CHAPTER-5

SUMMARY AND CONCLUSION
SUMMARY AND CONCLUSION

Menopause is the most striking event occurring during middle age in women and represents the end of woman’s reproductive life. The literal definition is the end of the cycle of monthly menstrual bleeding. Menopause develops in response to decreased estrogen levels and disruption of the hormonal cycle associated with ovulation. The dictionary meaning is absence of menstrual period for 12 months. The cause of natural menopause is shrinking of the ovaries which are produced in small quantities for a short time after menopause. During menopause, women’s reproductive capacity ceases because of the end of ovarian function. The ovary is the only endocrine gland that stops functioning before final stages of life. In the human ovary, there is a continuous and progressive decline in the number of follicles from fetal life onwards. At birth, each woman is endowed with 1-2 million primordial follicles, this pool of follicle decrease to about 300,000 by the time of menarche and at the time of menopause less than 1000 follicles remain. In every cycle, only one dominant follicle is selected, and the rest undergo atresia. Prior to menopause, there is a marked reduction in the number of primordial follicles in the ovary. The ovary shrinks and its surface becomes wrinkled during menopause and an ovulatory cycle decreases around the age of 38-42 years.

Menopause occurs in 3 phases, the Pre-menopause; Is the preliminary phase of ovarian dysfunction, exhibiting physiological symptoms that initiates, while menstrual cycle continue to be regular. Peri-menopause (climacteric): This is the transition period where the endocrinological, biological and clinical features of approaching menopause commence. Symptoms are typically experienced for a period of five to ten years. The Post-menopause: Is the final stage when the menstrual cycle stops for longer than 12 months and there is a drop in the level of oestrogen and progesterone, the most important hormones in females. The age at which natural
menopause occurs is between 45 and 55 years for women worldwide. It is generally accepted that the average age at menopause is about 51 years for developed countries and 42-48 years for developing countries. However there are wide individual and geographical differences during peri menopause in the age of onset of menopause.

A small portion of women encompasses menopause asymptotically or with symptoms less intense which generally are ignored. On the other hand among few others, symptomatic conditions become so alarming to affect both the woman and their families. The physiological and psychological changes associated with peri menopause are thought to increase the risks for various chronic diseases.

These psychological and physiological changes associated to menopause have an impact on food intake and food choices of menopausal women. It is an established fact that a well-balanced diet is important for good health and to reduce the severity of symptoms. Awareness about the symptoms and initiation of menopause among women in general is low. Thereby women find difficulty in managing menopause distress. Literature is limited to explain the food and nutrition related aspects of menopause, systematic classification of symptoms and community practices for using special foods to manage menopausal distresses. There are missing links to have clear picture about the onset and characteristics of the events and factors influencing these events. It is of prime importance to strategically design approaches to ameliorate the distresses and help women undergo the distressful period with ease. The present study focuses on age of onset of menopause, total period of menopause, health and nutritional profile, food and nutrient intake, food behavior, hormonal profile and effect of supplementation on the climacteric symptoms.
Objectives of the study are

- To study the health and nutritional status of women during their pre, peri and postmenopausal ages.
- To characterize the typical onset of menopause among women in South Indian region and factors affecting menopause.
- To study the effect of intervention on menopause symptoms and hormonal profile.

Methodology: A prospective study was conducted in two stages- A cross sectional and semi-longitudinal study.

1. Cross Sectional Study- 750 women aged between 35-55 were included. Women attending outpatient clinic of S.D.M. Medical College and Hospital, Dharwad were contacted. The purpose of the study was explained, a written consent was obtained from the subjects. The study was approved by the IHEC, University of Mysore, Mysore and also Institutional Ethical Committee, S.D.M. Medical College and Hospital Dharwad Karnataka. The assessment included general information about the subject’s health status, menstrual details, nutritional assessment and assessment of anxiety and depression.

2. Semi longitudinal study- A total of 20 subjects were selected for intervention study where in 10 for flax seed supplementation and 10 for Menopace supplementation. The duration of intervention was 3 months. The quantity of flax seed supplementation was 15gm per day whereas Menopace, one tablet per day. Pre and post assessment included assessment of blood parameters like lipid profile, Hb%, ferritin, hormones such as estrogen and progesterone. Menopause symptoms were assessed by using Greene’s Climacteric Scale and QOL was assessed by using WHOQOL scale.
Results: The results are discussed under the following heads.

1. General Characteristics of Study population
2. Menstrual Pattern, Health profile and Symptoms of Menopause
3. Nutritional Status of Selected Women
4. Intervention studies
5. Factors Affecting Menopause

General Characteristics of Study Population
The study population comprised of women aged between 35-55 years. Majority of the participants were literates (12.4 to 31%) while 8-20% of them were graduates and postgraduates. Majority of the women in all the age groups were housewives. The occupational feature indicated that higher percentages of women were employed in private sector while a small percentage of women (4 to 6%) were government employees. The occupational status of husbands varied between labour class, self employed, agriculture, private and government employed. Agriculture was in higher percentage i.e 24 to 30%. The marital status of the participants indicated that 70% of the women from younger age groups were married while 98 to 99% were married from higher age group. Younger women got married relatively at higher age. Younger women had 2 to 3 pregnancies while older women had 3 to 5 pregnancies. Women from higher age group (45 to 55 yrs) gave birth to the last child at a mean age of 40±6.57 where women in less than 44 years gave birth to the last child at 23±6.1 and 25±5.92. The time gap between first pregnancy and last pregnancy among all women in four age groups exhibited a linear increase with age which indicated that older women had planned pregnancies with a wide inter-pregnancy gap. The obstetric history presents that higher percentage of older women (50-55years) were found to have
abortion. Nearly 65 to 79% of women across the age groups varied between 24.7±3.69 to 27±4.57 years.

The population with respect to SES was found to be homogeneous. Higher percentage of women belonged to small family while small percentages of women were from big families. Among the selected population, 92 to 96% of women belonged to nuclear families. Effect of SES is seen to be small across the family size and types of family. Women from high SES have small family size.

**Menstrual Pattern, Health profile and Symptoms of Menopause**

The mean age at menarche among the participants regardless of age category was essentially similar i.e.13.34±1.35. Majority of women (89 to 92%) reported to have experienced regular periods while 7 to 11% reported have irregularity in their menstrual cycle. The per cent occurrence of pain was considerably higher (36 to 38%) in younger women. 50 to 64% participants reported to have moderate flow and considerably small percentage of women claimed to have severe bleeding (6 to 15%). Menstrual pattern of the study subjects indicated that the irregularity of menstruation increased with age 35 years and ended at 50-55 years. The frequency of occurrence varied from once in 2 months, 3 months and 6 months. The menopause stage was determined based on the regularity of menstrual cycle. IN older age group (group IV) higher percentage of women (94.6%) attained menopause whereas 61.9% in group III and 24.4% in group II attained menopause. The mean age at natural menopause of the study population was found to be 44.4±4.54 and median age 45 years. The menstruating years (the life time cumulative number of cycle a woman experiences) calculated for the study population was found to be 31.2±4.48 years which is an indicator of menstrual activity and reproductive health. The health status of the study population indicated high prevalence of hypertension in all the age group followed by diabetes. The oral and digestive
problems associated with menopause age reported by the participants were gingivitis followed by bleeding and swollen gums and oral cavity problems were burning sensation, bad breath and dry mouth. The highest occurrence of digestive problem reported by the study population was flatulence followed by constipation.

The prevalence of symptoms commonly associated to menopause are related to physical and physiological changes, urinary bladder problems, vasomotor, collagen and bone problems. Headache was the most prevalent symptom across the age group followed by burning feet, loss of balance, breast fullness, crawling ant sensation, water retention, body odour, swelling and tenderness in the breast. The vasomotor symptoms reported by the subjects were hot flashes, night sweats and insomnia among which the highest occurrence was insomnia. The bladder problem i.e. frequent urination was found to be high (23.4 to 38.3%) in all the age group. The commonly reported bone problem was pain in knees (i.e. 44.1 to 72.8%) in all the age groups followed by pain in lower back and achy joints. Since the symptoms vary in their nature and frequency it was difficult to explain the reason for differences in the symptoms. Hence it was felt necessary to identify the profile of occurrence of symptoms. So the cut off levels of occurrence of each symptom reported by the selected women was established based on the lowest and highest rate of occurrence and they are presented as Constant symptoms, Usual Symptoms, Occasional symptoms and Other Symptoms.

**Nutritional Status of Selected Women**

The prevalence of overweight was high i.e. 44.8 to 52.9 %. There was gradual increase in prevalence of overweight from 35 to 55 years. 13 to 18 % of the subjects were obese. There was marked shift in the weight status in women between age groups of I and II and Group III and IV, the younger were in normal weight status. There was also a marked increase in present occurrence of central obesity at each group. The WHR
ranged from 0.67 to 1.01 across the age group. The mean nutrient intake was essentially similar across the age group where as the protein intake was found to vary among women from different age group. The percent adequacy for energy among older age group (Group IV) were found to be 99% of RDA’s followed by 95% from Group I, 94% from Group II and 85% from Group III. The adequacy for other nutrients like protein, calcium, iron and β-carotene was also found to be high among older age group (Group IV) compared to other age groups. The adequacy for fat was found to be consistently high for all the age groups which were 2 to 3 times the recommendation which is the characteristic feature of Indian consumption pattern.

CV was calculated to note the variations in mean intake of energy and protein. The CV indicated that energy intake varied across the age groups from 9.2 to 17.9. The variance in protein intake differed between the age groups. High variance was seen in younger age as compared to older age groups. The CV for protein was 22 suggesting a large difference in intra-group.

The knowledge about special foods to be consumed during menopause indicated that 49 to 57% of the study population knew about the special foods consumed to ameliorate symptoms of menopause but an insignificantly small percentage of them were aware of special foods to be consumed during menopause and also an insignificant population used foods / supplements.

**Intervention Studies:** Intervention study was undertaken to study the effect of phytoestrogen i.e. lignan present in flax seed and a pharmacological preparation i.e. Menopace which is a micronutrient supplement for relieving menopause distress. It is observed that both the supplements brought about significant differences in the psychological, somatic and vasomotor symptoms. Such an observation could be associated to their compositional differences. It is obvious from the result that micronutrients are
highly beneficial in reducing the menopause symptoms. However the flax seed in small quantities supplemented provided all the micronutrients found in Menopace in relatively small quantity. Supplementation of flax seed and Menopace has also shown a small change in bio-chemical parameters. Significant change was noted for Total-C in both groups and also significant increase in ferritin was seen in both the groups. Reduction in LDL-C in flax seed supplementation was statistically highly significant. Effect of flax seed and Menopace on hormone levels indicated that flax seed markedly increased the circulating estrogen level where Menopace exhibited a small increase but statistically not significant. But it is worthwhile to mention that flaxseed supplementation does have an effect on circulating estrogen levels. The higher differences were also seen in progesterone levels for both flax seed and Menopace but the rise was not statistically significant.

The efficacy of both supplementations on QOL found that there is mild improvement in the QOL with flax seed supplementation whereas Menopace supplementation has shown significant improvements. Although food supplement has shown slight improvement in their QOL, it can be suggested that supplement for long duration with tolerable quantity could bring about more affective improvements.

Factors Influencing Menopause

The various bio-social factors /variables associated with menopausal age in our study revealed that number of pregnancies and age at last pregnancy found to influence menopause age significantly while family size, occupation and BMI didn’t show any correlation. Obstetric variables, menstrual history and intake of macronutrients also influenced the age of menopause where the linear association between number of pregnancies and ANM was observed in the study. Women who did not experience pregnancy attained NM at considerably younger age (38.0±4.41) and women with more than 3 pregnancies, the mean age of menopause was 45.6±5.88 yrs. It was also observed
that the intake of both energy and protein influence the age of menopause. Higher intake of calories brought about a marked increase in menopause age as compared to protein intakes. Consumption of protective foods such as greens brought about significant reduction in the constant and occasional symptoms. A small reduction in usual symptom was noted with fruit consumption which was statistically mildly significant.

**Conclusion:** The mean age at natural menopause in our study is 44.4 ±4.54 and median age 45 years. Menopause symptoms vary enormously among population, an attempt was made to classify symptoms systematically so as have a useful tool to identify the onset of menopause. The constant symptoms were headache, pain in lower back, pain in knees, loss of hair. Symptoms shifted in their frequency of occurrence and attained as constant status. Menstruating years is one of the criteria to potentially assess menopause age. Menopause age is influenced by a variety of bio social and physiological factors, notably number of pregnancy, age at last pregnancy and irregularity in menstruation are important physiological variables altering menopause. Among the biosocial factors, socio economic status, all types of stress increase age of menopause. Protective foods are important to reduce the intensity of symptoms although the benefit of protective food was low. Regularity of consumption may promote /provide benefit women during menopause. Awareness should be created about age of menopause, symptoms of menopause in population so as to help them to approach health personnel to better manage the condition and reduce the distress. Natural foods with phytoestrogens should be promoted as supplements to make the menopause period manageable. Pharmacological supplement as Menopace is also an effective supplement; however, importance should be given for natural food supplements. Although our study didn’t include exercise component, it is imperative to recommend regular exercise during this