

## The Use of Herbal Medications and Dietary Supplements by People with Mental Illness

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**Abstract** This study examined the relationship between herbal medication and dietary supplement (HMDS) use and mental health characteristics. Data are drawn from a national household survey of the United States' civilian, non-institutionalized population ( $N = 9,585$ ). Psychiatric medication and HMDS use, psychiatric diagnoses and treatment needs, utilization and satisfaction were assessed. Compared to non-users, HMDS users were more likely to perceive themselves as having mental health needs, to have received mental health and primary care treatment, and to be dissatisfied with their overall healthcare. Psychiatric medication use was not related to HMDS use, and in multivariate analyses, HMDS use was associated with perceived mental health needs. Differences in use of

specific HMDS between those with and without a psychiatric disorder were also examined. The use of HMDS warrants particular attention in persons with perceived mental health problems as these individuals may be turning to HMDS use for treatment of their symptoms.

**Keywords** Complementary and alternative medicine · Herbal medication · Dietary supplement · Mental illness

### Introduction

Use of complementary and alternative medicine (CAM) in the US population increased from 34% in 1990 to 42% in 1997 (Eisenberg et al. 1998). More recent data from the 2002 National Health Interview Survey reported that 36% of US adults used some type of CAM, *excluding* prayer, in the past 12 months (Barnes et al. 2004). Use of herbal medicines and dietary supplements (HMDS) has been no exception to this rising trend. However, little is known about the relationship between use of specific HMDS and mental health characteristics. It is becoming increasingly important to clarify these relationships as there is ample data indicating that a number of HMDS can cause significant drug interactions (Cott 2001) and that most patients do not discuss their use of CAM modalities with their mental healthcare specialist (Elkins et al. 2005). Also, it is important to understand the extent to which mental health needs are driving use of HMDS.

Rates of psychiatric disorders among CAM users are high. A national survey found that of the 14.5% of respondents who had used CAM in the past year, 21% met diagnostic criteria for one or more psychiatric disorders compared to 12.8% of respondents who did not report CAM use (Unützer et al. 2000). Druss and Rosenheck

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(2000) found that 9.8% of those with a psychiatric condition reported using CAM, and approximately half of those individuals (4.5%) reported visiting a CAM provider specifically to treat their mental health condition. One study found that 4.5% of respondents reported using CAM to treat anxiety or depression (Barnes et al. 2004), and individuals reporting these disorders used CAM more than those reporting any other condition other than back and neck pain (Eisenberg et al. 1998). In fact, those who cited anxiety as one of their three most serious health problems were much more likely to use CAM compared to those without anxiety (67 vs. 39%) (Astin 1998). A national survey found that of the 7% of individuals who reported severe depression and of the 9% of individuals who reported anxiety attacks, CAM use in the past year was 54 and 57%, respectively (Kessler et al. 2001). These findings have been replicated among older adults as well (Grzywacz et al. 2006). In persons 65 years old and older, those with anxiety or depression (35%) were significantly more likely to use any CAM excluding prayer compared to those that were not anxious or depressed (27%).

Herbal medicines and dietary supplements (HMDS) are types of CAM whose use has also increased from 2.5% in 1990 to 12% in 1997 to 14% in 1998/99 to 19% in 2002 according to community surveys (Eisenberg et al. 1998; Kaufman et al. 2002; Kelly et al. 2005). HMDS use was among the most widely used CAM modalities in adults with psychiatric problems (Kessler et al. 2001; Knaut et al. 1999), and chronic psychiatric disorders such as major depression are predictive of dietary supplement use (Druss et al. 1998). One study showed that 4.3% of depressed individuals and 3.3% of those with panic disorder used herbal medication (Kessler et al. 2001). Studies of outpatient psychiatric patients have shown even higher rates of HMDS use ranging from 15 to 24% (Knaut et al. 1999; Matthews et al. 2003). HMDS use was 11% in a sample of 682 primary care patients that was weighted toward those with anxiety symptoms (Roy-Byrne et al. 2005). The most commonly used HMDS in this study were St. John's wort, ginseng, ginkgo biloba, kava kava, melatonin, and valerian root.

Using a nationally representative sample, the goals of this study are: (1) to examine differences between HMDS users and non-users in regard to demographic variables, mental health characteristics and treatment utilization, (2) to determine if rates of use of specific HMDS differ between individuals with and without psychiatric problems, or between individuals who use psychiatric medications and those who do not, (3) to examine rates of psychiatric problems and psychiatric medication use between those who use different HMDSs and those who do not, and (4) to determine if mental health characteristics are associated with HMDS use after controlling for covariates.

## Methods

### Study Design

The data for this study is drawn from Healthcare for Communities (HCC), a national household telephone survey funded by the Robert Wood Johnson Foundation and completed from 1997 to 1998. The HCC respondents represent a stratified probability sample of participants from the Community Tracking Study (CTS), a nationally representative study of the United States' civilian, non-institutionalized population (Kemper et al. 1996). The CTS sample was stratified by psychological distress [distressed vs. not distressed as determined on the basis of subjects' responses to two mental health items from the 12-item Short Form Health Questionnaire (Ware et al. 1996)] and use of mental health specialty services in the past 12 months (use vs. no use). HCC sampled all adults who had reported psychological distress or mental health service use ( $n = 7,164$ ) plus a random sample of non-distressed, non-mental health service users ( $n = 7,821$ ). Of the 14,985 individuals selected for the sample, 9,585 completed the HCC interview for a response rate of 64%. Verbal informed consent was obtained from all subjects. Sampling weights were derived based on the inverse of the probability of selection and included adjustments for participant non-response and for the exclusion of households without telephones. The design of the HCC is described in more complete detail elsewhere (Sturm et al. 1999).

### Measures

All data originate from the HCC survey with the exception of some demographic data from the CTS survey. The HCC survey can be found at [www.hscenter.ucla.edu/research/hcc.shtml](http://www.hscenter.ucla.edu/research/hcc.shtml).

### *Psychiatric Medication and HMDS Use*

To assess medication use, participants were asked "In the past 12 months, did you take any medications or drugs at least several times a week for at least 1 month?" and prompted to "include vitamins and herbs." They were then asked for the name of each medication. Medication codes allowed for identification of psychiatric medication and HMDS use. Herbal medications were defined as any product commonly known to be an herbal treatment or defined as such by the survey participant. The definition of dietary supplements was based on the Dietary Supplement Health and Education Act (DSHEA) of 1994 and included amino acids, tissue extracts, and botanical products. Vitamins and minerals were not included. In addition to examining the use of any HMDS and specific HMDS, we

also examined the use of psychoactive HMDS, defined as the use of Saint John's Wort, ginkgo, ginseng, valerian, kava, melatonin, or fish oil.

### *Mental Health and Substance Abuse Problems*

Depression, dysthymia, and panic disorder were assessed using short-form versions of the Composite International Diagnostic Interview (CIDI-SF; Kessler et al. 1998) and are based on DSM-III-R criteria. Kessler et al. (1998) reported that the sensitivity and specificity of the CIDI short-form relative to full CIDI diagnosis is excellent, with concordance ranging from 90 to 100%. Lifetime mania was screened for by asking, "Has there ever been a period of at least 4 days when you were so happy or excited that you got into trouble, or your family or friends worried about it, or a doctor said you were manic?" Psychosis was also screened for by asking, "Has a doctor ever said that you had schizophrenia or schizoaffective disorder?" Substance use disorders were also assessed. The Alcohol Use Disorders Identification Test (AUDIT; WHO 1992) was used to assess for alcohol use and abuse, and drug abuse was assessed with a screener described by Rost et al. (1993). Study participants were considered to have a psychiatric problem if they met criteria for depression, dysthymia, or panic disorder, or they screened positive for mania or psychosis. Individuals who had a substance use problem alone were not included in this group.

### *Treatment Need, Utilization, and Satisfaction*

Perceived need for mental healthcare and service utilization were assessed by self report. Participants were asked if they thought they needed help for emotional or mental health problems in the past year. They were also asked if they had seen a mental health provider, a substance abuse specialist or their primary care physician in the past year. Counseling from a primary care provider was assessed by asking whether medical visits included at least 5 min of counseling about an "emotional, mental health, alcohol or drug problem." Lastly, participants were asked how satisfied or dissatisfied they were with their overall health care.

### *Data Analysis*

Data were weighted and analyzed with SUDAAN software (Research Triangle Institute 2002), which applies a Taylor series linearization method to account for the study's complex survey design. Chi-square tests and *t*-tests were used to compare HMDS users to non-users on demographic variables, mental health characteristics, and treatment utilization. We next examined the relationship between

HMDS use and psychiatric problems and psychiatric medication use using chi-square analyses. All results are reported as unweighted *n*'s and weighted means and percentages reflecting weighted US population estimates. To control for Type I error due to multiple tests, the significance level of these tests was set at  $P < .01$  to be conservative. Lastly, we developed a series of logistic regression models to predict the use of HMDS for which both  $P < .05$  and  $P < .01$  are provided accordingly. Institutional review and approval for the project was obtained. The authors certify responsibility for this study and have no known conflicts of interest.

## **Results**

### *Demographics, Mental Health Characteristics and Treatment Utilization of HMDS Users and Non-Users*

HMDS users ( $50.1 \pm 15.9$ ) were significantly older than non-users ( $46.6 \pm 17.4$ ) ( $t = 3.9$ ,  $P < .001$ ) and more likely to be White than non-users (78.5 vs. 72.0%;  $\chi^2 = 11.8$ ,  $P < .01$ ). Compared to non-users, HMDS users were significantly more educated ( $\chi^2 = 35.2$ ,  $P < .001$ ) and less likely to be unemployed (2.1 vs. 4.6%;  $\chi^2 = 15.6$ ,  $P < .001$ ). Those who used HMDS were more likely to live in the Western region of the US than non-users (36.9 vs. 22.4%), whereas non-users were more likely to live in the South than HMDS users (36.9 vs. 25.9%) ( $\chi^2 = 27.3$ ,  $P < .001$ ). There were no significant gender differences between the two groups.

HMDS users and non-users did not significantly differ in their rates of psychiatric disorders, alcohol and substance use disorders, or use of psychiatric medication. HMDS users, however, were more likely to perceive themselves as having mental health needs (16.0 vs. 9.7%;  $\chi^2 = 21.4$ ,  $P < .001$ ), to have seen a mental health provider in the past year (8.2 vs. 4.4%;  $\chi^2 = 11.4$ ,  $P < .001$ ), and to have seen a primary care physician in the past year (80.4 vs. 73.7%;  $\chi^2 = 9.4$ ,  $P < .01$ ). HMDS users were less satisfied with their overall healthcare compared to non-users ( $\chi^2 = 9.3$ ,  $P < .01$ ).

### *HMDS Use Among Individuals with Psychiatric Problems and Those Using Psychiatric Medication*

The weighted prevalence of HMDS use was 10.6% with HMDS users using an average of  $1.9 \pm 1.5$  different medications/supplements (range 1–13), and the weighted prevalence of use of HMDS with psychoactive properties was 2.9%. The most frequently used HMDS in this sample along with their weighted population estimates of use were garlic (1.8%), ginkgo (1.5%), St. John's Wort

(1.2%), zinc (1.2%), ginseng (1.1%), echinacea (1.0%), chromium picolinate (0.9%), saw palmetto (0.5%), and DHEA (0.4%). Co-enzyme Q10, omega-3 fatty acids, bilberry, evening primrose oil, glucosamine sulfate, and melatonin were all used by an estimated 0.3% of the population.

Rates of use of *any* of these HMDS did not differ between individuals with and without psychiatric problems (11.9 vs. 10.4%;  $\chi^2 = 1.9$ ,  $P > .01$ ). However, those with psychiatric problems were more likely to use an HMDS that has psychoactive properties compared to those without a psychiatric problem (4.7 vs. 2.6%) ( $\chi^2 = 7.9$ ,  $P < .01$ ). In regard to specific HMDS, those with a psychiatric problem were more likely to use St. John's Wort than those without a psychiatric problem (3.3 vs. 0.8%;  $\chi^2 = 14.0$ ,  $P < .001$ ). Individuals with a psychiatric disorder were also more likely to use melatonin than those without a psychiatric disorder (1.0 vs. 0.2%;  $\chi^2 = 7.8$ ,  $P < .01$ ). Compared to those without a psychiatric disorder, those with a psychiatric disorder were *less* likely to use garlic (0.9 vs. 2.0%;  $\chi^2 = 9.2$ ,  $P < .01$ ) and bilberry (0.02 vs. 0.3%;  $\chi^2 = 6.9$ ,  $P < .01$ ). Rates of other HMDS use did not differ between individuals with and without psychiatric problems. Rates of HMDS use also did not differ between those who used psychiatric medications and those who did not ( $P > .01$  for all HMDS).

#### Psychiatric Problems and Medication Use of HMDS Users and Non-Users

Rates of psychiatric problems and psychiatric medication use among individuals who used different HMDS were examined. Those who used an HMDS with psychoactive properties, St. John's Wort and melatonin were more likely to have a psychiatric problem than those who did not use these HMDS. Specifically, 22% of those who used an HMDS with psychoactive properties met criteria for at least one psychiatric diagnosis compared to 13.4% among those who did not use an HMDS with psychoactive properties ( $\chi^2 = 7.9$ ,  $P < .01$ ). Rates of psychiatric problems were significantly higher among those who used St. John's Wort (38.5%) compared to those who did not use St. John's Wort (13.4%) ( $\chi^2 = 14.0$ ,  $P < .001$ ). Rates of psychiatric problems were also higher among those who used melatonin (49.5%) compared to those who did not use melatonin (13.6%). In contrast, rates of psychiatric disorders were significantly lower among those who used garlic (6.6%) compared to those who did not use garlic (13.8%) ( $\chi^2 = 9.2$ ,  $P < .01$ ). They were also lower among those who used bilberry (0.8%) than those who did not use bilberry (13.7%) ( $\chi^2 = 6.9$ ,  $P < .01$ ). Rates of psychiatric medication use did not differ for HMDS users and non-users ( $P > .01$  for all HMDS).

#### Multivariate Analyses Examining the Associations Between Mental Health Characteristics and HMDS Use

Bivariate analyses had indicated a relationship between the presence of a psychiatric problem and the use of HMDS that had psychoactive properties as well as several specific HMDS (i.e., St. John's Wort, melatonin, garlic, and bilberry). Logistic regression models were developed to determine if mental health characteristics were associated with the use of these HMDS in multivariate analyses. Mental health characteristics included in the model were presence of a psychiatric problem, perceived mental health needs, use of psychiatric medication, and receipt of mental health treatment. Covariates included demographic characteristics (i.e., age, gender, ethnicity, education, employment, income, and census region) and other important health characteristics (i.e., visited a primary care physician and satisfaction with overall health).

Perceived mental health need was the only mental health characteristic significantly associated with using any HMDS with use of HMDS higher among respondents reporting perceived need (OR = 1.7;  $P < .01$ ). The use of any HMDS significantly increased as age, education, and dissatisfaction with healthcare increased ( $P < .01$  for all). Unemployed individuals were half as likely to use any HMDS relative to employed persons ( $P < .01$ ), and living in the Western region was significantly associated with HMDS use as well ( $P < .01$ ).

Mental health characteristics significantly associated with the use of any psychoactive HMDS included perceived mental health needs (OR = 2.4;  $P < .01$ ) and receipt of mental health services (OR = 1.6;  $P < .05$ ). The use of any psychoactive HMDS significantly increased as age, family income, and dissatisfaction with healthcare increased ( $P < .01$  for all). Living in the Western region was also significantly associated with psychoactive HMDS use ( $P < .01$ ).

The use of St. John's Wort increased with the presence of a psychiatric disorder (OR = 1.9;  $P < .05$ ) and increased perceived mental health needs (OR = 3.3;  $P < .01$ ). Other independent variables associated with the use of St. John's Wort included being female ( $P < .05$ ), having a greater family income ( $P < .01$ ), and living in the Western region of the US ( $P < .05$ ). African-Americans were significantly less likely to use St. John's Wort than Whites (OR = 0.2;  $P < .05$ ). The presence of a psychiatric disorder (OR = 3.3;  $P < .01$ ), perceived mental health needs (OR = 2.9;  $P < .01$ ), and having seen a mental health provider (OR = 3.1;  $P < .05$ ) were significantly associated with melatonin use. Other independent variables associated with melatonin use included being male, greater family income, and living in the Western region of the US ( $P < .05$  for all).



The use of garlic decreased with the presence of a psychiatric disorder ( $OR = 0.4$ ;  $P < .01$ ); however, it increased with greater perceived mental health needs ( $OR = 2.1$ ;  $P < .05$ ). Other variables significantly associated with garlic use included greater age and living in the Western region of the US ( $P < .01$  for both). Additionally, Hispanics were significantly less likely to use garlic than Whites ( $OR = 0.2$ ;  $P < .01$ ). The use of bilberry significantly decreased when a psychiatric disorder was present ( $OR = 0.1$ ;  $P < .05$ ) or if an individual had seen a mental health provider ( $OR = 0.01$ ;  $P < .01$ ). Use of bilberry increased with age, employment, income, and Western living and decreased with lower satisfaction with health-care ( $P < .05$  for all).

## Discussion

This study enhances our understanding of the use of CAM by focusing on HMDS use, and specifically, the relationship between HMDS use and mental health. Although use of HMDS in general was not associated with psychiatric illness, bivariate analyses showed that the use of any psychoactive HMDS, St. John's Wort, and melatonin was associated with the presence of psychiatric problems, and the use of garlic and bilberry was associated with the absence of psychiatric illness. However, the relationship between psychiatric illness and use of psychoactive HMDS in general was no longer significant in multivariate analyses, suggesting that multiple individual characteristics affect HMDS use.

Consistent with prior research (Roy-Byrne et al. 2005), HMDS users and non-users did not differ in their rates of psychiatric medication use. Similar to that study, utilization of mental health services was not associated with HMDS use in general. It was, however, associated with the use of any psychoactive HMDS, melatonin, and bilberry. Furthermore, regardless of the presence or absence of a psychiatric diagnosis, one's perceived need for mental health care and dissatisfaction with health care were strongly associated with HMDS use. These findings could be attributed to the possibility that individuals with greater perceived health needs tend to make greater use of all available health care services, both conventional and alternative, a finding also suggested by earlier research on the use of CAM from this survey (Unützer et al. 2000) as well as other studies (Druss and Rosenheck 1999).

The data indicate that 14% of those who use HMDS also use a psychiatric medication, and of those taking a psychiatric medication, 12% also use an HMDS. The increasing use of herbal remedies has generated the need for healthcare providers to familiarize themselves with the risks, side effects, and contraindications of more

commonly used HMDS. However, not enough is known about the interactions between HMDS and conventional medication treatment (Ernst and Schmidt 2004; Yager et al. 1999). Although there is sufficient data to suggest significant drug–drug interactions involving HMDS (Cott 2001), more research is needed to better understand these interactions. To compound the issue, a number of studies have shown that patients do not typically inform their physicians of their use of HMDS or other CAM modalities and such treatments are not consistently documented in the medical records (Druss and Rosenheck 1999; Eisenberg et al. 1998; Elkins et al. 2005; Kessler et al. 2001; Knudt et al. 1999). These findings underscore the need for clinicians to directly ask their patients about HMDS use (Mamtani and Cimino 2002). Information about such use would also allow clinicians to explore potentially unmet mental health needs.

The findings indicate that individuals with a psychiatric disorder were significantly more likely to utilize St. John's Wort and melatonin. However, the effectiveness of these compounds on outcomes is uncertain. The effectiveness of St. John's wort for depression is still questionable because clinical trials have reported contradictory results. Past reviews and meta-analysis of the effectiveness of St. John's wort concluded that it was more effective than placebo and as effective as standard antidepressants in treating depression (Gaster and Holroyd 2000; Kim et al. 1999). These studies, however, had several limitations including small sample sizes, inclusion of individuals with minor to moderate symptom severity, absence of an active antidepressant arm, and lack of data regarding long-term use. Since then, large, well-designed studies of St. John's wort in major depression have found the herb to be no more effective than placebo (Hypericum Depression Trial Study Group 2002). A more recent meta-analysis concluded that the evidence is inconsistent with older and smaller trials that were not restricted to major depression showing St. John's wort to have a large effect on depression compared to placebo while larger trials that included major depression showed little to no effect (Linde et al. 2005).

In regard to melatonin, clinical studies suggest that melatonin may be more effective than placebo in decreasing the amount of time required to fall asleep, increasing the number of sleeping hours, and boosting daytime alertness. There is some evidence that melatonin may improve depressive symptoms in seasonal affective disorder (Lewy et al. 1998). Melatonin has also been shown to decrease insomnia in individuals with depression (Dalton et al. 2000) and improve sleep latency and quality in schizophrenia (Sharmir et al. 2000). However, these were small trials with a number of design limitations.

Although research on specific HMDS has increased over the past decade, there is a clear need for further research on

the effectiveness of varying HMDS on mental health outcomes. Well-designed, controlled trials in select patient populations are needed before a clear conclusion can be reached about the effectiveness of any HMDS in mental health disorders. Randomized, controlled trials that compare specific compounds to both placebo and effective prescription medication are needed. The utility of HMDS as adjunctive therapies should also be examined.

Though the use of HMDS in the US has increased in the past decade, the precise reasons for this increase remain ambiguous. Self-treatment through the use of HMDS could represent an appealing option for those who fear stigmatization due to their perceived and/or diagnosed psychiatric disorder(s) (Charlton 2005), who have not received appropriate mental health treatments (Young et al. 2001) or who have experienced limited or no response to prescription psychiatric medication. The finding that HMDS users were more likely to be dissatisfied with their healthcare lends support to these explanations. HMDS may also be appealing in that they represent a relatively inexpensive alternative to conventional medicine in that the physician and associated fees can be by-passed. The increase in the use of HMDS may also be attributable to the increase in direct-to-consumer advertising, particularly the increase in Internet marketing of herbal medicines and dietary supplements. A 2002 study reported that 62% of Internet users sought health information online, and approximately half of these individuals sought information on alternative and complementary treatments (Fox and Rainie 2002). These hypotheses are provided as potential explanations for the increased use of HMDS, however, there is little research addressing this issue. Further research is needed to understand the reasons for increased use of specific HMDS.

The study data was collected from 1997 to 1998 and may not reflect current trends in HMDS use. Given the rise in HMDS use over the last decade (Eisenberg et al. 1998; Kaufman et al. 2002; Kelly et al. 2005), the data likely underestimate current use. The methodology likely underestimates use as well since participants were asked about medication they had taken at least several times a week for at least 1 month. The findings remain important, however, as even recent CAM studies do not focus specifically on HMDS use and mental health (Grzywacz et al. 2006; Rossler et al. 2007). We also cannot determine if use of particular HMDS represented an individual's personal decision or a recommendation by a traditional or alternative health care provider.

The use of complementary and alternative medicine, including herbal medicines and dietary supplements, is widespread in American society. The use of HMDS warrants particular attention in persons with mental health problems or even perceived mental health problems as these individuals may be turning to HMDS use for

treatment of their symptoms, though not to the exclusion of traditional treatments. However, those who seek both conventional and alternative care may not communicate their efforts to all of their providers. Considering the potential interactions between some HMDS and traditional medications, providers should talk with their patients about their use of HMDS (Werneke et al. 2006). Why individuals who use HMDS seek such alternative treatments, how they get information about the vast variety of HMDS, and what the interactions are between HMDS and conventional treatments are all important questions that need to be addressed in order to better meet the needs of those who use HMDS and experience psychiatric problems.

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