

*Full Length Research Paper*

# **Dietitians in the Netherlands and dietary supplements: Practices, personal use and beliefs**

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**The use of dietary supplements is increasingly common in the United States and Europe. Dietitians are among the health care professionals regarded as experts on healthy diet and lifestyle and as such, their recommendations and beliefs regarding dietary supplements may have a significant influence on the use of dietary supplements by consumers. Recommending practices, personal use and beliefs were evaluated in this cross-sectional pilot study. 64% reported using dietary supplements, sometimes, often or very often, themselves for prevention of a health condition, 60% for treatment of a health condition and 44% for enhancing physical or mental performance. 71% indicated recommending supplements sometimes, often or very often for prevention, 82% for treatment of a health condition and 43% for enhancement of performance. Dietary supplements were considered at least moderately safe by 94% of the participating dietitians, while 75% of the dietitians considered dietary supplements at least moderately effective in preventing a health condition, 91% for treatment of a health condition and 59% for performance enhancement.**

**Key words:** Dietary supplements, dietitians, CAM therapy, mineral supplements.

## **INTRODUCTION**

The use of dietary supplements is increasingly commonly in the United States, with prevalence as high as 73%, Europe and the Netherlands (Ocké et al., 2005; Skeie et al., 2009; Timbo et al., 2006). A considerable part of adults that take dietary supplements report regular use of multivitamin-multimineral supplement (Rock, 2007). For many Americans using mineral and vitamin products to supplement their daily intake is a common health practice (Balluz et al., 2000). Mineral and vitamin products also increasingly take a more important place in the total nutrient intake in the Netherlands (Kloosterman et al., 2007). Dietary supplements are widely available over-the-counter in the Netherlands, at stores ranging from supermarkets to specialized internet shops. The preparation, formulation, labeling and advertising of dietary supplements is regulated by two Dutch Commodity Acts. They also specify the distinction of herbal supplements, containing parts of plant or extracts, and, following a 2002 European Union (EU) Directive, nutrient-based supplements, containing vitamins and minerals (micronutrients) (Staatsblad, 2001; Staatsblad, 2003; Official Journal, 2002).

Several other dietary supplements are also used, including protein blends, amino acids, enzymes, fatty acids and probiotics. The common availability, without

prescription, of dietary supplements, may lead consumers to select their own dietary supplements to prevent and/or treat any health problems (Lederman et al., 2009). The title 'dietitian' is in the Netherlands reserved for graduates of the 4 years Bachelor program 'Nutrition and Dietetics'. This program is taught at a University of Applied Sciences. Patients are referred to a dietitian by a dentist or physician, such as a general practitioner (Dutch Association of Dietitians - Nederlandse Vereniging van Diëtisten, 2010). Dietitians are among the health care professionals regarded as experts on healthy diet and lifestyle (Steyn et al., 2005). As such, recommendations and beliefs of dietitians regarding dietary supplements may have a significant influence on the use of dietary supplements by consumers. Several studies have been conducted among health care professionals and dietitians concerning the personal use, beliefs and recommendation practices regarding dietary supplements (Lederman et al., 2009; Dickson et al., 2009). Although dietitians rated 'taking vitamin supplements' as of the lowest importance of 25 health-promoting practices, a study undertaken in Washington State revealed that nearly 60% of dietitians used a dietary supplement themselves (Vickery and Cotugna, 1990; Worthington-Roberts and Breskins, 1984).

To our knowledge no comparable study has been conducted in the Netherlands. The objective of this pilot study therefore, was to evaluate the personal use, recommendations to others and beliefs regarding dietary supplements.

## MATERIALS AND METHODS

### Recruitment of subjects

A cross-sectional design was used to assess recommendations, personal use and beliefs regarding dietary supplements among dietitians in the Netherlands. Five hundred dietitians were randomly selected, using a computer clock driven pseudorandom number generator, from those members of the Dutch Association of Dietitians (Dutch Association of Dietitians - Nederlandse Vereniging van Diëtisten) having registered an e-mail address in the public database. The Dutch Association of Dietitians is the largest association of dietitians in the Netherlands and almost 80% of the registered dietitians in the Netherlands are member of this association. The 500 selected persons were invited by e-mail to take an online survey.

The invitation contained information regarding the nature of the survey and instructions on how to participate. To improve response rates and facilitate sending the invitation to a large number of dietitians at once, no registration with personal information was required and a unique PIN code was not assigned. A time limit was not imposed on finishing the questionnaire response; however, it was only registered for a period of 21 days after sending the invitation.

### Design of the questionnaire

The questionnaire consisted partly of questions, adapted and translated to Dutch, as published by Lederman et al., to facilitate comparability (Lederman et al., 2009). The questions were both close-ended and open-ended. An odd-numbered Likert scale (1 = not at all and 5 = very often) was used to determine how often the participants would personally use or recommend dietary supplements to prevent a health condition, to treat a health condition and to enhance physical or mental performance. If one of these reasons was answered with a value of 2 through 5, participants could select the one or more dietary supplements they had recommended or personally used in the past 5 years out of 27 supplements.

Optionally a textbox 'Other' was also provided. Participants were also asked to indicate how safe they considered the use of dietary supplements (1 = not safe at all and 5 = very safe) and how effective they thought dietary supplements were to prevent a health condition, to treat a health condition or to enhance physical or mental performance (1 = not effective at all and 5 = very effective).

### Demographic variables

To determine professional and demographic characteristics, questions concerning age, gender and highest received education level were also included. Additionally participants were asked which patient categories they treated (children, youth, adults or seniors), where in the Netherlands they practiced, how long they had been working as a dietitian and if they practiced CAM therapy (yes/no, including phytotherapy and homeopathy).

### Data analysis

All data was gathered in May, 2010 with PHPSurveyor and analyzed using IBM SPSS Statistics for Windows (version 19.0.0).

Percentages concerning personal use and recommending practices represent the number of respondents reporting their personal use or recommendation as fraction of the total number of respondents. Based on distribution of the data, correlations were determined using the Pearson correlation coefficient, groups were compared with the Students *t*-test and frequencies with McNemar's test.

## RESULTS

### Demographic characteristics

All but one of the 95 dietitians who completed the questionnaire (19%) were female (99%) with a mean age of 41.8 years (SD 10.5). The majority of the respondents had received their highest level of education at the University of Applied Sciences (95%), the institution designated for training dietitians in the Netherlands. A small percentage had obtained additional education at University Bachelor (3%) or Master level (2%). 24% of the respondents were less than 5 years employed as dietitian, 33% between 5 and 15 years, 23% between 15 and 25 years and 20% more than 25 years. One tenth of the participants practiced in the three least populated Northern provinces (Groningen, Friesland and Drenthe) and 40% in the western provinces North-Holland, South-Holland and Utrecht. 26% practiced in the southern provinces Limburg, North Brabant and Zeeland, the remaining 24% in Overijssel, Flevoland and Gelderland. Of the respondents most treated adults (98%), seniors were treated by 91%, teens by 90% and children were treated by 83%. 11% of the participants communicated practicing CAM therapy.

### Practices, personal use and beliefs regarding dietary supplements

On average, dietitians used dietary supplements personally for the various reasons between not often and sometimes (Table 1). 38% of the respondents reported using dietary supplements often or very often for prevention of a health condition, 22% for treatment of a health condition and almost 13% for enhancing physical or mental performance. 64% reported using dietary supplements, sometimes, often or very often, themselves for prevention of a health condition, 60% for treatment of a health condition and 44% for enhancing performance. 42% of the participants often recommended dietary supplements for preventing a health condition to others, almost 36% often recommended dietary supplements for treatment and 16% for performance enhancement. 71% indicated recommending supplements sometimes, often or very often for prevention, 82% for treatment of a health condition and 43% for enhancement of physical or mental performance.

Dietary supplements were considered at least moderately safe by 94% of the participating dietitians, while 6% considered supplements not very safe or not

**Table 1.** Practices, personal use and beliefs regarding dietary supplements of Dutch dietitians.

	Mean $\pm$ SD
<b>Personal use<sup>a</sup></b>	
Prevention of a health condition	2.9 $\pm$ 1.4
Treatment of a health condition	2.6 $\pm$ 1.2
Enhance physical or mental performance	2.2 $\pm$ 1.2
<b>Recommendation<sup>a</sup></b>	
Prevention of a health condition	3.0 $\pm$ 1.2
Treatment of a health condition	3.2 $\pm$ 0.9
Enhance physical or mental performance	2.2 $\pm$ 1.2
<b>Beliefs</b>	
Safety <sup>b</sup>	3.3 $\pm$ 0.6
Effectiveness for prevention of a health condition <sup>c</sup>	3.1 $\pm$ 0.9
Effectiveness for treatment of a health condition <sup>c</sup>	3.3 $\pm$ 0.7
Effectiveness for enhancing physical or mental performance <sup>c</sup>	2.7 $\pm$ 0.9

<sup>a</sup> 1 = never, 2 = not often, 3 = sometimes, 4 = often, 5 = very often.

<sup>b</sup> 1 = not safe at all, 2 = not very safe, 3 = moderately safe, 4 = safe, 5 = very safe.

<sup>c</sup> 1 = not effective at all, 2 = not very effective, 3 = moderately effective, 4 = effective, 5 = very effective.

safe at all. On average, dietary supplements were considered most effective for treating a health condition, 32% scored their effectiveness for this purpose at least effective. Dietary supplements were deemed not very effective or not effective at all by 25% for the purpose of prevention, by almost 10% for treating a health condition and by 41% for physical or mental performance enhancement.

### Personal use of dietary supplements

84% of the respondents reported having used a vitamin supplement, while 60% reported having used a mineral supplement (which both includes multivitamin-mineral supplements) in the past 5 years. More than two-thirds of the participants (70%) used a vitamin supplement themselves to prevent a health condition, while 52% used a vitamin supplement to treat a health condition and 51% to enhance physical or mental performance (Table 2). Vitamins most commonly used for the entire above reasons included multivitamins, vitamin D, C and B complex. Mineral supplement use was reported by 45% of the respondents for prevention, by 44% for treatment and 28% for performance enhancement. The most commonly used minerals were calcium, iron and magnesium. Use of protein or amino acid supplements was not reported for performance enhancement, and by just 3% for prevention and 1% for treatment of a health condition. A formula including both vitamins and minerals was personally used by 35% for prevention and by 23 and 22% for treatment and performance enhancement.

Other nutrient-based supplements, including the most

often reported essential fatty acids, probiotics and coenzyme Q10, were used by 42 and 44% for prevention and treatment and 17% for performance enhancement. Personal use of herbal-based supplements was reported by 18%, significantly less than vitamin ( $p < 0.001$ ) or mineral supplements ( $p < 0.001$ ). The most often reported herbal-based supplements included single-celled algae *Chlorella* or *Spirulina* and Green Tea.

### Recommending practices regarding dietary supplements

97% of the respondents reported recommending a vitamin supplement, therefore more than 81% reported recommending a vitamin supplement to others for the purpose of preventing a health condition (Table 3). 85% recommend vitamins for treatment of a health condition, while 55% recommended them for enhancement of physical or mental performance. Vitamin D was the most commonly recommended vitamin supplement for preventing a health condition, followed by multivitamins, vitamin B complex and vitamin C. For performance enhancement multivitamin supplements were recommended the most, for treatment Vitamin D was recommended the most. More than 40% reported recommending calcium for prevention and treatment. 84 dietitians indicated recommending mineral supplements.

Supplements containing both vitamins and minerals (Multivitamin-mineral complex) were recommended by 39% for prevention, 46% for treatment and 28% for performance enhancement. Protein and amino acid

**Table 2.** Dietary supplements used personally in the last 5 years by dietitians.

	Reported personal use (%)		
	Prevention	Treatment	Enhancement
<b>Any vitamin supplement<sup>a</sup></b>	<b>69.5</b>	<b>51.6</b>	<b>50.5</b>
Multivitamin complex	31.6	20.0	21.1
Vitamin D	29.5	16.8	8.4
Vitamin C	24.2	13.7	10.5
Vitamin B complex	14.7	18.9	9.5
<b>Any mineral supplement<sup>a</sup></b>	<b>45.3</b>	<b>44.2</b>	<b>28.3</b>
Calcium	16.8	12.6	2.1
Iron	12.6	14.7	4.2
Magnesium	11.6	8.4	3.2
<b>Any protein/amino acid supplement</b>	<b>3.2</b>	<b>1.1</b>	<b>0.0</b>
<b>Any other nutrient-based supplement<sup>b</sup></b>	<b>42.1</b>	<b>44.2</b>	<b>16.8</b>
Multivitamin-mineral complex	34.7	23.2	22.1
Essential fatty acids	30.5	21.1	8.4
Probiotics	27.4	31.6	7.4
Coenzyme Q10	5.3	1.1	6.3
<b>Any herbal supplement</b>	<b>12.6</b>	<b>7.4</b>	<b>5.3</b>
Chlorella of Spirulina	3.2	1.1	0.0
Green tea	4.2	1.1	2.1

<sup>a</sup> Includes multivitamin-mineral complex; <sup>b</sup> excluding multivitamin-mineral complex.

supplement were recommended most often for treatment of a health condition (6%). Almost half of the participants reported recommending the other nutrient-based supplements to others for preventing a health condition, probiotics and essential fatty acids being recommended most often (both 39%). 71% recommended any of the other nutrient-based supplements for treatment of a health condition, while 23% recommended these supplements for physical or mental performance enhancement. Herbal-based supplements were recommended by 13% of the dietitians, significantly less than vitamin ( $p < 0.001$ ) or mineral supplements ( $p < 0.001$ ). Green Tea was recommended the most for all of the mentioned purposes, followed by St. John's Wort.

### Correlations and relationships

Personal use of dietary supplements for the prevention of a health condition was positively correlated with recommending them for prevention ( $r = 0.634$ ,  $p < 0.0005$ ) or treatment of a health condition ( $r = 0.332$ ,  $p = 0.001$ ) and enhancement of physical or mental performance ( $r = 0.249$ ,  $p = 0.015$ ). Personal use for treatment of a health condition was positively correlated with recommending dietary supplements for treatment ( $r = 0.473$ ,  $p < 0.0005$ ) and enhancement of performance

( $r = 0.326$ ,  $p = 0.001$ ). Also, personal use of supplements for performance enhancement was positively with recommending them for treatment ( $r = 0.331$ ,  $p = 0.001$ ) and performance enhancement ( $r = 0.642$ ,  $p < 0.0005$ ).

Dietitians that indicated practicing CAM therapy tended to use dietary supplements personally for the treatment of a health condition ( $t = 4.998$ ,  $p = 0.0001$ ) and physical or mental performance enhancement ( $t = 3.435$ ,  $p = 0.004$ ) more often. Practicing CAM therapy was also positively associated with beliefs regarding safety ( $t = 2.570$ ,  $p = 0.023$ ), effectiveness for the treatment of a health condition ( $t = 2.166$ ,  $p = 0.033$ ) and performance enhancement ( $t = 1.994$ ,  $p = 0.049$ ). Although not statistically significant data also suggests a positive association with personal use for prevention ( $t = 1.806$ ,  $p = 0.094$ ) and recommending dietary supplements for treatment of a health condition ( $t = 1.999$ ,  $p = 0.069$ ) or performance enhancement ( $t = 1.847$ ,  $p = 0.090$ ).

### DISCUSSION

The response rate of 19% is at the lower end of the range described in similar studies in the United States and Europe (Lederman et al., 2009; Jong et al., 2004). Results show however, that response rates of web surveys are often lower compared with other survey

**Table 3.** Dietary supplements recommended in the last 5 years by dietitians.

	Recommended by (%)		
	Prevention	Treatment	Enhancement
<b>Any vitamin supplement<sup>a</sup></b>	<b>81.1</b>	<b>85.3</b>	<b>54.7</b>
Vitamin D	61.1	56.8	13.7
Multivitamin complex	36.8	41.1	28.4
Vitamin B complex	24.2	34.7	15.8
Vitamin C	17.9	24.2	10.5
<b>Any mineral supplement<sup>a</sup></b>	<b>63.2</b>	<b>73.7</b>	<b>40.0</b>
Calcium	42.1	43.2	6.3
Iron	18.9	32.6	8.4
Magnesium	9.5	18.9	8.4
<b>Any protein/amino acid supplement</b>	<b>1.1</b>	<b>6.3</b>	<b>4.2</b>
<b>Any other nutrient-based supplement<sup>b</sup></b>	<b>49.5</b>	<b>70.5</b>	<b>23.2</b>
Probiotics	38.9	65.3	10.5
Essential fatty acids	38.9	49.5	15.8
Multivitamin-mineral complex	38.9	46.3	28.4
Coenzyme Q10	3.2	6.3	8.4
<b>Any herbal supplement</b>	<b>7.4</b>	<b>8.4</b>	<b>4.2</b>
Green thea	4.2	5.3	3.2
Chlorella of Spirulina	3.2	1.1	0.0
St. John's Wort	3.2	4.2	1.1

<sup>a</sup> Includes vitamin supplements and multivitamin-mineral complex. <sup>b</sup> Excluding multivitamin-mineral complex.

types, which may result in nonresponse bias (Shih and Xitao, 2008; Leeuw, 2009). The omission of a reminder may also have influenced the response. A 2004 mail survey, which also used a reminder, among Dutch dietitians showed similar gender, age and work experience characteristics, which supports the usefulness of the collected data (Jong et al., 2004). National food consumption surveys (DNFCS) in the Netherlands in 2003, found a prevalence of 27% of dietary supplement use in the general population (Ocké et al., 2005). In the DNFCS, respondents were considered supplement users when they reported the use of supplements on one or both of the non-consecutive survey days. The rate of personal use (often or very often) in this study is seems higher with a prevalence of 38% for prevention of a health condition. The 2003 surveys also determined that 16.0% used multivitamin-mineral supplements, while our data suggests that use by dietitians might be as high as 35% for certain purposes.

The DNFCS also indicated the prevalence of vitamin B complex use to be 2.1%, while dietitians in our study reported the use to be between 9.5 and 18.9%. The Lederman et al. study found a higher popularity of herbal supplements than our data suggests, with the most popular supplement being recommended in the last 5 months by 58% of the respondents, while the participants

of this survey seem to have recommended herbal-based supplements considerably less often. Dietitians showed a high prevalence of dietary supplement use. They recommend dietary supplements primarily for prevention or treatment of a health condition. Personal use correlated in varying degrees with recommending practices. Dietitians practicing CAM therapy tended to use dietary supplements more often, for treatment of a health condition and enhancement of physical or mental performance, regard supplements safer for use and more effective for these purposes.

In order to keep providing the best patient care, dietitians and other health care professionals should invest in their education concerning dietary supplements and related topics. Opinions in evidence-based medicine change frequently on the use of dietary supplements, so health care professionals should follow research closely. CAM therapy is not considered mainstream and often not evidence-based. Dietary supplement research evidence and prevalence of use are often considered to be imbalanced. Since dietitians practicing CAM therapies seem to be more positive towards dietary supplements, additional research might be needed. Noted must be however that due to the relatively low number of respondents indicating practicing CAM in this survey, strong conclusions regarding CAM therapy and dietary

supplements are not warranted.

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