydrate during and after exercise, and have a higher daily intake of carbohydrate relative to body mass than other athletes (Burke, Slater, Broad, Haukka, Modulon, & Hopkins, 2003).

**Future research.** Investigation of the specific reasons why athletes follow certain dietary regimens and the level of importance they place on these pre, during and post competition, would be of benefit to both caterers and nutrition support staff to better provide for individual needs. Eating behaviours such as distribution of food through the day, and
choices at each meal period, particularly in relation to the athlete’s stage of competition, as well as intake of culturally specific food, would also be of value. To increase study numbers for better representation of all nations and sports, distribution of surveys through team nutrition advisors/sports dietitians, and managers in advance of the event is recommended.

**Limitations.** This sample was based on convenience and relied on self-reported responses. Due to the unique nature of the environment in which this survey is distributed, test-retest reliability evaluation was not possible. Our study was also limited to English speaking athletes and therefore our results and discussion can only be attributed to this group. We grouped athletes based on their overall cultural style of eating and sport category so specific individual differences may not have been identified. Furthermore, as only certain nations are permitted to compete at the CG’s, these results should not be generalised to other international competition events.

**Conclusions.** This study has highlighted the diversity of reported dietary regimens across different sports and cultures, and emphasise the need for specialised food provision and adequate nutrition support in this environment. Although evidence-based guidelines exist for pre, during and post competition, it is evident that athletes may preferentially choose to eat food that is culturally familiar, and fits with their religious beliefs and personal preferences. While the majority of reported diets in this study were nutrient based, it is apparent that an increasing proportion follow a specialised regimen based on religion (predominately Halal), or the avoidance of meat or specific allergens. A Western style of eating was the most commonly reported culture style of eating, however, a number of athletes reported only following the style of eating from their home country.

It is clear that there are future challenges for caterers and organisers in providing a culturally diverse, high quality menu while still considering issues of sustainability and cost. A reduction in total variety with increasing use of local produce and the integration of key
cultural, sports and specialised items should be considered. An understanding of the number and characteristics of those following special dietary regimens can benefit food service providers and nutrition experts in planning for similar events, especially when held in regions where the availability of suitable items may be limited.
References


Figure 1: Reported styles of eating followed by athletes from different regions

Note: † Majority (59% and 41% respectively) followed an Asian and Pacific Island style of eating. ‡ Majority (90%) followed an Indian style of eating. § Majority (94%) followed an African style of eating.

*Indicates a significant association (p<0.005) as athletes from Africa, India and Sri Lanka and S. E. Asia and Pacific Islands were more likely to report following a non-western dietary regimen.

** Other includes: Asian, African, Indian, Mediterranean, Middle Eastern, Pacific Island, South American.
Figure 2: Reported energy and macronutrient-based dietary regimens classified by sport group.*

*Athletes were able to select from a number of predetermined categories
Table 1: Dietary regimens followed by athletes (n = 218, 62% of 351 participants)

<table>
<thead>
<tr>
<th>Dietary regimen category</th>
<th>Total number (n) of participants following dietary regimen (n= 218)</th>
<th>Proportion (%) of those following a dietary regime</th>
<th>Proportion (%) of total participants (n=351)</th>
<th>Proportion (%) of dietary regimen category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrient based</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Macronutrient content §</td>
<td>115</td>
<td>53</td>
<td>33</td>
<td>63</td>
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<tr>
<td>High fibre</td>
<td>38</td>
<td>17</td>
<td>11</td>
<td>21</td>
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<tr>
<td>Low sodium</td>
<td>18</td>
<td>8</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Low energy (kilojoule)</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Low carbohydrate</td>
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<td>0.5</td>
<td>0.3</td>
<td>1</td>
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<tr>
<td>TOTAL</td>
<td>174</td>
<td>80</td>
<td>50</td>
<td>100</td>
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<td>Specialised regimens</td>
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</tr>
<tr>
<td>i). Vegetarian/vegan</td>
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<tr>
<td>No red meat</td>
<td>44</td>
<td>20</td>
<td>13</td>
<td>62</td>
</tr>
<tr>
<td>Vegetarian (lacto and lacto ovo)</td>
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<td>12</td>
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<td>36</td>
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<td>Vegan</td>
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<td>1</td>
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<tr>
<td>Sub-total</td>
<td>73</td>
<td>33</td>
<td>21</td>
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<td>ii). Allergen/avoidance</td>
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<td>No/low lactose</td>
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<td>No additives</td>
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<td>Wheat free</td>
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<td>18</td>
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<tr>
<td>No spices</td>
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<td>6</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>Dietary regimen category</td>
<td>Total number (n) of participants following dietary regimen (n= 218)</td>
<td>Proportion (%) of those following a dietary regimen</td>
<td>Proportion (%) of total participants (n=351)</td>
<td>Proportion (%) of dietary regimen category</td>
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<td>--------------------------</td>
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<tr>
<td>Dairy free</td>
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<td>Gluten free</td>
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<td>Sub-total</td>
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<td>18</td>
<td>100</td>
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<td>iii). Religious</td>
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<tr>
<td>Catholic</td>
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<td>2</td>
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<tr>
<td>Other §</td>
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<td>12</td>
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<tr>
<td>Kosher</td>
<td>3</td>
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<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Sub-total</td>
<td>41†</td>
<td>19</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>iv). Other</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Low glycemic index</td>
<td>20</td>
<td>9</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>Diabetic</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>100</td>
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<tr>
<td>TOTAL</td>
<td>117</td>
<td>54</td>
<td>33</td>
<td></td>
</tr>
</tbody>
</table>

† 130 participants reported following no dietary regimens
‡ 154 participants (71%) followed more than one dietary regimen in total.
§ 87 (50%) followed more than one nutrient based dietary regimen, 11 (18%) followed more than one allergen/avoidance dietary regimen, 1(2%) followed more than 1 religious dietary regimen

Includes combinations of high carbohydrate, low fat, and high protein.

Includes Sikhism, Pilgrims Holiness Church, Congressional Church, Islamic and Seventh day Adventist.