Note: This article will be published in a forthcoming issue of the *International Journal of Sport Nutrition and Exercise Metabolism*. This article appears here in its accepted, peer-reviewed form; it has not been copyedited, proofed, or formatted by the publisher.

Section: Original Research

Article Title: Social Media as a Nutrition Resource for Athletes: A Cross Sectional Survey

Authors: Bridget Ellen Philippa Bourke[a], Dane Francis Baker[b], and Andrea Jane Braakhuis[a]

Affiliations: [a] Discipline of Nutrition and Dietetics, Faculty of Medical and Health Sciences, University of Auckland, New Zealand. [b] High Performance Sport New Zealand, Auckland, New Zealand.

Running Head: Social media as a nutrition resource for athletes

Journal: *International Journal of Sport Nutrition and Exercise Metabolism*

Acceptance Date: August 20, 2018

DOI: https://doi.org/10.1123/ijsnem.2018-0135

"Social Media as a Nutrition Resource for Athletes: A Cross Sectional Survey" by Bourke BEP, Baker DF, Braakhuis AJ
International Journal of Sport Nutrition and Exercise Metabolism

Social Media as a Nutrition Resource for Athletes: A Cross Sectional Survey

Bourke, Bridget Ellen Philippa (MHSC, RD)[a], Baker, Dane Francis (PG Dip Diet, RD)[b], Braakhuis, Andrea Jane (PhD, RD)[a]

[a] *Discipline of Nutrition and Dietetics, Faculty of Medical and Health Sciences, University of Auckland, New Zealand.*

[b] *High Performance Sport New Zealand, Auckland, New Zealand*

Corresponding author: Bridget Bourke, email: bbou880@auckland.ac.nz, phone: +6493737599, address: Discipline of Nutrition and Dietetics, Faculty of Medical and Health Sciences, University of Auckland, New Zealand, Private Bag 92019, Auckland 1142, New Zealand.

"Social Media as a Nutrition Resource for Athletes: A Cross Sectional Survey" by Bourke BEP, Baker DF, Braakhuis AJ
International Journal of Sport Nutrition and Exercise Metabolism

Abstract

Social media contains a wealth of nutrition information and proposes a cost-effective, highly engaging platform to deliver nutrition information to athletes. This study used an online questionnaire to determine whether New Zealand athletes are using social media as a source of nutrition information, and to understand perceptions of social media as a nutrition resource. Quantitative data was analysed using t-tests, chi-square tests and logistic regression analysis. Inductive thematic analysis was adopted for the qualitative data. From the 306 athletes who completed the questionnaire, 65% reported social media use for nutrition purposes in the last 12 months. Social media use was predicted by both athlete status and gender. Female athletes were more likely to have used social media for nutrition purposes (OR=2.7, 95% CI: 1.52–4.62, p = 0.001) than males. Elite athletes were less likely to have used social media for nutrition (OR = 0.44, 95% CI: 0.24–0.83, p = 0.011) than Recreational athletes. Athletes commonly used social media for practical nutrition purposes, including recipes and information about restaurants/cafes. Perceived advantages of social media as a nutrition resource included: ease of access, well presented information, personal connectedness and information richness. Athletes' primary concern for obtaining nutrition information from social media was information unreliability.

Keywords: Elite Athletes, Nutrition Information, Dietary Resource.

"Social Media as a Nutrition Resource for Athletes: A Cross Sectional Survey" by Bourke BEP, Baker DF, Braakhuis AJ
International Journal of Sport Nutrition and Exercise Metabolism

Introduction

Social media, such as blogs, social network sites and media sharing sites are rapidly becoming a quick and easy avenue for consumers to access well-presented nutrition information. Not only can registered practitioners 'post', 'tweet' or 'blog' nutrition information, so can any other user, regardless of their background or expertise. The vast quantity of nutrition information available on social media make it difficult for the public to ascertain whether information is reliable and as such, users are potentially being exposed to misleading and harmful advice (Carrotte et al., 2015; Helm & Jones, 2016).

The role of a sports dietitian or nutritionist is to work with athletes to optimise food and fluid intake to support or enhance performance (D. T. Thomas et al., 2016). Previous studies have shown that some athletes continue to obtain nutrition information from other sources despite having access to a sports dietitian (Burns et al., 2004; Hull et al., 2016). When athletes receive information from unreliable sources, they risk exposure to incorrect nutrition advice, which may inevitably have a detrimental effect on performance and wellbeing (D. T. Thomas et al., 2016). Coaches, athletic trainers and sports conditioning specialists working closely with athletes are commonly identified as a source of nutrition support (Jacobson et al., 2001; Torres-McGehee et al., 2012). Web technologies, including social media provide a resource for both coaches and athletes to seek nutrition information. Despite concerns for quality and credibility, there is no doubt that social media has become an important part of people's everyday lives, to disseminate, receive and seek information. While a few studies have identified the use of the Internet as a source of nutritional information for athletes (Lis et al., 2015; Malinauskas et al., 2007; Zuniga et al., 2016), there is a lack of evidence as to how athletes are utilising social media platforms, what information they are obtaining through social interactions, and more specifically what nutrition activities they are engaging in.

The objectives of the current study were to determine whether athletes in New Zealand are using social media as a source of nutrition information and secondly, to explore athletes perceived advantages and concerns of social media for nutrition purposes.

Methods

Study design

Athletes were invited to complete a self-administered online questionnaire. The questionnaire was adapted from previously validated surveys (Greenwood et al., 2016; Sensis, 2016) and was finalised after pilot testing with High Performance Sport New Zealand (HPSNZ) dietitians/nutritionists and University of Auckland dietetic students. The questionnaire consisted of closed questions, exploring sources of dietary information and social media use. A single open-ended question was included where athletes were asked to describe their perceived advantage(s) of obtaining nutrition information from social media compared to other resources.

Participants

The target population was athletes in New Zealand. Athletes were recruited in July 2017. Access to the questionnaire was made available for 28 days via an anonymous online link. Elite and Recreational athletes were recruited for the study. Elite or 'carded' Athletes were defined as those athletes eligible for performance support from HPSNZ. Elite athletes were recruited through an email invitation. Recreational athletes were recruited via advertisement on New Zealand University Facebook pages. Participants were classified as a Recreational athlete where they met the following criteria:

(1) New Zealand Resident

(2) Aged 18 to 30 years

(3) Not currently competing at a national, international or professional level

(4) Current weekly training schedule that involved: (1) At least 2.5 hours of moderate intensity activity or (2) At least 1.25 hours of vigorous intensity activity or (3) an equivalent combination of the two.

Ethics approval and consent to participate

Ethical approval for the project was gained from the University of Auckland Human Ethics committee (reference 018569). Athletes were provided with an information sheet, and required to give their consent prior to participation. Athletes were informed their participation in the study was both voluntary and anonymous.

Data Analysis

Quantitative data was analysed using IBM SPSS software (Statistical Package for Social Sciences, Advanced Statistics, version 24, Inc., Chicago, IL). Collected data were analysed using descriptive statistics: mean ± SD or frequencies and percentages. Statistic associations between categorical variables were made using chi-square test of independence (2 tailed). To compare means of continuous variables, an independent t-test (2-tailed) was used. Binary logistic regression modelling was used to estimate the odds of athletes' use of social media for nutrition purposes. Independent variables included in the models were gender, age, ethnicity, education and athlete competitive status. 'Don't know' and blank responses were excluded from analysis. Results were evaluated at the 95% confidence level and statistical significance was accepted at $p < 0.05$.

A general induction method as described by Thomas (2006) was used to analyse responses given by athletes for the open question 'Please describe the advantage(s) you perceive of obtaining nutrition or dietary information from social media over other nutrition resources'. The responses were studied several times and within the text, meaningful segments and key words were identified and coded. A pictorial pattern of codes and meanings was created to map connections between ideas. Themes emerged by grouping together common

and recurrent ideas within the text and a definition of each major theme was established. The text was re-read to group together and further refine themes and subthemes. Using the developed framework, data was coded into themes and the frequency of responses recorded. A single researcher undertook qualitative analysis. A second researcher reviewed the methodology and confirmed identified themes.

Results

Participant characteristics

The sample demographics are shown in Table 1.

Nutrition resources

Nutrition resources used by athletes in the last 12 months are shown in Table 2.

Social media for nutrition

One hundred and seventy two athletes reported to have used social media for nutrition or dietary purposes in the last 12 months (Table 3). The adjusted regression model included variables of education, athlete status, ethnicity, gender and age. Females were 2.7 times more likely than males to have used social media for nutrition (95% CI: 1.52–4.62, $p = 0.001$) after adjusting for age, education, ethnicity and competitive status. Elite athletes were less likely to have used social media for nutrition (OR = 0.44, 95% CI: 0.24–0.83, $p = 0.011$) adjusted for gender, age, ethnicity and education.

Table 4 shows the nutrition topics sought by athletes from social media.

Perceived concerns

Reasons for athletes not choosing to obtain nutrition or dietary information from social media are presented in Table 5.

Perceived advantages

Athletes were asked to describe their perceived advantages of social media as a nutrition resource in open text. Inductive analysis of participant responses revealed four main themes. A definition and description of each theme is provided below.

Ease of access

The highest number of comments related to the theme of information accessibility, where athletes described social media as a convenient, free, and fast way to access and receive nutrition information. Some athletes mentioned how nutrition information often 'pops up' whilst they are using social media, without them having to search for it.

> 'Easily available at athlete's convenience without need to arrange meeting with Nutritionist' (Elite athlete, male, 18)

> 'It's easy to access, quick to access, you have a wide range of information, and most of the time it's free (as opposed to doctor or books which cost money)'

> 'It's good to get new ideas and recipes that you haven't seen before. They just pop up and you are like "oh that looks nice" or "oh I need to read that"' (Recreational athlete, female, 25)

Well-presented information

Comments in this theme described the appealing format and language of nutrition information presented on social media. Some athletes described how social media could be used to simplify and broadcast nutrition messages to the public.

> 'Dietary information is conveyed in a visually appealing and interesting way' (Recreational athlete, female, 25)
> 'Social media is highly used so if we can get the right information out there this would be very valuable' (Recreational athlete, female, 19)

Furthermore, social media may provide athletes a less embarrassing or informal way to engage with health professionals.

> 'Going to a doctor/nutritionist can be embarrassing' (Recreational athlete, female, 22)

Personal connectedness

This theme refers to the sharing of information and personal connections established through social media. Athletes valued the personal experiences provided by 'real people', and described nutrition information from social media as more relevant to and personalised than general nutrition advice. Athletes described functions of social media that allowed them to interact with others, share information and foster support networks with peers.

> 'Real life results experienced by others to make comparison and how it differs from people to people instead of a very general and vague suggestion' (Recreational athlete, male, 22)

> 'You get to learn about other people's personal experiences. It's a great way for people to share and learn from one another' (Elite athlete, female, 21)

Information richness

This theme describes social media as a comprehensive, up to date and well-balanced nutrition resource. Athletes referred to information obtained from social media as 'fresh', 'new' with practical information such as recipes, meal ideas etc. Athletes described how social media offers a broader perspective on nutrition advice, therefore allowing users to consult multiple sources and form their own judgement.

> 'Ability to read comments/arguments from different perspectives from other social media users' (Elite athlete, female, 25)

> 'Sometimes books and doctors/nurses and trainers etc. can have a very biased or closed-minded opinion. By using social media you are able to see hundreds of different points of view on the same topic' (Recreational athlete, female, 21)

> 'Convenient and easy to obtain information from multiple sources at one time, usually more informative about the current nutrition trends' (Recreational athlete, female, 22)

Discussion

Results from this cross sectional study found almost two thirds (65%) of athletes in New Zealand had used social media for nutrition purposes in the last 12 months. Social media use was predicted by gender and athlete status, with females and Recreational athletes over two

times more likely to be engaging in social media for nutrition purposes. Whilst no studies of social media use for nutrition exist, other surveys from Australia, the United States and Switzerland have shown females are more likely to search the Internet to seek nutrition information (McCully et al., 2013; Pollard et al., 2015; Visschers et al., 2013). Given that age is frequently a predictor of social media use (Chou et al., 2009; Pálsdóttir, 2014; Ramaswami et al., 2014; Sin & Kim, 2013), it was interesting that age was not significantly associated with social media use in this current study. A possible explanation for this finding is the inclusion of only young adults and the narrow distribution of age ranges in the final sample.

Results from the current study suggest that athletes rely on nutrition information from easily accessible sources. Informal 'everyday' nutrition resources were well utilised by athletes, including the Internet, friends and teammates, social media platforms, and family members (Table 2). Compared to Elite athletes who regularly receive nutrition advice from a specialist nutritionist, professional nutrition resources were poorly utilised by Recreational athletes. Recreational athletes may therefore be more vulnerable to receiving non-evidenced based nutrition advice and consequently adopting nutrition practices that are less than optimal.

There were some discrepancies for athletes reported use of social media for nutrition. While 172 (n = 37 Elite, n = 135 Recreational) athletes reported using social media for nutrition purposes in the last 12 months (Table 3), only 153 (n = 32 Elite, n = 121 Recreational) included social media as a source of nutrition information (Table 2). Although some level of response error is likely, this also suggests that athletes may not perceive social media as a valuable nutrition resource. This is consistent with findings from Zhang et al. (2013), who reported that young adults have little motivation to use Facebook as a health resource, and perceive health information from Facebook as 'trivial and casual' and to have 'limited impact on their decision making' p.169. In a study by Williamson et al. (2012), Australian University students did not perceive social media platforms as a news gathering resource, but instead as a tool to interact

with friends. Interestingly, Lampe et al. (2012) reported that while Facebook was not perceived as a tool for information seeking, users still felt that it provided them with useful information. The authors suggested high levels of incidental information acquisition were likely, and that users were not necessarily associating such encounters with information seeking. To understand athlete perceptions of social media as a nutrition resource, future research should examine what value athletes place on social media as a nutrition resource, and secondly, to what degree athletes are being exposed incidentally to nutrition information.

The benefits of social media as an avenue for health communication have been recognised, including delivery of personalised and tailored advice, improved access and dissemination of information, peer support, wider access to information and empowerment of individuals to make healthier choices (Centers for Disease Control and Prevention, 2011; Helm & Jones, 2016; Moorhead et al., 2013). In the present study, athletes described how nutrition information often appears as 'pops up' in their newsfeed whilst they are browsing social media. While offering numerous benefits for accessibility and convenience, there is concern regarding the seemingly little control users have over information displayed in their newsfeed. Others have suggested social media users encounter the majority of their information through 'information scanning' i.e. passive exposures whilst undertaking routine activities (Khoo, 2014; Zheng, 2014). It is in this environment that marketers and nutrition promoters are able to strategically position themselves within the social lives of social media users. As such, people have become accustomed to nutrition advertising as an everyday part of their social media experience.

Concerns for 'quality' and 'reliability' are frequently cited in the literature as limitations of social media use for health communication (Moorhead et al., 2013). In a group of University students Oh and Kim (2014) identified information unreliability as the primary barriers for seeking health information from social media. In the present study, 84% of athletes

identified information reliability as a concern for obtaining nutrition information from social media. As concerns were not correlated with other measures, we were unable to ascertain whether reliability or other concerns would deter social media use in athletes. However, it is recommended that nutrition and dietetic practitioners consider strategies to distinguish credible nutrition advice from the plethora of nutrition information available on social media.

Most popular topics sought by athletes were recipes and eating at restaurants/cafes (Table 4). Athletes further re-iterated their desire for practical dietary advice when describing advantages of social media as a nutrition resource. This finding is consistent with other research in young adult populations, where social media is perceived as a platform to share and receive nutrition information including recipes, new food ideas and information about specific diets (Vaterlaus et al., 2015; Zilberman & Kaplan). Similarly, adults using the Internet for nutrition have reported a preference for practical advice, including quicker ways of preparing healthy meals and choosing ingredients that would assist them in making healthier dietary choices (Pollard et al., 2015). Although some athletes in this study acknowledged concerns for reliability, others felt that social media provided them with a balanced perspective; criticising mainstream nutrition advice for being out-of-date, vague or biased. Additionally, some athletes described how they use a wide variety of information to inform their behaviours. By encouraging athletes to critically assess nutrition information and take ownership of dietary behaviours, there are opportunities for social media to enhance self-efficacy, and empower athletes in overcoming barriers to implementing optimal nutrition behaviours.

Increased interactions and peer support have been identified as key benefits of social media in health communication (Chung et al., 2017; Zhang et al., 2013). Athletes in this present study commonly cited benefits in accessing nutrition advice from peers and other athletes from social media. Additionally, some athletes reported using advice from other athletes to inform their own dietary practice. The current literature suggests information obtained from athletes

should be treated with caution, with success in the athletic environment not necessarily translating into nutrition expertise (Heaney et al., 2011; Trakman et al., 2016).

The cross-sectional study design is limited in that prevalence is measured in one point in time. This is especially relevant for social media, given the dynamic nature of the environment. The study is also limited by the recruitment methods. With Recreational athletes recruited through Facebook advertising, our results are likely to overestimate true prevalence of social media use. Despite the aforementioned limitations, this research provides significant contribution to the literature due to its novelty and the current paucity in understanding social media behaviours.

The current study provides important insight into the nutrition behaviours of athletes and highlights potential strategies for the delivery of nutrition support through social media. For nutrition and dietetic practitioners, it is about balancing the delivery of formal credible nutrition information, but also exploiting the informal and visually appealing nature of social media. Provision of practical information is recommended, including tips for preparing meals and choosing healthy foods at restaurants. Additional strategies such as harnessing the interactive nature of social media, by engaging in dialogue and responding to athlete queries in a timely manner, and ensuring information is well presented and up to date may also be effective. Primary barriers for using social media for nutrition were concerns for reliability of information. There is a need for credible, reliable nutrition advice to be made readily available through social media platforms. Findings from this study have set the scene for larger scale investigations of social media use for nutrition in athletic and other population groups. Further research is needed to explore the effectiveness and feasibility of social media based nutrition interventions in improving nutrition knowledge and behaviours in athletes.

Acknowledgements:

The authors would like to thank all athletes who participated in the study, and High Performance Sport NZ for their collaboration.

Authorship:

All authors contributed to the research design. BB designed the questionnaire and analysed the data. DB initiated the study and recruited Elite athletes for the study. AB supervised the study. All authors prepared and approved the final manuscript.

Disclosure statement:

The authors declare that they have no competing interests.

Funding:

Not applicable.

References

Burns, R. D., Schiller, M. R., Merrick, M. A., & Wolf, K. N. (2004). Intercollegiate student athlete use of nutritional supplements and the role of athletic trainers and dietitians in nutrition counseling. *Journal of the American Dietetic Association, 104*(2), 246-249. doi: 10.1016/j.jada.2003.11.013

Carrotte, E. R., Vella, A. M., & Lim, M. S. (2015). Predictors of "liking" three types of health and fitness-related content on social media: a cross-sectional study. *Journal of Medical Internet Research, 17*(8). doi: 10.2196/jmir.4803

Centers for Disease Control and Prevention. (2011). The health communicator's social media toolkit. Retrieved 7 April 2017, from http://www.cdc.gov.ezproxy.auckland.ac.nz/healthcommunication/ToolsTemplates/SocialMediaToolkit_BM.pdf

Chou, W.-Y. S., Hunt, Y. M., Beckjord, E. B., Moser, R. P., & Hesse, B. W. (2009). Social media use in the United States: implications for health communication. *Journal of Medical Internet Research, 11*(4), e48. doi: 10.2196/jmir.1249

Chung, C. F., Agapie, E., Schroeder, J., Mishra, S., Fogarty, J., & Munson, S. A. (2017). When personal tracking becomes social: examining the use of Instagram for healthy eating. *Proceedings of the SIGCHI conference on human factors in computing systems . CHI Conference, 2017*, 1674-1687. doi: 10.1145/3025453.3025747

Couture, S., Lamarche, B., Morissette, E., Provencher, V., Valois, P., Goulet, C., & Drapeau, V. (2015). Evaluation of sports nutrition knowledge and recommendations among high school coaches. *International Journal of Sport Nutrition and Exercise Metabolism, 25*(4), 326-334. doi: 10.1123/ijsnem.2014-0195

Greenwood, S., Perrin, A., & Duggan, M. (2016). Social media update 2016. Washington D.C: Pew Research Center.

Heaney, S., O'Connor, H., Michael, S., Gifford, J., & Naughton, G. (2011). Nutrition knowledge in athletes: a systematic review. *International Journal of Sport Nutrition and Exercise Metabolism, 21*(3), 248-261. doi: 10.1123/ijsnem.21.3.248

Helm, J., & Jones, R. M. (2016). Practice paper of the Academy of Nutrition and Dietetics: social media and the dietetics practitioner: opportunities, challenges, and best practices. *Journal of the Academy of Nutrition and Dietetics, 116*(11), 1825-1835. doi: 10.1016/j.jand.2016.09.003

Hull, M. V., Jagim, A. R., Oliver, J. M., Greenwood, M., Busteed, D. R., & Jones, M. T. (2016). Gender differences and access to a sports dietitian influence dietary habits of collegiate athletes. *Journal of the International Society of Sports Nutrition, 13*, 38. doi: 10.1186/s12970-016-0149-4

Jacobson, B. H., Sobonya, C., & Ransone, J. (2001). Nutrition practices and knowledge of college varsity athletes: a follow-up. *The Journal of Strength & Conditioning Research, 15*(1), 63-68. doi: 10.1519/1533-4287(2001)015<0063:NPAKOC>2.0.CO;2

Judge, L. W., Kumley, R. F., Bellar, D. M., Pike, K. L., Pierson, E. E., Weidner, T., . . . Friesen, C. A. (2016). Hydration and fluid replacement knowledge, attitudes, barriers, and behaviors of NCAA division 1 American football players. *The Journal of Strength & Conditioning Research, 30*(11), 2972-2978. doi: 10.1519/JSC.0000000000001397

Khoo, C. S. (2014). Issues in information behaviour on social media. *Library & Information Science Research, 24*(2), 75.

Lampe, C., Vitak, J., Gray, R., & Ellison, N. B. (2012). *Perceptions of Facebook's value as an information source*.

Lis, D. M., Stellingwerff, T., Shing, C. M., Ahuja, K. D., & Fell, J. W. (2015). Exploring the popularity, experiences, and beliefs surrounding gluten-free diets in nonceliac athletes. *International Journal of Sport Nutrition and Exercise Metabolism, 25*(1), 37-45. doi: 10.1123/ijsnem.2013-0247

Malinauskas, B. M., Overton, R. F., Carraway, V. G., & Cash, B. C. (2007). Supplements of interest for sport-related injury and sources of supplement information among college athletes. *Advances in Medical Sciences, 52*, 50-54.

McCully, S. N., Don, B. P., & Updegraff, J. A. (2013). Using the internet to help with diet, weight, and physical activity: results from the Health Information National Trends Survey (HINTS). *Journal of Medical Internet Research, 15*(8), e148. doi: 10.2196/jmir.2612

Ministry of Health. (2017). How much activity is recommended? Retrieved 6 Jul 2017, 2017, from http://www.health.govt.nz/your-health/healthy-living/food-and-physical-activity/physical-activity/how-much-activity-recommended

Moorhead, S. A., Hazlett, D. E., Harrison, L., Carroll, J. K., Irwin, A., & Hoving, C. (2013). A new dimension of health care: systematic review of the uses, benefits, and limitations of social media for health communication. *Journal of Medical Internet Research, 15*(4), e85. doi: 10.2196/jmir.1933

Oh, S., & Kim, S. (2014). College students' use of social media for health in the USA and Korea. *Information Research, 19*(4), n4.

Pálsdóttir, Á. (2014). Preferences in the use of social media for seeking and communicating health and lifestyle information. *Information Research, 19*(4), n4.

Pempek, T. A., Yermolayeva, Y. A., & Calvert, S. L. (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology, 30*(3), 227-238. doi: 10.1016/j.appdev.2008.12.010

Pollard, C. M., Pulker, C. E., Meng, X., Kerr, D. A., & Scott, J. A. (2015). Who uses the Internet as a source of nutrition and dietary information? An Australian population perspective. *Journal of Medical Internet Research, 17*(8), e209. doi: 10.2196/jmir.4548

Ramaswami, C., Murugathasan, M., Narayanasamy, P., & Khoo, C. S. (2014). A survey of information sharing on Facebook. *Information Research, 19*(4).

Sensis. (2016). Sensis social Media report 2016: how Australian people and businesses are using social media. Melbourne, Australia: Sensis.

Shifflett, B., Timm, C., & Kahanov, L. (2002). Understanding of athletes' nutritional needs among athletes, coaches, and athletic trainers. *Research Quarterly for Exercise and Sport, 73*(3), 357-362. doi: 10.1080/02701367.2002.10609032

Sin, S.-C. J., & Kim, K.-S. (2013). International students' everyday life information seeking: the informational value of social networking sites. *Library & Information Science Research, 35*(2), 107-116. doi: 10.1016/j.lisr.2012.11.006

Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation, 27*(2), 237-246. doi: 10.1177/1098214005283748

Thomas, D. T., Erdman, K. A., & Burke, L. M. (2016). Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: nutrition and athletic performance. *Journal of the Academy of Nutrition and Dietetics, 116*(3), 501-528. doi: 10.1016/j.jand.2015.12.006

Torres-McGehee, T. M., Pritchett, K. L., Zippel, D., Minton, D. M., Cellamare, A., & Sibilia, M. (2012). Sports nutrition knowledge among collegiate athletes, coaches, athletic trainers, and strength and conditioning specialists. *Journal of Athletic Training, 47*(2), 205-211. doi: 10.4085/1062-6050-47.2.205

Trakman, G. L., Forsyth, A., Devlin, B. L., & Belski, R. (2016). A systematic review of athletes' and coaches' nutrition knowledge and reflections on the quality of current nutrition knowledge measures. *Nutrients, 8*(9). doi: 10.3390/nu8090570

Vaterlaus, J. M., Patten, E. V., Roche, C., & Young, J. A. (2015). #Gettinghealthy: the perceived influence of social media on young adult health behaviors. *Computers in Human Behavior, 45*, 151-157. doi: 10.1016/j.chb.2014.12.013

Visschers, V. H. M., Hartmann, C., Leins-Hess, R., Dohle, S., & Siegrist, M. (2013). A consumer segmentation of nutrition information use and its relation to food consumption behaviour. *Food Policy, 42*, 71-80. doi: 10.1016/j.foodpol.2013.07.003

Williamson, K., Qayyum, A., Hider, P., & Liu, Y.-H. (2012). Young adults and everyday-life information: the role of news media. *Library & Information Science Research, 34*(4), 258-264.

Zhang, Y., He, D., & Sang, Y. (2013). Facebook as a platform for health information and communication: a case study of a diabetes group. *Journal of Medical Systems, 37*(3), 9942. doi: 10.1007/s10916-013-9942-7

Zheng, Y. (2014). Patterns and motivations of young adults' health information acquisitions on Facebook. *Journal of Consumer Health on the Internet, 18*(2), 157-175. doi: 10.1080/15398285.2014.902275

Zilberman, D., & Kaplan, S. *What the adoption literature can teach us about social media and network effects on food choices*. Paper presented at the AAEA/EAAE/CAES Joint Symposium: Social Networks, Social Media and the Economics of Food, Montreal, Canada. 2014.

Zinn, C., Schofield, G., & Wall, C. (2006). Evaluation of sports nutrition knowledge of New Zealand premier club rugby coaches. *International Journal of Sport Nutrition and Exercise Metabolism*, *16*(2), 214-225. doi: 10.1123/ijsnem.16.2.214

Zuniga, K. E., Downey, D. L., McCluskey, R., & Rivers, C. A. (2016). Need for and Interest in a sports nutrition mobile device application among division I collegiate athletes. *International Journal of Sport Nutrition and Exercise Metabolism*, 1-20. doi: 10.1123/ijsnem.2015-0305

Table 1: Mean (SD) Demographics for age (years), physical activity (hours), count (%) by gender, ethnicity, education for Elite and Recreational athletes

		Total	Elite	Recreational
		n = 306	n = 87	n = 219
Age[a]		22.7 (3.7)	24.1 (5.2)	22.2 (2.8)***
Gender	Male	126 (41)	39 (45)	87 (40)
	Female	180 (59)	48 (55)	132 (60)
Ethnicity[a,]	Maori	29 (9)	11 (13)	18 (8)
	Pacific	19 (6)	5 (6)	14 (6)
	Asian	55 (18)	1 (1)	54 (25)***
	European/Other[b]	201 (66)	70 (80)	131 (60)***
Tertiary qualification[a,c]	No	145 (48)	39 (45)	106 (48)
	Yes	159 (52)	46 (53)	113 (52)
Athlete carding Level[d]	Level 1	-	28 (32)	-
	Level 2	-	33 (38)	-
	Level 3	-	26 (30)	-
Physical activity (hours per week)		-	-	8.6 (4.9)

[a] Some participants chose not to answer/left blank. [b] Other includes Australian, New Zealander, Middle Eastern, South African, South American. [c] Includes University or Polytechnic qualification. [d] Note level 1 indicates the highest athlete ranking.

* $p < 0.05$, ** $p < 0.01$ *** $p < 0.001$

Table 2: Count (%) for nutrition resources used in the last 12 months by elite and recreational athletes

Resource[a]	Total n = 306	Elite n = 87	Recreational n = 219
Internet	248 (81)	60 (69)	188 (86)**
Friends/Teammates	164 (54)	43 (49)	121 (55)
Social Media Platforms	153 (50)	32 (37)	121 (55)**
Parents/Family	107 (35)	26 (30)	81 (37)
Magazines/Popular Nutrition Books	94 (31)	24 (28)	70 (32)
HPSNZ Performance Nutritionist	76 (25)	76 (87)	-
Academic Journals/Nutrition Textbooks	52 (17)	10 (11)	42 (19)
Health Food Stores	50 (16)	14 (16)	36 (16)
Doctor/Nurse	48 (16)	8 (9)	40 (18)*
Strength and Conditioning Specialist	49 (16)	20 (23)	29 (13)*
Coach	49 (16)	20 (23)	29 (13)
Athletic Trainer	41 (13)	8 (9)	33 (15)
Dietitian	40 (13)	10 (11)	30 (14)
Workshops/Courses	36 (12)	13 (15)	23 (11)
Other Nutrition provider	23 (8)	11 (13)	12 (5)*
HPSNZ Medical Provider	7 (2)	7 (8)	-
Other[b]	2 (1)	2 (2)	0 (0)

[a] Multiple responses allowed [b] Includes nutrition qualification and mobile based nutrition application

* $p < 0.05$, ** $p < 0.01$ *** $p < 0.001$

Table 3: Binary logistic regression model estimating/predicting the association between athletes' use of social media for nutrition and age, gender, athlete status and education level (n=263)

Variable	Yes n (%)	No n (%)	Unadjusted *OR (95% C.I.)*	Adjusted model *OR (95% C.I.)*
Total	171 (65)	92 (35)		
Age ($\overline{x}$, *SD*)	22.5 (3.0)	23.5 (4.9)	1.06 (0.99–1.14)	1.07 (0.97–1.18)
Gender				
Male	55 (51)	52 (49)	-	-
Female	116 (74)	41 (26)	2.68 (1.59–4.50)***	2.65 (1.52–4.62)**
Ethnicity				
European/Other [a]	111 (63)	66 (37)	-	-
Maori	17 (65)	9 (35)	0.89 (0.38–2.11)	0.85 (0.34–2.11)
Pacific	14 (82)	3 (18)	0.36 (0.10–1.30)	0.26 (0.06–1.19)
Asian	29 (66)	15 (34)	0.87 (0.44–1.75)	1.00 (0.46–2.14)
Athlete				
Recreational	134 (71)	54 (29)	-	-
Elite	37 (49)	39 (51)	0.38 (0.22–0.66)**	0.44 (0.24–0.83)*
Tertiary Education				
No	79 (65)	43 (35)	-	-
Yes	92 (65)	49 (35)	1.02 (0.62–1.70)	1.18 (0.59–2.33)

Don't know or blank responses not included in analysis (n=39)

Model $\chi^2 = 30.748$, $df = 7$, $p < 0.001$

Note: SD = standard deviation SE = standard error, OR = odds ratio, CI = confidence interval. [a] Other includes Australian, New Zealander, Middle Eastern, South African, South American.

* $p < 0.05$, ** $p < 0.01$ *** $p < 0.001$

Table 4: Count (%) for athlete use of social media for nutrition

Topic[b]	Total n = 172[a]	Elite n = 37[a]	Recreational n = 135[a]
Recipes	137 (80)	32 (86)	105 (78)
Restaurants/cafes	107 (62)	25 (68)	82 (61)
Weight loss/maintenance	105 (61)	11 (30)	94 (70)***
Protein needs	86 (50)	11 (30)	75 (56)**
Meal posts	85 (49)	17 (46)	68 (50)
Fuelling during exercise	73 (42)	13 (35)	60 (44)
Recovery nutrition	54 (31)	15 (41)	39 (29)
Dietary supplements	50 (29)	6 (16)	44 (33)
Diet trends	48 (28)	8 (22)	40 (30)
Fluids/hydration	43 (25)	8 (22)	35 (26)
Carbohydrate needs	43 (25)	6 (16)	37 (27)
Nutrition for travel	28 (16)	10 (27)	18 (13)*
Injury nutrition	21 (12)	2 (5)	19 (14)
Other[c]	2 (1)	1 (3)	1 (1)

[a] Only includes participants who had indicated that they had used social media for nutrition in the last 12 months [b] Multiple responses allowed [c] Includes promoting vegetarian lifestyle, low carbohydrate high fat diet

* $p < 0.05$, ** $p < 0.01$ *** $p < 0.001$

Table 5 Count (%) for reasons for not choosing to use social media for nutrition information

Reason[a]	Total n = 306	Elite n = 87	Recreational n = 219
Unreliable information	250 (84)	67 (85)	183 (84)
Don't agree or believe in them	82 (28)	16 (20)	66 (30)
Prefer other sources	74 (25)	26 (33)	48 (22)
Not interested or not relevant	42 (14)	16 (20)	26 (12)
Security or privacy concerns	39 (13)	9 (11)	30 (14)
Time consuming	20 (7)	6 (8)	14 (6)
Don't know how	17 (6)	3 (4)	14 (6)
Other [b]	8 (3)	3 (4)	5 (2)

[a] Multiple responses allowed [b] Includes marketing/advertising concerns and information overload

* $p < 0.05$, ** $p < 0.01$ *** $p < 0.001$