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Research report

Vitamin and mineral supplement users. Do they have healthy or unhealthy dietary behaviours?☆

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ABSTRACT

It is unknown whether people use vitamin and mineral supplements (VMS) to compensate for unhealthy diets, or people whom already have a healthy diet use VMS. Therefore, this study aimed to examine correlates of VMS use and whether VMS users can be categorised into specific clusters based on dietary lifestyle variables. The data used came from the Swiss Food Panel questionnaire for 2010. The sample consisted of 6189 respondents, mean age was 54 years and 47.6% were males. Data was analysed with logistic regression analysis and hierarchical cluster analysis. The results revealed that for VMS use, gender, age, education, chronic illness, health consciousness, benefits of fortification, convenience food and sugar-sweetened beverage consumption were of importance. Cluster analysis revealed three clusters (1) healthy diet, (2) unhealthy diet and (3) modest diet. Compared to non-users a higher percentage of VMS users was categorised in the healthy cluster and a lower percentage in the unhealthy cluster. More VMS-users were categorised as having an unhealthy diet (31.4%) than having a healthy diet (20.6%). The results suggest that both hypotheses-VMS are used by people with unhealthy diets and by people who least need them-hold true meaning.

Introduction

The use of vitamin and mineral supplements (VMS) is increasingly common in the general population. In several European countries, the prevalence of VMS use varies around 15-20% (de Jong, Ocke, Branderhorst, & Friele, 2003; Marques-Vidal et al., 2000, 2009). VMS might contribute to healthy nutrition patterns and represent an important source of nutrition. Some population groups are at risk for marginal nutrient intakes and benefit from a multivitamin supplement per day (Beitz, Mensink, Fischer, & Thamm, 2002; Kiely et al., 2001; Schwarzpaul, Strassburg, Luhrmann, & Neuhauser-Berthold, 2006). In some, but not all studies, the use of multivitamins has been associated with a reduced risk of chronic diseases, such as a reduced risk of cardiovascular diseases (Holmquist, Larsson, Wolk, & de Faire, 2003; Rimm et al., 1998) and colorectal cancer (Giovannucci et al., 1995, 1998; Jacobs et al., 2003). Other benefits of vitamins and minerals are also clear, such as folic acid's protection against neural-tube defects (Pitkin, 2007). On the other hand, vitamin and mineral supplements are of concern because of potential adverse effects due to high intake (Celotti & Bignamini, 1999; Coppens, da Silva, & Pettman, 2006; Halsted, 2003; Hathcock, 1997).

It is recognized that VMS consumers may be the ones who least need them. The intake of fruits, vegetables and micronutrients from food have been found higher in VMS users, and VMS users often have healthier diets (Harrison, Holt, Pattison, & Elton, 2004; Kiely et al., 2001; Mason, 2007; Murphy, White, Park, & Sharma, 2007; Rock, 2007; Stang, Story, Harnack, & Neumark-Sztainer, 2000) and lifestyle patterns such as higher physical activity and non-smoking (Kim et al., 2010; Kirk, Cade, Barrett, & Conner, 1999; Mullie, Clarys, Hulens, & Vansant, 2011; Rock, 2007). Many adult VMS users believe that vitamin supplements make them feel better, give them more energy, improve health and prevent or treat illnesses (NIH State-of-the-Science Panel (2006). As well, according to several older studies, dietary supplements may be used to compensate for an unhealthy lifestyle or the presumption that one's diet is unbalanced (de Jong et al., 2003; Radimer, Subar, & Thompson, 2000; Touvier, Boutron-Ruault, Volatier, & Martin, 2005; Wallström et al., 1996). For instance, de Jong et al. found that 48% of VMS users agreed that the use of the product is an easy way to stay healthy (de Jong et al., 2003). From the presented literature, VMS use appears more pronounced in persons with a relatively healthy lifestyle, while on the other hand these products might also be consumed to compensate for an unhealthy lifestyle (Landstrom, Hursti, & Magnusson, 2009; Touvier et al., 2005). Therefore, the aims of this study were (1) to examine correlates of VMS use and (2) to investigate if specific clusters of dietary lifestyle

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variables, such as fruit, vegetable and snack consumption, could be identified in VMS consumers.

Methods

Participants and procedure

This study was part of the Swiss Food Panel, a longitudinal study regarding the eating behaviour of the Swiss population. Baseline data collection started in February 2010. A mail survey was sent out to 20,912 randomly selected household addresses from the telephone book in the German- and French-speaking parts of Switzerland. One reminder was sent with another copy of the questionnaire after 5 weeks to persons who had not yet responded. The response rate was 30.1% (n = 6290). Participants with missing values on the ID variable or both key variables of age and gender (n = 101) were deleted from the sample, resulting in a sample size of 6,189 (29.6%). In this sample, 47.6% of the participants were male, and the mean age was 54.4 years old (sd = 15.3, range 20–99). Compared to the general Swiss population (Swiss Federal Statistical Office, 2009), fewer males participated in the study (census = 49.2%) and more participants had a higher secondary or college/university degree. In addition, a lower percentage of young adults (20–39 years old) participated in the study (18.1% vs. 33.7%).

Non-response analysis

A telephone survey was conducted to examine demographic background variables and reasons for not responding. Out of the 200 non-responders, 72% (n = 144) were reached. Compared to the Swiss Food Panel participants, non-responders were more likely to be male (56.3% vs. 47.6%), to have a lower educational level (primary or lower secondary school 22.0% vs. 7.1%). Nationality (Swiss 83.8% vs. 82.7%) and mean age (51.4 vs. 55.4) were comparable between responders and non-responders.

Measures

In a separate study, most food frequency items included in the Swiss Food Panel were examined on two-week test–retest reliability. Data was analysed for 247 people who responded to both questionnaires, and test–retest correlations are reported in the following description the dietary behaviours.

VMS consumption

VMS use was assessed with one food frequency item: "On average, how often do you take vitamin or mineral pills?" on a 6-point answering scale (daily, several times per week, several times per month, several times per year, less or never, do not know). Two-week test–retest reliability for this item was r = .72. Respondents were categorised into two groups: taking VMS at least several times per week and taking VMS less than several times per week.

Health status and attitudes

Chronic disease was assessed with one item: "Do you have a chronic illness (yes/no)". Perceived health status was assessed with the following question: "Which of the following best describes your overall health?" on a 5-point scale ranging from poor to excellent. Health consciousness related to eating was assessed with four items (e.g. "I think it is important to eat healthy") on a six-point scale ranging from 1 = "do not agree at all" to 6 = "agree very much" (Schifferstein & Ophuis, 1998). Cronbach's alpha for the health consciousness scale was 0.79. Attitudes related to the perceived benefits and risks of fortification were assessed with five items on a six-point scale ranging from 1 = "do not agree at all" to 6 = "agree very much", that were based on questionnaires on functional foods/foods with health claims (Herath, Cranfield, & Henson, 2008; Landstrom, Hursti, Becker, & Magnusson, 2007; Urala & Lahteenmaki, 2007). Three items assessed the benefits of fortification (Cronbach's alpha = 0.75): "Foods that are fortified with vitamins and minerals promote my well-being", "My performance improves when I eat foods fortified with vitamins and minerals", and "It is important for your health to take vitamin and/or nutritional supplements regularly". Perceived risks of fortification were assessed with two items (Cronbach's alpha = 0.84): "In some cases foods that are fortified with vitamins and minerals may be harmful for healthy people", and "The new properties of foods that are fortified with vitamins and minerals carry unforeseen risks".

Dietary behaviours

Vegetable consumption was assessed with four items assessing the consumption frequency and portions of vegetables and salads. The frequency items were as follows: "On average, how often do you eat (1) vegetables (cooked/steamed) and (2) salad (lettuce, tomatoes) or raw vegetables", with a two week test-retest reliability of r = .75 and r = .77, respectively. Portions were assessed as follows: "On days that you eat vegetables/salad or raw vegetables, how many portions do you eat on average (one portion = a handful or 50 g)", with a two week test–retest reliability of r = .65 and r = .59, respectively. These items were combined to reflect vegetable servings consumed per day.

Fruit consumption was assessed with two items: "On average, how often do you eat fruit?" (daily, 4–6 × per week, 1–3 × per week, 1–3 × per month, less or never) and "On a day that you eat fruit, how many portions (1 piece or one handful) do you eat on average?" with a two week test–retest reliability of r = .83 and r = .59, respectively. These two items were combined to reflect the fruit consumption (pieces) per day.

Convenience food consumption (Cronbach's alpha = .71) was assessed with nine frequency items: "On average, how often do you eat (1) pre-packed sandwiches, (2) pizza (chilled/frozen), (3) pizza (take-away/home delivery), (4) a meal in a can, (5) ready meals (frozen/chilled), (6) instant noodles or pasta in a can, (7) instant noodles or pasta with powder sauce in a bag, (8) soup, ready to heat, (9) washed and cut salad in a bag", on a 5-point answering scale (daily, several times per week, several times per month, several times per year, less or never) (Brunner, van der Horst, & Siegrist, 2010; van der Horst, Brunner, & Siegrist, 2011). Two-week test–retest reliability for these items varied between r = .61 and r = .89.

Snack consumption was assessed with four frequency items: "On average how often do you eat (1) cookies, (2) chocolate, (3) sweet pastries and (4) salty snacks?" on a 6-point answering scale (several times per day, once a day, several times per week, several times per month, several times per year, less or never). Cronbach's alpha for this scale was 0.71 and two week test–retest reliability varied between r = .72 and r = .75.

Sugar sweetened beverage consumption was assessed with one frequency item: "On average how often do you drink sugar-sweetened beverages?" on a 6-point answering scale (several times per day, once a day, several times per week, several times per month, several times per year, less or never). Two week test–retest reliability was r = .81.

Wine/beer consumption was assessed with two items: "On average how often do you drink (1) wine and (2) beer?" on a 6-point answering scale (several times per day, once a day, several times per week, several times per month, several times per year,