Published in final edited form as:

J Acad Nutr Diet. 2012 August ; 112(8): 1223–1229. doi:10.1016/j.jand.2012.05.006.

Differences by race/ethnicity in older adults' beliefs about the relative importance of dietary supplements versus prescription medications: Results from the SURE study

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Abstract

Dietary supplement use is widespread among adults across races/ethnicities, yet reasons for use may vary across these groups. The SUPplement REporting (SURE) study quantified dietary supplement use and reasons for taking supplements in a multiethnic sample of adults who took at least one supplement. This study explored socio-demographic differences, including by race/ethnicity, associated with specific reasons/motivations for taking dietary supplements, including perceived importance of taking supplements relative to prescription medications. The study time period was March 2005 to August 2006. Participants (n=397) were older adults (age = 52–88 y) recruited from the Multiethnic Cohort Study in Hawaii and Los Angeles, with equal representation of males and females from six ethnic groups (white, Japanese-American, Native Hawaiian,

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African-American, US-born Latino, and foreign-born Latino). Subgroups of participants were compared by chi-square tests and logistic regression. The most common reasons for taking supplements were to maintain a healthy life, recommended by a health professional, and to prevent a disease/medical problem. A majority (76%) of participants reported that their dietary supplements were as important as prescription medications, with foreign-born Latinos and Japanese-Americans being most likely to state this belief. The relative importance of supplements was not associated with excessive use, but 27% of participants exceeded the upper limit for a nutrient. It is crucial for health professionals to better understand why individuals take supplements and the importance that they attach to their use. This information could lead to better monitoring and education efforts in order to prevent overuse of supplements and possible interactions with medications.

Keywords

Dietary Supplement; Medication; Race/Ethnicity

INTRODUCTION

Dietary supplement use is widespread in the United States. According to the 2003–2006 National Health and Nutrition Examination Survey, approximately one-half of the general population and 70% of adults older than 70 years, report taking at least one supplement in the past month, with 33% taking a multivitamin/multimineral supplement (1). In the Multiethnic Cohort (MEC), a large prospective study of older adults, the prevalence of dietary supplement use ranged from 44% among Native Hawaiians to 75% among Japanese Americans (2). Despite the weakened economy, growth in supplement sales has continued (3–5), with a 6% increase between 2008 and 2009 totaling \$26.9 billion (6). Among specific subgroups of the population, such as older adults and certain ethnic minorities, use is particularly high (2, 6–9). With these dramatic increases in supplement use, there is the potential for using supplements to manage medical conditions instead of or in addition to prescription medications.

Previous studies of adults have found the reasons or motivations for taking supplements include being given advice from a health professional or friend/family member to take a multivitamin or specific type of vitamin/supplement (10–12). Personal reasons range from symptom management/positive temperament (i.e., “to feel better”) to preservation of current health (“good for you”) to the prevention of future health problems (i.e., cold, flu) (10–13). Although Kaufman and Marninac’s samples included race and ethnic minorities (multiple races in the former (12) and African American/white in the latter (11)), differences between race/ethnicities’ reasons/motivations for taking supplements were not addressed. The Supplement Reporting (SURE) study was designed to evaluate an objective strategy for measuring supplement use by taking an inventory (i.e., pill counts) of the contents of all supplement containers in participants’ home over a year (14), and use this information to validate various supplement use questionnaires in a multiethnic population.

The purpose of this paper was to further examine older adults’ reasons for and concerns or worries about using dietary supplements and to determine if there are differences in these reasons/concerns between six race/ethnic groups: Japanese-Americans, African-Americans, whites, Native Hawaiians, native-born Latinos, and foreign-born Latinos. Another objective was to investigate race/ethnic and socio-demographic differences in perceived importance of taking dietary supplements compared to prescription medications. With the rapid growth of dietary supplement sales, findings clarify the need to better understand how and why supplements are used by older adults.

METHODS

Participants in the SURE study were members of the Multiethnic Cohort (MEC) (15) originally recruited in 1993–1996 using random sampling, stratified by sex, ethnic, and age groups. Socio-demographic information was collected upon recruitment; however, health history and medication use were collected in previous contacts. Details about the SURE study's sample and methods for quantifying supplement intake are available elsewhere (14). Briefly, MEC participants were recruited by mail from March 2005 to August 2006 and only those who reported current regular use of a dietary supplement (at least once a week for the past year) and would allow home visits with a study interviewer were eligible for the SURE study. All participants provided written informed consent. The study was approved by the Institutional Review Boards at the University of Hawaii and the University of Southern California.

Of the 1073 MEC participants who were contacted by phone and were eligible, 443 (43%) agreed to enroll in the study. Response rates varied across ethnic groups from 20% for foreign-born Latinos to 47% for African-Americans, yet there were no statistical differences in the proportion of participants from each race/ethnic group (12–19% in each group). The final sample included 396 participants.

Five home visits, equally spaced over one year, were made by trained interviewers from 2005 to 2006 where an inventory of all supplement containers by pill count was made (14). Frequency of supplement use was calculated as doses per day based on the inventories over the study year. The quarterly number of doses of each supplement was calculated as the difference between the number of pills in a bottle at the end of the quarter and those at the beginning of the quarter, divided by the number of pills per dose. Daily dose was computed as the sum of the quarterly doses, divided by the number of days between the first and last inventory. Average nutrient intakes from supplements were compared to the tolerable upper intake levels (UL) set by the Institute of Medicine (16).

A questionnaire measuring concerns and reasons/motivations for taking dietary supplements was developed based on qualitative, focus group results with similarly aged MEC participants in Hawaii. Specific instruments were adapted from previously published surveys of supplement users, including instruments designed to assess concerns about regular medication use and adherence (11–13, 17–21). Respondents could select more than one reason for taking a specific dietary supplement and more than one concern/worry related to their supplement use. Thus, their reasons and concerns regarding their supplement use are not independent or unique ratings. An additional question was developed that asked participants to report if they felt (yes/no) their dietary supplement was “as important” as their prescribed medications. Participants completed this questionnaire at the end of the supplement assessment period.

Statistical Analysis

Participant characteristics were summarized using descriptive statistics. Chi-square tests for independence were used to determine the association of race/ethnicity with multiple characteristics of supplement use. Additionally, a multiple logistic regression model was conducted to regress “importance of supplements” relative to medications onto significant sociodemographic, health history, supplement overuse indicators, and reasons for use. In the final model, Odds ratios (OR) and 95% confidence intervals (95% CI) were estimated to determine which factors were associated with the perception that supplement use was or was not as important as prescription medications. All statistical analyses were conducted using SAS (version 9.2, 2002, SAS Institute Inc., Cary, NC) and Bonferoni correction for multiple comparisons was applied when appropriate.

RESULTS AND DISCUSSION

Participant Characteristics

Participants (n=396) were 52% women ranging in age from 52 to 88 years (mean = 67.5 ± 7.4 years), college/post-graduate educated (41%), and equally represented the six race/ethnicity groups. Body mass index (BMI), computed from self-reported weight and height, ranged from 17.4 to 49.3 kg/m² (mean = 27.7 ± 4.8 kg/m²). All participants reported taking supplements with a frequency ranging between 0.15 to 18.4 doses per day (mean = 3.6 ± 3 doses a day). Most participants reported taking at least one medication (89%) and had been diagnosed with at least one medical condition (66%): 37.6% cardiovascular disease (CVD) or CVD risk factors including hypertension, 11.1% diabetes, 12.9% cancer, and 45.7% other health problems (i.e., cataracts, gout, arthritis, hip fracture) with no significant differences by sex. With the exception of medication use (women > men, $p < .023$), there were no sex differences in any of the participant characteristics.

Sex and race/ethnic differences in reasons used and perceptions about supplements

Table 1 shows differences by gender and ethnicity for reasons to take dietary supplements, concerns about supplement use, and the perception that supplements were as important as prescription medications. Of the seven most common reasons for taking supplements, “recommended by health professionals” (51%), “prevent disease/medical problems” (50%), and “maintain a healthy life” (64%) were cited most frequently. After correcting for multiple comparisons ($p = .05/11 = .005$), foreign-born Latinos were most likely (89%) to report feeling their supplements are as important as medications ($p < .001$) and females were more likely to report being advised to take a supplement by a health professional ($p < .001$).

Socio-demographic factors related to perception that supplements are as important as medications

Findings in Table 2 demonstrated significant differences between each of the non-white race/ethnicities relative to whites (OR range = 2.9 to 6.5, $p < .004$) on the reported importance of supplements relative to medications. African Americans and Native Hawaiians were nearly three times as likely, and foreign-born Latinos more than six times as likely, to report supplements being as important as prescription medications compared to whites. An interaction between ethnicity/race and medical conditions was not statistically significant, suggesting this finding was not moderated by differences in the prevalence of disease. Individuals who reported having a supplement recommended by a health professional and those who reported taking supplements “to have more energy” were twice as likely to feel supplements were as important as prescription medications, whereas individuals with a history of cardiovascular disease or cardiovascular disease risk factors were 53% less likely to feel supplements were as important as prescription medications.

Previous studies indicate that the most common reasons adults take dietary supplements (and/or herbal products) include: recommendation or advice from a health professional or friend to take a supplement, to feel better, to prevent colds/flu or chronic disease, and to balance or improve dietary intakes (10); to improve general wellness, to help manage arthritis, to help prevent or manage colds, or to improve memory (11); and for good health/they are good for you (12). In our study, the proportion taking dietary supplements to prevent disease/treat an existing medical problem (50.3%), to maintain a healthy life (63.9%), and because they were recommended by a health professional (51.5%). These proportions were within the range reported by Neuhouser and colleagues for the reasons: to “feel better” and to prevent colds/flu or chronic disease (16–81%) (10), but were lower than that reported by Kaufman and colleagues (“for good health”, 35%) (12). Likewise, the prevalence of taking supplements recommended by a health professional in our sample

(51.5%) was comparable to the reported reason 52% of Neuhouser's sample was taking calcium supplements (10) but much greater than the 6% reported by Kaufman and colleagues (12). Discrepancies in these prevalence rates are likely due to noted differences in study designs and participant characteristics. Specifically, the sample in the Neuhouser et al. study (10) was a modestly sized group (n=104) of men and women supplement users who were predominantly white, college-educated, with a mean age of 44 ± 13 years, whereas the sample in the Kaufman et al. study was a large (n=2590) ethnically-diverse sample of male and female participants aged 18 years and older (median age = 35y), and the sample included non-supplement users. Differences across samples as well as study designs (e.g. reasons for general use versus supplement-specific use) are most likely contributors to observed discrepancies in the reasons for dietary supplement use.

The strongest observed association of race/ethnicity with attitudes was for participants' perception of the relative importance of dietary supplements compared to prescription medications. High proportions of foreign-born Latinos and Japanese-Americans reported that dietary supplements were as important as prescription medications. These findings are supported by documented historical and cultural differences in medical/health care beliefs. Historically, the approach to medicine/health care for Latinos and Japanese is more closely aligned with collectivism (versus individualism) (22, 23). This approach could also be the basis for these two race/ethnic groups' support for and greater use of complementary and alternative medicine or holistic or ritualistic approaches to maintaining health and preventing disease relative to whites and African Americans (24–26). Such cultural beliefs and health care preferences may contribute to these race/ethnic group's perceptions that supplements have the same importance (to their health) as their prescribed medications.

Regardless of race/ethnicity, participants with CVD, who are probably taking potentially life-saving medications to manage symptoms or lower CVD risk factors, were significantly less likely to think their supplements were as important as their prescription medications. This belief, could be attributed to the years of medical treatment and public health campaigns that emphasize the importance of taking medications for hypertension, angina, and other CVD conditions/risk factors. There were no significant differences between those with or without other chronic diseases (i.e., cancer or diabetes), but the power to detect these differences was limited by the lower prevalence of these conditions.

Lastly, there were also no differences in perceptions of supplement importance relative to medications by the number of medications taken, the number of supplement types used or the number of supplement doses per day. However, approximately 27% of participants exceeded the tolerable upper intake level (UL) for one or more of the 10 nutrients examined. Exceeding a UL was not associated with sex [$\chi^2(1)=2.10$, $p=0.148$] or race/ethnicity [$\chi^2(5)=3.70$, $p=0.594$; data not shown], and there were no significant sex-by-race/ethnicity interactions. Furthermore, exceeding one or more of the ULs was not associated with believing that supplements are as important as medications (Table 2).

Although our study was one of the first to investigate motivations and concerns related to supplement use, and perceptions about the relative importance of supplements compared to medications, our findings have some limitations. Our questionnaire was based on the results of focus groups, and was not a previously validated instrument. One omission that was identified concerned "maintaining bone health" as a reason/motivation for taking dietary supplements (e.g., calcium). Though some participants chose to indicate bone health as a write-in reason, it is likely to have been underestimated. Because there are no standardized instruments for exploring motivations, concerns/worries, or the relative importance of supplement use compared to medications, it is difficult for us to compare our results,

particularly for the latter two constructs, to those from other studies. Future research should endeavor to develop and validate a standard instrument.

Our medication use information was obtained from a previously administered instrument, so we could not address issues of polypharmacy and polyherbacy supplement use as has been done in other studies (27). Furthermore, the BMI for our participants was self-reported on an earlier survey collected for the MEC study from 1999–2003. Since participant's weight could have been reported up to six years before the SURE study began, the mean BMI and proportion of subjects in the obesity categories may not be representative of a participants' BMI when they were participating in the SURE study. Also, SURE participants were recruited from a previously existing research cohort and all resided in Hawaii and Los Angeles; thus, the generalizability of these results may be limited.

CONCLUSIONS

These results have several implications for health professionals, including dietitians. It is important that physicians and dietitians are aware of how much and what supplements their patients are taking in order to be able to accurately assess a patient's potential for exceeding nutrient toxicity limits and possible nutrient-drug interactions in addition to their overall dietary intake of key nutrients. Many older, ethnic minority adults appear to think that their dietary supplements are as important as their prescription medications. While this belief was not related to exceeding UL, patients who are compliant with taking their medications and place a high level of importance to their supplements could be at risk for harmful drug-nutrient interactions. Unfortunately, we were unable to test for potential drug-nutrient interactions. Furthermore, only the participants who reported having CVD did not equate their supplements with their potentially lifesaving medications. It is possible that individuals who are prescribed medication for other chronic diseases could decide to use a supplement instead of medication thus negatively impacting medication compliance. Given the widespread and increasing use of dietary supplements (28), it is important to fully understand the type and amounts of supplements taken and a patient's motivations and beliefs underlying their use. These findings begin this process, but further work is needed to design effective monitoring and education methods that could prevent overuse of supplements and possible interactions with medications.

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Sex and race/ethnic differences in reporting reasons for and concerns about supplement use, and their importance relative to prescription medications

Table 1

	All (n=396)	Males (n=191)	Females (n=205)	p-value	White (n=70)	African American (n=74)	Native Hawaiian (n=61)	Japanese American (n=64)	Latinos – US born (n=69)	Latinos – foreign born (n=58)	p-value
Reasons (%)											
Recommended by health professional	51.5	35.1	66.8	<0.001	51.4	40.5	20.8	60.9	55.1	51.7	0.287
Recommended by friend/family member	17.4	22.5	12.7	0.010	15.7	10.8	16.4	26.6	20.3	15.5	0.245
Lack of balanced diet/regular meals	24.8	23.0	26.3	0.446	20.0	29.7	21.3	20.3	30.4	25.9	0.530
Prevent disease/medical problem	50.3	47.6	52.7	0.316	54.3	50.0	44.3	56.3	53.6	41.4	0.494
To maintain a healthy life	63.9	62.8	64.9	0.671	61.4	64.9	65.6	75.0	63.8	51.7	0.190
To feel better	33.3	29.8	36.6	0.155	28.6	39.2	29.5	18.8	39.1	44.8	0.025
To have more energy	33.3	29.3	37.1	0.102	27.1	43.2	36.1	20.3	36.2	36.2	0.074
Concerns (%)											
Interaction with medications	10.9	12.0	10.2	0.569	4.3	10.8	8.2	9.4	10.4	24.4	0.014
Physical reactions or side effects	11.1	11.5	10.2	0.684	15.7	12.2	4.9	6.3	10.1	17.2	0.170
Forgetting to take	22.5	24.1	22.9	0.786	17.1	14.9	24.6	17.2	33.3	36.2	0.010
Importance (%)											
Are as important as prescription medications	75.9	70.0	81.4	0.009	55.2	72.2	76.3	83.9	82.1	89.1	<0.001

Differences by sex and race/ethnicity were separately analyzed using chi-squares tests for independence. After adjusting for multiple comparisons significance was set at $p < 0.005$.

Table 2
 Characteristics of participants reporting the use of supplements being as important as medications

	Supplements are as important as prescription medications				
	No (n = 92)	Yes (n = 283)	OR	95% CI	p-value
Sex					
Male	55 (60%)	126 (44%)	1.00		
Female	37 (40%)	157 (56%)	1.49	0.85, 2.63	0.165
Age (years)					
63 years	32 (34%)	101 (36%)	1.00		
64–70 years	30 (33%)	92 (32%)	1.23	0.64, 2.38	0.537
71 years	30 (33%)	90 (31%)	1.11	0.56, 2.20	0.769
Race/Ethnicity					
White	30 (33%)	37 (13%)	1.00		
African American	20 (22%)	51 (18%)	2.95	1.27, 6.86	0.012
Native Hawaiian	14 (15%)	44 (16%)	3.19	1.29, 7.89	0.012
Japanese	10 (11%)	52 (18%)	5.36	2.12, 13.56	<.001
US-born Latino	12 (13%)	53 (19%)	3.53	1.41, 8.87	0.007
Foreign-born Latino	6 (6%)	46 (16%)	6.55	2.01, 21.38	0.002
Education					
High school or less	15 (16%)	86 (30%)	1.00		
Vocational school or some college	27 (29%)	89 (32%)	0.74	0.33, 1.65	0.455
College graduate or more	50 (55%)	108 (38%)	0.56	0.26, 1.21	0.141
Health History [†]					
History of CVD/CVD risk factors ^{††}					
No	48 (52%)	189 (67%)	1.00		
Yes	44 (48%)	94 (33%)	0.51	0.29, 0.90	0.020
History of diabetes					
No	77 (84%)	255 (90%)	1.00		
Yes	15 (16%)	28 (10%)	0.52	0.24, 1.14	0.104
History of cancer ^{†††}					
No	80 (87%)	247 (87%)	1.00		
Yes	12 (13%)	36 (13%)	1.78	0.77, 4.15	0.181

Supplements are as important as prescription medications		No (n = 92)	Yes (n = 283)	OR	95% CI	p-value
History of other health conditions ^{††††}						
		50 (54%)	155 (55%)	1.00		
Yes		42 (46%)	128 (45%)	1.04	0.61, 1.80	0.877
Reported medication use						
No medications		7 (8%)	32 (11%)	1.00		
One or more medications		85 (92%)	251 (89%)	0.85	0.32, 2.25	0.744
Number of supplement types used						
1–4 types		40 (43%)	138 (49%)	1.00		
5–24 types		52 (57%)	145 (51%)	0.60	0.32, 1.12	0.107
Frequency of supplement use						
0–1 doses per day		21 (23%)	65 (23%)	1.00		
2–3 doses per day		31 (34%)	103 (36%)	1.74	0.82, 3.68	0.147
4–18 doses per day		40 (43%)	115 (41%)	1.55	0.68, 3.54	0.298
Number of ULs exceeded						
0 ULs exceeded		68 (74%)	207 (73%)	1.00		
1–8 ULs exceeded		24 (26%)	85 (27%)	1.20	0.65, 2.23	0.567
Reported reasons for supplement use						
Recommended by health professional						
No		57 (62%)	128 (45%)	1.00		
Yes		35 (38%)	155 (55%)	1.98	1.12, 3.50	0.018
To have more energy						
No		71 (77%)	179 (63%)	1.00		
Yes		21 (23%)	104 (37%)	2.61	1.40, 4.85	0.003

Multivariate logistic regression analyses were used to estimate odds ratio (OR) and 95% confidence intervals; OR are adjusted for all model variables presented.

Sample size reduced to n=375 due to listwise deletion

Age = Age at SURE study visit 1 (2005–2006).

Race/ethnicity, level of education = Multithnic Cohort baseline questionnaire (1993–1996)

Health history = Multithnic Cohort questionnaires (1993–1196 & 1999–2003)

Dietary supplement use = SURE study (2005–2006)

Medication use = at biospecimen collection (2001–2006)

[†] Categories are not mutually exclusive – participants can be represented in any number of categories

^{††} Cardiovascular disease and disease risk factors includes: angina, heart attack, high blood pressure, stroke.

777 Cancers include: breast cancer, prostate cancer, colon/rectal cancer, melanoma and other skin cancers, other cancers.

7777 Other health conditions include: cataracts, gallbladder removal, glaucoma, gout, hip fracture, kidney stones, osteoarthritis, polyps of the intestine, rheumatoid arthritis, ulcer, previous gastrectomy.