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Sara Walzer
Medical University of Ohio

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Submitted by

Sara Walzer

In partial fulfillment of the requirements for the degree of
Master of Science in Biomedical Sciences

Date of Presentation:

December 5, 2005

Academic Advisory Committee

Major Advisor
Christopher Bork, Ph.D.

Department Chairperson
Clayton Holmes, Ed.D., P.T.

Dean, College of Health Sciences
Christopher E. Bork, Ph.D., P.T.

Dean, College of Graduate Studies
Keith K. Schlender, Ph.D.
Knowledge of Physical Therapists Regarding the Uses and Adverse Effects of the Twelve Most Common Herbal Supplements

Sara Walzer, B.S.
Christopher E. Bork, Ph.D., P.T.

Background and Purpose: The purpose of this study was to investigate physical therapists’ knowledge of the uses and adverse effects of the twelve most common herbal supplements. The use of alternative modalities in the United States is on the rise as people try to combat the increasing costs of traditional health care. Herbal supplements have the potential for physically harmful effects; however, patients’ use of herbal supplements is not always disclosed to health care providers. With the U.S. Food and Drug Administration only loosely controlling the herbal supplement market, all health care providers, including physical therapists, need to be aware of herbal supplement uses and adverse effect. Methods: A random sample of 500 subjects from the American Physical Therapy Association was mailed a survey asking them to complete questions on uses and adverse effects for the twelve most common herbal supplements. Data was examined for physical therapists’ knowledge of herbal supplements and for relationships between practice views and knowledge, degrees earned and knowledge, and years of experience and knowledge. Results: The mean percent correct for knowledge of uses and adverse effects of herbal supplements were 15.64% and 2.75% respectively. Respondents who answered positively to questions on practice views scored higher on knowledge of uses and adverse effects of herbal supplements. Neither degree earned or years of experience determined knowledge of herbal supplements. Discussion and Conclusion: Physical therapists’ knowledge of adverse effects is limited. With direct access and an evolving profession, physical therapists need to
become more educated on the uses and adverse effects of herbal supplements to better serve their patients.

**Introduction**

In today’s society, people are depending more upon alternative medicine to alleviate and prevent medical conditions. Annual visits to nontraditional medical providers are beginning to outweigh visits to traditional health care providers [1]. One reason for this phenomenon is that people are using alternative modalities to avoid the excessive costs of traditional medical services [2]. Over the past few years, there has been an increase in the use of herbal supplements. Unlike some other forms of alternative medicine, such as prayer, relaxation, or massage, herbal supplements have the potential for producing physically harmful adverse effects that consumers might not be aware of [3].

Another problem associated with herbal supplements is that patients are often reluctant to tell their health care providers that they are using them. In many cases providers also neglect to ask their patients about the use of herbal supplements (and other alternative modalities). If patients are not regularly asked about their use of herbal supplements by health care providers, it is believed that patients may be unwilling to volunteer this information for fear of a negative response from the provider because it is not a traditional form of health care. Another view is that because providers are not asking about herbal supplements, patients may feel this information is not important to disclose to the provider [3]. In fact, it has been shown that when asked specifically about the use of herbal supplements, patients are willing to disclose the information to their providers. Evidence suggests that even when this information is shared, there is a good chance that a provider will not have adequate knowledge of herbal supplements to give
informed advice. A survey of U.S. medical schools in 1997 showed that only 31% of the these schools required any training in alternative medicine [4].

When it comes to herbal supplements, the U.S. Food and Drug Administration (FDA) can only loosely control the market. Unlike legal medications, proof of efficacy and evidence of safety are not required for supplements. In fact, with herbal supplements, the burden of proof for lack of safety rests on the FDA and must be clinically proven before a product can be removed from the market [2, 5]. Data about the safety and efficacy of herbal supplements is limited because it is old, based on animal research, or only available outside the United States [6]. This is especially true regarding information on adverse effects. Another problem is that there are no guidelines or standardization for dosage of herbal supplements. Dosages may vary between companies and are usually based on historical precedent or tradition, rather than clinical trials. Potency of the herb is also a factor that varies with each company; there is no requirement for quality control or proof of purity, which often depends on genetics, growing conditions, time harvested, plant part used, preparation, and storage[6].

Herbal supplements can become FDA approved as medications; however, it costs approximately $230 million and requires about 8-10 years of research to achieve approval; a burden that most companies are unwilling to shoulder. Due to the lack of FDA regulation of herbal supplements, it is important for all health care providers to have knowledge of these products and their adverse effects so that health care providers can provide guidance for their patients[6]. While an herbal supplement may not have an adverse effect when taken by itself, it may adversely react with prescribed medications.
When looking at the twelve most common herbal supplements used, there are several adverse effects to be aware of. For example, chamomile, used as a sedative, spasmodic, anticoagulant, anti-inflammatory, for wound healing and as an antioxidant, should not be taken in conjunction with other sedatives or anticoagulants. When taken with anticoagulants, like Warfarin, the combination increases the risk of bleeding. When taken with other sedatives, such as benzodiazepines or alcohol, chamomile has the potential to intensify and prolong the effects [6-8].

Echinacea is the most commonly used herb in the United States due to the claims that the herb can prevent and treat colds. It is also reported to have wound healing properties. When taken for more than 8 weeks in the place of antibiotics, Echinacea has been shown to suppress immunity and cause liver damage. Therefore, Echinacea should not be taken for a long period of time or with any other medications that may cause liver damage because the risk of damage greatly increases [6-9].

Feverfew had been used as a migraine prophylactic and an anti-arthritis. Evidence shows that it causes vasodilation and reduces inflammation. Feverfew is contraindicated for patients with coagulation problems and those taking anticoagulants like aspirin or Warfarin because it alters platelet activity and may increase the risk of bleeding [6, 7, 9].

Garlic is known for its lipid lowering, antithrombotic, fibrinlytic and antihypertensive properties; however, it has also been shown to increase international normalized ratios (INR) and
prothrombin time (PT) in patients taking Warfarin. Therefore, garlic should not be taken with anticoagulants due to the increased risk of bleeding. Garlic should also be avoided when patients are taking medications that lower blood sugar levels, such as insulin because it increases the effect of the drug causing excessively lower blood sugar levels [6-8].

Ginger, usually taken as an antiemetic, can surprisingly cause gastrointestinal (GI) upset when taken for too long. It may also cause central nervous system (CNS) depression and cardiac arrhythmias. It has been shown that when taken with anticoagulants, ginger increases the risk of bleeding [8, 9]. On the other hand, Goldenseal, taken as an antidiarrheal and antiseptic, opposes the effects of anticoagulants and may cause blood clots. Goldenseal also causes mucotaneous irritation, GI tract upset, cardiac and uterine contractility, vasoconstriction, CNS stimulation, and neonatal jaundice [6, 8].

Ginkgo, used for intracerebral and peripheral vascular insufficiency (dementia and claudication), can cause GI disturbances, headaches, and contact dermatitis. Ginkgo, when taken with anticoagulants, aspirin, or other NSAIDS, may increase the risk of bleeding. Ginkgo may also decrease the effectiveness of anticonvulsants from preventing seizures. When taken with monoamine oxidase inhibitors (MAOIs), ginkgo can cause an increased risk of headaches, tremors, or manic episodes [6-8].

Ginseng, known as a performance enhancer, is also reported to have anticancer effects and prevent tachycardia and hypertension. Because it is a mild stimulant, ginseng should not be taken with other stimulants or by those who have cardiovascular disease. It has also been known to
cause mastalgia and postmenopausal bleeding. Ginseng may cause increased risk of bleeding when taken with anticoagulants, and may also cause hypoglycemia when taken with drugs that decrease blood sugar levels. Ginseng intensifies the effects of corticosteroids, Digoxin, and estrogen replacement therapy. It can cause headaches, tremors and manic episodes when taken with MAOIs. Also, ginseng may decrease the effectiveness of opioids [6-9].

Milkweed thistle, thought to be a hepatoprotectant and an antioxidant, also intensifies the effects of antihyperglycemics, which may cause an excessive drop in blood sugar levels. Milkweed thistle may also decrease the effectiveness of Saquinavir, a protease inhibitor anti-HIV medication [6, 8].

St. John’s Wort is widely known as an antidepressant. It also decreases the effectiveness of Benzodiazepines in decreasing anxiety and increases the risk of drowsiness. St. John’s Wort also decreases the effectiveness of cyclosporine, an immunosuppressive drug, which could possibly lead to rejection of an organ transplant. St. John’s Wort decreases the effectiveness of Digoxin, Indinavir (another drug to treat HIV), Warfarin, and Iron. When taken with MAOIs, St. John’s Wort increases the risk of headaches, tremors and manic episodes. It can increase sun sensitivity when taken with photosensitizing medications, such as tetracyclines, and can intensify the effect of selective serotonin reuptake inhibitors [6, 8, 10].

Saw Palmetto is generally taken for benign prostatic hypertrophy, prostatitis, and antiexudative effects. It can also cause headaches and GI tract upset. Saw Palmetto also increases the intensity of estrogen replacement therapy and oral contraceptives [6-9].
Valerian, used as a sleep aid, is an anxiolytic and an antispasmodic. Valerian is known for causing restlessness, cardiac dysfunction, and cytotoxic and mutogenic activity in vitro. It should not be taken with barbiturates or anesthetics because it may increase sedation [6, 8, 9].

It is important for all health care providers to be aware of potential herb-drug interactions when discussing herbal supplements with their patients. With direct access, many times physical therapists are the first health care provider to see patients and may also have substantial contact with patients. As health care providers, physical therapists are educated to understand normal physiology and pathophysiology, thus physical therapists are apt to notice changes in the body systems of their patients. These changes can be caused by treatment, disease, medications, the effects of herbal supplements, or a combination. Because physiological changes may affect a patient’s response to treatment, it is important for physical therapists to have up to date knowledge of the medications their patients are taking. In addition, because of the prevalence of the use of herbal supplements by the public, physical therapists should also be knowledgeable of the uses and potential adverse effects of common herbal supplements. The literature contains no studies of physical therapists’ knowledge of the uses and adverse effects of herbal supplements. The purpose of this study was to investigate physical therapists’ knowledge of the uses and adverse effects of the twelve most common herbal supplements. It was hypothesized that: 1. the majority of physical therapists would not be knowledgeable about herbal supplements; 2. physical therapists who routinely asked their patients about herbal supplements would be more knowledgeable; 3. the entry level preparation for practice or highest degree earned would not be associated with knowledge; and 4. the years of experience in practice would not be associated with a subject’s knowledge.
Methods

Design

Descriptive research was used for this study. An exploratory research design was used to develop and refine the questionnaire. The survey was designed to assess physical therapists’ knowledge of herbal supplement uses and adverse effects. A pilot study was conducted with several local physical therapists to refine the survey. The survey was divided into the following four sections:

1. Practice

   The survey asked physical therapists to respond to whether or not they regularly ask their patients about herbal supplements, whether or not they believe physical therapists should be knowledgeable about herbal supplement uses and adverse effects, and whether or not they use herbal supplements themselves.

2. Uses of common herbal supplements

   The subjects were asked to answer 23 questions about uses of the twelve most common herbal supplements.

3. Adverse effects of common herbal supplements

   The subjects were asked to answer 17 questions about adverse effects of the twelve most common herbal supplements.

4. Demographics

   The survey concluded by requesting demographic information about years of experience as a physical therapist, entry level degree, highest degree obtained and sources of information on
herbal supplements (formal education, continuing education, informal education/personal research, none or other). (Appendix A)

**Study Population**

The investigator surveyed a random sample of 500 subjects stratified for gender and geographic distribution from the American Physical Therapy Association (APTA). The inclusion criteria for this study were that subjects had to be practicing physical therapists in the United States and members of the APTA. There was no risk or cost to the subjects, and no compensation was provided to the subjects. The investigation was reviewed by the Institutional Review Board of the Medical University of Ohio and approved as exempted research.

**Procedure**

The subjects were mailed a survey and a cover letter asking them to participate in the study (Appendix B). In this letter, subjects were informed of the intent of the survey and that by returning the survey, they were implying their consent. The subjects were also assured that anonymity would be maintained.

After 21 days, respondents were sent reminder letters. Non-respondents were identified through a coding system attached to the return envelope for the survey. Each coded envelope corresponded to a subject on a master mailing list. This list was locked in a secure location by an individual not involved in the study. When a survey was returned, the number used for coding was crossed off the mailing list, and the survey was separated from the envelope to maintain anonymity. This process was used to efficiently determine who was sent reminder letters.
Data Analysis

The raw data were entered into an Excel [11] spreadsheet according to a codebook developed for this study. The data, including knowledge scores for uses and for adverse effects of herbal supplements were then imported into SPSS version 13.0 [12] for subsequent analyses. Frequencies were obtained for discrete data, and descriptive statistics for continuous data. Cross tabulations, independent t tests and analysis of variance (ANOVA) were performed to analyze differences in knowledge for selected demographic variables.

Statistical hypotheses

1. Less than 50% of physical therapists will be knowledgeable (score 70%) about the uses and adverse effects of herbal supplements

2. There will be no statistically significant difference ($\alpha \leq 0.05$) in knowledge between physical therapists who:

   2a. routinely asked their patients about herbal supplements and those who did not

   2b. indicated that physical therapists should be familiar with common uses of herbal supplements and those who did not

   2c. indicated that physical therapists should be familiar with adverse effects of herbal supplements and those who did not

   2d. personally used herbal supplements and those who did not

3. There will be no statistically significant difference in knowledge among physical therapists based on their entry level preparation for practice ($\alpha \leq 0.05$)

4. There will be no statistically significant difference in knowledge among physical therapists based on their highest degree earned ($\alpha \leq 0.05$)
5. There will be no correlation between physical therapists’ years of experience in practice and a subject’s knowledge

5a. of uses

5b. of adverse effects

**Results**

Thirty-two percent (N=160) of the survey sample returned the survey. Of the subjects who returned the survey, 2.5% (N=4) stated they did not wish to participate in this study. This left 97.5% (N=156) who completed and returned the survey.

The mean percent correct for uses of herbal supplements was 15.64% (SD=3.793) with the maximum percent correct being 58%. For adverse effects, the mean percent correct was 2.75% (SD=0.052) and the maximum was 24%. Tables 1 and 2 show the results for uses and adverse effects of the twelve most common herbal supplements.

Independent t tests were used to analyze responses to questions on practice views. Of those who responded, 16.67% (N=26), routinely asked their patients about use of herbal supplements and scored significantly higher on knowledge of uses of herbal supplements: 25.9% vs. 13.6% (t=3.926, df=29.7, p<0.001). They also scored higher on knowledge of adverse effects of herbal supplements, but this difference was not statistically significant: 5.9% vs. 2.1% (t=2.446, df=28.106, p=ns).
Additionally, 76.28% (N=119) of respondents believed that physical therapists should be knowledgeable about uses of herbal supplements. Those who responded “yes” scored higher in knowledge of uses and adverse effects of herbal supplements. Differences in knowledge of uses was not found to be statistically significant: 16.78% vs. 11.95% (t=2.122, df=154, p=ns); however, knowledge of adverse effects was found to be statistically significant: 3.23% vs. 1.22% (t=2.818, df=115.944, p<0.05).

Physical therapists’ knowledge of adverse effects was thought to be important by 83.33% (N=13) of respondents. Those who responded “yes” scored higher on both knowledge of uses and of adverse effects of herbal supplements, but neither differences were statistically significant: 15.99% vs. 13.9% (t=0.795, df=154, p=ns) and 2.98% vs. 1.63% (t=1.217, df=154, p=ns) respectively.

Twenty-five percent of respondents indicated they use herbal supplements and scored significantly higher for knowledge of herbal supplement uses: 24.56% vs. 12.66% (t=4.740, df=49.575, p<0.001). They also scored significantly higher for knowledge of adverse effects: 5.12% vs. 1.96% (t=2.77, df=49.291, p<0.05).

When comparing entry level degrees to physical therapists’ knowledge of herbal supplements, those respondents with a masters degree scored highest for knowledge of uses and those with degrees described as “other degrees” scored highest for knowledge of adverse effects. Table 3 shows these results. Based on the ANOVA, there was no statistically significant difference
between entry level degrees and uses (F=0.227, df=3, p=ns) or adverse effects (F=0.593, df=3, p=ns).

Those with bachelors degrees as the highest degree obtained scored the highest for knowledge of herbal supplement uses, while those with highest degrees described as “other degrees” continued to score the highest for knowledge of herbal supplement adverse effects. Results are shown in Table 4. The ANOVA for these results show that there was no statistically significant difference between highest degree obtained and knowledge of uses (F=0.160, df=3, p=ns) or adverse effects (F=0.566, df=3, p=ns) of herbal supplements.

Number of years of experience of respondents ranged from 1 year to 37 years with the mean being 11.987 (SD=9.817). Pearson Correlation revealed that there was no statistically significant correlation between experience and herbal supplement uses (r=0.004) or experience and herbal supplement adverse effects (r=0.007).

Additionally, there was a modest correlation between scores on herbal supplement uses and scores on herbal supplement adverse effects (r=0.628).

**Discussion**

The results of this study show that physical therapists’ knowledge of herbal supplement uses and adverse effects is very limited. Overall, respondents scored higher on knowledge of uses than on knowledge of adverse effects: 15.6% vs. 2.75%. Herbal supplements and uses that scored the highest were: Echinacea for curing colds (71.85% correct), St. John’s Wort as an antidepressant
(57.5% correct), Chamomile as a sedative (48.1% correct), and Ginkgo for decreasing effects of dementia (41% correct). Adequate knowledge was defined at 70%, generally the lowest used for a C or “average”; overall, the respondents could not be characterized as knowledgeable except about Echinacea, which is considered to be the most widely used herbal supplement

The highest scoring herbal supplements and adverse effects were Valerian and Chamomile for increasing sedation when taken with other sedatives (11.5% and 9% correct respectively), and St. John’s Wort for increasing risk of headaches, tremors and manic episodes when taken with MAOIs (8.3% correct). It is possible the adverse effects that scored the highest are more widely publicized, which would explain why the results were greater. Nonetheless, overall, the respondents could not be characterized as knowledgeable about adverse effects.

Sources of information on herbal supplements varied greatly. Almost half of respondents (48.1%) indicated no source of information on herbal supplements. Very few (1.9%) had formal education on herbal supplements and 3.8 % have taken continuing education courses in herbal supplements. The second largest number (41.7%) indicated their knowledge of herbal supplements was from informal education or personal research. Other sources of information on herbal supplements included friends, peers, patients, athletic trainers, health food stores, and multimedia; these made up 9.6 % of respondents’ knowledge of herbal supplements.

As a whole, those who responded positively to practice questions were more knowledgeable of herbal supplement uses and adverse effects, even though not all were statistically significant. This may be because those who responded “yes” to these questions believe that herbal
supplement knowledge is important and have decided to become more knowledgeable about the uses and adverse effects of herbal supplements.

There seemed to be no difference between degrees and knowledge of herbal supplement uses. Interestingly, those with degrees other than a bachelors, a masters or a DPT scored higher in knowledge of adverse effects for both entry level degrees or highest degrees obtained. One possible explanation for this higher score could be more years of experience in patient care, mostly with respondents who earned certificates; however, there was no significant correlation between years of experience and knowledge of herbal supplements. Another explanation is that the other degrees provided more of an education in herbal supplements. Other entry level degrees included a certificate and a Masters of Arts. Other highest degrees obtained included a Ph.D., a MBA, a M.Ed., a MPH and an Honors in Physiotherapy (2nd Class).

The correlation between scores on uses and scores on adverse effects shows that those who scored higher on herbal supplement uses also scored higher on herbal supplement adverse effects. It is possible that since years of experience and degrees did not predict knowledge of herbal supplements, those who are knowledgeable of herbal supplements educated themselves about uses and adverse effects.

**Conclusion**

As previously stated, this survey indicates that physical therapists’ knowledge of herbal supplement uses and adverse effects is inadequate. With direct access, it is essential for physical therapists to be able to monitor physiological changes that could affect patient care. Because it
has been shown that herbal supplements can cause these physiological changes, physical therapists need to become more knowledgeable of herbal supplement uses and adverse effects.

In our society, alternative modalities are a relatively new focus of the medical profession; therefore, herbal supplement education for physical therapists is not something that has received much attention in the past. However, as indicated by this study, years of experience and degrees obtained do not determine physical therapists’ knowledge on herbal supplements. This means that while much of education for physical therapists is progressing and evolving, education on herbal supplements is still lacking.

Respondents indicated that the majority of physical therapists’ knowledge of herbal supplements is from informal/personal research, word-of-mouth, and multimedia, rather than formal or continuing education. As the use of herbal supplements increases, educators must become attentive to the need to make herbal supplement education more of a priority for physical therapy students. This knowledge will continue to make physical therapists more independent as practitioners and help protect their patients.
References
11. Microsoft Excel, 2000
12. SPSS version 13.0
<table>
<thead>
<tr>
<th>Use</th>
<th>Herbal Supplement</th>
<th>% Correct (N correct)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antiarthritic</td>
<td>Feverfew</td>
<td>5.1% (N=8)</td>
</tr>
<tr>
<td>Anticancer Agent</td>
<td>Ginseng</td>
<td>8.3% (N=13)</td>
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<td>Antidepressant</td>
<td>St. John’s Wort</td>
<td>57.5% (N=90)</td>
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<td>Goldenseal</td>
<td>2.6% (N=4)</td>
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<td>Ginger</td>
<td>26.3% (N=41)</td>
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<td>Garlic</td>
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<td>Chamomile</td>
<td>7.7% (N=12)</td>
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<td>Feverfew</td>
<td>3.8% (N=6)</td>
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<td>Feverfew</td>
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<td>Milkweed Thistle</td>
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<td>Goldenseal</td>
<td>5.1% (N=8)</td>
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<td>Chamomile</td>
<td>5.8% (N=9)</td>
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<td></td>
<td>Valerian</td>
<td>4.5% (N=7)</td>
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<td>Cures Common Cold</td>
<td>Echinacea</td>
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<td>Decreases Claudication</td>
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<td>26.3% (N=41)</td>
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<td>35.3% (N=55)</td>
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<td>% Correct (N Correct)</td>
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<td>--------------------------------------------------------------------------------</td>
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<td>Goldenseal</td>
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<td>Saw Palmetto</td>
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<td></td>
<td>Ginseng</td>
<td>1.3% (N=2)</td>
</tr>
<tr>
<td>Increases Risk of Blood Clots</td>
<td>Goldenseal</td>
<td>0% (N=0)</td>
</tr>
<tr>
<td></td>
<td>St. John’s Wort</td>
<td>1.3% (N=2)</td>
</tr>
<tr>
<td>Increases Risk of Headaches, Tremors and Manic Episodes when taken with MAOIs</td>
<td>Ginkgo</td>
<td>4.5% (N=7)</td>
</tr>
<tr>
<td></td>
<td>Ginseng</td>
<td>3.2% (N=5)</td>
</tr>
<tr>
<td></td>
<td>St. John’s Wort</td>
<td>8.3% (N=13)</td>
</tr>
<tr>
<td>Increases Risk of Liver Damage</td>
<td>Echinacea</td>
<td>1.3% (N=2)</td>
</tr>
<tr>
<td>Increases Risk of Organ Transplant Rejection</td>
<td>St. John’s Wort</td>
<td>1.3% (N=2)</td>
</tr>
<tr>
<td>Increases Sedation when taken with Other Sedatives</td>
<td>Chamomile</td>
<td>9.0% (N=14)</td>
</tr>
<tr>
<td></td>
<td>Valerian</td>
<td>11.5% (N=18)</td>
</tr>
<tr>
<td>Vasoconstriction</td>
<td>Goldenseal</td>
<td>1.3% (N=2)</td>
</tr>
</tbody>
</table>
Table 3: Entry Level Degrees vs. Knowledge of Herbal Supplement Uses and Adverse Effects

<table>
<thead>
<tr>
<th>Degree</th>
<th>% Correct for Uses</th>
<th>% Correct for Adverse Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelors</td>
<td>16.53%</td>
<td>2.24%</td>
</tr>
<tr>
<td>Masters</td>
<td>15.41%</td>
<td>2.87%</td>
</tr>
<tr>
<td>DPT</td>
<td>14.2%</td>
<td>3.23%</td>
</tr>
<tr>
<td>Other</td>
<td>13.83%</td>
<td>4.77%</td>
</tr>
</tbody>
</table>

Table 4: Highest Degree Obtained vs. Knowledge of Herbal Supplement Uses and Adverse Effects

<table>
<thead>
<tr>
<th>Degree</th>
<th>% Correct for Uses</th>
<th>% Correct for Adverse Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelors</td>
<td>16.76%</td>
<td>2.07%</td>
</tr>
<tr>
<td>Masters</td>
<td>15.34%</td>
<td>2.71%</td>
</tr>
<tr>
<td>DPT</td>
<td>15.02%</td>
<td>3.55%</td>
</tr>
<tr>
<td>Other</td>
<td>15.06%</td>
<td>3.70%</td>
</tr>
</tbody>
</table>
Appendix A

Uses and Adverse Effects of the 12 most Common Herbal Supplements

Herbal supplements are made of plant derivatives and are often seen by patients as having less adverse effects than synthetic pharmaceutical medications.

Do you routinely ask your patients about their use of herbal supplements?

___Yes    ___No

Do you believe physical therapists should be familiar with the common uses of herbal supplements?

___Yes    ___No

Do you believe physical therapists should be knowledgeable about adverse effects of herbal supplements?

___Yes    ___No

Do you personally take any herbal supplements?

___Yes    ___No

Listed below are typical reasons why people use herbal supplements. Please check which of the herbal supplements may produce each desired response. There may be more than one herbal supplement for each use and herbal supplements may be used for more than one desired effect.

**Antiarthritic:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Anticancer Agent:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Antidepressant:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Antidiarrheal:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Antiemetic:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Antiexudative:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Antihypertensive:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know
Anti-inflammatory:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Antioxidant:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Antiseptic:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Antispasmodic:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Cures Common Cold:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Decreased Claudication:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Decreased Effects of Dementia:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Decreases Prostatitis:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Hepatoprotectant:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Lowers Lipid Levels:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Migraine Prophylactic:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Performance Enhancer:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Prevents, Delays, or Breaks Down Blood Clots:
<table>
<thead>
<tr>
<th>Adverse Effect</th>
<th>Chamomile</th>
<th>Echinacea</th>
<th>Feverfew</th>
<th>Garlic</th>
<th>Ginger</th>
<th>Ginkgo</th>
<th>Ginseng</th>
<th>Goldenseal</th>
<th>Milkweed Thistle</th>
<th>St. John’s Wort</th>
<th>Saw Palmetto</th>
<th>Valerian</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedative:</td>
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<td>Wound Healing Properties:</td>
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<td>Cardiac Dysfunction:</td>
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<tr>
<td>CNS Stimulation:</td>
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<tr>
<td>Decreased Effectiveness of Anticonvulsants on Seizures:</td>
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<tr>
<td>Decreases Effectiveness of Anti-HIV Drugs:</td>
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<tr>
<td>Gastrointestinal Upset:</td>
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<tr>
<td>Greatly Decreases Blood Sugar Levels When Taken with Medications of the Same Sort:</td>
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<tr>
<td>Immunosuppression:</td>
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<tr>
<td>Increases Anxiety:</td>
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<tr>
<td>Increases Intensity of Corticosteroids:</td>
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</tr>
</tbody>
</table>

Listed below are possible adverse effects for herbal supplements. Please check which of the 12 most common herbal supplements may cause each adverse effect. There may be more than one herbal supplement for each effect and herbal supplements may have multiple effects.

**Cardiac Dysfunction:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**CNS Stimulation:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Decreased Effectiveness of Anticonvulsants on Seizures:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Decreases Effectiveness of Anti-HIV Drugs:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Gastrointestinal Upset:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Greatly Decreases Blood Sugar Levels When Taken with Medications of the Same Sort:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Immunosuppression:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Increases Anxiety:**
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

**Increases Intensity of Corticosteroids:**
Increases Intensity of Estrogen Replacement Therapy and Oral Contraceptives:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Increases Risk of Bleeding:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Increases Risk of Blood Clots:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Increases Risk of Headaches, Tremors and Manic Episodes When Taken with MAOIs:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Increases Risk of Liver Damage:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Increases Risk of Organ Transplant Rejection:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Increases Sedation When Taken with Other Sedatives:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Vasoconstriction:
- Chamomile
- Echinacea
- Feverfew
- Garlic
- Ginger
- Ginkgo
- Ginseng
- Goldenseal
- Milkweed Thistle
- St. John’s Wort
- Saw Palmetto
- Valerian
- Don’t Know

Please complete the following section to ensure appropriate background information is obtained.

Years of Experience as a Physical Therapist: _________________________________

Physical Therapy Entry Level Degree: _________________________________

Highest Degree Obtained: _____________________________________________

Source of Information on Herbal Supplements (Please Check All that Apply):
- Formal Course
- Continuing Education
- Informal Education/Personal Research
- None
- Other _________________________________
  please specify

Thank you for completing this questionnaire.
Appendix B

June 2005

Dear Colleague:

You have been selected to participate in a research study about physical therapist’s knowledge of herbal supplements and their uses and adverse effects. You are part of a stratified random sample of 500 physical therapists that was obtained from the American Physical Therapist Association.

The study instrument consists of a four-page survey, which should take no longer than 10 minutes to complete. Be assured that anonymity will be maintained should you choose to fill out the survey. Note that there is a small number on the return envelope. This number corresponds to your name on the master list. Upon receiving your returned survey, a third party will cross your name off the list, and your survey will be removed from the envelope. The envelope will then be destroyed by the third party before the researchers receive the survey. Because there is no number or name on the survey, there is no way to identify which survey is yours. This assures that you, and your responses, will remain anonymous and also allows us to efficiently send reminder letters in six weeks.

We would like to reiterate that the purpose of this study is to discover what physical therapists know about the uses and adverse effects of herbal supplements.

We wish to thank you for taking the time to complete the survey.

Sincerely,

Christopher E. Bork, Ph.D., PT
Dean, School of Allied Health

Sara Walzer
Graduate Student, Department of Physical Therapy