SUMMARY AND CONCLUSIONS

SUMMARY AND CONCLUSION

Depression is not a disease but a serious illness with biological, psychological and social aspects relevance to its cause, symptoms and treatment. This disease is more common in women than in men and is four times more likely to affect the elderly than the young. Depression can be a debilitating disease, limiting daily activity as much as severe arthritis or heart disease. However, in case of elderly symptoms of depression are often mistaken for other illnesses or mere "signs of aging". Mostly depression in older people remains undiagnosed and untreated for several reasons. The vulnerability of older women to depression is increased due to the process of aging, poor health, under nutrition, decreasing ability to function, psychosocial factors and economic dependency. Majority of the health problems among the aged are diet related and nutrition dependent. Nutritional status is one of the important determinants of health status or on the other hand poor mental health also affects nutritional status.

The brain produces potent chemicals called neurotransmitters, which are made of nutrients from food. Neurotransmitters govern our emotions, memory, moods and behavior, sleep and learning abilities. The two major neurotransmitters involved in preventing depression are serotonin and non-epinephrine. Complex carbohydrates and nutrients such as folate, magnesium, niacin, selenium, omega 3 fatty acids and tryptophan are particularly influential on brain processes, and thus may be used to decrease symptoms of depression (Serendip, 2006). Available research suggests that nutrition does play a major role in the development or maintenance of depression. Tanskanen and colleagues (2001) in Finland studied the diet pattern of 3204 males and females aged 25-64 years having mild to severe levels of depression, their results revealed that the consumption of foods rich in omega – 3 fatty acids, vitamin B12 and selenium such as fish, sea foods and milk products was less than once a week. Nutrition, therefore, can play a key role, both in the onset, severity, and duration of depression.

Existing evidence on depression underscores urgent need for interventions to combat depression, particularly among women. The problem of depression in older women may be more complex due to difficulty in recognizing depression in older persons and at the same time their double disadvantage of being women and elderly person. It is very important to treat depression at the right time. Herbal intervention is thought to be one of the alternative treatments to reduce the signs of depression and improve the cognitive function. Ayurveda is the most ancient alternative medical system in the world having an unbroken history and is widely acceptable by the people. Keeping this background in view, the present study was carried out with the central objective to assess the diet, nutritional, physical and mental health profile of adult and older women suffering from depression. The study also included an intervention component with respect to folic acid tablets and brahmi for a specific period and analysis of post intervention effect. The specific objectives of the present study were:

1. To identify and study depressed women aged more than 40 years from free living population belonging to all the three income groups with respect to their socio demographic profile.
2. To study diet related aspects and dietary intake of adult and older women with depression.
3. To assess mental & physical health profile and nutritional status of adult and older women with depression.
4. To collect data on morbidity profile of adult and older women with depression.
5. To study psychosocial profile of adult and older women with depression.
6. To carry out intervention studies with the use of
    A. Folic acid supplementation for a period of eight weeks and study the post intervention effect of the supplementation on older women with depression
    B. Brahmi supplementation for a period of twelve weeks and study the post intervention effect of the supplementation on elderly women with depression

The study was carried out into three phases as described below:

PHASE I

COLLECTION OF BASELINE DATA ON SOCIO-DEMOGRAPHIC PROFILE, DIET PROFILE, NUTRITIONAL STATUS, MORBIDITY PROFILE AND PSYCHOSOCIAL PROFILE IN DEPRESSED WOMEN.

This section presents the demographic and socio-economic background characteristics of the women who were screened for obtaining the required sample of 180 women for the in-depth interviews. The screening was conducted on women who were in the age group of 40 years and above belonging to upper, middle and low income groups. Vadodara city was divided into 25 areas. A sub-sample was taken from each area of Vadodara, ensuring equal representation of locality for the study. Using the snowball sampling method, subjects were identified from each locality of the city.The Beck's Depression Inventory (BDI) was used for screening women for depression. The screening process was continued till the required sample of 180 women with moderate depression was met. Thus 426 women were screened, on the basis of their scores on the BDI they were identified as having 'minimal', 'mild', 'moderate' and 'severe' depression. For the purpose of analysis, women were categorized into two age groups 40-60 years and above 60 years. In addition to these 180 women, 20 women over 60 years of age from the middle income group were selected as controls. These women were selected from those who were classified as non-depressed, i.e., had a score of 0-2 points on the BDI scale during the screening.

PHASE II

FOLIC ACID SUPPLEMENTATION FOR A PERIOD OF EIGHT WEEKS AND EVALUATION OF THE POST INTERVENTION EFFECT OF SUPPLEMENTATION ON OLDER WOMEN WITH DEPRESSION.

Among the 180 women with moderate depression who were selected for in-depth interviews in phase I, 90 women were above the age of 60 years. Amongst these 90 elderly women who were moderately depressed, 30 women irrespective of the income group were selected for the intervention with folic acid supplementation for eight weeks.

PHASE III:

BRAHMI SUPPLEMENTATION FOR A PERIOD OF TWELVE WEEKS AND EVALUATION OF THE POST INTERVENTION EFFECT OF SUPPLEMENTATION ON OLDER WOMEN WITH DEPRESSION.

Among the 90 elderly women above the age of 60 years who were moderately depressed, 30 women from middle income group were selected for the intervention. Their respective controls were selected from the same population i.e. thirty selected subject were categorized into experimental group (n=15) and control group (n=15).

Tools and techniques used in the study have been briefly summarized as under.

TOOLS AND TECHNIQUES

The baseline information was collected from the subjects selected for Phase I, II and III of the study with respect to the following:

1) **Socio- demography:** A detailed questionnaire was used to collect information on age, marital status, religion, ethnic group, educational qualification, occupational status, language used, family composition, family income, presence of physical ailments, history of mental illness and alcoholism within the family.

2) **Lifestyle Factors**: The data related to lifestyle factors was collected on activity pattern and addiction pattern. Activity pattern was assessed by total self reported time spent in activities related to work and leisure along with time spent in sleep. The addiction pattern was evaluated in Phase I subjects with respect to alcohol, cigarette/bidi, tobacco powder, tobacco paste, snuff, tea and coffee.

3) **Diet Survey:**

a. General dietary aspects

A pre-tested questionnaire was used to obtain the data on general dietary aspects such as: water intake, meal pattern, fasting practices, skipping meals, intake of special health foods, craving for special food, reduction in food consumption, changes in food consumption pattern, food causing allergy, and food preference.

b. Dietary intake

The Dietary intake of the women was assessed through 24-hour dietary recall method and frequency of consumption of foods, using the food frequency questionnaire. The mean nutrient intakes were calculated for energy, protein, fats, folic acid, vitamin B12, vitamin C,

isoflavone, amino acid, B-complex vitamin, mineral and choline. Data on general dietary information which included consumption of specific uncooked (raw) and cooked foods was collected on the basis of their frequency of intake (Phase I)

For food frequency, frequency in terms of frequent consumption and non-frequent consumption of common foods was noted.

4) **Nutritional Status:** Nutritional status was assessed using anthropometric measurements like height, weight, Mid Upper Arm Circumference (MUAC) and Body Mass Index (BMI). As a part of clinical parameter blood pressure assessment was also carried out.

5) **Morbidity Profile:** Morbidity profile was assessed by collecting prevalence of major and minor illnesses using checklist method among adult and elderly women. Additionally pre tested questionnaire was used to get the information on the menopausal aspects.

6) **Psychosocial Profile:** Questionnaire was designed for obtaining information on power structure, loneliness and isolation parameters. Standardized scales were used for getting information on life's stressful events and self esteem aspects.

7) **Biochemical Parameters:** Mean hemoglobin levels were estimated using cynamethaemoglobin method in Phase II and III. Serum folic acid levels were estimated using an enzymatic kit in Phase II for getting the information on pre and post intervention data.

8) **Mental Health Status:** Mental health status of the subject was assessed using Beck's Depression Inventory scale to compare the depression status from the score obtained in pre and post data after intervention for phase II and III. Information on cognition levels as a part of mental health status of the subjects was gathered with the help of

Mini-Mental State Examination Scale (MMSE) and Cognitive Impairment Test (CIT) scale in Phase III.

The data collected were appropriately analyzed using percentages, mean and standard deviation, Paired't' test and chi square were used to study the difference between pre and post intervention data on nutritional status, dietary intake, clinical parameters and disease profile. 'Independent "F" test was used to compare differences between the mean score for anthropometric measurements and Chi square test was applied to assess the difference between the mean complaints in disease profile in pre and post data obtained after intervention period. The data were analyzed using Statistical package for social sciences (SPSS/PC+).

RESULTS:

The results of the study are summarized below:

PHASE I

COLLECTION OF BASELINE DATA ON SOCIO-DEMOGRAPHIC PROFILE, DIET PROFILE, NUTRITIONAL STATUS, MORBIDITY PROFILE AND PSYCHOSOCIAL PROFILE IN DEPRESSED WOMEN.

The results of this section included general background information, dietary profile, nutritional status, morbidity profile and psychosocial aspects of 180 adult and older women moderately depressed above the age of 40 years from free living population. The results are summarized below:

1. SOCIO DEMOGRAPHIC PROFILE

Majority of the women belonged to the middle income group were from upper castes and married. With respect to occupational status they were found to be homemakers, though nearly one third of them were currently working and 10 percent had retired. Physical ailments in terms of arthritis and blood pressure were the two most frequently reported health problems followed by diabetes and body ache amongst adult and older women. Most of the women with

moderate depression did not have history of mental illness in self, in their natal or marital family. Majority of them also denied having any family history of alcohol dependence.

2. LIFESTYLE FACTORS: Information on lifestyle factors in terms of daily activity pattern and addiction pattern was obtained.

a. Activity pattern

With respect to recreational/social activities and religious activities no significant difference $P \leq 0.05$ was seen in both the groups of adult and older moderately depressed women. Significant difference was obtained in case of physical activity pattern in women belonging to 40-60 years of age group compared to their older counterparts. The difference was seen within the involvement in types of physical activity pattern in women belonging to age group of 40-60years. Majority of the women in the age group of more than 60 years in the high and middle income groups were not independent in their daily activities as compared to their younger counterparts. About two fifths of the women (42.8 percent) in the same age group reported of having arthritis. In contrast the older women from the lower income group were found to be more active and independent in comparison to their younger counterparts of the entire income group.

b. Addiction pattern

Addiction pattern was found to be negligible in case of majority of the women. Three percent of the adult woman among the high income group was found to consume at present alcohol, cigarette, tobacco, snuff or tea and coffee, whereas among older women in the low income group only tobacco powder and tobacco paste was used.

3. DIET SURVEY

a. General Dietary Aspects

The dietary intake of the women was assessed through a diet survey which included questions on general dietary aspects such as: water intake, meal pattern, fasting practices, skipping meals, intake of special health foods, craving for special food, reduction in food consumption, changes in food consumption pattern, food causing allergy, and food preference.

i. Water intake:

Consumption of the recommended quantity of water was reported more among high income women in both the age groups (36.7 percent in 40-60 years age group; 33.3 percent in the above 60 years age group). As high as 75 percent of the non-depressed women aged 60 years and above could not provide any information on their actual consumption of water in a day. Majority of the low income women (73 percent) aged 40-60 years consumed between 6 and 10 glasses of water as compared to lower income group women aged 60 years and above (53.3 percent).

ii. Meal Pattern:

Majority of the women with depression in both the age groups 40-60years as well as 60 years and above were vegetarians. A comparison between middle income women in the depressed and non-depressed group showed that the percentage of vegetarians was much higher among depressed women (90 percent) as compared to those in the non-depressed group (65 percent).

Depressed women belonging to lower income group did not follow the typical three-meal pattern from both the age groups. Majority of the low income women in the younger age group did not take breakfast, or any other meal, such as evening snacks, and some of them did not take dinner (13.8 percent) in 40-60 years of age whereas (26.7 percent) of older women from 60 years and above missed taking dinner. The reason reported mainly were poverty, no availability of foods and health problems. A comparison of the meal patterns

of middle income women over 60 years of age in both the depressed and non-depressed groups showed that non-depressed women had more regular meal pattern than those who were depressed.

iii. Fasting Practices:

Fasting practices were more prevalent in women over 60 years of age than in adult depressed group. Among women aged 40-60 years, half of the women from middle income group (50 percent) followed by those from the high income group (43.3 percent) showed practicing fast as compared with women from the low income group (39.3 percent). Also, more than half of the women in the depressed group (63.3 percent) than those in the non-depressed group (40 percent) showed fasting practice. A comparison between meal pattern during fasting of depressed and non-depressed women showed that (75 to 87 percent) of the non-depressed women consumed green leafy and other vegetables, roots & tubers and fruits, while (84.2 percent) of depressed women consumed mostly fruits and (63.2 percent) consumed milk and milk products.

iv. Skipping Meals:

Middle and high income women in the younger age group, i.e. 40-60 years were found to skip breakfast more than lunch or dinner, while older women (above 60years) in the same income groups skipped lunch and dinner more often. The main reasons for skipping meals by depressed women were reported as busy schedule (completing household chores), low mood, digestive disorders or other complaints like headache, body ache, etc.

v. Special Health Foods:

Among depressed women aged 40-60 years, consumption of special health foods was found to be highest in the high income group (62.1 percent) and lowest in the low income group (16.7 percent). Similar results were observed in their counterparts. The type of special health foods consumed by women were mainly multivitamin tablets, as reported by (42–54 percent) of women in the 40–60 years age group and consumption of ayurvedic supplements were reported by (30–78) percent of women over 60 years of age.

vi. Craving for foods:

Most of the women (aged 40-60 years and above 60 years) with depression had shown craving for foods like sweets, salty and crispy food items, and chocolates. They experienced cravings for such foods when they felt lonely, neglected, or if they had skipped meals, or they had lost interest in other foods after menopause.

vii. Changes in food consumption in past 5-10 years:

Most of the women (80-100 percent) with depression across age and income groups had made changes in their food consumption in the past 5-10 years. Two-thirds of middle income women aged 40-60 years and those above 60 years reported reduction in food consumption due to lost appetite and low mood. Aversion to food was also reported by (38-53 percent) of the women.

Reasons for striking reduction in food consumption were reported by majority of older depressed women as aging, indigestion, major health problems, disregard for their choice of foods by their family, and no power to decide what to eat.

viii. Food Preferences:

A comparison between the food preferences of older depressed and non-depressed middle income women showed that the majority of non-depressed women had greater preference for salted and baked items (53 percent each), milk based foods and fast foods (71 percent each), as well as dry fruits, processed items and instant mixes, when compared to their depressed counterparts, who showed greater preference for sweets and farsan.

b. Nutrient Intake

A significant difference was obtained amongst both the age groups of depressed subjects. The mean nutrient intake of iron, calcium, vitamin-C and vitamin B6 were significantly higher ($p \leq 0.05$) in adult depressed women as compared to their counterparts. The significant difference ($p \leq 0.05$) was seen amongst the intake of folic acid which was found to be lower amongst older

depressed women as compared to adult depressed subjects and non depressed counterparts.

The moderately depressed subjects aged 40-60 years from middle income group showed significant difference ($p \leq 0.05$) and better intake with respect to energy, iron, folic acid and amino acids compared to older depressed women.

The findings revealed significant difference ($p \leq 0.05$) with poor intake of selenium, choline and Vitamin-B12 amongst both the depressed age group. Overall intake of all the Non-depressed subjects showed higher intake of all the nutrients.

With respect to food frequency, the depressed groups belonging to both the age groups (40-60 years and above 60 years) from higher and middle income were found to have frequent consumption of all the food groups compared to lower income group. With respect to milk and milk products frequent intake was noted in case of women belonging to middle income group aged (40-60years) 63.3 percent as compared to their older counterparts (30 percent). Nearly 86.7 to 100 percent of women from both the age groups amongst all the income groups showed non frequent consumption of animal and sea foods.

A comparison between frequency of consumption of various foods by depressed and non-depressed women aged 60 years and above belonging to the middle income group showed much higher percentage of significant difference with respect to food items, including animal foods, milk and milk products were found to be frequently taken than their depressed counterparts.

Thus, overall the dietary intake of non depressed subjects was found to be more balanced and healthy compared to their counterparts.

4. NUTRITIONAL STATUS

Nutritional status was assessed using anthropometric measurements. No significant difference ($p \leq 0.05$) was obtained in case of weight, height and MUAC within the three income groups of adult and older women belonging to both the age groups.

Clinical parameters with respect to blood pressure levels of both systolic and diastolic levels did not show significant difference between adult and older depressed women.

5. MORBIDITY PROFILE

With respect to disease profile, the prevalence of major health problems was higher in women over 60 years of age compared to their counterparts. Amongst them, prevalence was higher in case of middle income women. Locomotor problems ranked first (52 percent) in all the three income groups, followed by oral cavity problems (43.3 percent) and cardiovascular (31 percent) in middle income women above 60 years of age. Neurological problems were reported least in depressed women of both age groups. In the non-depressed group, hardly 10 percent of the women reported locomotor problems and still fewer reported endocrine and respiratory problems (5 percent each) compared to their depressed counterparts.

With respect to minor health complaints majority of the women reported psychological complaints and complaints related to the digestive system. Older women aged 60 years and above mainly reported complaints like acidity, indigestion, flatulence, constipation and lack of appetite compared to their younger counterparts. Most of the women in the younger age group reported loss of interest, fluctuation in blood pressure, lack of sleep, low mood and lethargy. Prevalence of minor health problems was found to be lower in non-depressed women as compared to their depressed counterparts.

With respect to menopausal problems, women with depression experienced vasomotor and physiological symptoms related to menopause such as: hot flushes sleep disturbances, headache, high blood pressure, and decrease in appetite. Complaints, like backache, change in vision, pain in the joints and limbs, slight memory loss and dizziness were reported mainly by women above 60 years of age.

6. PSYCHOSOCIAL PROFILE

a. Power Structure

With respect to heading position in the family, among women within the age of 40-60 years, percentage of women who reported self as the head of their household was highest in high income group (56.7 percent) followed by low income (46.7 percent). Among middle income women in the same age group, husband was the head of the household in majority of the households (53.3 percent). Among older women, the percentage of women who reported self as the head of their household was the highest in the low income group (53.3 percent). Middle income women over 60 years of age also have reported highest percentage for 'self' as head of household, but there is not much difference with the second most representative category.

With respect to Involvement in household responsibilities, almost 90 percent of the women across age and income group, (with the exception of middle income women in the older age group) were engaged in household chores (86.7 percent).While most middle and high income women in both age groups took part in household responsibilities by choice, more low income women (in both age groups) carried out household responsibilities due to compulsion or due to circumstances.

Decision making in case of health related aspects were found to be taken by both adult and older depressed women. Lower percentage of women from both the age groups was found to be involved in decision making on financial aspects and outing matters with family indicating that when it comes to social and entertainment activities, the preferences of women was considered.

Higher percentage of younger low income women (53.3 percent) and older low income women (86.7 percent) stated that they did not consult others while making decisions.

b. Loneliness and Isolation

Eighty seven percent of the moderately depressed women with the age group of 40–60 years, belonging to lower income and high income reported feeling of loneliness, whereas comparatively lower percentage of middle income women reported the same. In women over 60 years of age, loneliness was reported highest by high income women (96.7 percent), followed by middle income women (93.4 percent) and low income women (83.3 percent).

With regard to feeling isolated, about two-thirds of low and high income women in the 40-60 age group and 70 percent low and high income women above the age of 60 reported of feeling isolated. Isolation was comparatively less reported by middle income women in both age groups.

With respect to coping strategy for loneliness by women within the age group of 40–60 years, 34.6 percent reported 'crying' as solution. However, the most frequently used coping strategy of middle income women in the age group of 60 years and above was 'diverting mind to other work" (39.3 percent). Similar pattern of response were obtained in case of coping strategies for isolation. Response of "doing nothing" (26.7 percent) was the coping strategy further used more frequently by middle income women in the 40-60 years age group. To 'find solutions' was the most frequently reported coping strategy by middle income women over the age of 60years (25 percent).

c. Life's Stressful Events

Almost all of the moderately depressed women across age and income groups have experienced highly stressful life events, with perhaps the exception of middle income women aged 40-60 years who have experienced moderate stressful life events. Adult women belonging to 40–60years of age group showed highest percentage for most stressful event in the low income group as "illness of close family member" (73.3 percent), which is also true for

43.3 percent in the middle income women in the same age group. For high income women in this age group, 'family conflicts' were the most stressful event (70 percent).

d. Self Esteem

The level of self-esteem of older moderately depressed women in the low income group was found to be less, with only 46.7 percent compared to their counterparts within the same age group in middle and high income group women having high self-esteem.

7. IMPACT OF PSYCHOSOCIAL PARAMETERS ON NUTRITIONAL INTAKE

In order to verify the interplay of two identified parameters for depression i.e. dietary intake and psychosocial factors some statistical tests were applied at the end. The psychosocial parameters selected for studying the association were: power structure, isolation, life events and self esteem. The nutrition related parameter selected for studying the association was: general nutrient intake or by and large calorie intake, i.e. the standard RDA calorie intake.

a. Power Structure:

Significant difference ($p<0.05$) was observed between the power structure and the calorie intake. Amongst different levels of satisfaction, the depressed group of women which was satisfied in their existing role in the family showed better caloric intake compared to women who were dissatisfied.

b. Isolation:

The association of isolation and calorie intake were significant ($p\leq0.05$) in depressed women. Women who were feeling isolated on all the times had lower calorie intake compared to women who experienced isolation only sometimes. During the in-depth interview on health and nutritional parameters also majority of the women showed loss of interest, no mood and subsequently development of aversion for food intake.

c. Stressful Events:

Significant difference ($p \leq 0.05$) was observed on the Gurmeet Singh presumptive stressful life events scale. The depressed women who had higher levels of stress showed reduction in caloric intake.

d. Self Esteem:

An analysis carried out to assess the impact of self-esteem – both positive and negative - on calorie intake of depressed women showed a significant difference ($p \geq 0.0005$) between the positive self esteem level and negative self esteem level and calorie intake of the depressed subjects. The depressed women with positive self esteem levels had better calorie intake compared to women with a negative esteem.

PHASE II

FOLIC ACID SUPPLEMENTATION FOR A PERIOD OF EIGHT WEEKS AND EVALUATION OF THE POST INTERVENTION EFFECT OF SUPPLEMENTATION ON OLDER WOMEN WITH DEPRESSION.

This phase includes the evaluation of the impact of intervention of folic acid Supplementation by comparing the pre and post intervention data on dietary intake, hemoglobin and folic acid levels, nutritional status, mental health status and disease profile of older moderately depressed women. The results are summarized below:

1. MENTAL HEALTH STATUS

Beck's Depression Inventory (BDI) was used to assess the impact of intervention on the mental health status. Significant difference $p \leq 0.05$ was found in the severity levels of depression after supplementation of folic acid tablets for eight weeks.

2. NUTRITIONAL STATUS

The results of mean anthropometric measurements height, weight and MUAC of the depressed elderly women (≥ 60 years) did not show any significant impact on the physical health after intervention.

With respect to biochemical estimation for folic acid marked significant difference ($p \leq 0.05$) was observed after intervention. The serum values increased from 3mg to 10mg after intervention. Marginal change was observed in case of hemoglobin levels for the same group.

3. DIET PROFILE

Significant difference ($p \leq 0.05$) was observed in the intake of the majority of nutrients. The intake of folic acid, iron, vitamin B12, calcium and amino acids was increased after intervention. No significant difference was observed in terms of intake of choline, selenium and isoflavone nutrients. Folic acid supplementation improved the appetite and reduced the complaints of development of aversion for foods within the subjects after intervention.

4. MORBIDITY PROFILE

Majority of the minor health complaints were found to be reduced after intervention period of eight weeks by the depressed elderly women. A marked difference was observed in complaints related to digestion, like acidity, constipation, ulcers, flatulence and indigestion along with psychosomatic complaints at the end of supplementation.

Thus, intervention with folic acid supplement showed beneficial effects on severity of depression, nutritional status, dietary intake, and minor health complaints in the elderly women.

PHASE III

BRAHMI SUPPLEMENTATION FOR A PERIOD OF TWELVE WEEKS AND EVALUATION OF THE POST INTERVENTION EFFECT OF SUPPLEMENTATION ON OLDER WOMEN WITH DEPRESSION.

This phase included the evaluation of the impact of intervention of Brahmi capsules supplementation by comparing the pre and post intervention data on dietary intake, hemoglobin levels, nutritional status, mental health status and disease profile of older moderately depressed women. The results are summarized below:

1. MENTAL HEALTH STATUS

A significant decrease ($p \leq 0.05$) was found in the depression level in the experimental group receiving Brahmi over a period of 6 weeks. Subjects with moderate depression reduced from 100% to 93% in mild and 7% in normal category.

Similar results were obtained with regard to MMSE Score in experimental group where MMSE score of all the subjects reduced to 27%. A shift of 66% of subjects into mild and 7% subjects into normal category of MMSE score was noticed. Cognitive impairment test scores of experimental group showed significant improvement ($p \leq 0.05$) from 33% to 93% under the normal category.

2. NUTRITIONAL STATUS AND CLINICAL PARAMETERS

There was no significant change observed in the anthropometric measurements of the depressed subjects in experimental as well as control group.

A significant reduction ($p \leq 0.05$) in the systolic blood pressure and marginal reduction in diastolic blood pressure was found in the experimental group.

3. DIETARY INTAKE

With respect to dietary intake, a significant increase ($p \leq 0.05$) was found in the mean intake of choline, folic acid, tryptophan and vitamin C in the subjects belonging to experimental group whereas significant reduction ($p \leq 0.05$) in the mean intake of vitamin C was observed in the control group. With regard to other nutrients like energy, protein, methionine and vitamin B12 a slight improvement in the intake of experimental group was observed whereas control group showed the decreasing trend.

4. MORBIDITY PROFILE

There was no significant reduction in the number of major health problems of the experimental group and control group. Significant reduction ($p \leq 0.05$) in the number of minor health complaints was observed in the experimental group, whereas slight reduction was observed in the number of minor health complaints of the control group.

Thus, it can be concluded from the present study that Brahmi (supplementation of 60% bacoside, 750 mg of Brahmi extract) proved its beneficial effects with respect to mental health status in depressed subjects after twelve weeks of intervention period.

Based on the findings of the present study following concluding remarks can be made:

1. Prevalence of depression seems to be higher amongst women of free living population belonging to middle income group aged 40 years and above.

2. Nutritional status and dietary intake is considered as an important determinant playing important role in depression.

3. Nutritional status and psychosocial aspects both or either seems to have impact on level of depression leading to poor caloric intake.

4. Depression leads to increased number of minor health complaints.

5. Folic acid tablet supplementation on depressed elderly subjects proved to be highly beneficial in increasing serum folic acid levels and reducing minor health complaints along with reduction in levels of depression.

6. Herbal intervention in the form of Brahmi has been found to be very encouraging and proves to be good alternative therapy resulting into improvement of depression.

Thus, the present study clearly indicates the need for taking concrete steps for creating awareness amongst the women aged 40 years and above from free living population regarding depression and its predisposing factors. Identifying depression and seeking treatment for the same are as essential as physical health problems while tackling health issues of elderly. Understanding the health needs of women, is very important for designing effective interventions for depressive illness. Most of the work reported in the literature revolves around medications and psychotherapies. Intervention strategies for improving depression using food based approach, herbal supplements or other alternative healing methods should be introduced for adult as well as older women as these alternatives have greater social acceptance in Indian society. If this approach of present study is proved to be effective on larger sections of the society, our efforts are fruitful.

RECOMMENDATIONS

Present study clearly indicates interplay of diet, nutritional status and specific interventions on mental and physical health of the depressed adult and older women. From the conclusions of the present study, following recommendations can be made.

- Elderly women are more vulnerable to depression; due to poor nutrient intake, untreated and undiagnosed physical illnesses which are commonly believed to be a natural part of the process of ageing these have affected the appetite and nutritional status of elderly women. Therefore there is a need for nutrition supplementation programs for elderly women especially in lower income groups in general to create awareness about nutritional needs of elderly women.

- Nutrition and health education initiatives must promote knowledge about consumption of low cost, locally available, culturally acceptable, vegetarian sources of key nutrients related to mental health found deficient in women.

- Use of foods rich in micronutrients such as choline and selenium can be encouraged in recipes for older women.

- Sensitizing the staff involved with depressed patients i.e., staff of psychiatric clinics, hospitals, doctors, health workers, public health centers, social workers, therapy centers regarding spreading the role of dietary intake and its effect on the nutritional status leading to various mental health disorders.

- There is a need for future research on the use of more of herbal and unani medicines for the treatment of depression as well as other mental health disorders.

- Facilitating changes in the routine pattern can be achieved by lifestyle changes such as including meditation and relaxation, exercise,

acupuncture, pranic healing and reiki etc. Involvement of elderly women in social groups such as senior citizen clubs, mahilamandals, laughing clubs could further reduce the risk of various mental and physical health problems.

- There is a need to develop illustrated guidelines and imparting nutrition health education in simple regional languages for assisting elderly and their care-givers regarding depression in formulating adequate diet to be consumed, timely medical checkup up on regular basis, social support and understanding the needs of the elderly due to advancing age especially women can contribute to improve the overall health of the elderly as well as their quality of life.

SUGGESTED AREAS FOR FUTURE RESEARCH

1. Long term follow up studies on herbal interventions are needed from the adulthood and followed up till old age to establish their role in ageing process and mental health.
2. More research studies related to mental health should be carried out using interventions such as Vitamin B12, Vitamin B6 and amino acids and other beneficial nutrients etc.
3. Properly designed clinical trials are required to arrive at the exact recommended dietary allowances for the Indian population with respect to various nutrients that are required to give protection against various mental health and age related chronic degenerative disorders.
4. Further research is required to formulate healthy, nutritious and easy to use recipes to treat depression.
5. Assessing the knowledge and practices of the caregivers of the elderly in terms of practices for healthy aging.