ANNEXURE 1: CONSENT FORM FOR THE STUDY

Prevalence of vitamin-D deficiency and determinants of vitamin-D status among free-living adult population

I ___________________________ have been fully informed about the purpose of study titled “Prevalence of vitamin-D deficiency and determinants of vitamin-D status among free-living adult population (30-60 years) of Vadodara city”

I have understood the implications of the study and I am willing to participate in the study.

Following Bio-Chemical estimations will be done:

1. Blood haemoglobin
2. Fasting Blood Glucose
3. HbA1c
4. hs-CRP
5. Liver profile
6. Lipid profile
7. Kidney profile
8. Serum TSH, T4, T3
9. Vitamin D & Calcium

Protocol for the Study

1. Blood (10 ml) will be drawn once in fasting state, i.e., after a fast of more than 8 to 10 hours.
2. The blood will be drawn by lab technician.
3. Disposable syringes and needles will be used.
4. A copy of report will be provided to you for your future use.

The information that is collected will be kept confidential and no personal information will be revealed to anyone. No remuneration will be provided to the participants to become a part of the study.

_________________________________   __________________________________
Signature of Investigator                Signature of the participant
ANNEXURE 2: CONSENT FORM FOR THE STUDY
‘Effect of Vitamin D Supplementation on Vitamin D status and Cardio-metabolic profile of Subjects with Type II Diabetes Mellitus’

Study Title

‘Effect of Vitamin D Supplementation on Vitamin D status and Cardio-metabolic profile of Subjects with Type II Diabetes Mellitus’ is a randomised control trial to be carried out on confirmed diabetic patients with serum vitamin D levels below 20ng/ml.

Principal Investigator

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Akota, Vadodara
(C) 0265 2330208

Person in-charge for collection of information

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Doctoral Student, Department of Foods & Nutrition
Faculty of Family & Community Sciences
M S University of Baroda, Vadodara
(M) 9979895313

Purpose of the study

Diabetes mellitus is one of the main non-communicable chronic diseases and vitamin D deficiency is also recognised as a public health problem around the world. A high prevalence of vitamin D deficiency is reported among the type-2 diabetic subjects. Thus a need is felt to frame vitamin D intervention study and see its effect on improvement of serum vitamin D levels among the diabetic subjects and bring about a positive change in their cardio-metabolic profile to improve the quality of life. The study proposes to provide you vitamin D supplements (granules) in dosage of 60,000 IU to be consumed per week for a period of 2 months.

Benefits and risks

The study will show the extent to which serum vitamin D levels are raised by supplementation (60,000 IU once a week for 2 months) and whether optimal vitamin D status plays a vital role to positively alter the cardio-metabolic profile among the diabetic subjects. By participating in the study you will also know the changes in your vitamin D, glycemic and lipemic status as a copy of the blood reports will be handed over to you after the supplementation.

There is no risk involved as the drawing of blood will be carried out by a trained lab technician and the estimations will be done at an authorised accredited lab. The dose of vitamin D supplementation provided is under the guidance of an experienced
endocrinologist, who will be available in any case of extreme condition if experienced by the subject.

**Protocol of the study**

1. You will be asked to provide information regarding medical and family history of lifestyle diseases, details of your dietary and physical activity patterns with the help of a questionnaire.
2. Your body measurements (weight, height, waist & hip circumference, body fat and blood pressure) will be taken to assess your nutritional status.
3. You will be provided a sachet of vitamin D granules (60,000 IU) once a week for 2 months which has to be dissolved in a glass of water and consumed.
4. 10ml blood in fasting state will be drawn by a trained laboratory technician at the end of 8 weeks and 16 weeks to estimate the following parameters:
   - HbA1c, hs-CRP, Lipid profile (TC, TG, LDL, HDL, VLDL)
   - Kidney profile, Liver profile and Serum vitamin D

**Costs**

The tests, procedures and visits that are a part of this study will cost only your time and travel. There is no financial compensation for your participation in this research, as all the costs incurred on blood tests and vitamin D supplements will be borne by the investigator. You will not be paid for being in this study.

**Confidentiality**

Your identity in this study will be treated as confidential. Your personal information will not be revealed in any publication or release of results. But the results of the study, including laboratory or any other data, may be published for scientific purposes. If a health condition is detected during this examination, you will be told about it and the information will be given to your doctor or clinic.

**Voluntary Consent**

Your decision to join in this study is voluntary. You may quit at any time, for any reason, without notice. If you have any questions about any part of the study or your rights as a volunteer, the person in-charge for collection of information will be on hand to answer them before you sign this consent form.

A clearance from the Institutional Ethics Committee of experts has been procured for the study, which will be later reviewing the study results to see if there are clear associations between the conditions.

**Participant’s statement**

I certify that I have read, or had read to me, and that I understand the description of the study. I voluntarily consent to join in this study.

Signature ___________________________                  Date ______________
ANNEXURE 3: Prevalence of vitamin-D deficiency and determinants of vitamin-D status among free-living adult population

CODE NO: ____________ DATE: ____________

BACKGROUND INFORMATION
1. Name:
2. Age:
3. Sex: a) male  b) female
4. Address:
5. Contact no.: (M) (R)
7. Educational level: a) Illiterate d) Graduate b) Primary e) Post graduate c) Secondary f) Others d) Higher secondary
10. Type of family: a) Nuclear b) Joint c) Extended
11. No. Of family members:
12. Total family income (monthly): PCI:
13. Menopausal status (for women subjects)

FAMILY HISTORY:

<table>
<thead>
<tr>
<th>Type</th>
<th>Mother</th>
<th>Father</th>
<th>Sibling 1</th>
<th>Sibling 2</th>
<th>Sibling 3</th>
<th>Grandparents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity</td>
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<tr>
<td>Diabetes</td>
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<td>Hypertension</td>
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<td>CHD</td>
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<td>Hyperlipidemia</td>
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<td>Stroke</td>
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<tr>
<td>Hypo/Hyperthyroidism</td>
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<td>Asthma</td>
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<tr>
<td>Cancer</td>
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<tr>
<td>Any other (Specify)</td>
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</tbody>
</table>

MEDICAL HISTORY:
1. Do you go for regular general health checkups? a)Yes  b) No
2. If yes, How often?

3. Present medical problems

<table>
<thead>
<tr>
<th>Sr. N</th>
<th>Medical problem</th>
<th>Date of diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hypertension</td>
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<tr>
<td>2</td>
<td>CHD</td>
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<tr>
<td>3</td>
<td>Hyperlipidemia</td>
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<tr>
<td>4</td>
<td>Stroke</td>
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<td>5</td>
<td>Hypo/Hyperthyroidism</td>
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<tr>
<td>6</td>
<td>Asthma</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cancer</td>
<td></td>
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<tr>
<td>8</td>
<td>Rheumatoid arthritis</td>
<td></td>
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<tr>
<td>9</td>
<td>Osteoporosis/Osteopenia</td>
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<tr>
<td>10</td>
<td>Other, specify:</td>
<td></td>
</tr>
</tbody>
</table>

4. Are you taking any medication presently?
   a) Yes  b) No

If yes specify:

<table>
<thead>
<tr>
<th>Name of drug</th>
<th>Dosage</th>
<th>Frequency</th>
<th>Date started</th>
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</table>

5. Any kind of nutritional supplements taken:
   a) Yes  b) No

If yes, specify:

<table>
<thead>
<tr>
<th>Type of supplement</th>
<th>Dosage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

6. Did you have any fractures in your life?
   a) Yes  b) No

7. If yes, please specify:
   a) No. of fractures:
   b) Site:
   c) Age at which fracture occurred:

8. Significant past illness

<table>
<thead>
<tr>
<th>Illness</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

9. Past surgery

<table>
<thead>
<tr>
<th>Type of surgery</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
LIFE STYLE:

General habits:

<table>
<thead>
<tr>
<th>Sr. N</th>
<th>Type</th>
<th>Currently (Frequency)</th>
<th>Past (Frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tobacco</td>
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<td></td>
<td>Pan</td>
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<td>Patiki</td>
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<td>Gutka</td>
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<td></td>
<td>Patti</td>
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<td>Cheekni</td>
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<td></td>
<td>Bidi</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>Cigarette</td>
<td></td>
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</tr>
</tbody>
</table>

If in past, give the reason of giving up habits:

4. What is the skin type (observe):
   a) Fair  b) Wheatish  c) Dark

5. Between 10-3pm how often do you go out and for how long:
   a) Duration:
   b) Frequency:

6. Do you use sunscreen?
   a) Yes  b) No

7. If, yes then specify the duration and frequency:

<table>
<thead>
<tr>
<th>Name of sunscreen</th>
<th>Frequency</th>
<th>Duration</th>
<th>SPF</th>
</tr>
</thead>
</table>

8. What type of clothing do you prefer to wear when you go out?

DIETARY HABITS

1. What type of diet do you take?
   a) Vegetarian  b) Non vegetarian  c) Ovo-vegetarian

2. Type of cooking oil purchased:

3. Quantity of cooking oil used per month/ per year:

4. Do you use the same type of oil for the whole year?
   a) Yes  b) No

5. If no, duration of changing:

6. How do you use the oil which remains after deep frying?
   a) Again use it for deep frying some other day
   b) Use it in preparing vegetables
   c) Discard it

7. Which milk do you generally use?
   a) Cow  b) Buffalo  c) Packed (specify)  d) Other

8. Number of cups of tea per day

9. Number of cups of coffee per day

10. Brand of salt purchased

11. Quantity of salt purchased in a month:

12. Quantity of sugar purchased per month:
Frequency of consuming the following foods:

<table>
<thead>
<tr>
<th>Milk &amp; Fats</th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Never</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
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<tr>
<td>Curd</td>
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<tr>
<td>Cheese</td>
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<tr>
<td>Paneer</td>
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<td>Lassi/Chas</td>
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<tr>
<td>Butter</td>
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<td>Pure ghee</td>
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<td>Meat &amp; its products</td>
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<tr>
<td>Egg</td>
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<tr>
<td>Fish</td>
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<tr>
<td>Mutton</td>
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<tr>
<td>Chicken</td>
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<tr>
<td>Liver</td>
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<tr>
<td>Kidney</td>
<td></td>
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</tbody>
</table>

ANTHROPOMETRY:
Weight (kg): ____________________
Height (cm): ____________________
Waist Circumference (cms): ___________
Hip circumference (cms): ___________
WHR: __________ WSR: __________ BMI: __________
Body Fat %: ________ BMR: __________
Blood Pressure: Systolic BP (mm of Hg): ________ Diastolic BP (mm of Hg): ________

24 HOUR DIETARY RECALL (one day)

<table>
<thead>
<tr>
<th>Meal time</th>
<th>Name of the foodstuff</th>
<th>Ingredients</th>
<th>Raw weight (g)</th>
<th>Cooked volume (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
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<td>Mid morning</td>
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<tr>
<td>Lunch</td>
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<tr>
<td>Evening tea</td>
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<tr>
<td>Dinner</td>
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</table>
INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE
We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the last 7 days.

1. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?
   
   _____ days per week

   No vigorous physical activities

   Skip to question 3

2. How much time did you usually spend doing vigorous physical activities on one of those days?
   
   _____ hours per day _____ minutes per day

   Don’t know/Not sure

3. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.
   
   _____ days per week

   No moderate physical activities

   Skip to question 5

4. How much time did you usually spend doing moderate physical activities on one of those days?
   
   _____ hours per day _____ minutes per day

   Don’t know/Not sure

5. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?
   
   _____ days per week

   No walking

   Skip to question 7

6. How much time did you usually spend walking on one of those days?
   
   _____ hours per day _____ minutes per day

   Don’t know/Not sure

7. During the last 7 days, how much time did you spend sitting on a week day?
   
   _____ hours per day _____ minutes per day

   Don’t know/Not sure

This is the end of the questionnaire, thank you for participating.
SHORT LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised August 2002.
ANNEXURE 4: Vitamin D status in type II diabetes mellitus

CODE NO: __________
DATE: ____________

BACKGROUND INFORMATION

11. Name:
12. Age:
13. Sex: a) male b) female
14. Address:

15. Contact no.: (M) (R)
16. Religion:
   g) Hindu
   h) Muslim
   i) Sikh
   j) Christian
   k) Jain
   l) Other
17. Educational level:
   h) Illiterate
   i) Primary
   j) Secondary
   k) Higher secondary
18. Marital status:
   e) Unmarried
   f) Married
   g) Divorcee
   h) Widow/widower
19. Occupation:
   g) Unemployed
   h) Unskilled labour
   i) Housewife
   j) Service (Specify)
   k) Business
   l) Retired
20. Type of family:
   b) Nuclear
   c) Joint
   d) Extended

11. No. of family members:
12. Family Income (monthly): Rs.
13. Per capita income: Rs.
14. Menopausal status (only for women patients):

FAMILY HISTORY:

<table>
<thead>
<tr>
<th>Type</th>
<th>Mother</th>
<th>Father</th>
<th>Sibling 1</th>
<th>Sibling 2</th>
<th>Sibling 3</th>
<th>Grandparents</th>
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<tbody>
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<td>Obesity</td>
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<td>Diabetes</td>
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<td>Hypertension</td>
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<td>Stroke</td>
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<td>Hypo/Hyperthyroidism</td>
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<tr>
<td>Asthma</td>
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<tr>
<td>Any other (Specify)</td>
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</tbody>
</table>

MEDICAL HISTORY:

1. How often do you go for regular general health checkups?
2. Present medical problems

<table>
<thead>
<tr>
<th>Sr. N</th>
<th>Medical problem</th>
<th>Date of diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Obesity</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Diabetes</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Hypertension</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Chronic Heart Disease</td>
<td></td>
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<tr>
<td>5</td>
<td>Hyperlipidemia</td>
<td></td>
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<td>6</td>
<td>Stroke</td>
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<td>7</td>
<td>Hypo/Hyperthyroidism</td>
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<td>8</td>
<td>Cancer</td>
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<td>9</td>
<td>Asthma</td>
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<td>10</td>
<td>Rheumatoid arthritis</td>
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<tr>
<td>11</td>
<td>Osteoporosis/Osteopenia</td>
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<tr>
<td>12</td>
<td>Other, specify:</td>
<td></td>
</tr>
</tbody>
</table>

**Information regarding Diabetes Mellitus**

i. Duration of disease: _________

ii. Precipitating factors:
   a) Emotions  
   b) Surgery  
   c) Infections  
   d) Pregnancy  
   d) Trauma
   Others (specify)

iii. Symptoms
   1) Polyuria (freq urination)  
   2) Polydipsia (↑thirst)  
   3) Polyphagia (↑ hunger)  
   4) Neuropathy (loss of sensation)  
   5) Fatigue  
   6) Unexplained loss of weight  
   7) Retinopathy (blurred vision)  
   8) Slow healing of wounds  
   9) Oedema  
   10) Gangrene

   v. Treatment followed
   a. Diet modification ____________________________  
   b. Drugs (specific) ____________________________  
   c. Insulin (specific) ____________________________  
   d. Combination therapy (specific) ____________

**Other Information**

6. Are you taking any medication presently? 
   a) Yes  
   b) No
   If yes specify:

<table>
<thead>
<tr>
<th>Name of drug</th>
<th>Dosage</th>
<th>Frequency</th>
<th>Date started</th>
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</tbody>
</table>

7. Any kind of nutritional supplements taken: 
   a) Yes  
   b) No
   If yes, specify:

<table>
<thead>
<tr>
<th>Type of supplement</th>
<th>Dosage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Did you have any fractures in your life? 
   a) Yes  
   b) No

9. If yes, please specify: 
   a) No. of fractures: 
   b) Site:
c) Age at which fracture occurred:

10. Past surgery

<table>
<thead>
<tr>
<th>Type of surgery</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**LIFE STYLE:**

General habits:

<table>
<thead>
<tr>
<th>Sr. N</th>
<th>Type</th>
<th>Currently (Frequency)</th>
<th>Past (Frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tobacco</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pan</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patiki</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gutka</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bidi</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cigarette</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Alcohol</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If in past, give the reason of giving up habits:

6. What is the skin type (observe):
   a) Fair  b) Wheatish  c) Dark

7. Between 10-3 pm how often do you go out and for how long:
   c) Duration:
   d) Frequency:

8. Do you use sunscreen?
   c) Yes  d) No

9. If, yes then specify the duration and frequency:

<table>
<thead>
<tr>
<th>Name of sunscreen</th>
<th>Frequency</th>
<th>Duration</th>
<th>SPF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

10. What type of clothing do you prefer to wear when you go out?

**DIETARY HABITS**

1. What type of diet do you take?
   b) Vegetarian  b) Non vegetarian  c) Ovo-lactarian

2. Type of cooking oil purchased:

3. Quantity of cooking oil used per month/ per year:

4. Do you use the same type of oil for the whole year?
   a) Yes  b) No

5. If no, duration of changing:

6. How do you use the oil which remains after deep frying?
   a) Again use it for deep frying some other day
   b) Use it in preparing vegetables
   c) Discard it

7. Which milk do you generally use?
   a) Cow  b) Buffalo  d) Packed (specify)  e) Other (specify)

8. Number of cups of tea/coffee per day: ________

9. Brand of salt purchased: ___________

10. Quantity of salt purchased in a month: ___________

390
11. Quantity of sugar purchased per month: _________

12. Frequency of consuming the following foods:

<table>
<thead>
<tr>
<th></th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Never</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk &amp; Fats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curd</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheese</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paneer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lassi/Chas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pure ghee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat &amp; its products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutton</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidney</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

24 HOUR DIETARY RECALL (one day)

<table>
<thead>
<tr>
<th>Meal time</th>
<th>Name of the foodstuff</th>
<th>Ingredients</th>
<th>Raw weight (g)</th>
<th>Cooked volume (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid morning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evening tea</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dinner</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ANTHROPOMETRY:
1. Weight (kg): ____________
2. Height (cm): ____________
3. Waist Circumference (cms): ____________
4. Hip circumference (cms): ____________
5. Waist Hip ratio: ____________ WSR: ____________ BMI: ____________

BIOPHYSICAL MEASUREMENTS:
1. Body Fat %: ____________
2. BMR: ____________
3. Pulse: _______ Peripheral pulse: _______ Femoral pulse: _______
4. Blood Pressure: Systolic BP (mm of Hg): _______ Diastolic BP (mm of Hg): _______
INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the last 7 days.

1. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

   _____ days per week

   □ No vigorous physical activities

   *Skip to question 3*

2. How much time did you usually spend doing vigorous physical activities on one of those days?

   _____ hours per day _____ minutes per day

   □ Don’t know/Not sure

3. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

   _____ days per week

   □ No moderate physical activities

   *Skip to question 5*

5. How much time did you usually spend doing moderate physical activities on one of those days?

   _____ hours per day _____ minutes per day

   □ Don’t know/Not sure

5. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

   _____ days per week

   □ No walking

   *Skip to question 7*

6. How much time did you usually spend walking on one of those days?

   _____ hours per day _____ minutes per day

   □ Don’t know/Not sure

7. During the last 7 days, how much time did you spend sitting on a week day?

   _____ hours per day _____ minutes per day

   □ Don’t know/Not sure
ANNEXURE 5: Compliance sheet for vitamin-D supplementation

CODE NO: ___________    DATE: ____________

Name of the subject:

COMPLIANCE FOR VITAMIN-D SUPPLEMENTATION

Date and day of initiation:

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
<th>Week 8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Signature of the participant: _______________
Appendice 1: Nutrition Health Education Material

**Vitamin-D and Type-2 Diabetes Mellitus: A Lifestyle Management Approach**

**Know about Vitamin-D**
- Vitamin D is also called the ‘sunshine vitamin’ and is a group of fat-soluble vitamins.
- Vitamin D was discovered as the factor in cod-liver oil that prevented rickets in children in the early 20th century.
- D₃ (cholecalciferol) and D₂ (ergocalciferol) are its two major biological precursors.
- Vitamin D has now evolved as an hormone having numerous non-skeletal effects by its action to regulate up to 2000 genes.

**Major targets & actions of Vitamin D**

**Sources Of Vitamin D**

<table>
<thead>
<tr>
<th>Source</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cod liver Oil</td>
<td>400-1000 IU/trap</td>
</tr>
<tr>
<td>Egg yolk</td>
<td>20 IU/yolk</td>
</tr>
<tr>
<td>Mackerel, canned</td>
<td>250 IU/100 g</td>
</tr>
<tr>
<td>Salmon, canned</td>
<td>300-600 IU/100 g</td>
</tr>
<tr>
<td>Sardines, canned</td>
<td>300 IU/100 g</td>
</tr>
<tr>
<td>Sunlight/UVB radiations</td>
<td>3000 IU on exposure of arms &amp; legs to 0.5 Minimal Erythema Dose (MED) for 10-15 min</td>
</tr>
<tr>
<td>Fortified foods like</td>
<td>Around 100 IU per serve</td>
</tr>
<tr>
<td>breakfast cereals, milk,</td>
<td></td>
</tr>
<tr>
<td>cheese, yogurt</td>
<td></td>
</tr>
<tr>
<td>Multivitamins</td>
<td>400, 500, &amp; 1000 IU</td>
</tr>
<tr>
<td>Vitamin D3 supplements</td>
<td>400, 800, 1000, 2000, 10000, 14000 &amp; 50000 IU</td>
</tr>
</tbody>
</table>

**Classification of Vitamin D Status**

- **Toxic** >150ng/mL
- **Excessive** >100ng/mL
- **Sufficient** 30-100 ng/mL
- **Insufficient** 20-30 ng/mL
- **Deficient** <20ng/mL

Proposal for staging VDD

- **Serum 25(OH)D**
  - **Stages**
    - 10-20 ng/ml Mild VDD
    - 5-10 ng/ml Moderate VDD
    - <5 ng/dl Severe VDD

To convert ng/ml to nmol/L multiply by factor 2.5

Source: Lips, 2001 Endocrine Reviews
**T2DM: Signs and Symptoms**

- Polyuria (Frequent Urination)
- Polydipsia (Excessive Thirst)
- Polyphagia (Excessive Hunger/Increased Appetite)
- Involuntary Weight Loss
- Pain and numbness in hands or feet

**Possible complications in Type-2 Diabetes**

- Eyes (optic)
- Kidneys (renal)
- Heart (cardiovascular) and blood vessels
- Nerves (neuropathic)

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**Management: ABCD Of Diabetes**

- **A** - ALC levels
- **B** - Blood pressure
- **C** - Cholesterol levels
- **D** - Diet
- **E** - Exercise

<table>
<thead>
<tr>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;6.0</td>
<td>&lt;7.0</td>
<td>&lt;7.0</td>
</tr>
<tr>
<td>&lt;120/80</td>
<td>&lt;130/85</td>
<td>&lt;130/85</td>
</tr>
<tr>
<td>&lt;180</td>
<td>&lt;200</td>
<td>&lt;200</td>
</tr>
<tr>
<td>&lt;100</td>
<td>&lt;130</td>
<td>&lt;130</td>
</tr>
<tr>
<td>&gt;45</td>
<td>&lt;40</td>
<td>&lt;40</td>
</tr>
<tr>
<td>&gt;150</td>
<td>180</td>
<td>180</td>
</tr>
</tbody>
</table>

**Blood sugar levels**

- **Fasting Blood Sugar (FBS)**
  - Normal: <126 mg/dL
  - Borderline: 126-200 mg/dL
  - Confirmed Diabetes: >200 mg/dL

**Body Mass Index (BMI)**

- **Normal** 18.5-22.9
- **Overweight** 23-24.9
- **Obesity** >25

---

**T2DM: Modifiable risk factors**

- Body Mass Index >23
- Elevated blood pressure
- Waist measurement: men >90 cm & women >80 cm
- Inactive lifestyle
- High intake of fat
- Low intake of fruits, vegetables

**Points to remember**

- **Insulin & Medications**
- **Healthy Life with Diabetes**
- **Physical Exercise**
- **Proper Diet**

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### Dietary Guidelines

- **Carbohydrates**: 55-60% of total calories
- **Protein**: 20-25% of total calories
- **Fats**: 15-20% of total calories

#### Dietary Fibre

- Consume high fiber foods such as legumes, whole-grain products, fruits and vegetables
- Choose whole fruits more often than fruit juice
- Start the day with a whole grain breakfast cereal
- 30-40 g/day preferably from natural sources

#### Sources of Fibre

- Cereals like wheat, jowar, bajra, ragi, mojoe
- Legumes & dals like beans, lentils, peas, whole grains
- Fenugreek seeds, nuts and fruits

### Whole Grains

- Replace maida, suji with whole wheat flour, multigrain flour
- Consume at least half of all grains as whole grains, pulses

#### Grain Products to Avoid

- Maida/Suji
- White bread
- Noodles
- Biscuits / Bakery goods

#### Grain Products to Choose

- Whole wheat flour
- Whole grain / multigrain bread
- Oatmeal
- Ground Flaxseed
- Brown rice
- Barley
- Pulses

### Fats and Oils

<table>
<thead>
<tr>
<th>Type of fat</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total fat</td>
<td>Less than 10-20% of total daily calories</td>
</tr>
<tr>
<td>Saturated fat</td>
<td>Less than 7% of total daily calories</td>
</tr>
<tr>
<td>Trans fat</td>
<td>Less than 1% of total daily calories</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>Less than 200 mg/d for adults with high levels of LDL-C</td>
</tr>
</tbody>
</table>

#### Healthy Practices

- Cook with minimum oil
- Avoid foods high in trans-fats
- Avoid re-use of cooking oils
- Avoid ghee, butter, whole milk & cream in food preparation
- Cooking oil: 0.5 kg/month/person

### Proteins and Dairy Products

- Protein & body weight
- Incorporate legumes, soybean that are an excellent source of soluble fibre, plant sterols
- Choose a mix of cereals, millets, pulses
- Spread legumes
- If meat is consumed, extra lean meat should be the choice. Eat fatty fish twice at least per week if religion permits

#### Increase intake of fat-free or low-fat milk and milk products

- Use low fat milk when preparing desserts

### Oil Blends

#### Cooking Oil Combinations

- Groundnut/Seasame/Rice bran + Mustard
- Groundnut/Seasame/Rice bran + Canola
- Groundnut/Seasame/Rice bran + Soyabean
- Palmolene + Soyabean
- Safflower/ Sunflower + Palmolene + Mustard
- Sunflower / Safflower + Palmolene / Olive
- Safflower / Sunflower + Groundnut /Seasame / Rice bran
**Annexure and Appendices**

**Tips For Healthy Eating**
- Avoid/Restrict: Sugar items, use of artificial sweeteners in limited quantity
- Use Sparingly: Fermented foods, Ragi, Rice, refine flours, fats
- Use Moderately: Snacks with cereal-pulse, cereal-pulse-veg, Minimum processing and having less fat
- Use Liberally: Whole grains, Cereals-Pulses, Fruits and Vegetables

**Lifestyle changes: Sun Exposure**
- Sunlight is the most abundantly available natural source of vitamin-D
- When full body is exposed to sun, enough to induce a slight pinkness, probably between 10,000-25,000 IU of vitamin D is produced in the body.
- Cutaneous vitamin D synthesis is maximum between 10 AM-3 PM.
- Try to do daily activities like reading, gardening, exercising or housework work in sunlight.
- Avoid the use of sunscreens or covering your body with sun coats.

**Physical Exercise helps to...**
- Improve physical and mental well-being
- Keep blood glucose in control
- Improve fitness profile & thus heart health
- Reduce weight
- Minimize calcium loss

**Remember while exercising...**
1. Feet should be inspected daily (before and after exercise) for cuts, blisters and infections
2. Exercise should be avoided in extreme hot and cold weather conditions
3. The exercise program should start slowly, build up gradually
4. Include exercises that you are familiar with
5. Always carry quick acting carbohydrate to be used in the event of hypoglycemia