LIST OF TABLES

Sr. No.	Contents	Page No.
2.1	Menopausal Status Definitions	52
2.2	Findings from the SWAN study - Adjusted hazard ratios (and 95% CI) and demographic, lifestyle, and health factors affecting median ages at natural menopause	59-60
2.3	Factors affecting to early or late menopause	61
2.4	Correlation coefficients between ovarian and pituitary hormones as assessed in simultaneously obtained samples in different stages of the menstrual cycle	68
2.5	Results of WHI's Hormonal trails	82-83
2.6	Summary of the hypothesized and observed risks of specific clinical outcomes	84
2.7	The possible benefits and risks of diet and lifestyle on menopause symptoms and long-term postmenopausal health	90-91
2.8	List of evidences for complementary and alternative medicine approaches for management of menopausal symptom	95-97
2.9	Phytoestrogen content of foods as consumed (wet weight) per 100g and per serving (µg)	100-101
2.10	Phytoestrogen content in beverages, nuts, seeds, and oil	103-104
2.11	Amount of lignans (µg/g) in different pomegranate fruit juices, obtained by extraction under reflux in acetone-water	111
2.12	Comparison of analytical methods for analysis of Phytoestrogen	131
3.1	Cut-offs for BMI	155
3.2	Reference range for biochemical indicators	160
4.1	Distribution of subjects based on the stages of reproductive life	166
4.2	Distribution of subjects based on their education and profession	167
4.3	Distribution of subjects based on parity numbers (n=1000)	169
4.4	Self reporting medical history of the population (n=1000)	171
4.5	Knowledge of the population (n=1000)	172-173
4.6	Perceptions of the population for menopausal symptoms at different stages of menopause	175
4.7	Perceptions of the population for thyroid symptoms at different stages of menopause	176
4.8	Percent prevalence of menopausal symptoms in the	177-

	population	179
4.9	Severity level of menopausal symptoms in premenopausal women	184
4.10	Severity level of menopausal symptoms in perimenopausal women	186
4.11	Variables/symptoms to predict perimenopause	188
4.12	Severity level of menopausal symptoms in postmenopausal women	190
4.13	Variables/symptoms to predict postmenopause	192
4.14	Comparison of Subscales (three different dimensions) and total MRS Score according to the menopausal status (Mean ±SD)	195
4.15	Analysis of Standard solutions	207
4.16	Phytoestrogen estimation from samples using HPLC	213
4.17	Socio-demographic profile of subjects (n=150)	225
4.18	Changes in anthropometric indicators – before and after intervention in all three groups (EG1, EG2 and CG)	227
4.19	Nutritional status of women based on their BMI – before and after intervention in all three groups (EG1, EG2 and CG)	228
4.20	Correlation and t-statistics for anthropometric indicators in all three groups (EG1, EG2 and CG)	229
4.21	Percent prevalence of menopausal symptoms – At baseline	233
4.22	Percent prevalence of menopausal symptoms – after intervention	237
4.23	Percent improvement in menopausal symptoms – after intervention	238-239
4.24	Mean of MRS along with Mean of its three subscales (P, S & U) in all study groups (EG1, EG2 and CG) – before and after intervention	241
4.25	Mean±SD of selected biochemical parameters in all study groups (EG1, EG2 and CG) - before and after intervention	243
4.26	Correlation and t-statistics for biochemical parameters in all study groups (EG1, EG2 and CG)	244
4.27	Level of significance for improvement in knowledge	245
4.28	Awareness about onset age for menopause	248
4.29	Percent responses for Importance of iodized salt	249
4.30	Percent responses for Importance of Calcium	255
4.31	Percent responses for Sources of Calcium	256

LIST OF FIGURES

Sr. No.	Contents	Page No.
1.1	Menopausal loss of ovarian function	05
1.2	Symptoms observed during menopausal transition	07
1.3	Pathophysiology for menopausal symptoms	11
1.4	Common hormonal axis between adrenals, thyroid and ovaries – OAT axis (Ovarian Adrenal Thyroid axis)	15
1.5	Different classes of phytoestrogen and members in each class	19
1.6	The structural similarities of phytoestrogens to estradiol	21
1.7	Chemical structures and names of the isoflavones most commonly found in food.	22-23
1.8	Structure of coumestrol	24
1.9	The chemical structure of the prenylated flavonoids identified in food	24
1.10	Structures of Lignans most commonly found and identified in food	25
1.11	Several sites for Estrogen receptors in the body	27
1.12	The possible mechanisms involved in the cellular actions of natural estrogens (e.g., 17β-estradiol, E2) and other estrogenic compounds	28
1.13	Absorption of daidzein from the gut	31
1.14	Metabolism of daidzein and genistein based on human urinary metabolites	32
1.15	Conversion of Lignans to enterolactone and enterodiol	33
1.16	Sample preparation for phytoestrogen analysis	35
2.1	Stages of reproductive aging workshop (STRAW)	44
2.2	Common causes of early menopause	56
2.3	Post menopausal Estrogen Prescription in US (1995-2003)	85
2.4	Production of pomegranate in India	108
2.5	*Amorphophalluspaeoniifolious*plant and tuber	112
2.6	*Trigonellafoenum-graecum*plant and seeds	116
2.7	*Linumusitatisimum*plant and seeds	120
2.8	Estrogen signaling pathways: 1) Genomic ER pathway, 2) membrane bound ER pathway, 3) GPER pathway	122
2.9	Transcription action by liganded SRs.	123
2.10	Nongenomic effects of estrogen action via G protein-coupled receptors (GPCRs)	125
2.11	Signaling pathways for phytoestrogen activity in mesenchymal stem cells (MSCs)	128
2.12	Comparison of analytical methods for analysis of	131

	Phytoestrogen	
3.1	Experimental design for Phase I	144
3.2	Experimental design for Phase II	147
3.3	Oven dried seeds of a) Flaxseeds b) Pomegranate c) Elephant foot yam d) Fenugreek	148
3.4	Experimental design for Phase III	152
3.5	Instruments used for (a) Filtration of solvents (b) HPLC analysis	163
3.6	Process of HPLC analysis (Technical support by a Lab technician in HPLC analysis)	163
3.7	Home visits during data collection	164
3.8	A valuable supporters of the study – women participants	164
3.9	Nutrition and physical health education	165
3.10	Community outreach – distribution of booklet "Menopause and its management"	165
4.1	Distribution of subjects based on their Education and menopausal status	168
4.2	Menopausal stage of subjects with respect to their profession	168
4.3	Distribution of subjects based on the number of children along with their menopausal stage	170
4.4	Distribution of population based on the number of pregnancy undergone by the women	170
4.5	Self reporting medical history of population along with their menopausal stage	171
4.6	Distribution of population based on knowledge and their menopausal stage	174
4.7	Perceptions of the population for menopausal symptoms (n=1000)	175
4.8	Perceptions of the population for thyroid symptoms (n=1000)	176
4.9	Percent prevalence of menopausal symptoms in premenopausal women	183
4.10	Percent prevalence of menopausal symptoms in perimenopausal women	186
4.11	Percent prevalence of menopausal symptoms in postmenopausal women	190
4.12	Distribution of MRS across menopausal phases	197
4.13	Pair wise comparison: Score of Psychological Symptoms across menopausal stages	199

4.14	Pair wise comparison: Score of Somato-vegetative Symptoms across menopausal stages	200
4.15	Pair wise comparison: Score of Urogenital Symptoms across menopausal stages	201
4.16	Calibration curves for phytoestrogen standard solutions	205-206
4.17	HPLC chromatogram for standard solutions	208-210
4.18	HPLC chromatogram for phytoestrogen estimation from Elephant foot yam: a) without hydrolysis and b) after alkaline hydrolysis	214
4.19	HPLC chromatogram for phytoestrogen estimation from Pomegranate seeds: a) without hydrolysis and b) after alkaline hydrolysis	215
4.20	HPLC chromatogram for phytoestrogen estimation from Fenugreek seeds: a) without hydrolysis and b) after alkaline hydrolysis	216
4.21	HPLC chromatogram for phytoestrogen estimation from Flaxseeds: a) without hydrolysis and b) after alkaline hydrolysis	217
4.22	Estimated phytoestrogen components and content in all four food samples	219
4.23	Role of Wnt and Sirt1 signalling pathways in repressing adipognesis	231
4.24	Effect of Intervention on MRS	242
4.25	Post intervention changes in distribution of MRS – amongst experimental (EG1 & EG2) and control (CG) groups	243
4.26	Post intervention changes in distribution of P (Psychological) score – amongst experimental (EG1 & EG2) and control (CG) groups	244
4.27	Post intervention changes in distribution of S (Somato-vegetative) score – amongst experimental (EG1 & EG2) and control (CG) groups	244
4.28	Post intervention changes in distribution in U (Urogenital) score – amongst experimental (EG1 & EG2) and control (CG) groups	245
4.29	Effect of intervention on knowledge level - amongst experimental (EG1 and EG2) and control (CG) groups	254
4.30	Percent responses for symptoms of thyroid	256
4.31	Consumption pattern of major phytoestrogen rich foods in EG1 (Before intervention)	262
4.32	Consumption pattern of major phytoestrogen rich foods in EG1 (After intervention)	262
4.33	Consumption pattern of major phytoestrogen rich foods in	263

	EG2 (Before Intervention)	
4.34	Consumption pattern of major phytoestrogen rich foods in EG2 (After Intervention)	263
4.35	Consumption pattern of phytoestrogen rich foods in CG (Before Intervention)	264
4.36	Consumption pattern of phytoestrogen rich foods in CG (After Intervention)	264
4.37	Consumption frequency of selected Iron rich foods in EG1 (Before intervention)	265
4.38	Consumption frequency of selected Iron rich foods in EG1 (After intervention)	265
4.39	Consumption frequency of selected Iron rich foods in EG2 (Before intervention)	266
4.40	Consumption frequency of selected Iron rich foods in EG2 (After intervention)	266
4.41	Consumption frequency of selected Iron rich foods in CG (Before intervention)	267
4.42	Consumption frequency of selected Iron rich foods in CG (After intervention)	267
4.43	Consumption pattern of major Iodine rich foods in EG1 (Before intervention)	268
4.44	Consumption pattern of major Iodine rich foods in EG1 (After intervention)	268
4.45	Consumption pattern of major Iodine rich foods in EG2 (Before intervention)	269
4.46	Consumption pattern of major Iodine rich foods in EG2 (After intervention)	269
4.47	Consumption pattern of major Iodine rich foods in CG (Before intervention)	270
4.48	Consumption pattern of major Iodine rich foods in CG (After intervention)	270
4.49	Overview of a booklet - “Menopause-and Its Management”	274-278