Awareness on Anti-Arthritic Effect of *Cardiospermum halicacabum* (Balloon Vine) Among Menopausal Women

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Abstract

Balloon Vine *Cardiospermum halicacabum* (Sapindaceae) is a woody perennial fast growing vine distributed almost globally in the tropics. The roots, leaves, stem, and seeds of this plant are employed as herbal medication. Significance of balloon vine and nutritional status was carried out in selected menopause women in the age group of 40-60 years. Positive correlation between waist hip ratio and fat intake of the selected menopausal women with arthritis was noted. The present study also revealed dietary inadequacy among the selected menopausal women particularly energy, calcium and iron. Therefore, it is necessary to identify the inadequacy of food intake among menopausal women which help plan and implement healthy choice of eating especially calcium rich foods given through proper nutrition education during pre and post-menopausal period.

Keywords: Balloon Vine Squat Test, *Cardiospermum halicacabum*, Menopause, Mudakathan Keerai

1. Introduction

Plant-based drugs have been used globally for healing different illnesses in conventional systems of medicines. Medicinal plants satisfy primary health care needs especially where modern medicines are not accessible. Eco-friendly and bio-friendly plant-based commodities has recently been given consideration for the prevention and treatment of various human infections including microbial diseases throughout the world and employment of plants in ethno medicine is on rise worldwide[1]. *Cardiospermum halicacabum* (Sapindaceae) is an herbaceous climber of about 2–4 m long is an evergreen branch, having inflated fruits containing white heart-shaped pattern. It is widely distributed in tropical and subtropical regions of Africa and Asia, and it is often consumed as green leafy vegetable in India. *C. halicacabum* is commonly known as Balloon vine, heart pea (England), Parol-paralon (Philippines), Jia hu gua (China) and Mudakathan Keerai (Tamil Nadu, India). *C. helicacabum* is used in Indian traditional folk medicine system for the treatment of rheumatism, lumbago, cough, hyperthermia nervous diseases, stiffness of limbs and snake bite[2]. Menopause is a transition into a new phase of life, however hormonal changes and other factors involved can cause discomfort[3]. Anti-inflammatory properties of balloon vine provide noticeable relief for joint pain which can be effective for benefitting menopausal women.

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2. Methods and Materials

For the current study, based on easy accessibility of the area and the cooperation rendered by subjects Moolapalayam, in Erode district was selected by convenience sampling method. About 200 menopause women in the age group of 40-60 years were selected through purposive sampling method. A questionnaire was formulated to collect the data from 200 menopausal women from the selected area. A subsample of 50 menopausal women with joint pain were identified to assess the socio-economic status, nutritional status and nutritional awareness regarding menopause related arthritic problem, food frequency and the importance of nutritious food was given using charts in the topic of "Foods that improve bone health" during menopausal period. Calcium and iron was estimated in Cardiospermum helicacabum using standard procedures.

Data obtained through the above method is consolidated and analyzed by using mean, standard deviation and t-test, Z - score test and Pearson correlation coefficient.

3. Results and Discussion

3.1 Income Classification

Table 1 indicates that nearly 90 percent of the selected menopausal women belong to upper class, and only about 2 percent of subjects belonged to middle class according to B.G Prasad's income classification. All the menopausal women with arthritis belonged to urban town of Erode.

3.2 Height of the Menopausal Women

Table 2 indicates that majority (30 percent) of the selected subjects were in the mean height of 155.9 cm and about 12

Table 1. Income classification of selected menopausal women

(N=50)

Monthly income	Socio economic status	Total number of subjects	Percentage (%)
≥ Rs. 7008	Upper class	45	90
Rs. 3504 –7007	Upper Middle class	2	4
Rs. 2102 – 3503	Middle Class	1	2
Rs. 1051 – 2101	Lower middle class	-	-
≤ Rs.1050	Middle Class	-	-
Total		50	100

Table 2. Mean height of the selected menopausal women with arthritis

(N=50)

Height	Number of subjects	Percentage (%)	Height in cm Mean ± S.D	ICMR height in cm	't' value
141-150	6	12	143.16±1.57		34.07**
151-160	15	30	155.9±2.93		11.90**
161-170	9	18	165.3±2.4	165	0.37^{NS}
171-180	13	26	162.7±41.9		0.19**
181-190	7	14	187.7±2.71		21.47**

NS - Not significant

**Significant at 1% level

percent of the selected subjects were in the mean height of 143.16 cm. Statistical analysis revealed that the mean height of all the category except 161-170 cm showed 1% significant difference when compared with standard ICMR values.

3.3 Weight of the Menopausal Women

About 36 percent of the menopausal subjects had mean weight of 64.2 kg and 6 percent of the subjects had a mean weight of 104 kg. When the mean weight of the women was compared with the standard as given in Table 3, it was greater than the standard and statistical analysis revealed that except 51-60 kg weight category the rest showed 1% significant difference.

3.4 BMI of the Women

Table 4 indicates that, about 60 percent of the menopausal women with arthritis belonged to overweight and obese category as most of them were involved in sedentary work with less physical activity. Obesity and overweight create added burden to arthritis to the menopausal women.

3.5 Waist and Hip Circumference of the Menopausal Women

Table 5 showed that about 60 percent of the subjects had a mean waist circumference of 96.8cm, further statistical analysis showed significant difference between the mean waist circumference and standard. According to the classification of Molarius *et al.* (1990)[5], the hip

Table 3. Mean weight of the selected menopausal women with arthritis

(N=50)

Weight	Number of subjects	Percentage (%)	Weight in kg Mean ± S.D	ICMR weight in kg	't' value
51-60	8	16	55.5±30		0.42[NS]
61-70	18	36	64.2±13.15		13.60[**]
71-80	14	28	73.9±2.78	55	25.4[**]
81-90	7	14	85.14±3.4		23.4[**]
91-100	-	-	-		-
101-110	3	6	104±4.02		21.25[**]

[**]Significant at 1% level

Table 4. Body mass index of selected menopausal women with arthritis

(N=50)

BMI Grades	Total number of subjects (N=50)	Percentage (%) (100)
<18.5	3	6
18.5-22.9	5	10
>23	12	24
>25	14	28
>30	16	32
TOTAL	50	100

Table 5. Waist circumference and hip circumference of the menopausal women with arthritis

(N=50)

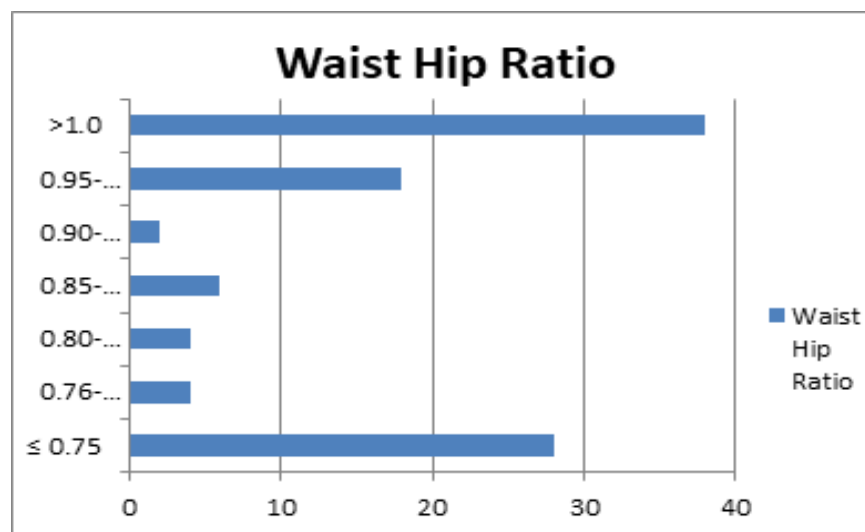| #Waist circumference	N	%	Waist Circumference Mean ± S.D	't' value	##Hip circumference	N	%	Hip Circumference Mean ± S.D	't' value
>80	30	60	96.8±5.81	15.86**	<97	28	56	88±6.6	11.22**
< 80	20	40	76.25±4.7	3.5**	97-108	22	44	100.8±3.6	1.20[NS]
Total	50	100				50	100		

#(Jacobs *et al.*, 2010)[4]　　　##(Molarius *et al.*, 1990)[5]

**Significant at 1% level　NS - Not Significant

Table 6. Correlation between waist hip ratio and fat intake of the selected menopausal women with joint pain

(N=50)

Mean waist hip ratio	Mean fat intake	Correlation Co-efficient(R)
0.82±0.29	38.2±8.8	1.2

Figure 1.　Waist to hip ratio of the selected menopause women with arthritis.

circumference of the menopausal women was higher in 44 percent of women and it is markedly again responsible for joint pain pertaining problems and leads to more severe complications in future. Statistical analysis revealed that the subjects under 97-108 cm category however did not show significant difference when compared with standard

hip circumference. Figure 1 showed that in 38% of the menopausal women the waist hip ratio was more than 1.00

From the (Table 6) it is evident that the mean fat intake and the mean waist hip ratio showed positive correlation among the menopausal women.

3.6 Functional Assessment of the Selected Menopausal Women with Arthritis

Functional assessment was done to assess the arthritic status of menopausal women (Table 7), the squat test revealed that about 50 percent of the menopausal women scored high in half squat position with the time period of
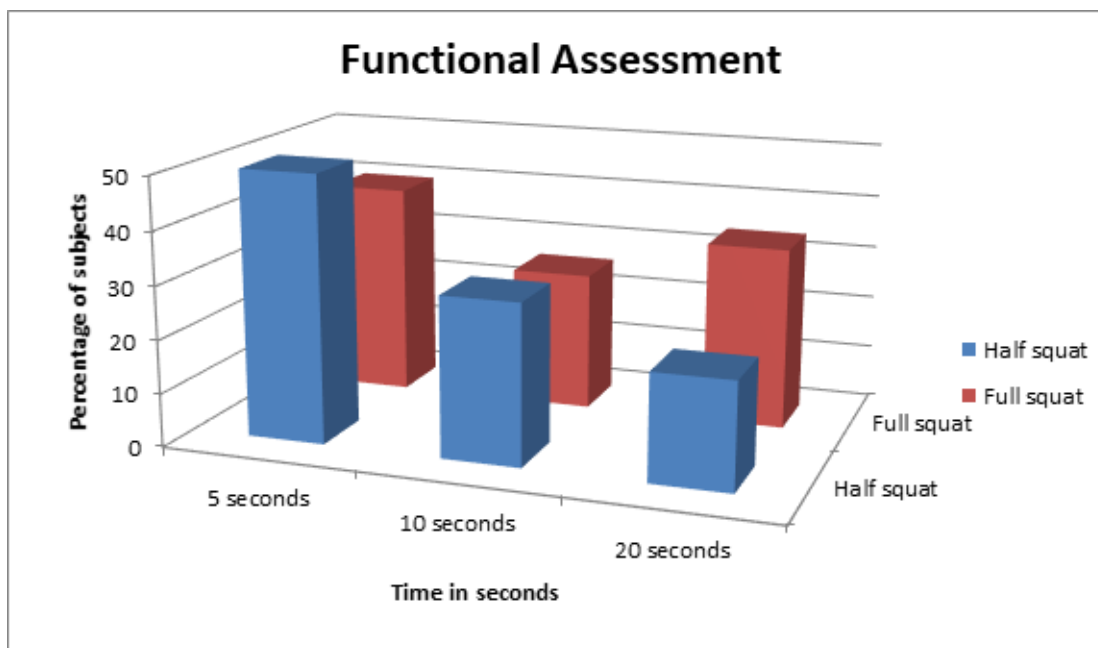

Figure 2. Functional Assessment.

Table 7. Squat test   (N= 50)

Intensity of test	Time in (sec)	Score	No.	Percentage
Half squat	5	1	25	50
	10	2	15	30
	20	3	10	20
TOTAL			50	100
Full squat	5	1	20	40
	10	2	13	26
	20	3	17	34
TOTAL			50	100

5 seconds and on the other side about 40 percent of the menopausal women scored best for full squat position. From these only 20 percent were able to perform half squat for 20 seconds and 34 percent (Figure 2) were able to perform full squat for 20 seconds in the rest the time duration was less due to arthritic problem.

According to Cliborne *et al.* (2004)[7], "the intraclass correlation coefficients for all tests were greater than 0.87. Composite and individual test pain scores and ROM scores improved significantly following hip mobilization. All clinical test findings were more frequent in the group with knee OA, except for those of the FABER test, and the number of subjects with painful test findings following hip mobilization was reduced for all tests except the hip flexion test".

3.7 Calcium and Iron Content of Balloon Wine

Studies of bone histomorphometry and markers of bone remodelling indicate that bone remodelling is accelerated in the perimenopausal and postmenopausal periods. The span of 5 to 10 years surrounding menopause is characterized by a decrease in oestrogen production and an increase in resorption of calcium from bone, resulting in a marked decrease in bone density. This change during the postmenopausal period increases the need for calcium in the diet. Calcium content of the dehydrated leaves of balloon vine was found to be (1550mg/100g) which is rich enough when compared to other leafy vegetables and could be suggested for the menopausal women with arthritis. Further the amount of iron present in dried *Cardiospermum halicacabum* was about 330mg which makes it beneficial for menopausal women.

It is evident that from the Table 8 that the energy, calcium and iron intake were lower than the Recommended Dietary Allowance and unfortunately fat intake of menopausal women was higher than RDA this may be an added burden for arthritic pain in menopausal women. Statistical analysis revealed that all the nutrients show 1% significant difference when compared with RDA.

Table 8. Nutrient intake of the selected menopausal women

(N=50)

Age in years	Nutrient intake	RDA*	Mean± S.D	't' value
40-60 years	Energy (Kcal)	1660	1578.9±133.1	43.13**
	Protein (g)	36	45.8±7.38	9.4**
	Fat (g)	20	38.2±8.8	14.67**
	Calcium (mg)	800	295.6±35.9	99.4**
	Iron (mg)	15	10.04±3.8	27.5**

*Recommended Dietary Allowance, 2020[6]

** Significant at 1% level

Table 9. Assessment of nutritional knowledge on selected *Cardiospermum halicacabum* plant and arthritis

(N=50)

Category	Score (Mean ± SD)	No. of subjects (N=50)	Total Score	*Z-Score test
Before education	4.68±2.99	20	16	5**
After education	15.16 ±1.02	44		

**Significant at 1% level

Table 9 indicates that there was significant improvement in the knowledge of the menopausal women after nutrition education on balloon wine and arthritis as revealed by the Z score. The *p*-value was <.00001.

4. Conclusion

The present study concludes that among 50 menopausal women, majority attained menopause at the age of 50-55 years. On the basis of anthropometric assessment 36 menopausal women were found to be having 61-70 kg when compared with ICMR. The correlation between waist hip ratio and fat intake of the selected menopausal women with arthritis had revealed that there was strong positive correlation, which means that high fat intake goes with the high waist hip ratio level. The present study also revealed dietary inadequacy among the selected menopausal women particularly energy, calcium and iron. Therefore, it is necessary to identify the inadequacy of food intake among menopausal women which would help to plan and suggest healthy choice of eating especially calcium rich foods during pre and post-menopausal period.

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