IMPACT OF ASHWAGANDHA (WITHANIA SOMNIFERA) ON MENTAL HEALTH PROFILE OF ELDERLY WOMEN

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Abstract

Growing old certainly involves a variety of life stressors that can lead to depression at any age, any gender, race or class. Depression is a pervasive and impairing illness affecting women twice more than men. An ayurvedic approach of using herbs like Ashwagandha with its active principle component withanolides seems to be more acceptable to relieve anxiety, stress, depression, aging, fatigue and depressed immunity. About 15 moderately depressed women of 60 years and above age were supplemented 500 mg Ashwagandha tablets per day for 6 weeks. Mental health was assessed by GDI, MMSE and CIT scales. Socio economic status, dietary pattern, health profile and activity pattern were also assessed. After the intervention there was a significant ($p \leq 0.05$) change in number of moderately depressed subjects (base line: 56 percent, final: 13 percent). About 13 percent subjects scored normal MMSE. A significant ($p \leq 0.05$) reduction i.e. 6.3% in CIT score was observed (base line: 14.5, final: 8.2). About 53 percent subjects were showing high self esteem and 93 percent subjects ($p=\leq 0.05$) were able to meet >50 percent of RDA for major nutrients like energy and protein (base line: 60 percent). Nutrients contributing mental health like tryptophan, methionine, choline, vitamin C and folic acid intake were also improved among 70 percent subjects. Present study showed the beneficial effect of Ashwagandha on moderately depressed elderly women.

Keywords: Elderly, Ashwagandha, MMSE, CIT, GDI, mental health, depression

Health care of the senior citizen is a major concern of society as older people are more prone to disease. About 40 percent elderly in India live with various disabilities (WHO, 2002). In Gujarat, the life expectancy of female is

63.7 years compared to male i.e. 61.9 years and resulting in a major increase in the age-related diseases like depression, Alzheimer's disease, dementia, Parkinson's disease, loss of memory and other physiological problems (Shah, 1993; Park, 2001). Mental disorders are projected to increase up to 15 percent of the global burden by the year 2020 (Minicuci *et. al.,* 2002). Around 4 million Indians aged 60 years and above are suffering from mental illness (Jai Prakash, 1997). In Gujarat, 25 percent elderly populations were suffering from depression and 16.7 percent from schizophrenia, 7.9 percent from anxiety and 8.3 percent from bipolar disorder (Sharma *et. al.,* 1980). Studies showed that isolated constituents of Withania somnifera (sitoindosides VII-X and withaferin-A) increase cortical acetylcholine receptor capacity, partly explaining the cognition-enhancing and memory-improving effects, improve mood and reducing stress and anxiety (Bhattacharya *et. al.,* 2000). Hence, the present study was undertaken on depressed elderly women aged 60 years and above to assess the impact of ashwagandha on their mental health.

Materials and Methods

Study setting: Urban Vadodara city, Gujarat State, India

Sample size: 120 elderly women 60 years and above

Sampling technique: Random sampling

A total of 120 elderly subjects from Vadodara city were screened for depression level by GDI (Geriatric Depression Inventory), MMSE (Mini Mental State Examination), SERS (Self Esteem Rating Scale) and CIT (Cognitive Impairment Test) scale and divided into two groups i.e. depressed group (n=60) and non-depressed group (n=60). Out of 60 moderately depressed subjects randomly 15 subjects were selected for intervention. Ashwagandha capsule containing 500 mg was supplemented daily to the subjects for a period of 6 weeks. Base line data on parameters like socio-demography, life style factors (activity pattern, addiction pattern), anthropometric measurements (height, weight, BMI), dietary intake (24 hour recall, food frequency), health and disease (minor disease, major disease), hemoglobin were measured. Data on side effects of the supplementation were also collected. After the completion of the supplementation, final data were collected for the same variables except socio-demographic and anthropometric variables.

Activity pattern: 24 hour activity recall of all the subjects was noted down and then they were grouped on daily routine activities like at home or outside work, leisure, religious, social activities and sleep.

Addiction Pattern/ Habit: As per the preference and frequency of consumption the following parameters were taken, cigarette/bidi, alcohol, tobacco powder, tobacco paste, tea, coffee etc.

GDI Scale: The Geriatric Depression Inventory Scale (Yasavage *et. al.,* 1983) is designed as a screening instrument for the depression in the elderly persons. Concepts measured by this 30-item scale include: cognitive complaints, motivation, future/ past orientation, self-image, losses, agitation, obsessive traits and mood itself. A score of 11 and more is the indication for presence of depression, yielding 84percent sensitivity and 95percent specificity rate.

MMSE Scale: Mini Mental Status Examination Scale (Folstein *et. al.,* 1975) is used to assess the orientation, registration, attention, calculation, memory, and language and visuo-special abilities of the subjects. The questionnaire contains different sections and the maximum score is 30. The total of all the answers give the extent of mental health. A cut-off for depression was 20-11 and those who scored more than 26 were considered normal, those below 26 were considered having mental impairment.

SER Scale: Self Esteem Rating Scale contained 40 questions. Each question had 5 points and each option had a score of 1-5. Out of 40 questions, 20 are positive and 20 are negative. The total of all answers gives the extents of psychological well-being. If the score is positive then the subject has high self esteem and if the score is negative then the subject has low self esteem.

CIT Scale: Cognitive Impairment Test Scale (Katzman *et. al.,* 1983) measures the cognitive function. The score of 1 is given for each incorrect response; maximum weighed error score is 28. Score of 0-11 indicates normal percentage and 11-28 indicates abnormality.

BMI (Body Mass Index): Height (cm) and weight (kg) of women were measured using height meter and bathroom scale. BMI was calculated using the formula weight (kg)/ height (miter^2). Based on the BMI scores, the women were categorized as follows: Less than 18.4 – Underweight, 18.5 to 22.9 – Normal, 23 to 24.9 – Overweight, More than 25 – Obese (WHO, 2007).

Hemoglobin estimation: Cyanmethemoglobin method (Toteja G.S. et. al., 2006)

24 hour dietary recall: Dietary recall of last 24 hours was done using semi structured questionnaire and standard cups and spoons. The average nutrient intake was calculated in terms of calories, protein, fat, folic acid, tryptophan, methionine, vitamin C, vitamin B12 etc. and compared with the RDA for elderly (Mehta, P. *et. al.,* 2009).

Food frequency method: Data on frequency of consumption of foods like cereals, pulses, green leafy vegetables, other vegetables, milk and milk products, fruits etc. were collected using Food frequency questionnaire and divided into frequent and non frequent categories. Frequent consumption

includes daily, twice a week and once a week. Non frequent consumption include fortnightly, once in a month, rare or never.

Statistical Analysis: Appropriate statistical tests such as mean, SD, paired t-test, student's t-test, were used and analyzed by SPSS/PC+.

Results and Discussions

In phase I, parameters like socio economical status, activity pattern, addiction pattern, anthropometric measurements, blood pressure and hemoglobin were analyzed in correspondence to the depression status of women recruited in the study.

Socio-economic status in correspondence to depression

Mean age of the depressed women was 64.48 ± 4.06 yrs. About 57 percent depressed women were widow and 28percent were staying absolutely alone. Only 5% depressed women were highly educated and 95percent were not working and all of them belonged to middle income group (Table 1). Carla M. Teixeira *et. al*. in 2012 demonstrated that at the level of educational attainment it was found that individuals with lower level of education tend to have higher values for both depression and anxiety.

Table 1: Socio-demographic characteristics of the depressed subjects in percentage

Sr. No.	Characteristics	Depressed group (n=60)	Non depressed group (n=60)	Total (N=120)
1.	Age (yrs)	64.48 ± 4.06	64.65 ± 3.53	64.56 ± 3.79
2.	Marital status			
	Widow/ unmarried	56.6 (34)	50 (30)	53.3(64)
3.	Education			
	College	5 (3)	11.6 (7)	8.3 (10)
	School	81.6 (49)	80 (48)	80.8 (97)
4.	Occupation			
	Non working	95 (57)	90 (54)	92.5 (111)
5.	Religion			
	Hindu	81.6 (49)	88.3 (53)	85(102)
6.	Middle income	100 (60)	100 (60)	100 (120)
7.	Living arrangement			
	Alone	28.3 (17)	8.3 (5)	18.3 (22)

Figures in parenthesis denote number of subjects

Activity pattern in correspondence to depression

Mean time spent on sleep by the depressed women was only 7.58 ± 0.9 hours, indicated sleep disturbance. Mean time spent for exercise and daily routine activities was 0.6 ± 0.5 and 5.5 ± 8.2, respectively, indicated minimal physical inactivity. Depressed subjects spent more time remaining idle showing sihns of depression as compared to their counterpart. (Table 2). Carla M. Teixeira *et. al*. in 2012 demonstrated that those who practiced physical activity had lower rates of depression and anxiety and women had

higher values than men and a significant correlation was identified between physical activity, depression and anxiety, and for trait anxiety.

Table 2: Mean hour spent in different activities by the depressed elderly women

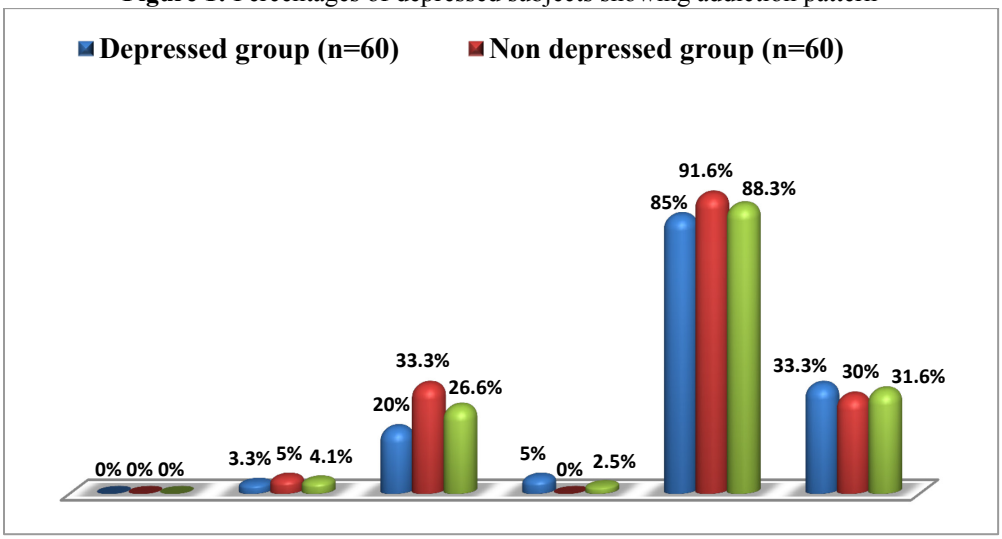
Sr. No	Activities	Depressed group (n=60)	Non depressed group (n=60)	p- value
1.	Daily routine activities	5.5 ± 8.2	5 ± 0.5	
2.	Leisure activities	3.2 ± 1.1	4.1 ± 1.4	
3.	Religious activities	1.8 ± 1.2	1.3 ± 0.9	≤ 0.05
4.	Exercise	0.6 ± 0.5	0.6 ± 0.5	
5.	Sleep	7.5 ±0.9	8.2 ± 0.7	
6.	Idle time	5.9 ± 1.2	4.6 ± 1.8	

Significant at p-≤ 0.05

Addiction pattern in correspondence to depression

About 20 percent depressed women were addicted to regular tobacco chewing and 8% were engaged in smoking and taking snuff (Figure 1). Study conducted by Lam TH. *et. al.* in 2004 stated that smoking is positively associated with depressive symptoms in Chinese elderly.

Figure 1: Percentages of depressed subjects showing addiction pattern

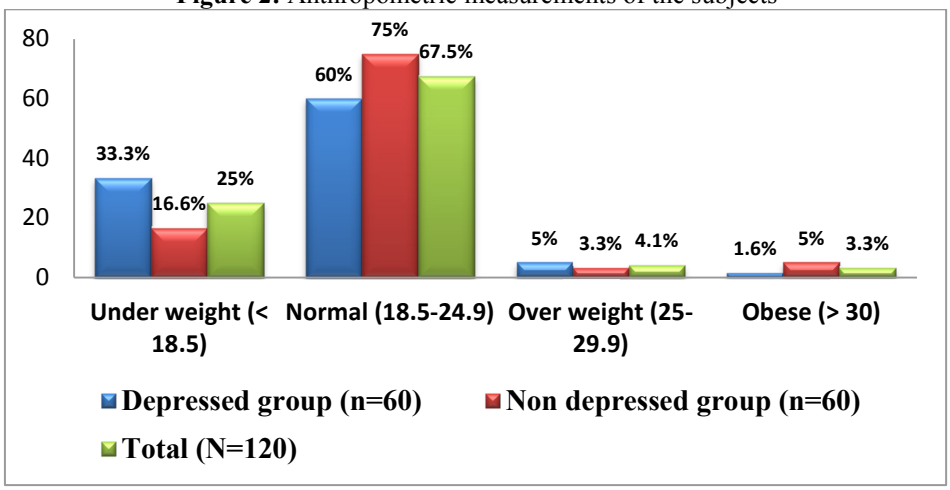


BMI in correspondence to depression

About 33 percent depressed subjects were under weight indicated less consciousness after health care and food intake, which deteriorates the overall health and standard of living (Figure 2). Overweight Chinese women had a lower risk of developing depression than normal weight women (Chang Gung et. al., 2011). On the contrary, Godin O. *et. al.* in 2012 stated that subjects with high BMI at follow-up had an increased adjusted risk of

developing depression compared with subjects with normal BMI (risk ratio = 1.60, 95% confidence interval: 1.03, 2.51).

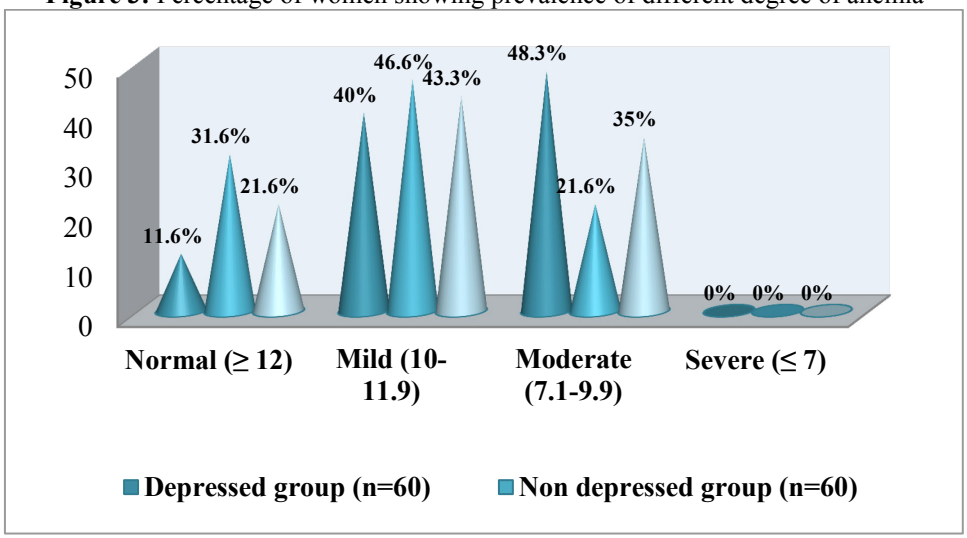
Figure 2: Anthropometric measurements of the subjects



Anemia in correspondence to depression

Mean hemoglobin of the depressed women was 10 ± 1.3 gm/dl and 89percent were either moderately or mildly anemic (Figure 3). This is mainly due to the negligence towards nutrition and health care of self as well as the negligence of their care givers. Depressive symptoms are associated with anemia among older persons. Anemia was prevalent among 15 percent depressed Italian elderly compared to non depressed elderly (8 percent) (p <.001). After adjusting for potential confounders, depression was associated with a significant higher risk of anemia (odds ratio = 1.93; 95% confidence interval, 1.19–3.13) (Onder G. *et. al.*, 2004).

Figure 3: Percentage of women showing prevalence of different degree of anemia



Nutritional status in correspondence to depression

Mean intake for almost all the nutrients among the depressed subjects were less than the RDA. The effect of depression is very much clear on the nutritional status, which indicates the clear cut negative impression of depression on overall health (Table 6).

Table 3: Mean intake of nutrients among the depressed elderly females

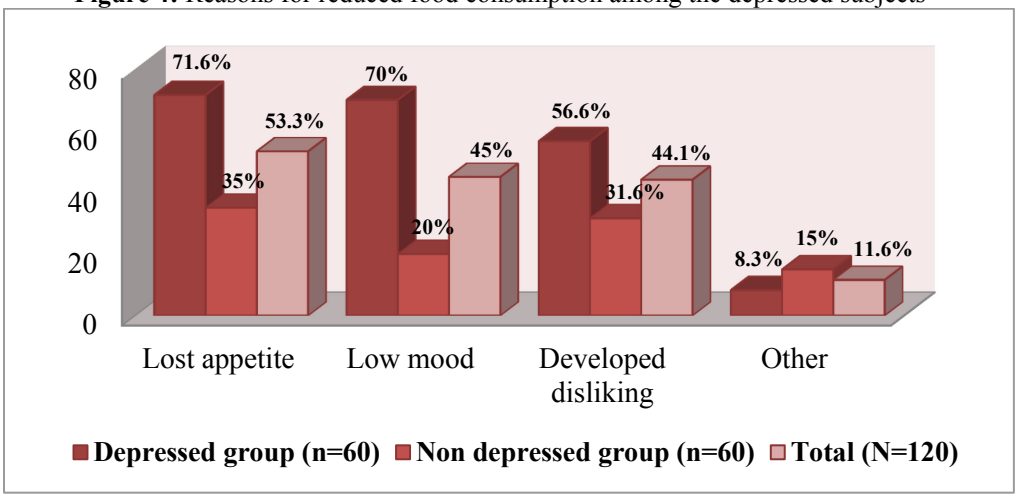
Sr. No	Nutrients	RDA	Depressed group (n=60)	Non depressed group (n=60)	t-value
1.	Energy (Kcal)	1350	777 ± 210.4	848 ± 218.4	1.81
2.	Protein (gm)	50	25.3 ± 8.4	29 ± 9.3	2.18
3.	Fat (gm)	20	18.4 ± 7.6	22.4 ± 9.7	2.43
4.	Calcium (mg)	1000	465 ± 208.7	560 ± 188.7	2.63
5.	Folic acid (µg)	100	54.2 ± 20.9	57.1 ± 16.9	0.84
6.	Vitamin B12 (µg)	1	0.4 ± 0.2	0.4 ± 0.2	1.24
7.	Vitamin C (mg)	40	24.6 ± 11.2	29.6 ± 8.6	2.74
8.	Tryptophan (mg)	200	141 ± 74.5	177.2 ± 85.9	2.46
9.	Choline (µg)	30	37.3 ± 47.7	38.9 ± 44.3	0.17
10.	Methionine (mg)	650	358.5 ± 106.8	434.7 ± 107.3	3.89

Significant at p-≤0.05, RDA source- Natrajan, 1991

Food consumption in correspondence to depression

Very important dietary aspect like food consumption was reduced among the depressed subjects and mainly because of the fluctuating mood and lost interest that affected the physical health and improper physical health affected the mental health in a cyclic order (Figure 4).

Figure 4: Reasons for reduced food consumption among the depressed subjects



In phase II, dietary intake, dietary habit, minor health problems and depression status was analyzed in correspondence to supplementation of Ashwagandha for 6 weeks.

Mental health status in relation to Ashwagandha supplementation

After the intervention of six weeks there was a noticeable (p= ≤0.05) increase in mean MMSE score i.e. base line: 20±2.8, final: 25.2±1.6, showed improvement in cognitive health. Mean GDI score was decreased (base line: 18.2±1.4, final: 9.7±2.3), thus indicated improvement in depression status. Mean CIT score also decreased (base line: 14.5±4.2, final: 8.2±2.6) indicating the improvement in cognitive status, thus leading to better mental health status (Table 4).

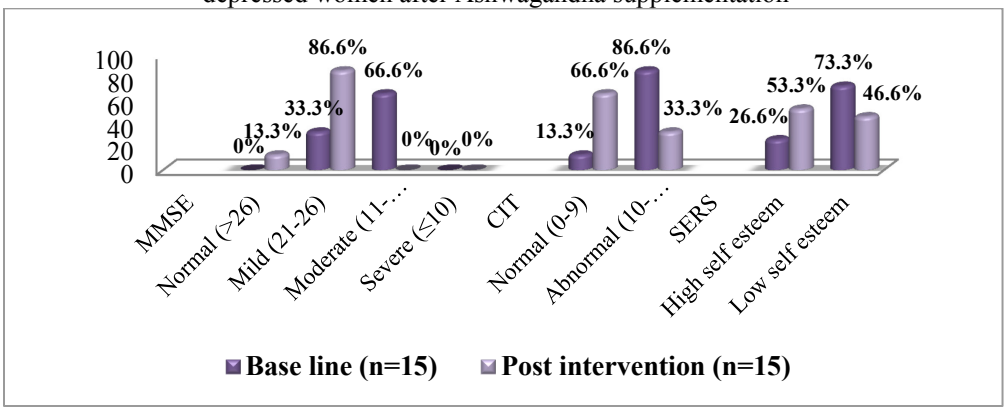
Table 4: Mean improvement in various tests (scores) for mental health status among the depressed women after Ashwagandha supplementation

Sr. No	Scale	Base line	After intervention	t-value
1.	GDI	18.2 ± 1.4	9.7 ± 2.3	14.2
2.	MMSE	20 ± 2.8	25.2 ± 1.6	7.5
3.	CIT	14.5 ± 4.2	8.2 ± 2.6	5.7

Significant at p-≤0.05, n=15

A noticeable improvement in depression status was observed. About 13.3percent subjects scored normal in MMSE scale after the intervention and 66.6percent subjects shifted from moderate to either mild or normal MMSE score. About 66.6percent subjects scored normal in CIT and 26.7percent subjects improved self esteem after the intervention. This indicated a clear cut positive effect of Ashwagandha supplementation on depression (Figure 5). Study carried out with Ashwagandha has shown that 20 and 50 mg/kg intake of Ashwagandha for 5days has an anxiolytic and antidepressant action because of the glycowithanolides (Bhattacharya *et. al.* 2000).

Figure 5: Percentage improvement in various tests for mental health status among the depressed women after Ashwagandha supplementation



Other parameters in relation to Ashwagandha supplementation

Significant improvement in mean BMI (t-value: 2.09) and hemoglobin (t-value: 3.2) was observed. Kuppuranjan *et. al*. (1996) showed

1 year administration of Ashwagandha powder increased the hemoglobin level of the subjects. Decrease in minor health problems like interest level was improved among 73.3percent subjects, 33.3percent were able to bring stability in mood, 46.6percent recovered sleep disturbance and 33.3percent subjects improved their appetite (Table 5).

Table 5: Percentage improvement in various parameters among the depressed women after Ashwagandha supplementation

Characteristics	Base line (n=15)	Post intervention (n=15)	t-value/Difference
Mean BMI	19.9 ± 2.7	20.4 ± 2.9	2.09 (t-value)
Under weight (<18.5)	40 (6)	20 (3)	20 (3)
Normal (18.5-29.9)	53.3 (8)	66.6 (10)	13.3 (2)
Mean hemoglobin	10.4 ±1.6	11 ± 1.2	3.2 (t-value)
Mild anemic (10-11.9gm%)	40 (6)	53.3 (8)	13.3 (2)
Moderately anemic (7.1-9.9gm%)	40 (6)	26.6 (4)	13.3 (2)
Minor health problems			
No interest	80 (12)	6.6 (1)	73.3 (11)
Headache	33.3 (5)	6.6 (1)	26.6 (4)
Joint pain	93.3 (14)	40 (6)	53.3 (8)
Dizziness	26.6 (4)	6.6 (1)	20 (3)
Sleep disturbance	80 (12)	33.3 (5)	46.6 (7)
Lethargy	46.7 (7)	26.6 (4)	20 (3)
Lack of appetite	53.3 (8)	20 (3)	33.3 (5)
Fluctuation on mood	73.3 (11)	40 (6)	33.3 (5)

Figures in parenthesis denote number of subjects

Nutritional intake in relation to Ashwagandha supplementation:

Improved mental health status increased food intake and changed behavior towards diet and dietary practices. Thus, mean increase in intake of several important nutrients were observed. Though subjects were unable to meet the RDA for nutrients like protein, vitamin C, vitamin B12, choline and methionine, but the intake was improved after the supplementation for three weeks. Thus, in long them supplementation significant improvement would be observed.

Table 11: Mean improvement in dietary intake among the depressed women after Ashwagandha supplementation

Sr. No	Nutrients	RDA	Base line group (n=15)	Post intervention group (n=15)	t-value
1.	Energy (Kcal)	1350	787 ± 216	1053 ± 274	4.29
2.	Protein (gm)	50	21.6 ± 7.4	29.1 ± 7.2	3.59
3.	Fat (gm)	20	29.7 ± 6.3	38.2 ± 16.2	2.22
4.	Calcium (mg)	1000	295 ± 126.8	310.1 ± 139.2	0.31
5.	Folic acid (µg)	100	73.7 ± 30.1	85.8 ± 36.2	1.2
6.	Vitamin B12 (µg)	1	0.1 ± 0.7	0.2 ± 0.1	0.49
7.	Vitamin C (mg)	40	27 ± 17.3	25.2 ± 18.8	0.44
8.	Tryptophan (mg)	200	229 ± 99.5	241.6 ± 92	0.33
9.	Choline (µg)	30	88.4 ± 75.1	102.7 ± 66.1	0.59
10.	Methionine (mg)	650	346 ± 133.8	383.2 ± 132.1	0.67

Significant at p-≤0.05, RDA source - Mehta P. *et. al.,* (2009)

Conclusion

Major findings of the study are briefly indicated below:

- Improvement in degree of depression (as shown by the GDI scale)
- Improvement in cognitive functioning (as shown by the MMSE and CIT)
- Increased consumption of nutrient improved health & nutritional status of elderly women
- Reduction in minor health problems

Plant medicines like Ashwagandha can be used for remedial measures among depressed patients in community, but further research is suggested in large scale to standardize the dose. Research is also suggested to use other herbal preparations like shankhapushpi, shatavri as a remedial measure for depressed patients.

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