



<sup>1</sup>Francis C. Lau, Ph.D., FACN, <sup>1,2</sup>Amalia Blanco, Pharm.D., <sup>1</sup>Randi Neiner, Ph.D., and <sup>1</sup>Bruce P. Daggy, Ph.D., FACN. <sup>1</sup>Shaklee Innovation Center, Pleasanton, CA; <sup>2</sup>University of Berkeley, Berkeley, CA.

## ABSTRACT

Nutrition should be a major tool for disease prevention. Unfortunately, poor diet choices greatly increase the risks for many diseases, and the current healthcare system pays scant attention to nutrition. Findings from NHANES suggest that inadequate intakes of many nutrients exist among U.S. adults. In this regard, dietary supplements may be used to promote health and fill nutrient gaps. In fact, according a recent survey, more than two-thirds of American adults take dietary supplements and that users of supplements are more likely than non-users to make healthy dietary choices and adopt other healthy lifestyle habits.

Effects of supplement use have been studied in a cohort of consumers with documented long-term (>20 years) use of multiple supplements. Previous reports found that this cohort had improved levels of disease-risk biomarkers and reduced prevalence of diseases such as diabetes and coronary heart disease as compared to non-supplement users or multivitamin-only users from the NHANES database. Here we report the results of a survey of this cohort examining their opinions on the role of supplements in promoting health.

The online survey collected supplement usage pattern and measured consumer experience with five dietary supplements: multivitamin; resveratrol/polyphenol-rich supplement (RPS); vitamin B complex; herbal supplement containing alfalfa leaf powder; and omega-3 supplement. The online survey was sent to 3,426 U.S. consumers and of whom 907 responded (87% females). Regional distribution of the responders was as follows: 36% Midwest, 25% South, 21% Northeast and 19% West. Of all the responders, 55% were between 60 – 79 years old. More than two-thirds (69%) of responders indicated that they have been using supplements for more than 20 years. The primary reasons for using supplements were health from within or overall health (49%) and filling nutrient gaps (12%). The responses related to supplement usage experience were grouped by keywords as related to health benefits. The main benefits for multivitamins: energy (48.1%), overall health (19.5%), immunity (19.0%), well-being (14.4%); RPS: energy (26.1%), skin health (7.8%), anti-inflammation (7.5%), vision health (7.4%); B-Complex: energy (42.3%), stress relief (23.9%), calm (21.2%); Alfalfa: allergy relief (56.6%), arthritis relief (17.1%), anti-inflammation (12.7%); and Omega-3: anti-inflammation (20.6%), heart health (17.3%), joint health (14.5%).

These results indicated that long-term supplement use was driven by perceived benefits. Some perceived benefits suggest areas for future research.

## BACKGROUND AND OBJECTIVES

Findings from a previous cross-sectional study in a cohort of consumers with documented long-term (>20 years) use of multiple supplements indicated that the health status of this cohort was significantly better than non-supplement or multivitamin-only users surveyed by the National Health and Nutrition Examination Survey (NHANES) [Block et al., Nutr. J. 6:30, 2007]. Specifically, this cohort had improved levels of disease-risk biomarkers and reduced prevalence of diseases such as diabetes and coronary heart disease.

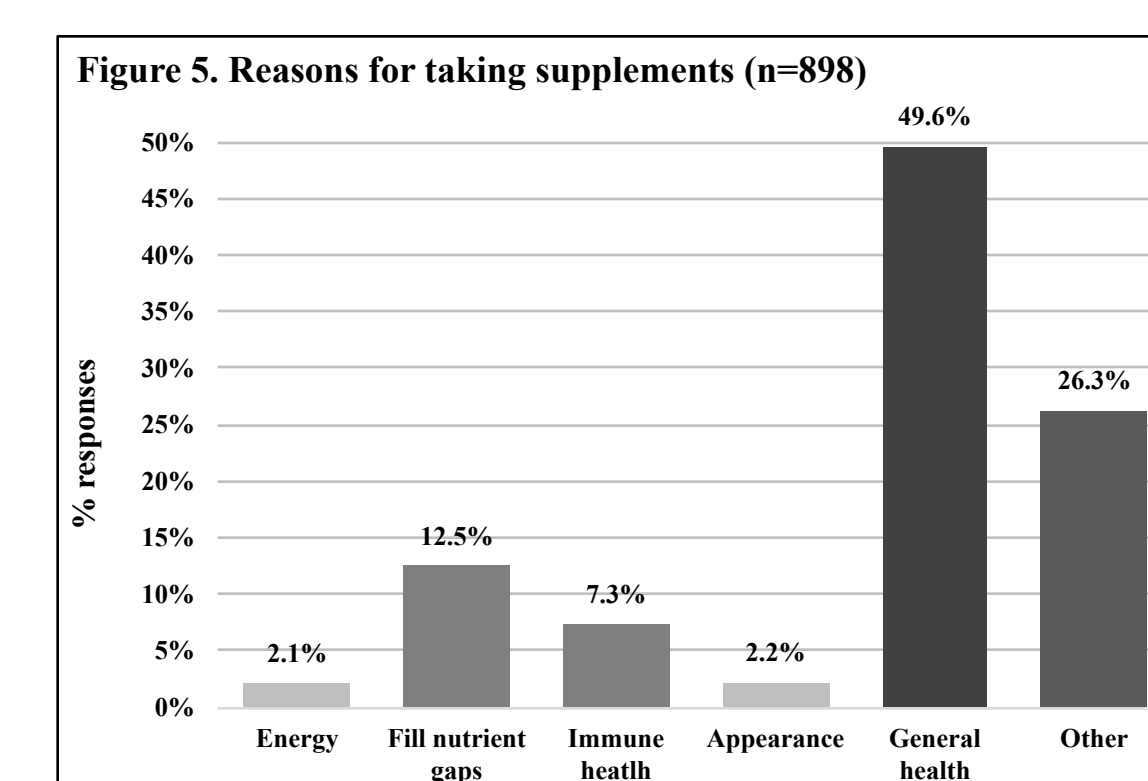
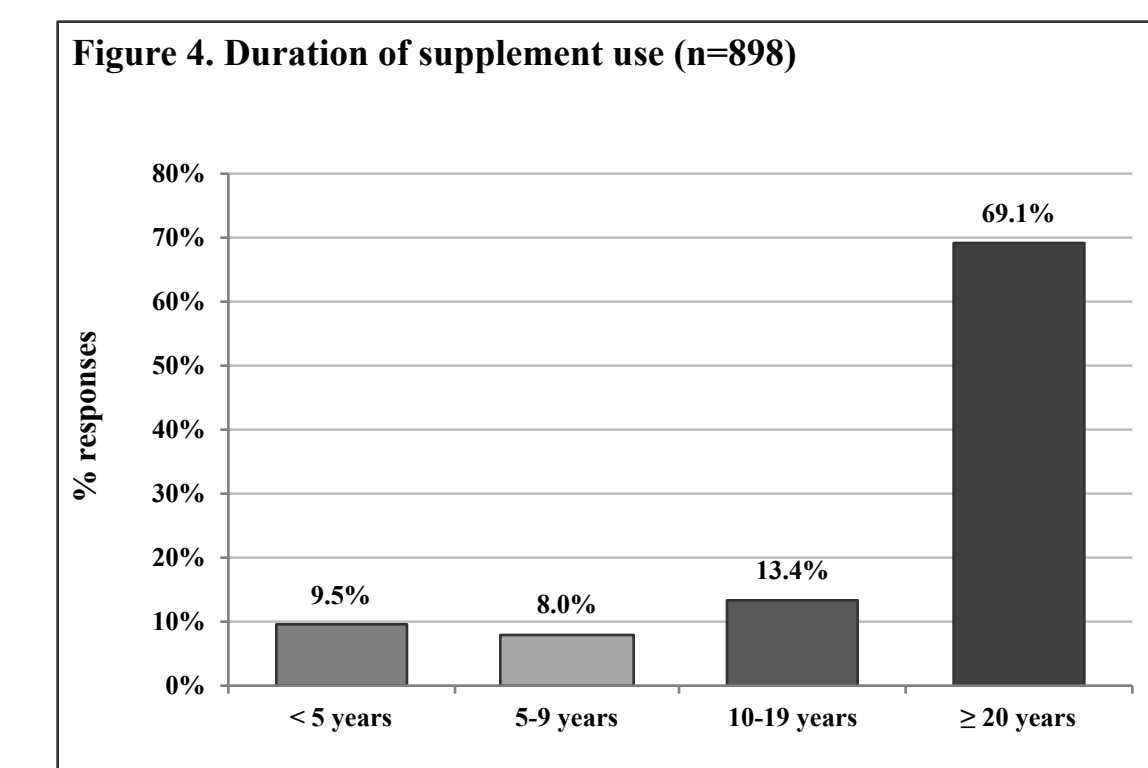
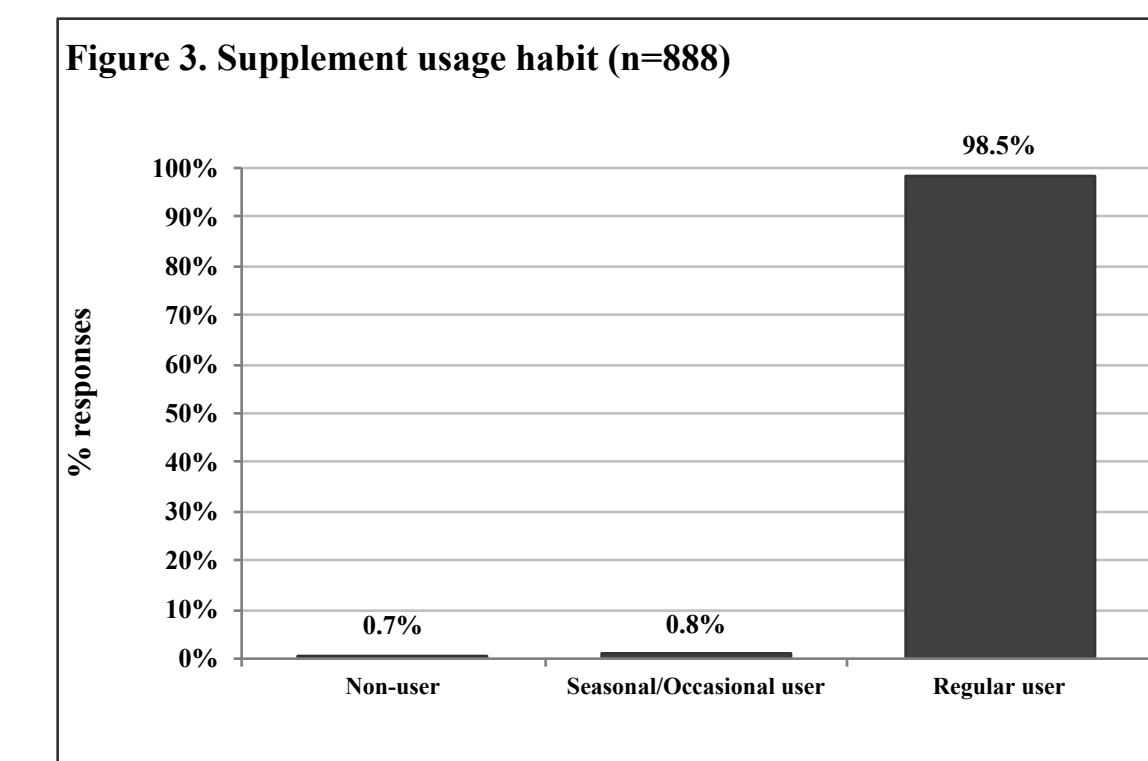
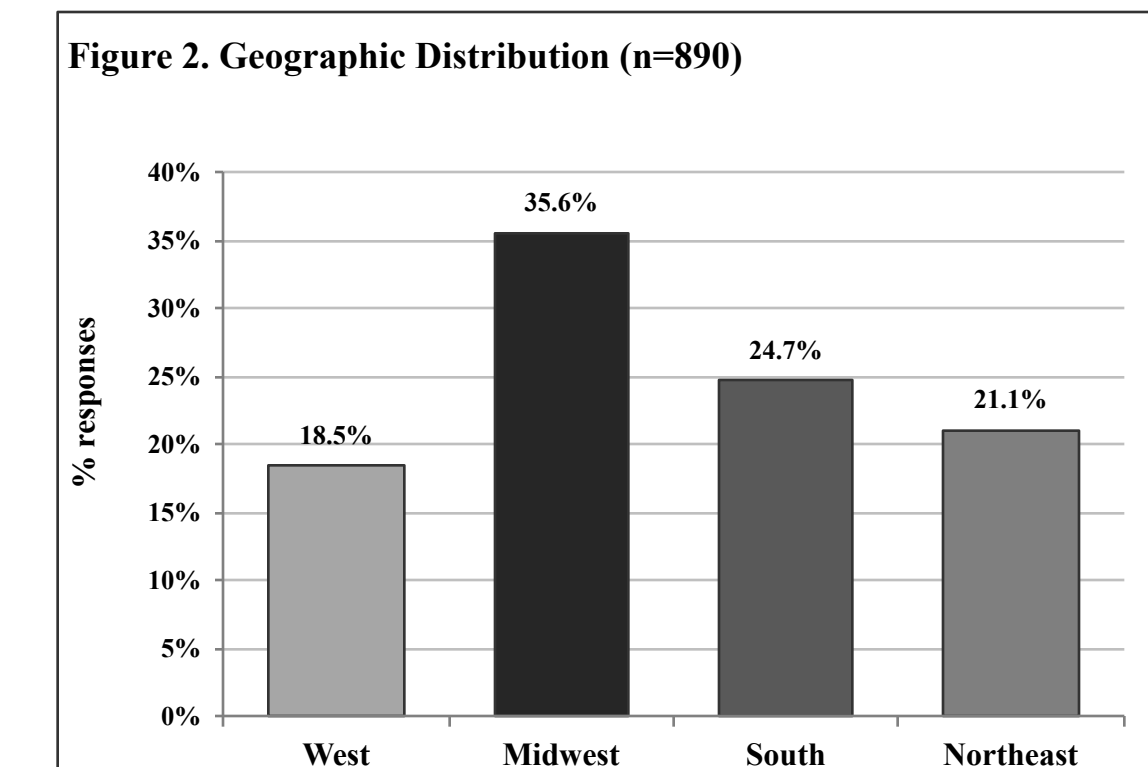
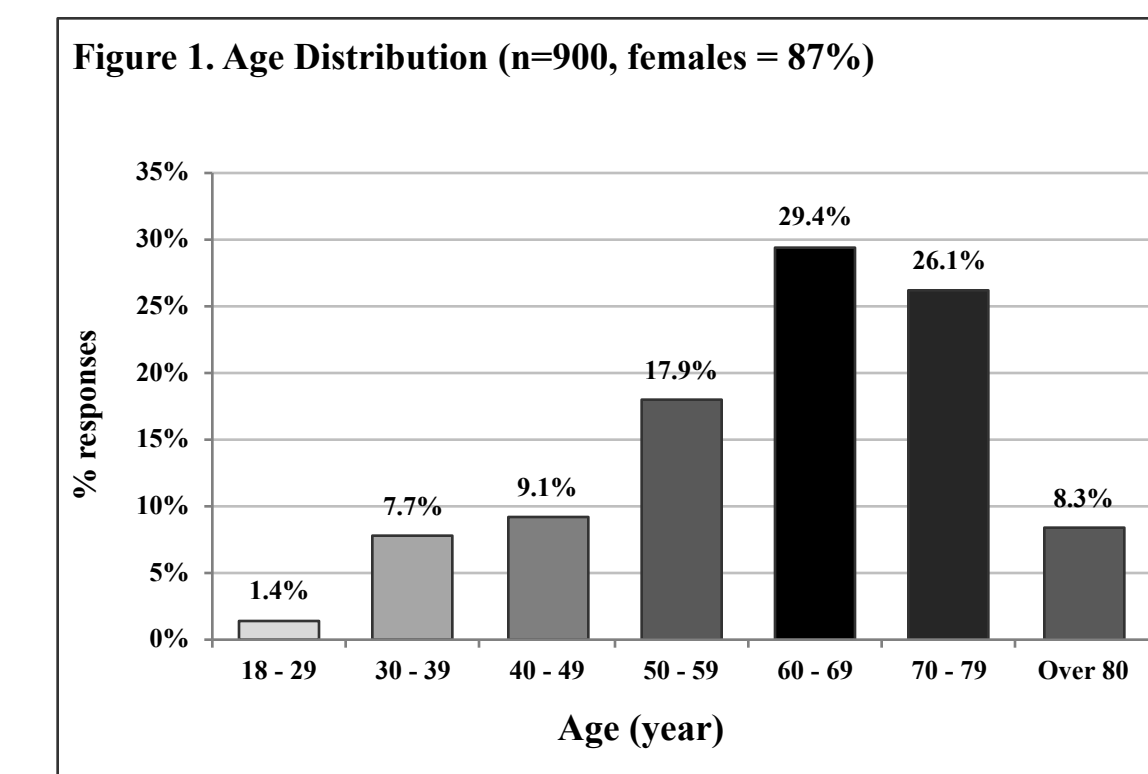
The objective of the current study was to survey this cohort of long-term supplement users regarding their opinions on the role of supplements in promoting health.

## METHODS

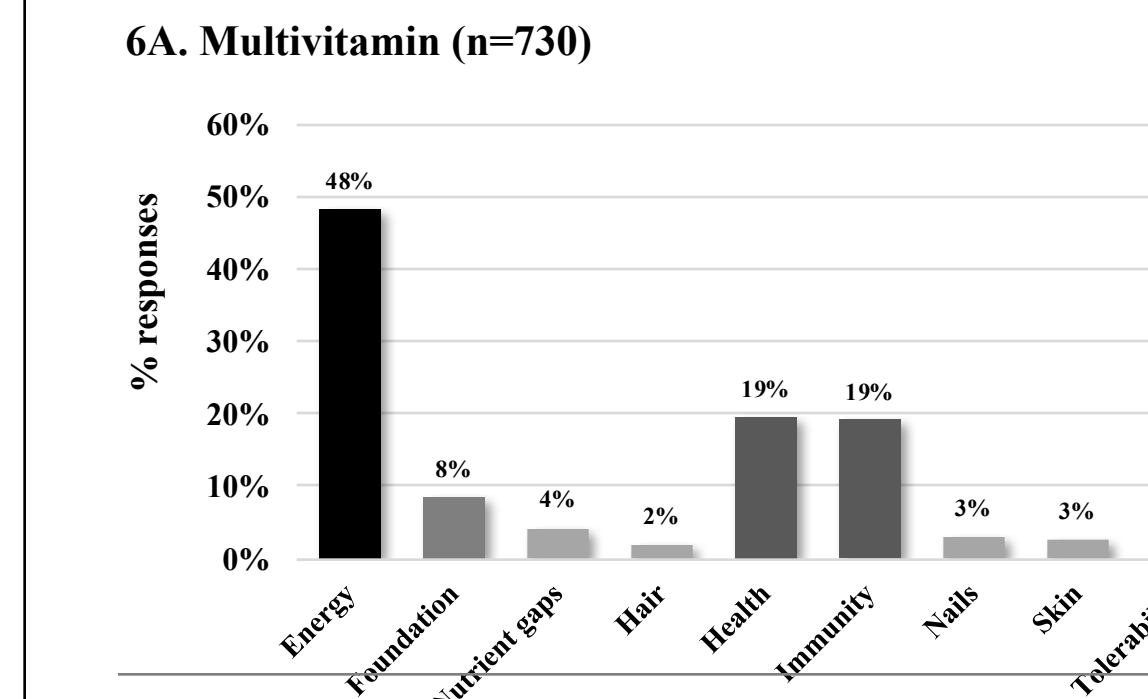
Online survey link was sent to a pool of 3,426 long-term supplement users residing in four general geographic regions within the continental USA via email. There were 907 recipients who responded to the invitation and among them, more than 700 subsequently completed the 13-item survey regarding their opinions and knowledge of five supplements.

The supplements surveyed were: multivitamin; resveratrol/polyphenol-rich formulation (RPS); vitamin B complex; herbal extract of alfalfa leaves and omega-3 EPA+DHA.

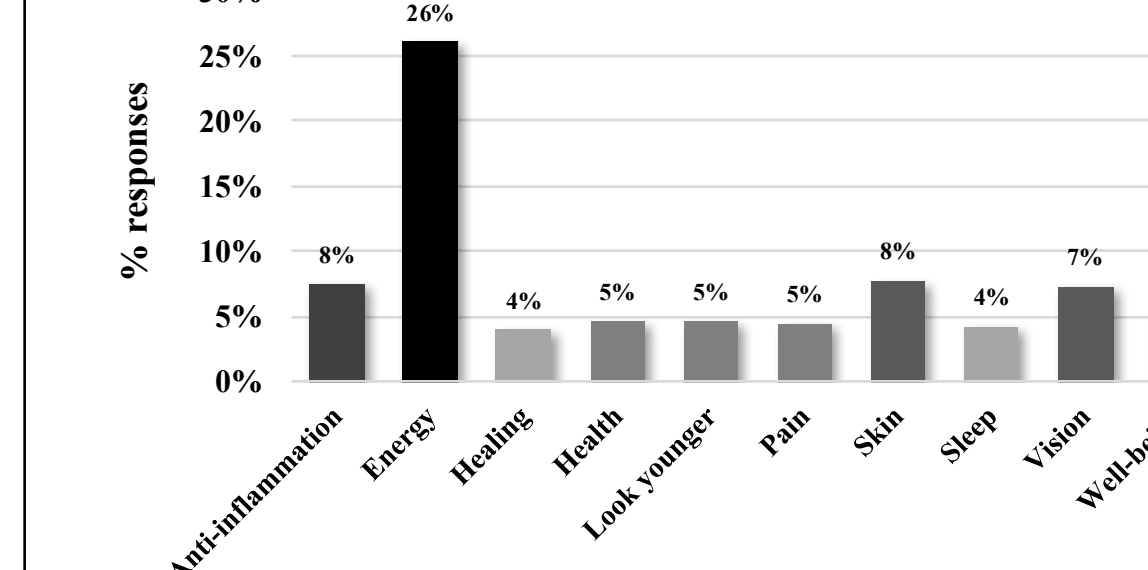
The respondents were asked about their personal experience on the benefits of these five supplements. The responses were grouped into keywords and the top 10 keywords for each supplements were used to illustrate consumers perception of the health benefits associated with these supplements.



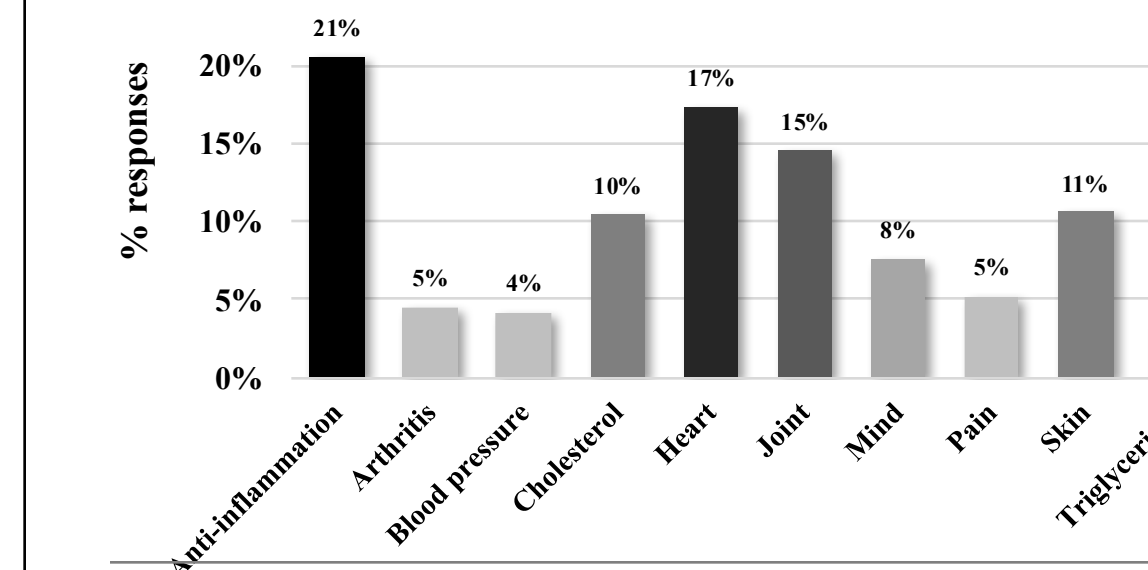
**Figure 6. Top 10 reported benefits**



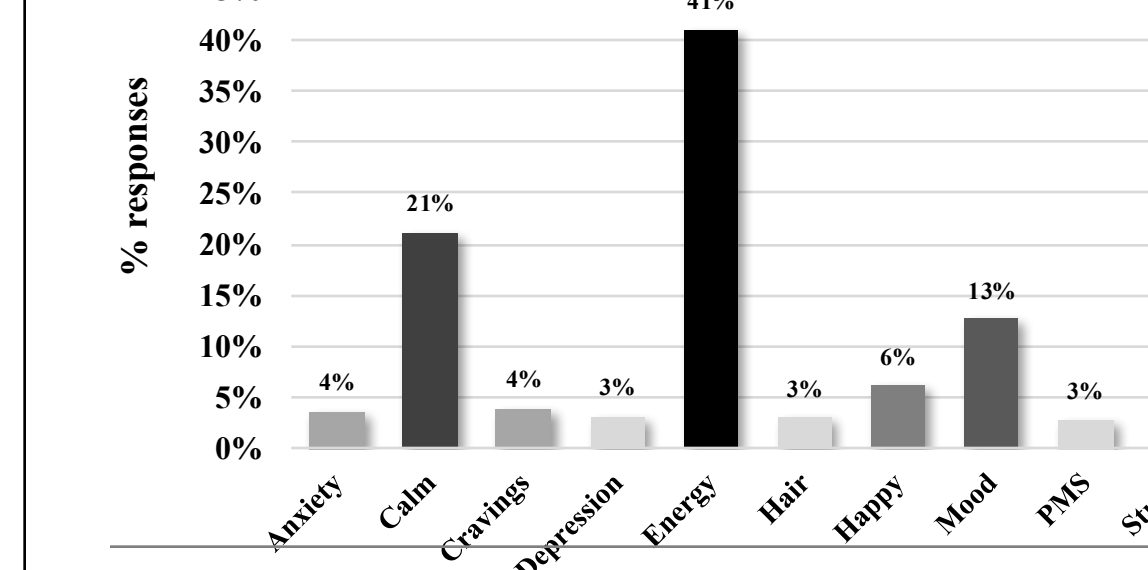
**6B. Resveratrol/polyphenol supplement (n=732)**



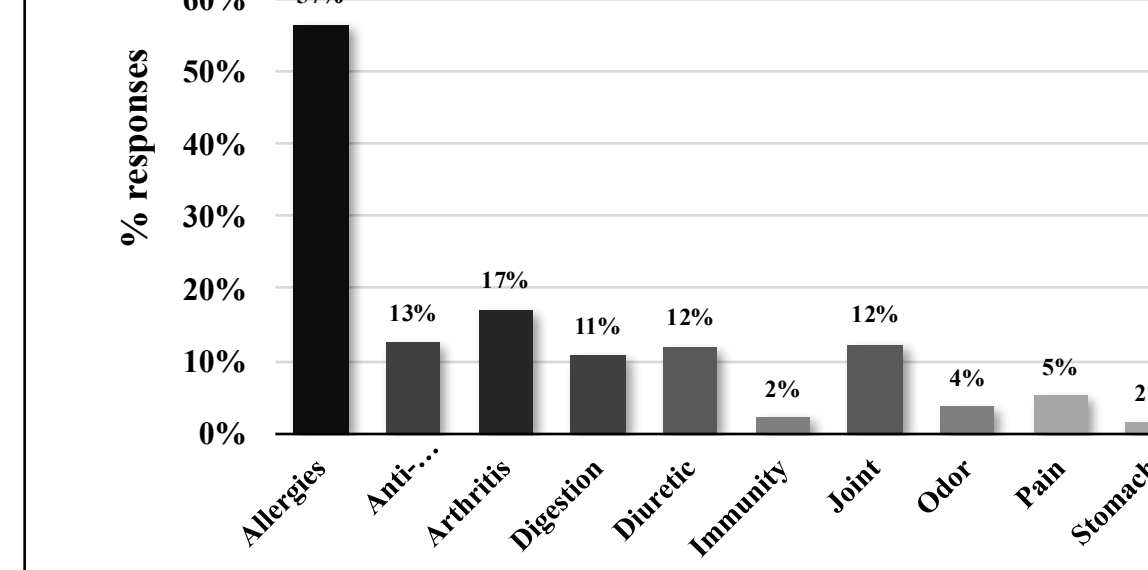
6C. Omega-3 EPA + DHA (n=710)



6D. B-complex (n=770)



**6E. Alfalfa herbal supplement (n=788)**



### Word cloud illustration of benefits

Supplement facts			Serving Size: 1 Scoop	
Supplement Facts			Serving Size: 1 Scoop	
	Amount per Scoop	% DV		% DV
24 Carotenoids	<1 mg	<1%*	140 mg (includes beta carotene and 140 other carotenoids)	100% <sup>†</sup>
100 mg Vitamin A (as beta-carotene)	100 mg	100% <sup>†</sup>	100 mg (includes beta-carotene and 140 other carotenoids)	100% <sup>†</sup>
100 mg Vitamin E (as d-alpha-tocopherol)	100 mg	100% <sup>†</sup>	100 mg (includes d-alpha-tocopherol and 140 other tocopherols)	100% <sup>†</sup>
100 mg Vitamin C (as ascorbic acid)	100 mg	100% <sup>†</sup>	100 mg (includes ascorbic acid and 140 other ascorbic acids)	100% <sup>†</sup>
100 mg Vitamin B6 (as pyridoxine hydrochloride)	100 mg	100% <sup>†</sup>	100 mg (includes pyridoxine hydrochloride and 140 other pyridoxines)	100% <sup>†</sup>
100 mg Vitamin B12 (as cyanocobalamin)	100 mg	100% <sup>†</sup>	100 mg (includes cyanocobalamin and 140 other cyanocobalamins)	100% <sup>†</sup>
100 mg Vitamin D (as cholecalciferol)	100 mg	100% <sup>†</sup>	100 mg (includes cholecalciferol and 140 other cholecalciferols)	100% <sup>†</sup>
100 mg Vitamin K (as menaquinone-7)	100 mg	100% <sup>†</sup>	100 mg (includes menaquinone-7 and 140 other menaquinones)	100% <sup>†</sup>
100 mg Zinc (as zinc gluconate)	100 mg	100% <sup>†</sup>	100 mg (includes zinc gluconate and 140 other zinc gluconates)	100% <sup>†</sup>
100 mg Magnesium (as magnesium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes magnesium citrate and 140 other magnesium citrates)	100% <sup>†</sup>
100 mg Calcium (as calcium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes calcium citrate and 140 other calcium citrates)	100% <sup>†</sup>
100 mg Potassium (as potassium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes potassium citrate and 140 other potassium citrates)	100% <sup>†</sup>
100 mg Sodium (as sodium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes sodium citrate and 140 other sodium citrates)	100% <sup>†</sup>
100 mg Phosphorus (as phosphorus citrate)	100 mg	100% <sup>†</sup>	100 mg (includes phosphorus citrate and 140 other phosphorus citrates)	100% <sup>†</sup>
100 mg Chloride (as chloride citrate)	100 mg	100% <sup>†</sup>	100 mg (includes chloride citrate and 140 other chloride citrates)	100% <sup>†</sup>
100 mg Sulfate (as sulfate citrate)	100 mg	100% <sup>†</sup>	100 mg (includes sulfate citrate and 140 other sulfate citrates)	100% <sup>†</sup>
100 mg Nitrate (as nitrate citrate)	100 mg	100% <sup>†</sup>	100 mg (includes nitrate citrate and 140 other nitrate citrates)	100% <sup>†</sup>
100 mg Fluoride (as fluoride citrate)	100 mg	100% <sup>†</sup>	100 mg (includes fluoride citrate and 140 other fluoride citrates)	100% <sup>†</sup>
100 mg Iodine (as iodine citrate)	100 mg	100% <sup>†</sup>	100 mg (includes iodine citrate and 140 other iodine citrates)	100% <sup>†</sup>
100 mg Selenium (as selenium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes selenium citrate and 140 other selenium citrates)	100% <sup>†</sup>
100 mg Copper (as copper citrate)	100 mg	100% <sup>†</sup>	100 mg (includes copper citrate and 140 other copper citrates)	100% <sup>†</sup>
100 mg Manganese (as manganese citrate)	100 mg	100% <sup>†</sup>	100 mg (includes manganese citrate and 140 other manganese citrates)	100% <sup>†</sup>
100 mg Chromium (as chromium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes chromium citrate and 140 other chromium citrates)	100% <sup>†</sup>
100 mg Molybdenum (as molybdenum citrate)	100 mg	100% <sup>†</sup>	100 mg (includes molybdenum citrate and 140 other molybdenum citrates)	100% <sup>†</sup>
100 mg Vanadium (as vanadium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes vanadium citrate and 140 other vanadium citrates)	100% <sup>†</sup>
100 mg Boron (as boron citrate)	100 mg	100% <sup>†</sup>	100 mg (includes boron citrate and 140 other boron citrates)	100% <sup>†</sup>
100 mg Silicon (as silicon citrate)	100 mg	100% <sup>†</sup>	100 mg (includes silicon citrate and 140 other silicon citrates)	100% <sup>†</sup>
100 mg Nickel (as nickel citrate)	100 mg	100% <sup>†</sup>	100 mg (includes nickel citrate and 140 other nickel citrates)	100% <sup>†</sup>
100 mg Cobalt (as cobalt citrate)	100 mg	100% <sup>†</sup>	100 mg (includes cobalt citrate and 140 other cobalt citrates)	100% <sup>†</sup>
100 mg Manganese (as manganese citrate)	100 mg	100% <sup>†</sup>	100 mg (includes manganese citrate and 140 other manganese citrates)	100% <sup>†</sup>
100 mg Chromium (as chromium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes chromium citrate and 140 other chromium citrates)	100% <sup>†</sup>
100 mg Molybdenum (as molybdenum citrate)	100 mg	100% <sup>†</sup>	100 mg (includes molybdenum citrate and 140 other molybdenum citrates)	100% <sup>†</sup>
100 mg Vanadium (as vanadium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes vanadium citrate and 140 other vanadium citrates)	100% <sup>†</sup>
100 mg Boron (as boron citrate)	100 mg	100% <sup>†</sup>	100 mg (includes boron citrate and 140 other boron citrates)	100% <sup>†</sup>
100 mg Silicon (as silicon citrate)	100 mg	100% <sup>†</sup>	100 mg (includes silicon citrate and 140 other silicon citrates)	100% <sup>†</sup>
100 mg Nickel (as nickel citrate)	100 mg	100% <sup>†</sup>	100 mg (includes nickel citrate and 140 other nickel citrates)	100% <sup>†</sup>
100 mg Cobalt (as cobalt citrate)	100 mg	100% <sup>†</sup>	100 mg (includes cobalt citrate and 140 other cobalt citrates)	100% <sup>†</sup>
100 mg Manganese (as manganese citrate)	100 mg	100% <sup>†</sup>	100 mg (includes manganese citrate and 140 other manganese citrates)	100% <sup>†</sup>
100 mg Chromium (as chromium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes chromium citrate and 140 other chromium citrates)	100% <sup>†</sup>
100 mg Molybdenum (as molybdenum citrate)	100 mg	100% <sup>†</sup>	100 mg (includes molybdenum citrate and 140 other molybdenum citrates)	100% <sup>†</sup>
100 mg Vanadium (as vanadium citrate)	100 mg	100% <sup>†</sup>	100 mg (includes vanadium citrate and 140 other vanadium citrates)	100% <sup>†</sup>
100 mg Boron (as boron citrate)	100 mg	100% <sup>†</sup>	100 mg (includes boron citrate and 140 other boron citrates)	100% <sup>†</sup>
100 mg Silicon (as silicon citrate)	100 mg	100% <sup>†</sup>	100 mg (includes silicon citrate and 140 other silicon citrates)	100% <sup>†</sup>

SUPPLEMENT FACTS	
Serving Size: 1 Teaspoon (5 mL)	
Servings Per Container: 30	
Amount Per Serving	% DV*
Calories 15	
Total Carbohydrate 4 g	1% **
<b>Rejuvetrol® Plus Blend 1,340 mg †</b>	
Muscadine Grape Extract ( <i>Vitis rotundifolia</i> ) (fruit pomace),	
Roses-Rosewater ( <i>Polygonum</i>	
<i>aspensatum</i> ) (root) standardized to	
a minimum of 98% purple, Red Wine	
Extract ( <i>Vitis vinifera</i> ) (fruit pomace),	
Pomegranate Extract ( <i>Punica</i>	
<i>granatum</i> ) (fruit), Chebulic Myrobalan	
Extract ( <i>Terminalia chebula</i> ) (fruit),	
Purple Carrot Extract ( <i>Daucus carota</i>	
<i>sativus</i> ) (root), Black Currant Extract	
( <i>Ribes nigrum</i> ) (fruit)	

\*Percent Daily Values (DV) are based on a 2,000 calorie diet.

†Rejuvetrol Plus Blend is a registered trademark of the manufacturer.

Supplement Facts			
Serving Size: 2 Softgels		Servings Per Container: 90	
	Amount Per Serving	% DV	
Calories	10		
Calories from Fat	10		
Total Fat	1 g	2%	**
Saturated Fat	0 a	0%	**
Trans Fat	0 g		
Cholesterol	0 mg		
Total Fish Oil	1,200 mg		†
Total Omega-3 Fatty Acids (as ethyl ester)	667 mg		†
Our full spectrum includes:			
EPA (eicosapentaenoic acid)	363 mg		†
DHA (docosahexaenoic acid)	240 mg		†
and five other naturally found fatty acids: docosapentaenoic, stearidonic, stearoleic, heptacosapentaenoic, and alpha-linolenic acids.			
	94 mg		†

†Percent Daily Values (DV) are based on a 2,000 calorie diet. Daily Value not established.

## Supplement Facts

Serving Size: 2 Tablets  
Servings Per Container: 60

	Amount Per Serving	% DV
Calories	5	
Total Carbohydrate	1 g	<1%*
Thiamin (as thiamine mononitrate)	20.25 mg	1,350%
Riboflavin	22.95 mg	1,350%
Niacin (as niacinamide)	270 mg	1,350%
Vitamin B <sub>6</sub> (as pyridoxine hydrochloride)	27 mg	1,350%
Folate (as folic acid)	44 mg	100%
Vitamin B <sub>12</sub> (as cyanocobalamin)	81 mcg	1,350%
Biotin (as d-biotin)	300 mcg	100%
Phorboliferic Acid (as d-calcium pantothenate)	135 mg	1,350%

\*Percent Daily Values (DV) are based on a 2,000 calorie diet.

## Supplement Facts

Serving Size: 10 Tablets  
Servings Per Container: 70

	Amount Per Serving	% DV*
Calories	15	
Total Carbohydrate	2 g	<1%*
Dietary Fiber	<1 g	4%*
Calcium	300 mg	30%
Phosphorus	130 mg	13%
Sodium	20 mg	<1%
Alfalfa powder ( <i>Medicago sativa</i> ) (leaf)	3 g	†

\*Percent Daily Values (DV) are based on a 2,000 calorie diet.  
†Daily Value not established.

## CONCLUSIONS

- The predominant age of the participants was between 60-69 years (Fig. 1).
- More than 99% of the respondents were regular supplement users (Fig. 3) and about 70% of them were long-term users (>20 years, Fig. 4).
- The main reason for taking supplements were for general health and filling nutrient gaps (Fig. 5).
- The main reported benefits for multivitamin, resveratrol/polyphenol supplement, and B-complex were energy (Fig. 6A, 6B, and 6D).
- The reported benefits for omega-3 supplement were anti-inflammation, heart health, and joint health (Fig. 6C).
- The benefits associated with alfalfa leaf extract supplement were allergy and arthritis relief, anti-inflammation, and joint health (Fig. 6E).
- The findings suggest that long-term supplement use may be driven by perceived benefits.
- Some perceived benefits suggest areas of future research.