



The Effect of a Proprietary Polyphenol Compound on Fitness Variables and Mood State in Menopausal Women: An Investigational Trial

Neil E. Wolkodoff¹, Gerald M. Haase²

¹Colorado Center for Health & Sport Science: Denver, CO. ²University of Colorado, Department of Surgery: Aurora, CO.

ABSTRACT

Purpose: Menopause is associated with well described symptomatic issues for women that affect health, fitness and quality of life, especially in the psychological domain. This study assessed the effect on these variables of a unique nutritional supplement based upon the polyphenol-rich citrus phytonutrient Bergamot when consumed by already exercising women.

Methods: Eighteen (n=18) women matched for exercise and menopausal status were prospectively randomized and assigned to a placebo or intervention product group. Prior to the 60-day intervention period, initial study parameters included results for the Utian Quality Of Life (UQOL) scale and a battery of physiological and performance measures.

Results: As measured by the physiological testing battery and when compared to the placebo group, participants consuming active product demonstrated statistically significant improvement in muscular and energy system measures. The UQOL survey also showed dramatic improvement in the total UQOL or overall mood/outlook rating (+15%), Occupational QOL (+13.3%), Health QOL (+15.3%), Emotional QOL (+14.3%) and Sexual QOL (+9.7%).

Conclusion: Based upon previous polyphenol research, these results were consistent with expected physiological improvements. However, the results in the psychological dimensions were most noticeable and promising because menopausal women typically report little changes in these measures despite trying a wide variety of interventions.

This study demonstrated that while a proprietary high concentration bergamot combination can beneficially influence physiological results from exercise, more interesting is the increase in positive mood state of post-menopausal women. Further research may explore the breadth of the health benefits found in this beta study.

INTRODUCTION

Fifty years of age is considered by many to be the average initiation point of menopause, accompanied by age-related hormonal changes in women. The physiological dimension of menopause in terms of reduced effectiveness of exercise strategies is related to the psychological dimension of specific mood states. In this population, exercise results are diminished because of hormonal changes, especially in muscular mass maintenance and strength.

Possibly more important is the relationship between mood and lifestyle changes and adherence. Unlike their male counterparts of similar age, menopausal women often cite mental state changes as reasons for decreased exercise adherence. Optimal exercise programs do not have full benefit unless they are applied consistently, and in this population overall mood state is possibly the key determinant of lifestyle change and adherence. Menopausal women often cite "hot flashes" and related discomfort as interfering with daily life and other activities, such as exercise.

To date, there have been limited studies on polyphenols and menopause, and extremely limited investigation of polyphenols such as Bergamot, one of the more effective polyphenols, on the physiological and psychological aspects of menopause. Therefore, we assessed whether a polyphenol such as Bergamot can positively influence mood state and exercise results in post-menopausal women.

METHODOLOGY

The study protocol enrolled eighteen women who were consistent exercisers as defined by the American College of Sports Medicine guidelines of 30 minutes of moderate activity, five days per week. In addition to the required time total, the subjects had to spend time in both resistance training and energy system training exercise.

Participants were randomly assigned into an intervention (N=13) or placebo group (N=5). The intervention group consumed a proprietary Bergamot supplement specifically formulated for this group (Figure 1). The control group consumed a placebo tablet with no additives. Each were consumed twice per day for the eight-week period.

Testing before and afterward consisted of a physiological battery that included isokinetic measures of muscular endurance and power and VO2 max. The psychological dimension was assessed using the UQOL Scale, an instrument which rates overall mood as well as specific sub-domains in menopausal women.

Figure 1: Product Label



RESULTS

Statistically significant gains were measured for the intervention group in energy system fitness, muscular endurance, and muscular power (Table 1, Table 2).

Table 1: Physiological Variables/Energy System

Variable	Pre	Post	Sig
Anaerobic Threshold - Control	14.3±3.03	13.76±2.62	
AT - Intervention	17.18±4.75	19.52±5.65	.009
VO2 Max - C	17.24±3.40	17.52±3.48	
VO2 Max - I	22.11±6.13	24.23±5.99	.004

Values are in ml/kg/min-1.
Values are presented as mean ± standard deviation.
P<0.05.

Table 2: Physiological Variables/Muscular Endurance/Power

Variable	Pre	Post	Sig
M. Endurance - Control	1307±267.19	1321±216.99	0.032
M. Endurance - Intervention	1362±301.79	1746±341.44	
M. Power - C	364±48.2	382±76.97	0.003
M. Power - I	425±93.01	538±99.99	

Values are in ft. pounds of force.
Values are presented as mean ± standard deviation.
P<0.05.

The UQOL scale revealed dramatic improvement for the intervention group compared to the control group. The intervention group overall score increased by 12 points, compared to a decrease of two points for the control group. All the specific sub-domains comparatively increased as well for the intervention group (Table 3, Figures 2-6).

Table 3: UQOL Scores Comparison

Variable	Pre	Post	Sig
UQOL Total-Control	75.2±14.44	73±16.57	
UQOL - Intervention	80±14.29	92±12.06	.015
Occupational QOL-C	23.6±5.50	23.4±5.13	
Occupational QOL-I	24.16±6.30	27.38±4.57	.230
Health QOL-C	22±4.35	22.6±3.78	
Health QOL-I	25.08±5.12	28.92±4.11	.005
Emotional QOL-C	21.3±6.30	20.8±5.80	
Emotional QOL-I	20.92±5.57	23.92±5.00	.245
Sexual QOL-C	8.4±2.07	8.4±2.07	
Sexual QOL-I	10.31±3.12	11.31±2.83	.011

Values are scored in a 1-5 rating scale, then tallied for that sub-area.
Values are presented as mean ± standard deviation.
P<0.05.

Figure 2: UQOL Total Scores Comparison

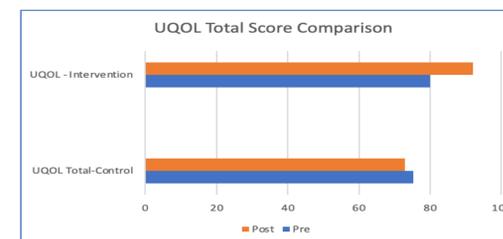


Figure 3: Occupational QOL Scores Comparison

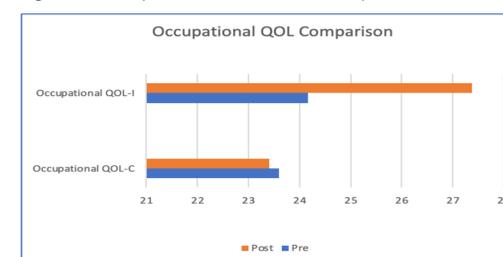


Figure 4: Health QOL Scores Comparison

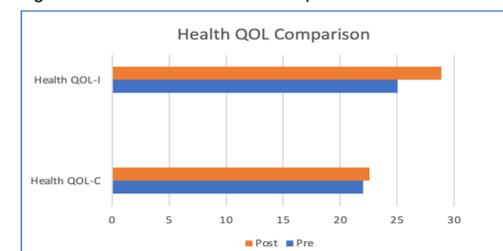


Figure 5: Emotional QOL Scores Comparison

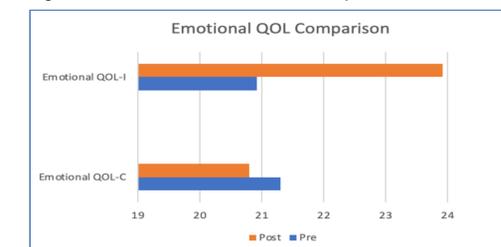
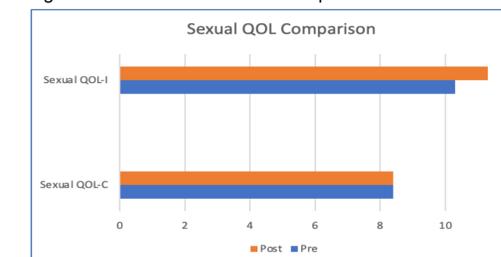


Figure 6: Sexual QOL Scores Comparison



DISCUSSION/CONCLUSION

In this investigation with post-menopausal women, a proprietary Bergamot supplement increased fitness scores in already exercising women. This result is in line with previous research on polyphenols and athletic performance and recovery. However, more significantly, the intervention subjects dramatically increased their mood and life self-satisfaction scores.

Affecting mood is important for this population as mood and psychological state often determine adherence to positive lifestyle changes. As expected from previous Bergamot polyphenol research, this investigational study demonstrated benefits in menopausal women, and it is anticipated that similar results would be seen in a younger aged group.

ACKNOWLEDGEMENTS

Funding:

This research did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors. The proprietary Bergamot product utilized in this study was provided by BergametNA. However, the company was not involved in the research design, implementation, or analysis of results.

Competing Interests:

NW reports no competing interests. GMH became a scientific advisor to the product company unrelated to this study, and after the study design was developed and first implemented.

Contact:

Neil E. Wolkodoff, neil@cochss.com

Presentation Venue:

This presentation was made at the SciTechCentral Global Women-Childcare, Nursing and Internal Medicine Summit, June 16-17, 2021.