Use of vitamins, minerals and herbs: a survey of patients attending family practice clinics

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Abstract

Objective: To examine the use of vitamin, mineral and herbal supplements in patients attending family practice clinics.

Design: A prospective 1-year cohort study.

Setting: Sixteen family practices in Calgary.

Participants: One hundred and eighteen patients (more than 18 years of age) were initially interviewed; 12 patients were lost to follow-up.

Main outcome measures: Number and type of supplements used, duration of use, sources of patient information, beliefs about supplement efficacy and safety, reporting use to physicians, costs and changes in pattern of use over 1 year.

Results: Supplement use was unrelated to age, but more women (73%) used supplements than men (44%). Relative to age, more patients younger than 50 years believed supplements were safer than prescription medications (82% v. 43%, p = 0.0005). Younger patients were less likely than those over 50 years old to have received supplement information from physicians (10% v. 37%, p = 0.0008) and were less compliant than older patients with manufacturers’ recommended dosages (p = 0.02). Whereas 74% of those over the age of 50 years informed their physician that they used supplements, only 30% of younger patients did so (p = 0.0006). At 1-year follow-up, the number of supplements taken per patient increased (p < 0.05), and there was a tendency for more patients to take supplements (61% v. 70%, p = NS).

Conclusions: The majority of patients attending family practices in Calgary use vitamin, mineral or herbal supplements, and monitoring of supplement use by health care professionals is minimal. Young patients, in particular, tend not to report their use of supplements. They also believe the supplements are safer and more effective than prescription medications and obtain information from nonmedical sources. Physicians should enhance patient understanding of these products and include supplement use in all medical histories. In particular, younger patients require more reliable information on supplements.

Résumé

Objectif: Étudier la consommation de suppléments de vitamines, de minéraux et de plantes médicinales chez les patients qui se présentent aux cliniques de médecine familiale.

Conception : Étude prospective de cohorte d’une durée d’un an.

Contexte : Seize pratiques de médecine familiale à Calgary.

Participants : On a interviewé au début 118 patients (de plus de 18 ans) et l’on en a perdu 12 au suivi.

Principales mesures de résultats : Nombre et type de suppléments consommés, durée de la consommation, sources d’information des patients, croyances au sujet de
Supplement use in family practice patients

Introduction

Vitamins, minerals, herbal remedies and other supplements are commonly used by the public, but education about these products is not generally included in medical school curricula. Up to 40% of North Americans reportedly use supplements, but many of these, especially herbal preparations, have not have been tested for efficacy, toxicity or even the purity or activity of the product. Because many of these products are often marketed as natural dietary supplements, there is a general perception that they pose little or no health risk.

Some supplements, however, have been shown to cause significant harm or even death. Risks of herbs include life-threatening adverse effects, poisoning from contaminants, interference with drug metabolism and unknown pharmacologic action. Many physicians generally regard common vitamins and minerals as nontoxic and of some therapeutic effectiveness. Studies of vitamin and mineral preparations in the United States reveal marked discrepancies between the actual and the stated contents of tablets. Although lead impurities in calcium supplements have been known as a potential health hazard for decades, many calcium supplements still have lead impurities that could cause adverse health consequences for long-term users. Both iron and calcium supplements can cause significant drug interactions with common medications and can lead a marked reduction in absorption of a number of drugs. Fat-soluble vitamins can cause substantial toxicity if ingested in large quantities. In particular, β-carotene, a commonly used vitamin, can increase the risk of lung cancer in male smokers, and some vitamin A congeners are teratogens. Some multivitamin tablets and over-the-counter vitamin preparations contain sufficient quantities of vitamin A or β-carotene to cause concern with respect to toxicity.

Aggressive marketing of supplements, positive reviews in the lay literature and dissatisfaction with the perceived impersonal approach of Western medicine have all been touted as reasons why patients seek herbal medicine and other supplements. Recent randomized controlled trials have established the efficacy of some herbs relative to placebo. Given that many patients use supplements or alternative health products, there will be increasing demand for physicians to provide patients with evidence-based advice about these products.

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agement challenges, given the lack of high-quality data on efficacy and safety of most supplements and the lack of a cure with conventional therapy.

This study addressed patterns of supplement use in relation to age and gender in adult patients attending the clinics of family physicians. The goals were to determine: (1) prevalence and duration of supplement use, (2) supplement types and costs, (3) beliefs about efficacy and safety of supplements, (4) sources of information about supplements, (5) compliance with recommended dosages, and (6) patients’ perceptions of physicians’ awareness of and attitude toward supplement use. Finally, we examined changes in supplement use over a 1-year follow-up.

Methods

Study design and protocol

In this study we investigated use of vitamin, mineral and herbal supplements by patients recruited through family physicians in Calgary. To assure a representative sample, only community-based family practitioners were recruited by referring to the family practice alphabetic list from the mini-directory sponsored and edited by the Calgary Medical Society. Every 30th name (starting with the 1st, 31st, 61st, etc.) of 609 physicians practising in Calgary was selected and the physician was approached (the physician investigators telephoned the selected physicians) to participate in the study. If 20 physicians were not obtained, then the process was repeated starting with the 2nd, 32nd, 62nd and so on until a total of 16 physicians agreed to participate. Patients 18 years of age and older attending the selected family practice locations were asked to enter the study. Interviewers attended the clinics of each physician for one half-day and recruited up to 10 consecutive, consenting English-speaking patients. Participants were interviewed in person using a standard questionnaire. To reduce the variability of supplement use patterns due to season, day of the week and time of recruitment, subjects were phoned and completed the questionnaire again at 4 to 6 and at 12 months (June–September 1998) after the initial contact. Only the initial and 12-month data are reported here. The Conjoint Medical Research Ethics Board at the University of Calgary approved the study. All participants gave signed informed consent.

Statistical analyses

The sample size of up to 200 participants was chosen in order to obtain adequate numbers of supplement users to assess the primary outcome measure of the study: the pattern of current use of vitamins, minerals and herbs (the secondary outcome measure is the change in use after 1 year). On the basis of the existing literature, reporting at least a 45% use of supplements, and a pilot study performed by the authors in 3 subspecialty clinics (diabetes, hypertension and lipid) in the Calgary region. The proportion of use was found to be 59%. Therefore, 65 to 80 users would be expected if the survey included up to 200 participants. At least 2 studies found that numbers (of alternative or complementary medicine users) of this magnitude gave adequate power to assess patterns of current alternative or complementary medicine use.

Data were categorized, and responses to the survey questions were compared among age groups (<29, 30–44, 45–64 and ≥65 years) and between genders. Discrete data were analyzed using Fisher’s exact test (for 2 × 2 tables), χ² test (for larger contingency tables) and, where appropriate, the χ² test for trend.32 Continuous data were analyzed using Student’s t-tests and analyses of variance (ANOVA) and, where appropriate, Fisher’s a posteriori multiple comparisons test.32 Some contingency table analyses were deemed invalid due to low cell frequencies. In these cases, data were pooled. Longitudinal trends were examined using the Wilcoxon signed rank test.30 Costs were reported in Canadian dollars.

All participants were included in analyses of how demographic variables (age and gender) affect supplement use, but only those participants reporting current use of at least 1 supplement or complementary health product (hereafter referred to as “users”) were included in further analyses of specific supplement use patterns (e.g., number, type, dose, adverse effects). Supplements were classified as vitamins (or multivitamins), minerals, herbs (e.g., garlic, Echinacea, cayenne, Ginkgo biloba) and other (e.g., flax seed oil, core level thyroid, cardio-lymph chelate). Data are expressed as means (and standard errors).
Results

Of the 33 doctors approached to participate in the study, 5 refused, 12 did not return calls and 16 agreed to participate. Of the 16 participating physicians, 7 were from the southwest, 5 from the northwest, 1 from the northeast and 3 from the southeast quadrants of Calgary. These numbers approximate the distribution of the 609 family physicians throughout these sectors of Calgary (38.9%, 36.4%, 11% and 13.7% respectively in 1997).

One hundred and twenty-eight subjects were approached, 10 (7.8%) refused; the remaining 118 (92.2%) completed the initial interview (questionnaire). Twelve subjects did not complete the 1-year follow-up questionnaire (4 had moved out of province and left no forwarding number, 1 was too ill to participate and 7 did not return 3 separate phone calls).

Of the 118 study participants 48 (40.7%) were recruited from practices located in the southwest of Calgary, and 37 (31.4%), 10 (8.5%) and 23 (19.5%) were recruited from the northwest, northeast and southeast respectively (approximating the distribution of family practices throughout Calgary). Fifty-nine percent were female. The mean age of all participants was 50.5 (2.61) years. Sixty-one percent were supplement users at the time of their first interview.

The different types of supplements used are indicated in Fig. 1. Not surprisingly, multivitamin, and vitamin C and E use were common, and each was used by more than 10% of subjects. However, as a category, herbs, especially garlic preparations, were also commonly used, accounting for over 23% of supplement use. There were 74 different vitamins (14 varieties), minerals (16 varieties), herbs (16 varieties) and others (28 varieties) reported [list available from the authors on request]. There was no association between age or gender and supplement type (when broadly classified as herbs, minerals or vitamins).

Tables 1 and 2 show the association of gender and age (respectively) on supplement use. Women were more likely to use supplements than men (72.9% v. 43.8%, \( p = 0.002 \)): mean for whole group 2.28 (0.184) supplements, women 2.4 (0.2), men 2.0 (0.3), \( p = 0.025 \). Of those reporting simultaneous use of 3 or more supplements, 85.2% were female and 14.8% were male. There was no statistically significant effect of age on the use of supplements (\( p = 0.7 \)) or number of supplements used (\( p = 0.7 \)).

Mean duration of supplement use per patient report was 48.7 (8.75) months. The duration of supplement use increased with age (\( p = 0.04 \)) but did not differ between men and women (men, 51.03 [18.5] months, women 47.7 [9.8] mo, \( p = 0.9 \)).

![Fig. 1: The percentage of supplements (by category) used by patients in family practices. Seventy-two of 118 study participants took supplements, and 152 different supplements were reported. Not shown here are that 4% of the participants used supplements not classified and 1% were using various cold remedies.](image-url)
Of those who had an opinion (78%), many users believed that supplements were safer and more effective than medications. Most users under age 50 years (81.5%) believed supplements were safer than prescription medications. Fewer patients over age 50 years (43%) held this belief ($p = 0.0052$). Of those under 50 years of age taking supplements, 56% believed supplements were more effective than medications, whereas 40% ($p = 0.4$) of supplement users over age 50 years held a similar belief.

Critical to beliefs about effectiveness and safety are the sources of information. In this study, patients learned about supplements from diverse sources (Fig. 2). Younger participants tended to obtain information from friends, family, stores and other sources, whereas older participants heard about supplements from physicians or the lay media ($p < 0.0001$). Only 10.2% of younger participants but 36% of older participants received supplement information from physicians ($p = 0.0024$, Fisher’s exact test).

Serious adverse effects and drug interactions can occur when physicians are unaware that patients are taking supplements, even common ones such as minerals. Physician awareness of supplement use differed between younger and older patients, with 74.3% of older and only 30.3% of younger patients having informed their physicians that they used supplements ($p = 0.0006$). There were no differences between men and women in the number whose physician was aware of their supplement use (men 10 of 20 [50%], women 26 of 48 [54.2%], $p = 0.795$).

Eighteen percent of those surveyed were unable to indicate the cost of their supplements. Mean supplement cost per week for those who were aware was $2.42 (0.469)$ (range from $0.10$–$22.26$). The cost did not differ with age or gender.

Table 2: Age relationships with respect to supplement use

<table>
<thead>
<tr>
<th>Factor/comparison</th>
<th>≤29</th>
<th>30–44</th>
<th>45–64</th>
<th>≥65</th>
<th>$p$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplement use, %</td>
<td>40</td>
<td>61.5</td>
<td>58.8</td>
<td>65</td>
<td>0.7</td>
</tr>
<tr>
<td>No. of supplements used</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>8</td>
<td>11</td>
<td>11</td>
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</tr>
<tr>
<td>2</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>0.7*</td>
</tr>
<tr>
<td>≥3</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Duration of use, mo</td>
<td>15.3</td>
<td>51.5</td>
<td>56.6</td>
<td>76.6</td>
<td>0.04</td>
</tr>
<tr>
<td>Participants whose physician was aware of use, %</td>
<td>9.7</td>
<td>9.7</td>
<td>35.5</td>
<td>45</td>
<td>0.0006</td>
</tr>
<tr>
<td>Beliefs, effectiveness, %†‡</td>
<td>56 (Y)</td>
<td>40 (O)</td>
<td></td>
<td></td>
<td>0.4</td>
</tr>
<tr>
<td>Beliefs, safety, %§</td>
<td>81.5 (Y)</td>
<td>43 (O)</td>
<td></td>
<td></td>
<td>0.0052</td>
</tr>
</tbody>
</table>

*For trend
† Where analyses were invalid due to insufficient cell frequencies, the data were reanalyzed using data pooled into 2 age categories (<50 yr [Y = younger] and ≥50 yr [O = older]).
‡ Patient believes that the supplement is more effective than conventional drug therapy.
§ Patient believes that the supplement is safer than conventional drug therapy.
At the 1-year follow-up there was an increase in the number of supplements taken by patients (14.2% were taking fewer supplements than reported initially, 57.5% were taking the same number and 28.3% were taking more \[ p = 0.041 \]). This was also true for the 4 to 6-month follow-up but the difference was not significant. There was also a tendency for more patients to take supplements (61% v. 70% of patients, \( p = 0.206 \)) over the 1 year of observation.

There were no age or gender relationships associated with the changes in medications over the year.

Discussion

This study revealed that the majority of family practice patients use vitamin, mineral or herbal supplements. However, in many cases the doctor is unaware of the supplement use. In particular, younger patients tended not to inform health care professionals of supplement use, obtained information on supplements largely from nonmedical sources and believed that supplements are safer and more efficacious than prescription medications. There was an increase in the number of supplements used at 1-year follow-up. Physicians need to obtain a history of supplement and other alternative medicine use, obtained information on supplements largely from nonmedical sources and believed that supplements are safer and more efficacious than prescription medications.

There was an increase in the number of supplements used at 1-year follow-up. Physicians need to obtain a history of supplement and other alternative medicine use from their patients and advise patients about known safety and efficacy issues related to these products, particularly as the numbers of supplements and patients using supplements appear to be increasing. In particular, health care professionals should educate those under age 50 years of age about the risks and benefits of supplement use. Additionally, to aid health care professionals in comprehensive patient care, alternative medicine should be included in undergraduate and postgraduate training programs.

Supplement use in this study is higher than that reported in national surveys from Canada (15%) and the United States (34% and 40%) but similar to that reported in the Canada Health Monitor for supplement use in a trans-Canada survey of 2592 (57.7% of those surveyed) people performed in June 1997. Although these studies differed in their definitions, the high rate of supplement use revealed here indicates that the majority of patients seen by family physicians in Calgary are supplement users. The strength of this study is the design that obtained data from consecutive, consenting patients obtained from a representative sample of family physicians in Calgary. The data in this study therefore are reflective of patients who see family doctors in Calgary, a medium-sized (population approximately 850 000) North American city. Further, the study had a cohort component that allowed direct observation of changes in supplement use over time. Another difference in this study is the use of a broader definition of supplements than that used in some other studies. The definition used in this study for supplements was that of “natural health products” as defined by the Health Protection Branch of Health Canada. Narrow definitions of supplements fail to address потен-
tial benefits, drug interactions and other risks associated with common over-the-counter supplements that are used by many patients.21,22

Females were more likely than males to use supplements and used a greater number of supplements than did males, which contradicts some other surveys of supplement use.12,24,28 One explanation for this is that we sampled a different patient population (family practice patients v. random household survey1,2,4), personally interviewed the patients, used a different response variable (supplement use v. visits to alternative health care providers29) and used a broad definition of supplements. Alternatively, the gender differences revealed here could reflect a geographic pattern. Results of a population-based survey from rural Alberta revealed that women were more likely than men to have seen a practitioner of alternative medicine.33 Owing to supplement recommendations for pregnancy (e.g., folate, iron) and osteoporosis (e.g., calcium), females might be expected to consume on average more vitamins and minerals than males. However, our study revealed no association between gender and supplement type.

Our finding that older patients were no more likely to use supplements than younger patients is consistent with patterns of supplement use in other studies2,28 but contradicts 2 studies, one that found the highest use in the 30 to 44-year group,4 and the other that found the highest use among people 25 to 49 years of age.1 Part of the discrepancy may relate to the definition of supplements used in the studies. Age differences in use pattern revealed here suggest that older patients who use supplements will, in general, have a history of long-term supplement use and will have more frequently obtained supplement information from family physicians.

Older patients take more prescription medications than younger patients. Their lower levels of hepatic drug metabolism, cardiac output and renal function affect drug clearance and place them at greater risk of adverse effects and interactions between supplements and drugs. Also, older patients have more chronic illnesses, so it is important for physicians to be able to counsel patients about the relative efficacy of prescription medications and interactions with supplements. As has been shown for diabetic patients,34 disease can progress more rapidly and outcomes worsen if patients substitute less efficacious alternative therapies for prescribed medications.

There are few studies of direct costs of supplement use to consumers. Overall, the cost per person of supplement use was relatively low. The highest cost recorded in the cross-sectional survey was $22.26/wk, but 1 patient in the cohort study claimed that he purchased a mixture of vitamin, mineral and herbal supplements that cost $75/wk. For patients taking both prescription medications and supplements, an important question to address is whether cost trade-offs may explain lack of compliance with medication.

While many are aware that herbal preparations can cause significant disease and drug interactions, even common minerals and vitamins can cause problems. Few supplements are of proven benefit. This study highlights the frequent use of supplements and indicates the need to specifically question patients about their use. Because the use of supplements changed significantly over the 1 year of observation in this study, there is a need to reassess supplement use at all appropriate patient visits. This will provide the opportunity for appropriate counselling and an opportunity to avoid adverse effects. In particular, efforts need to be directed to younger patients.

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