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Consumption and reasons for use of dietary supplements in an Australian university population

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ABSTRACT

Objective: The aim of this study was to examine the association between dietary supplement use and sociodemographic factors in an Australian university population. Additionally, reasons for use of specific dietary supplements were explored.

Methods: A cross-sectional online questionnaire was completed by 1633 students and staff members of Griffith University, Queensland, Australia (76% female). The questionnaire collected information on sociodemographic characteristics, use of dietary supplements, and reasons for use of each dietary supplement reported. Multiple regression analyses were used to describe the relationship between demographic factors and dietary supplement use. Pearson χ^2 was used to identify correlations between frequency of dietary supplement use and selected demographic factors. Frequency distributions were used to explore the reasons for use of each dietary supplement reported.

Results: Vitamin or mineral use and use of "other" dietary supplements was reported by 69% and 63% of participants, respectively. Age, sex, ethnicity, and physical activity were independently associated with dietary supplement use. Age, sex, and income were associated with acute use of specific dietary supplements during illness or injury. The reasons for use of specific dietary supplements were closely aligned with marketed claims. Broad reasons of health were commonly reported for use of most dietary supplements.

Conclusions: Use of dietary supplements in this population reflects that of other countries. Individuals were unsure of the benefits and risks associated with dietary supplementation. Health professionals should account for dietary supplements when assessing diet. These results also warrant consideration by regulating bodies and public health officers to ensure safe practices.

Introduction

Dietary supplements provide concentrated nutrients to prevent, alleviate, enhance, or influence physiological processes within the body [1]. The use of dietary supplements is widespread, with reports indicating ≤75% of individuals in developed countries use one or more dietary supplements [2–4]. Despite their popularity, the benefits of dietary supplementation in general populations are equivocal [4–8]. The risks associated with dietary supplementation are well documented, and include contamination of ingredients, inadvertent outcomes, and undesirable side effects. Furthermore, promotion of supplements may include misleading nutrition labels and health claims [7–12].

A recent Australian health survey collected information about dietary supplements from a representative sample of adults [13]. Less than one-third of the sample reported to use a dietary supplement, with the highest proportion of users being women, aged >50 y. Multivitamins/multiminerals and fish oils were the most frequently reported supplements (16% and 12% of users, respectively) [13]. In comparison with other developed countries, the prevalence of dietary supplement use by Australian adults was low [2–4]. However, the study used 24-h recalls to assess dietary supplement use, which reduced the scope to investigate previous intake. Furthermore, the relationship between demographic characteristics and supplement use was

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only investigated based on age and sex, and did not include the full range of demographic factors known to influence dietary supplements use [13].

Factors such as education, age, sex, income, physical activity levels, and health status, are positively associated with dietary supplement use in international populations [2–4,6,14,15]. An influence of body mass index (BMI) and ethnicity is also recognized, although evidence is contradictory [2–4,6,14,15]. The association between education and dietary supplement use is evident; individuals who have attended tertiary education in almost any capacity may be twice as likely to take a dietary supplement [2,6,14]. Although these associations provide insight into what may influence overall dietary supplement use, they do not indicate the reasons why individuals choose to use dietary supplements.

Previously reported reasons for overall use of dietary supplements relate to improvement or maintenance of general health and physical performance [16–19]. However, these studies have focused on dietary supplementation broadly, and the reasons why individuals choose to use specific dietary supplements have not been thoroughly investigated. To further previous research, we included perceived effectiveness because it is likely to influence an individual's choice to use dietary supplements. Understanding why dietary supplements are used and the perceived benefits associated with use could help to improve and tailor health promotion and education, direct regulation of dietary supplements and associated marketing, and inform educational and sporting organizations about dietary supplement use.

Due to the strong positive influence of education on dietary supplement use, a tertiary institution was identified as a rich environment in which to explore dietary supplement practices in Australia. As such, the aim of this study was to explore which dietary supplements are most commonly used in a tertiary education environment, why individuals choose to use specific dietary supplements, and the perceived effectiveness of these dietary supplements among staff and students attending an Australian University.

Methods

A cross-sectional online questionnaire was conducted among students and staff from Griffith University. The study was conducted according to the guidelines in the Declaration of Helsinki and approved by the Griffith University Human Research Ethics Committee.

Participants

In all, 1633 participants (415 men and 1218 women) were involved from the potential participant pool of individuals enrolled as a student (n = 41 971) or listed as a staff member (n = 4346) during the first teaching semester of 2013 at Griffith University in Australia.

Data collection

An email containing study details, researcher contact details, and a link to the questionnaire was sent to students and staff in March 2013. The study was included in the fortnightly Griffith News email for the month of March. A summary of the questionnaire, ethics approval, and inferred consent were included on the first page of the questionnaire.

Questionnaire

The online questionnaire was developed using LimeSurvey version 1.9 after a review of the current literature and visits to local pharmacies, supermarkets, and health food stores to identify commonly available dietary supplements. A 59-item questionnaire was developed using a combination of multiple-choice questions and Likert scale questions. A tailored layout allowed participants to move through the questionnaire only answering relevant questions.

The questionnaire was comprised of four sections. Section 1 included information on sociodemographic and personal characteristics, including: age, sex, cultural/ethnic background, gross income, university member status, BMI, body composition changes and weight history, and physical activity. Section 2 focused on the use of vitamin and mineral supplements. Participants were asked if they had taken any vitamin/mineral supplements in the previous 6 mo. This was identified as an appropriate time frame to capture both chronic dietary supplement use, and acute dietary supplement use, which may be infrequent or seasonal. Vitamin and mineral supplements investigated were: multivitamins/multiminerals; specialty multivitamins; vitamin A; B-group vitamins; vitamins C, D, E, and K; iron; magnesium; calcium; zinc; folic acid; selenium; potassium; iodine; and fluoride. Section 3 followed a similar format for "other" dietary supplements classified as non-vitamin/non-mineral dietary supplements. Non-vitamin/non-mineral dietary supplements investigated were fish oil, probiotics, herbal supplements, fiber, protein powders, protein bars, flaxseed oil (or similar products), glucosamine/chondroitin, amino acids, coenzyme Q10, and chromium. Each participant was asked if the supplements were taken: never, when sick, monthly, weekly, or daily.

For each supplement that participants reported to use, reasons for use were investigated using multiple-choice answers. Answer options were: "to help meet my nutrition needs," "to be healthy," "because I was told to," "to alleviate symptoms of an illness/injury," "to increase immune strength," "to assist recovery from an illness/injury," as well as specific indications for supplements such as "for bone strength" for calcium, and "energy" or "women's health" for specialty multivitamins. Participants were able to select more than one answer for each dietary supplement they used. An open-ended option was provided for answers not listed.

The fourth section asked participants about dietary supplement practices and beliefs. Participants were asked if they believed the supplements they used to be effective. Answer options included "no," "unsure," and "yes." Participants were asked whether they had experienced any undesirable effects from using dietary supplements and if so, whether they continued to use that supplement. Finally, participants were asked whether they mentioned their dietary supplement use to their doctor. Answers for these questions were all dichotomous "yes" or "no" with an open-ended section to provide comments if required by the participant.

The questionnaire was pretested among six students and five staff members. Recommendations for changes to question wording for the purposes of maximizing interpretation and understanding of questions were completed before data collection. The final survey was anticipated to take 15 min to complete and was only available in English.

Data analysis

Univariate analysis consisted of the frequency of distribution of all sociodemographic and personal characteristic variables. The proportions for the categorical variables were calculated. Open-ended responses were tallied and recoded where appropriate. Additionally, mean ± SD were calculated for open numerical questions and calculated numerical questions. Initially, univariate logistic regression analysis was conducted to assess the association of each of the sociodemographic and personal characteristic variables (age, sex, university member, ethnicity, student status, primary area of work, income, and exercise) with overall vitamin/mineral supplement use. Second, a multiple logistic regression analysis was conducted to examine the independent association of each independent variable, adjusted for all other sociodemographic variables to examine independent association with the overall use of vitamin/mineral supplements.

Similar analyses were carried out to assess the association between use of total non-vitamin/non-mineral supplements and various sociodemographic and personal characteristics. For those variables that showed significant independent associations with overall vitamin/mineral and non-vitamin/non-mineral supplement use (age, sex, ethnicity, and exercise), multiple regression analysis was conducted to further examine their association with individual dietary supplement use. In this analysis, all other sociodemographic variables were adjusted for in the univariate model.

Descriptive statistics were used to investigate frequency of dietary supplement use. Responders were categorized as either regular users ("daily," "weekly," or "monthly" use) or "when sick." Pearson χ^2 tests were conducted to identify differences in frequency of consumption for age, sex, and income. Dietary supplements with <15% of users reporting frequency of use when sick were excluded from this analysis.

Frequency distributions were calculated for each reason for use of the dietary supplements investigated. The three most frequently reported reasons were included for analysis as participants could select more than one reason for each supplement during the questionnaire. In this analysis, any dietary supplement with a prevalence of <15% use was excluded. $P \leq 0.05$ was considered statistically significant. The statistical analysis was performed using SPSS statistical software (SPSS for Windows, version 20.1, SPSS Inc, Chicago, IL, USA).