APPENDIX – I
INTERVIEW SCHEDULE TO ELICIT INFORMATION ON
SOCIOECONOMIC AND OTHER DETAILS

A. SOCIO-ECONOMIC PROFILE

1. Name :
2. Residential Address :
3. Age in years :
4. Educational qualification :
   Illiterate Primary Secondary
   Higher Secondary Graduate
5. Occupation : Yes No
   If Yes, indicate the type of occupation.
   Profession Employed Self employment Others
6. Marital status : Married Unmarried
7. Type of the family : Nuclear Joint
8. Total income of the family :
   Rs.3,301 – Rs.7,300 Rs.7,301 – 14,500 Rs.≥14,501
9. Monthly expenditure pattern

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Items</th>
<th>Rupees spent</th>
<th>Percentage of income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Food</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clothing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>House rent</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other services</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Savings</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recreation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
B. **LIFE STYLE PATTERN**

10. Do you drink coffee / tea ?
    Yes        No
    If yes, No of cups / day :  < 2    2 – 4    > 4

11. Do you have the habit of chewing ?   Yes      No
    If yes, No. of time / day :
    Tobacco    Betal leaves + chunna    Supari

12. Do you have the habit of doing exercise regularly ?
    Yes        No
    If yes, indicate the type and duration of exercise.
    Outdoor    In presence of sunlight

13. Do you practise yoga / meditation ?
    Yes        No
    If yes, Indicate the type and duration.

14. How many hours do you sleep daily ?
    < 6 hours    6-8 hours    > 8 hours

15. What sort of life do you spend ?
    a. relaxed    b. familial stress    c. occupational stress
    d. Under both familial and occupational stress

16. How do you spend your leisure time ?
    Reading books    Watching T.V    Hearing music
    Others

C. **FOOD CONSUMPTION PATTERN**

17. Are you a :
    Vegetarian    Non-vegetarian    Ova-vegetarian

18. Number of meals consumed per day.
    2 meals    3 meals    Above 3 meals
19. Do you avoid any foods? If yes give reasons.

<table>
<thead>
<tr>
<th>Foods</th>
<th>Reasons</th>
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<tbody>
<tr>
<td>Avoided</td>
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</tr>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

20. How often do you consume the following foods

**Calcium rich foods**

<table>
<thead>
<tr>
<th>Food items</th>
<th>Daily</th>
<th>Monthly</th>
<th>Rarely</th>
<th>Not at all</th>
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</tbody>
</table>

21. Vitamin D rich foods

<table>
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<th>Food items</th>
<th>Daily</th>
<th>Weekly</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
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</tbody>
</table>
22. How often do you eat from outside?
   Not at all
   Weekly once
   Once in a fortnight
   Once in a month

23. Do you eat fast foods?
   Yes
   No
   If Yes,
   Weekly once
   Weekly twice
   Once in a fortnight
   Once in a month

24. Which food do you generally eat in fast food centers?
   a.
   b.
   c.
   d.

25. Do you consume any supplements?
   Vitamins
   Minerals
   others eg. horlicks boost etc., ...............
   Any other, specify ________________________

D. ANTHROPOMETRIC MEASUREMENTS
   Height (cm)
   Weight (kg)
   Body Mass Index (BMI)
   Waist circumference (cm)
   Hip circumference(cm)
   Waist hip ratio (WHR)
   Bio chemical assessment
   Haemoglobin level (g/dl)
   Serum calcium (mg/dl)
   Bio physical assessment
   Blood Pressure
   Bone Mineral Density (BMD)
E. DETAILS REGARDING HEALTH STATUS

26. Do you have any nutritional deficiency symptoms?

<table>
<thead>
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<th>Deficiency symptoms</th>
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</tbody>
</table>

27. Did you suffer from any of the following common ailments within six months?

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<tr>
<th>S.No.</th>
<th>Illness</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>1.</td>
<td>Cold</td>
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<tr>
<td>2.</td>
<td>Fever</td>
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<td>3.</td>
<td>Diarrhea</td>
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<tr>
<td>4.</td>
<td>Measles</td>
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<tr>
<td>5.</td>
<td>Allergy</td>
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<tr>
<td>6.</td>
<td>Jaundice</td>
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<tr>
<td>7.</td>
<td>Any other</td>
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</table>

28. Do you have any thyroid problems? Yes No

If Yes, mention the type
29. Do you suffer from any of the following chronic diseases?
   Yes   No
   If Yes, duration____________

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Disease</th>
<th>Yes</th>
<th>No</th>
<th>Duration</th>
<th>Medications</th>
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<tbody>
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<td>1.</td>
<td>Diabetes mellitus</td>
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<tr>
<td>2.</td>
<td>Stroke</td>
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<tr>
<td>3.</td>
<td>Hypertension</td>
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<tr>
<td>4.</td>
<td>Kidney Stones</td>
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<tr>
<td>5.</td>
<td>Asthma</td>
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<tr>
<td>6.</td>
<td>Arthritis</td>
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<tr>
<td>7.</td>
<td>Hyperthyroidism</td>
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<td>8.</td>
<td>Stomach ulcer</td>
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</table>

30. Do you have any of the following symptoms?

<table>
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<th>S.No.</th>
<th>Symptoms</th>
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<td></td>
<td>Joint pain</td>
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</tr>
<tr>
<td></td>
<td>Leg pain</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Back pain</td>
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<td></td>
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<tr>
<td></td>
<td>Neck pain</td>
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<tr>
<td></td>
<td>Difficulty in walking</td>
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<tr>
<td></td>
<td>Difficulty in standing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Difficulty in bending</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fatigue / lassitude</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

31. Do you take any of the following treatment for pain?
   Naturopathy   Allopathy   Siddha   Ayurvedic
32. Did any of your family members suffer from osteoporosis problem?
   Father               Grand Father
   Mother               Grand Mother               Others

33. Age at puberty
   < 13 years           13 years           > 13 years

34. What are the menstruation problems you faced during menstruation.
   Menorrhagia (excessive bleeding)
   Dysmenorrhea (Painful menstruation)
   Emotional disturbance
   Oligomenorrhea (Irregularity of periods)
   Physical discomfort
   Other problems....

35. Age at marriage :

36. Age at first pregnancy :

37. Number of children :

38. Age at menopause :

39. The problems faced during premenopausal period?
   Excessive bleeding       Extreme tiredness       Hot flashes
   Irregular menstruation   Sleep disorder
   Emotional disturbance   Infections

40. Do you face any problem after menopause?
   Yes                      No
   If Yes, indicate
   Hot flashes               Insomnia                Nervousness
   Extreme tiredness        Excitability             Frequent urination
   Mental depression        Fatigue / Apathy        Palpitation of heart
APPENDIX – II

BONE DENSITOMETRY PROCEDURE
(ULTRA SOUND METHOD)

Principle:
Bone density testing is a good way to determine whether one has any age-related bone loss and if so, the extent of it. It’s a great tool for assessing the risk of osteoporosis and bone loss.

Ultrasound is one of the portable techniques that is used to examine structures inside the body. Sound waves of extremely high frequency, inaudible to the human ear, are beamed into the body. The echoes of reflected sound, or the rate and path of transmission of the sound, are used to build up an electronic image or measurement of the structure being examined. Ultrasound does not use radiation.

Portable and relatively inexpensive ultrasound machines have been developed, which are designed to look at bone structure and strength, usually of the heel bone (calcaneus), wrist or finger. They measure the speed of the ultrasound wave through the bone or the absorption of the beam is measured. The measurement is referred to as quantitative ultrasound to distinguish it from ultrasound used for imaging body structures.

Heel ultrasound is useful in predicting osteoporotic fracture risk in men and women around the time of the menopause and adults. A heel ultrasound is a simple and painless procedure, taking a few minutes. In some machines, the heel is placed into a small water bath machine. In others, gel is applied to both sides of the heel, before

Procedure:
The measurement is taken through the heel bone using ultrasound (sound waves) rather than radiation (x-ray). Primarily clean the surface of the coupling pad with an alcohol and apply enough gel. Then clean both sides of patient’s heel with an alcohol pad and apply the gel. Avoid this if specific wound or cut persists in heel. Gel is applied to both sides of the heel, before
the individual place the foot in the ultrasound machine. The procedure is quick, painless and non-invasive. The precise measurement has been accomplished with heel temperature, compensation of speed measurement and assisted by a height adjustable footplate to accurately align a different size heel to the optimized position of the measuring device. Measuring procedure is very simple, apply gel to a standoff and position the foot, align the cylinder then press start key. Within 10 seconds, result is printed out from onboard printer and displayed on a LCD. Because the size and weight are so small, it can be carried to any place for measurement.

While it is connected to PC with an optional data management software installed, remote operation and management of database for measured data is available. A report about the individual bone quality and risk of fracture, along with advice on how to prevent or halt the onset of osteoporosis is received. The heel bone is very similar to the bone in the hip. It is also easy to get to the heel, the procedure is quick and it will usually cost less than the traditional x ray method.

Bone Mineral Density Testing Procedure

![Bone Mineral Density Testing Procedure Diagram]

Correct Position

Wrong Position
BMD test paper is attached for reference
APPENDIX III

Scorecard for Sensory Evaluation

ACCEPTABILITY TEST – HEDONIC SCORES

<table>
<thead>
<tr>
<th>Judge Name</th>
<th>Product name</th>
<th>Attribute</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Score</th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 3</th>
<th>Sample 4</th>
<th>Sample 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like extremely</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Like very much</td>
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<tr>
<td>Like moderately</td>
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<td>Like slightly</td>
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<td></td>
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<tr>
<td>Neither like nor dislike</td>
<td>5</td>
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<td></td>
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<tr>
<td>Dislike slightly</td>
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<tr>
<td>Dislike moderately</td>
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<tr>
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Comments: ________________________________________________________

ACCEPTABILITY TEST – HEDONIC SCORES

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Comments: ________________________________________________________
### ACCEPTABILITY TEST – HEDONIC SCORES

**Judge Name** : 
**Product name** : 
**Attribute** : Texture

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Comments: __________________________________________________________

### ACCEPTABILITY TEST – HEDONIC SCORES

**Judge Name** : 
**Product name** : 
**Attribute** : Flavour

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Comments: __________________________________________________________

### ACCEPTABILITY TEST – HEDONIC SCORES

**Judge Name** : 
**Product name** : 
**Attribute** : Appearance

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</table>

Comments: __________________________________________________________
APPENDIX IV

Avinashilingam Deemed University for Women
Coimbatore - 641 043, Tamil Nadu, India

Certificate of Appreciation

This is to certify Mrs. D. Radha, Assistant Professor, Department of Nutrition, Avinashilingam Deemed University for Women, Coimbatore.

She was a participant of the Workshop “PATH FINDER - EXPERIMENT, ELUCIDATE RESEARCH” held on December 22nd & 23rd, 2010 at Avinashilingam Deemed University for Women, Coimbatore.

Coimbatore.

G. P. Jayanthi
Convenor, Professor of Biochemistry

Dr. Sheela Ramachandran
Vice-Chancellor

Dr. Gowri Ramakrishnan
Registrar
Pondicherry University
(A Central University)
Puducherry

University Grants Commission
ACADEMIC STAFF COLLEGE

UGC Sponsored All India Workshop on Research Methodology for Research Scholars

Certificate of Participation

This is to certify that D. Radhapriya, Research Scholar in Food Science & Nutrition, Annamalai University, participated in the All India Workshop on Research Methodology for Research Scholars held from 04-08-2011 & 05-08-2011.

Prof. S. Hariharan
Director

Prof. J.A.K. Tareen
Vice-Chancellor
Certificate of Participation

This is to certify Mrs. / Ms. E. Madhulika, Dr. & Post Time Scholar of Department of Social Sciences and Nutrition, was a participant of Research Convention "Research Ethics & Post Research Perspectives" on August 10th & 11th, 2011 at Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore.

Dr. P. Santhanakrishnan
Director (Research & Consultancy)

Dr. R. Parvatham
Dean, Faculty of Science
INTERNATIONAL SYMPOSIUM
ON
FUNCTIONAL FOODS AND HEALTH
(ISFAH - 2011)
Certificate

This is to certify that Dr. / Mr. / Ms. / Mrs. D. Radhakrishya, Ph.D. Scholar, Dept. of Food Science, has participated as delegate / lead speaker / poster judge / poster presenter in the International Symposium on Functional Foods and Health organized by the Department of Food Science, Periyar University, Salem, Tamil Nadu, India on 19th November 2011.

Title of the Paper: Functional Food Ingredients In Improving Bone Health

Sponsored by

Convener of the Conference
Registrar
Vice Chancellor
This is to certify that Mrs. / Ms. Radhapriya D Ph.D Scholar,
of Department of Food Science & Nutrition was a participant of the Research Convention titled "Research Ethics & Post Research Methods" held during 13th to 15th September 2012 at Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore.

Dr. R. Parvatham
Dean, Faculty of Science

Dr. Gowri Ramakrishnan
Registrar
Narayana Medical College
Nellore - Andhra Pradesh
1st National Conference on Micronutrients

This is to certify that Dr. Radha Prinya
has delivered a guest lecture/presentation at the 1st National Conference on Micronutrients, held at Narayana Medical College, Nellore on 12th June, 2012.

Dr. S. Srinivasan
President - Organizing Committee

Dr. B. A. Narasimha
Principal

Dr. M. Veera Prasad
Org. Secretary
NUTRITION SOCIETY OF INDIA
National Institute of Nutrition Campus, Hyderabad-500 007

44th National Conference
Theme: Current Trends in Food Security to Meet National Nutritional Challenges
16 - 17 November, 2012
Organized by
NSI Tirupati Chapter, Dept. of Home Science, SV University, Tirupati

This is to certify that

D. RADHAPRIYA

has been awarded the Dr. K. SEETHARAM BHAT MEMORIAL PRIZE for the best poster presentation during the 44th National Conference of the Nutrition Society of India held at Sri Venkateswara University, Tirupati.

Title of poster: "Incidence of Osteopenia & Osteoporosis Among Selected Women in Coimbatore District."

President
This is to certify that Dr./Mr./Mrs./Ms. [Name] has participated/presented paper on "Dietary habits and lifestyle pattern of women" in the Symposium on "Access and Participation of Women and Girls to Nutrition & Health, Education & Training, Science & Technology" held on 13th-14th March 2014 at Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu.

[Signature]
Director
Women's Studies Centre

[Signature]
Registrar

[Signature]
Vice Chancellor
To
Ms. Radhapriya D
Department of Food Science and Nutrition
Avinashilingam Institute for Home Science and Higher Education for Women
Coimbatore – 641 043

Dear Madam,

Ref : Our letter dt. 21st February 2014 in response to your proposal No. AUW.IHEC.2013:35 entitled “Bone mineral health of women of different ages and impact of intervention strategies”

With reference to the above letter, in continuation with the documents submitted by you in support of your proposal and the revisions made in the work plan, as per the suggestions made by the IHEC, the Institutional Human Ethics Committee of our University hereby grants approval to your research proposal No.AUW.IHEC.2013:35 entitled “Bone mineral health of women of different ages and impact of intervention strategies”. The Approval number for the same is AUW/IHEC-13-14/FHP-08.

We wish you all the best in your research endeavours.

Regards,

Dr.P.R.Padma
Member Secretary
APPENDIX V

QUESTIONNAIRE TO ELICIT NUTRITION KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) AMONG THE SUBJECTS

1. Which nutrient is essential for bone health?

2. Which vitamin helps in making healthy and strong bones?
   a. Vitamin D   b. Vitamin K  c. Vitamin C  d. Vitamin A

3. Among the following cereals which is a good source of calcium?

4. Green leafy vegetables are rich in __________
   a. Proteins   b. Vitamins   c. Fat        d. Calories

5. Milk and milk products help in providing __________

6. Osteopenia is caused due to __________
   a. Increased energy intake  b. Poor calcium intake
   c. Intake of more fats     d. Intake of more cereals

7. Why you should include dairy products in the diet?

8. Which of the following food contains high calcium?

9. Which of the following food contains high calcium?
   a. Calories b. Vitamin D c. Fibre    d. Vitamin B
11. How can you improve bone health?
   a. Exercise   b. Nutritious diet   c. Food supplements   d. All the above

12. What is osteoporosis?
   a. Joint pain   b. Increased body weight   c. Weak and fragile bone
   d. Physical inactivity

13. What are the signs and symptoms of osteoporosis?

14. What is the sign of bone weakness and diseases?
   a. Fracture risk   b. Swelling   c. Joint pains   d. All the above

15. What would be the reason for bone problems?
   a. Family history   b. Menopause   c. Lack of exercise   d. All the above

16. Do smoking and alcohol habits related to osteoporosis?
   a. No   b. Yes   c. Might be   d. No idea

17. At what stage a women’s bone become more weak?
   a. At puberty   b. Adulthood   c. After menopause   d. Pregnancy

18. How much calcium per day is recommended for adults?
   a. 500 mg   b. 1000 mg   c. 200 mg   d. 400 mg

19. Soya, badam and groundnuts are a good source of which nutrient?

20. Which type of exercise is not recommended for osteoporosis?

21. Early menopause may cause__________
   a. Anaemia   b. Dental problems   c. Bone diseases   d. Allergy
22. Weight bearing exercises leads to ________

23. Which nutrient combination is essential for skeletal strength?
   d. Vitamin K & Fat

24. In a human body the calcium content is approximately ________
   a. 500 mg    b. 750 g    c. 2 kg    d. 1 kg

25. Prolonged periods of immobility increases the risk of ________
Publications