HIV Nutrition

By: Ms. Chintana Chaturawit
Research dietitian,
TACHIN project, TRCARC

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OUTLINES

- Relationship between Nutrition, HIV and the immune system
- Goals of Nutritional care in HIV
- Nutritional requirements for PLHIV
- Frequently asked nutritional questions by PLHIV
- Roles of Nurse in HIV Nutritional Care
  - How to screen client’s nutritional problems
  - How to easily assess client’s nutritional status
  - How to provide Nutritional education, counseling and monitoring
    - General Dietary Advice
    - Symptom Management
Relationship between Nutrition, HIV and the immune system

- Synergistic relation nutrition & HIV/AIDS

- Poor Nutrition
  (Weight loss, muscle wasting, weakness, micronutrient deficiency)

- Impaired Immune System
  (Poor ability to fight HIV and other infections)

- Increased Nutrition Needs
  (Due to malabsorption, diarrhoea and decreased food intake; and in order to address infections)

- Increased vulnerability to infections
  (Enteric infections - TB, flu - and thus faster progression to AIDS)

- HIV

Factors affecting nutritional status in PLHIV

- Health status
- Increasing Energy requirement
- Food habits and Food myths
- Food insecurity and Food budget
- Socio-economic status (SES)
- Antiretroviral Therapy (ART)
- Physical Activity Level (PAL)
- Stress
- Stigma
**Good nutritional status & HIV/AIDS**

- **Good Nutrition**
  - (good food intake, maintenance of wt. and muscle tissue, good micronutrient status)

- **Management of HIV-related Complications system**
  - (e.g. malabsorption, diarrhea, lack of appetite, weight loss)

- **Strengthening the immune system**
  - (ability to fight HIV and other infections)

- **Increased Resistance to infections**
  - (e.g. diarrhea, TB, respiratory infections)

The goals of Nutritional Care

1. Build awareness about the role of nutrition in HIV care
2. Maintain or restore healthy body weight & normal morphology
3. Preserve or restore optimal protein status
4. Prevent nutrient deficiency
5. Treat or minimize HIV or medication-related complications that interfere with either intake or absorption of nutrients.
The goals of Nutritional Care

6. Correct metabolic abnormality.
7. Support adherence to medications to achieve optimal therapeutic drug level.
8. Prolong and optimize quality of life.
9. Maintain & expand nutrition knowledge and sense of empowerment.

Keeping HIV-infected people productive, able to work, grow food and contribute to the income of their families.
The nutrition needs of HIV-infected persons depended on:

- the Health status
- the stage of disease progression
- the absence or presence of symptoms i.e. fever, diarrhea, weight loss and wasting

Nutritional requirements for PLHIV

Additional energy needed because of:

* Energy used for HIV infection and OI
* Nutrient mal-absorption
* Altered metabolism

<table>
<thead>
<tr>
<th></th>
<th>HIV Positive phase</th>
<th>Energy</th>
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</thead>
<tbody>
<tr>
<td><strong>Adults and Adolescents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>10 % increase</td>
<td></td>
</tr>
<tr>
<td>Symptomatic</td>
<td>20-30 % increase</td>
<td></td>
</tr>
<tr>
<td><strong>Children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>10 % increase</td>
<td></td>
</tr>
<tr>
<td>Symptomatic with no wt. loss</td>
<td>20-30 % increase</td>
<td></td>
</tr>
<tr>
<td>Symptomatic with wt. loss</td>
<td>50-100 % increase</td>
<td></td>
</tr>
</tbody>
</table>

Energy Requirement for HIV-infected pregnant, lactation woman and adolescent

<table>
<thead>
<tr>
<th>HIV Positive phase</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic</td>
<td>10 % increase*</td>
</tr>
<tr>
<td>Symptomatic</td>
<td>20-30 % increase*</td>
</tr>
</tbody>
</table>

*% increase from daily energy intake during pregnancy

Protein Requirement for PLHIV

- PLHIV do not require more protein than the level recommended for healthy non-PLHIV of the same age, sex and physical activity level.

- At the onset ofOI, the body loses nitrogen, which suggests a need for increase protein intake if OI remain untreated.

- Protein requirements may be estimated 1-1.4 g/kg for maintenance and 1.5 -2 g/kg for repletion.

**WHO “Nutrient requirements for PLHIV/AIDS” Jeneva; WHO, 2003**
Fat Requirements

There is no evidence that fat requirements are different because of HIV infection.

PLHIV with ARV or certain infection symptoms such as diarrhea may require changes in the timing or quantity of fat intake in some cases.

Insufficient volume of water (<50-70% of BW) inside the body can result in malfunctions of body systems. When mucous membrane becomes dry, there would be a higher risk of infection.

The average water requirement for a person is 30 to 35 cc /1 kg BW/ day (20% from foods, need to drink 80% of the amount lost)
Micronutrients and HIV
Micronutrient Deficiencies

Micronutrient deficiencies are common in HIV infected persons

Why?

- poor dietary intake
- reduced absorption
- increased nutrient losses that occur in PLHIV beginning from the early stages of HIV infection
Micronutrients and HIV

Nutrients that affect the immune system:

- Vitamin A, B2, B6, Biotin, Folate, Niacin and Pantothenic acid.

Antioxidant vitamins and minerals:

- Vitamin A, vitamin E, vitamin C, Zinc and Selenium.
Important Vitamins and Minerals in HIV

- Vitamin A
- Vitamin E
- Vitamin B1
- Vitamin B2
- Niacin
- Pantothenic acid
- Biotin
- Folate
- Vitamin B6 (Pyridoxine)
- Vitamin B12
- Vitamin C
- Iron
- Zinc
- Selenium
- Calcium
HIV and Micronutrients

- Infection increases demand for and utilization of antioxidant vitamins (A, E, C) and minerals (zinc, selenium and iron)

- Studies have shown deficiencies in Vitamin A, E, B1, B2, B6, B12, Folate, Iron and Calcium in PLHIV.
Micronutrient Supplementation

- The relationship between micronutrient status, multivitamin use and slower disease progression has been documented in studies of PLHIV in the United States and Africa.

- Study in Thailand (n= 481) – death rate lower in PLHIV receiving micronutrient supplementation (AIDS 2003, 17:2461-2469)

- Antioxidant supplementation no significant affect on viral load (Batterham et al, 2001)
WHO Recommendations

“Micronutrient supplementation above the level of recommended micronutrients for healthy non-HIV-infected persons of the same age, sex, and physical activity level is not recommended”

- Ideally, an adequate micronutrient intake should be achieved through consuming a diverse range of foods rich in micronutrients

- Micronutrient supplementation may be appropriate for some PLHIV.
  - Discourage mega dosing of supplements
How to increase in Food Intake

*In addition to normal food intake, 3 meals per day:

<table>
<thead>
<tr>
<th>% increase</th>
<th>Quantity of food*</th>
</tr>
</thead>
<tbody>
<tr>
<td>+10%</td>
<td>One extra snack</td>
</tr>
<tr>
<td>+20%</td>
<td>Two extra snacks</td>
</tr>
<tr>
<td>+30%</td>
<td>1 extra main meal</td>
</tr>
<tr>
<td>+40%</td>
<td>One extra main meal and one snack</td>
</tr>
<tr>
<td>+50%</td>
<td>One extra main meal and two snacks</td>
</tr>
<tr>
<td>+60%</td>
<td>Two extra main meals</td>
</tr>
<tr>
<td>+100%</td>
<td>3 extra main meals and one snack</td>
</tr>
</tbody>
</table>
Frequently asked nutritional questions by PLHIV

- What kind of food that an HIV patient should take or should not take?

- What food supplement is beneficial or can enhance the immunity?

- Should we take any vitamins or minerals e.g., zinc, selenium? Many myths about food, vitamins and minerals.

- Is protein or fat good for patient with lipoatrophy?

- Can any exercise improve limb lipoatrophy or truncal obesity?
Dietary Intake among Thai PLHIV with varying nutritional status Presenting for Comprehensive HIV Services

C. Chaturawit¹, S. Pengnonyang¹, N. Phanuphak², T. Apornpong², S. Sadler³, S. Teeratakulpisarn²,
E. Wasantwisut⁴, J. Gold³, P. Phanuphak²

- Nutritional status in PLHIV in Nutrition Service 2007

  □ Mean age 33 yrs. (range 23-66, 65% in 30-39 yrs.)

Nutritional status in 70 PLHIV
(21 Men, 49 Women)

![Bar chart showing nutritional status]

Data from MTCT+ Clinic
## Data from MTCT+ Clinic

<table>
<thead>
<tr>
<th>Micro-Nutrients</th>
<th>Median</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate (g)</td>
<td>177</td>
<td>46</td>
<td>427</td>
</tr>
<tr>
<td>PRO (g)</td>
<td>60 g</td>
<td>11 g</td>
<td>160 g</td>
</tr>
<tr>
<td>- animal (%)</td>
<td>65%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Vegetable (%)</td>
<td>35%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FAT (g)</td>
<td>43</td>
<td>11</td>
<td>206</td>
</tr>
<tr>
<td>Energy (kcal)</td>
<td>1487</td>
<td>351</td>
<td>4897</td>
</tr>
<tr>
<td>Cholesterol (mg)</td>
<td>102</td>
<td>7</td>
<td>1150</td>
</tr>
<tr>
<td>Fiber (g)</td>
<td>8</td>
<td>0.3</td>
<td>28</td>
</tr>
<tr>
<td>Sodium (mg)</td>
<td>1630</td>
<td>12</td>
<td>7808</td>
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<tr>
<td><strong>Potassium (mg)</strong></td>
<td>1486</td>
<td>104</td>
<td>3911</td>
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</table>

Low=12 (17.1%), High = 39 (55.7%), In Normal = 19 (27.1%)

Low=53 (75.7%), High = 1 (1.4%), In Normal = 16 (22.9%)
Data from MTCT+ Clinic

<table>
<thead>
<tr>
<th>Micro-Nutrients</th>
<th>% DRI</th>
<th>Median</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td></td>
<td>16</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>Vitamin C</td>
<td></td>
<td>90</td>
<td>0</td>
<td>106.5</td>
</tr>
<tr>
<td>Vitamin B1</td>
<td></td>
<td>101</td>
<td>5.7</td>
<td>770</td>
</tr>
<tr>
<td>Vitamin B2</td>
<td></td>
<td>85</td>
<td>15</td>
<td>412</td>
</tr>
<tr>
<td>Niacin</td>
<td></td>
<td>89</td>
<td>13</td>
<td>246</td>
</tr>
<tr>
<td>Ca</td>
<td></td>
<td>54</td>
<td>2.6</td>
<td>197</td>
</tr>
<tr>
<td>Zn</td>
<td></td>
<td>24</td>
<td>1.5</td>
<td>144</td>
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%Macro-nutrients Distribution and Energy intake in 70 PLHIV by Nutritional status

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>&lt;18.5</th>
<th>18.5-22.9</th>
<th>23-24.9</th>
<th>&gt;25</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>%CHO_D</td>
<td>44.8</td>
<td>53.6</td>
<td>60</td>
<td>55.1</td>
<td>0.017</td>
</tr>
<tr>
<td>%PRO_D</td>
<td>16</td>
<td>16.8</td>
<td>14.8</td>
<td>16.9</td>
<td>0.715</td>
</tr>
<tr>
<td>%Fat_D</td>
<td>42.8*</td>
<td>29.2</td>
<td>24.3</td>
<td>25.8</td>
<td>0.021</td>
</tr>
<tr>
<td>%DRI of Energy</td>
<td>102.1</td>
<td>84</td>
<td>94.7</td>
<td>77.3</td>
<td>0.011</td>
</tr>
<tr>
<td>Energy (Median)</td>
<td>1787.5</td>
<td>1482.6</td>
<td>1832.8</td>
<td>1352.2</td>
<td>0.032</td>
</tr>
</tbody>
</table>
Results and Conclusion

✓ No significant difference in micronutrient intakes among groups with different nutritional status.

✓ The gr. of underweight demonstrated decreased intake of total dietary carbohydrate (P=0.017) while increased intake of total dietary fat (P=0.021) and energy (P=0.011)

✓ 80% of all participants reported imbalance diet.

Conclusion: There were high proportions of PLHIV with overweight and obesity in this study. Micronutrient intakes were under DRIs in general and majority took imbalance diet. Dietitian should advice them the appropriate nutrient distribution, otherwise imbalance diet could lead to risk factors for metabolic syndrome in the future.
Prevalence of dyslipidemia and overweight in naïve HIV-infected Thai patients

S. Pengnonyang¹, N. Phanuphak², T. Aporpong², C. Chaturawit¹, T. Pankam³, W. Sathainthammavit³, E. Wasantwisut⁴, J. Gold⁵, P. Phanuphak²

Method:
Data from HIV-infected clients of the TRCARC who were not on antiretroviral therapy (ART-naïve) and came for MTCT-Plus clinic or Wellness-Plus clinic during November 2006 - September 2007, were reviewed and analyzed.

Available data included fasting plasma lipid level, fasting plasma glucose, body weight, body mass index (BMI) demographics

Results:
- There were 181 ART-naïve patients who had been tested lipid profile and FBS.
- Mean age was 33.1 years (64% being female).
- Mean CD4 count was 417 cells/µl.
- Mean BMI was 22.7 kg/m².
- The prevalence of underweight (BMI<18.5 kg/m²) and overweight to obesity (BMI>23 kg/m²) were 8.2% and 35.1%, respectively.
- The prevalence of hypertriglyceridemia (>150 g/dL) was 15.6%,
  - hypercholesterolemia (>200 g/dL) was 23.7%,
  - Low HDL (male<40 g/dL and female<50 g/dL) was 43.4%
  - hyperglycemia (blood sugar>110 mg%) was 3.6%.
  - Hypertriglyceridemia and hypercholesterolemia were significantly higher in male than female (65%-vs-35%, p=0.016 and 64%-vs-36%, p=0.005, respectively).
- Conversely, low HDL was higher in female than male (76% vs 24%, p=0.015).
- Weight and BMI, but not dyslipidemia, had significant positive correlation with CD4 (Pearson-correlation=0.30 and 0.26, p=0.003 and 0.018, respectively).

Conclusion:
- Dyslipidemia and overweight were found in Thai HIV-infected patients even before commencing ART.
- Screening abnormal lipid profile and other related risk factors for cardiovascular diseases should be promoted for HIV-infected patients regardless ART status. Necessarily, in the era of longer lifespan of HIV-infected patients, lifestyle modification combine with other aspects of nutritional intervention can be implemented long before ART to better prepare patient before ART starting.
Method: Metabolic syndrome was defined as having ≥3 of the following 5 components:

1) **abdominal obesity**
   - men ≥ 90 cm, women ≥ 80 cm
2) **hypertriglyceridemia**
   - ≥ 150 mg/dl
3) **low HDL**
   - men < 40, women < 50 mg/dl
4) **high blood pressure**
   - 130/85 mmHg
5) **high fasting plasma glucose**
   - FPG ≥ 100 mg/dl

Conclusion:
- The prevalence of metabolic syndrome in Thai HIV-infected patients was not higher than general population.
- However, around 1/3 had ≥ 2 features of metabolic syndrome.
- Efforts should be made to screen HIV-infected patients who are at high risk for metabolic syndrome and early interventions should be given to prevent or modify the long-term morbidities and mortalities.

Results:
- 206 patients (50 Men, 156 Women)
- 168 patients (81.6%) were on HAART
- 78% on NNRTI-based regimens
- Mean age was 34.1 years.
- High BMI (≥ 23 kg/m²) was found in 38.3%
- The prevalence of metabolic syndrome was 8.7% but 31.1% had ≥ 2 features of metabolic syndrome.
- Being male, older age, high CD4 count, low HDL, increased waist circumference, and high BMI were significant risk factors for metabolic syndrome by univariate analysis.
- Only CD4 ≥ 350 cell/mm³ (OR=4.4 [95%CI 0.8-24.2], P=0.05), HDL < 45 mg/dl (OR=6.4 [95%CI=2.0-20.6], P<0.01), and BMI ≥ 23 kg/m² (OR=6.2 [95%CI=1.7-22.1], P<0.01) remained significant after adjustment.
- Among 48 patients with available data on diet and exercise, high fat intake was the only significant risk factor for having ≥ 2 features of metabolic syndrome by univariate analysis (OR=4.7 [95%CI=0.9-24.9], P=0.04).
Roles of Nurse in HIV Nutritional care

- Nutrition Screening
- Nutrition Assessment
- Nutrition education and counseling

How to?
Nutritional Screening and Assessment

Nutritional Screening

- Not at-risk
  - Re-screen at
    - Regularly specified interval
    - When nutritional /clinical change

- At-risk
  - Develop Nutrition Care Plan
  - Re-assessment

Reference: The American Society for Parenteral and Enteral Nutrition (ASPEN)
Frequently Used Nutrition Screening Criteria

- Weight
- Height
- Change in weight
- Food allergies
- Diet
- Laboratory data
- Change in appetite
- Nausea/vomiting
- Bowel habits
- Chewing/ Swallowing ability
- Diagnosis

Modified from the Guideline and Protocol of Care for Providing Medical Nutrition Therapy to HIV Persons, Standard of Care Committee, Los Angeles County Commission on HIV Health Services, 1997.
Nutrition Screen and Referral Criteria for Adults (18+ yrs) with HIV/AIDS

Modified from the Guideline and Protocol of Care for Providing Medical Nutrition Therapy to HIV Persons, Standard of Care Committee, Los Angeles County Commission on HIV Health Services, 1997.

<table>
<thead>
<tr>
<th>Have you ever seen dietitian before?</th>
</tr>
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<tbody>
<tr>
<td>□ No  □ Yes  The topics is.................</td>
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</table>

<table>
<thead>
<tr>
<th>Automatically refer/see to a dietitian for any of the following: (check and tick all that apply)</th>
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</thead>
<tbody>
<tr>
<td><strong>A. Medical Diagnosis and Nutrition Assessment</strong></td>
</tr>
<tr>
<td>□ Newly Diagnosis HIV/AIDS or never been seen by Dietitian</td>
</tr>
<tr>
<td>□ HIV with symptom or AIDS/asymptomatic: not seen by Dietitian in the past 6 month to 1 year</td>
</tr>
<tr>
<td>□ Any change in disease, diet or nutrition status</td>
</tr>
</tbody>
</table>
Nutrition Screen and Referral Criteria for Adults (18+ yrs) with HIV/AIDS (cont)

B. Physical Changes and Weight Concerns

- > 3% unintentional weight loss from usual body weight within the last 6 month or since the last visit
- Visible wasting, < 90% ideal body weight, BMI < 20 kg/m²
- Lipodystrophy  □ Abdominal obesity: Waist circumference > 90 cm (men) and > 80 cm (women)
- Client or MD initiated weight management, or obesity: BMI > 25 kg/m²
Nutrition Screen and Referral Criteria for Adults (18+ yrs) with HIV/AIDS (cont)

C. Oral/GI Symptoms

- Loss of appetite or poor oral intake of food or fluid for > 3 days
- Difficulty chewing, swallowing, Severe dental carries, mouth sores, thrush or Herpes simplex type 1
- Persistent gas, bloating, heart burn, nausea/vomiting, diarrhea, constipation, change in stool (color, consistency, frequency, smell)
- Change in perception of taste or smell
- Food allergy/intolerance: fat, lactose, wheat, etc.
- Receives or needs evaluation oral supplyment or enteral or parenteral nutrition
- Medication involving food or meal modification
### D. Metabolic Complications and Other Medical Condition

- Concomitant Diabetes, Hypertension, Hepatic or Renal insufficiency, Heart disease, Cancer, Pregnancy, or other nutrition-related condition
- **Dyslipidemia:** Cholesterol < 120 mg/dl or > 200 mg/dl, Triglycerides > 150 mg/dl, LDL >100 mg/dl, HDL (men < 40 mg/dl, women < 50 mg/dl)
- Albumin < 3.5 mg/dl
- Schedule Chemotherapy or radiation therapy
E. Behavioral concern or Unusual Eating Behaviors

☐ Client initiated vitamin and/or mineral supplementation, or complimentary or alternative diet

☐ Vegetarianism

☐ Alcoholic consumption: > 2 drinks/day (men), > 1 drink/day (women)

☐ Cigarettes smoking

☐ Well-nourished

Patients Referred to Dietitian

☐ Yes

☐ No, why? .................................................................
What are the most common nutritional problems in your clients?
Most Nutritional Problems in Anonymous Nutrition clinic, TRCARC

(Seen by Dietitians)

1. Hyperlipidaemia
2. Overweight and Obesity
3. High Blood Pressure
4. Lipodystrophy
5. Hyperglycemia

6. Problem in Kidney Function
7. Anemia
8. Poor appetite
9. Weight Loss and/or Underweight
10. Constipation
11. Diarrhoea
How can we do nutrition assessment?

Using ABCDEF Approach

A = Anthropometric data
B = Biochemical data
C = Clinical data
D = Dietary data
E = Exercise data
F = Family history
A: Anthropometric data

- Overweight or Underweight?
  - weighing
  - measuring height
  - calculating Body Mass Index (BMI)
  - Body composition by BIA scale

- Risk to Metabolic syndrome?
  - waist circumference
  - hip circumference
  - waist-hip ratio
Body Mass Index

$$\text{BMI} = \frac{\text{Wt. (kg)}}{\text{Ht. (m) x Ht. (m)}}$$

(kg/m²)

Interpretation:

- $< 18.5$ = Underweight
- $18.5-22.9$ = Normal
- $23.0-24.9$ = Overweight
- $25.0-30.0$ = Obesity
- $> 30.0$ = Morbid obesity

Borderline upper level of Wt. accepted:

$$\text{Wt. (kg)} = [\text{Ht. (m) x Ht. (m)}] \times 22.9$$

Borderline lower level of Wt. accepted:

$$\text{Wt. (kg)} = [\text{Ht. (m) x Ht. (m)}] \times 18.5$$
Example:

Mr. Sompong: Ht = 165 cm. Wt = 46.5 kg.

\[ \text{BMI} = \frac{46.5}{1.65 \times 1.65} \]

\[ = 17.1 \text{ kg/m}^2 \]

- **Lower level of Wt. accepted:**
  \[ \text{Wt. (kg)} = [\text{Ht. (m)} \times \text{Ht. (m)}] \times 18.5 \]
  \[ = [1.65 \times 1.65] \times 18.5 \]
  \[ = 50 \text{ kg} \]

- **Upper level of Wt. accepted:**
  \[ \text{Wt. (kg)} = [\text{Ht. (m)} \times \text{Ht. (m)}] \times 22.9 \]
  \[ = [1.65 \times 1.65] \times 22.9 \]
  \[ = 62 \text{ kg} \]

His weight should be in the range of **50-62 kg.**
% Body fat
Skinfold thickness measurement

Risk to Metabolic syndrome?

Waist circumference

- **Interpretation:** High risk to Chronic dz.
  - if > 80 cm (32”) for female
  - if > 90 cm (36”) for male

Hip Circumference

- **Interpretation:** Waist Hip Ratio (WHR)
  - High abdominal fat accumulation
  - if > 0.8 for female
  - if > 0.9 for male
B: Biochemical data

CD4, Viral Load
Iron status
Blood lipids and sugar
Renal and liver function
Others
C: Clinical data

Vital sign: BP, Pulse, Temperature

Any symptoms:
- that can affect dietary intake
- Health-related problems

ART: type of ARV, ARV adherence
D: Dietary data

Dietary Intake?
- Meal pattern; 3 main meals? Skip meal?
- Kind of foods? Alcohol? Smoking?
- Quantity of food?
- Food-ARV interaction?: Time and Type

Energy intake & requirement?
D: Dietary data (cont)

Food belief, dietary knowledge, dietary supplement or herbs?

Socio-economic aspects that can affect dietary intake?

Stage of behavior change?
E: Exercise data

Type
Duration
Frequency
Motivating Factors
F: Family History

✓ HIV-infected person
✓ Chronic disease
✓ Family support
General Dietary Advice

Thailand Nutrition Flag

Layer 1:
- Rice-starchy food: 8-12 rice-serving spoons/day
- Vegetables: 4-6 rice-serving spoons/day
- Fruits: 3-5 portions/day
- Milk: 1-2 glass(es)/day
- Oil, sugar and salt: Eat in limited amount/day
- Meats and milk group: Eat appropriately.
- Oil, sugar and salt group: Eat in limited amounts.

Eat this food group the most.
A balanced diet includes a variety of nutritious foods.
1. Eat a variety of foods from each of the 5 food group and maintain proper weight.

2. Eat adequate amount of rice or alternative carbohydrate sources.

3. Eat plenty of vegetables and fruits regularly.

4. Eat fish, lean meat, eggs, legumes and pulses regularly.

5. Drink milk in appropriate quality and quantity for one’s age.
Food Based Dietary Guideline for Thai (1-9)

6. Eat a diet containing appropriate amounts of fat.

7. Avoid sweet and salty foods.

8. Eat clean and safe food.

9. Avoid or reduce the consumption of alcoholic beverages.
Foods to be avoided or taken in small quantities

- Sweet and salty foods
- Simple carbohydrate or High refined sugar
- High fat meat or High fat milk
- Saturated fat i.e. animal oil, palm oil, cheese, etc.
- Trans-fat i.e. margarine, bakery products, etc.
- Fermented foods
- Uncooked foods
- Alcoholic beverages
Foods to be consumed in greater quantities

- **Complex carbohydrate** i.e. unpolished rice, corn, taro, etc.
- **Low fat or lean meat** i.e. fish, tofu, pork/chicken/beef without skin
- **Various fresh fruits and vegetables**
- **Low fat and low sugar milk**
- **Mono-, poly- unsaturated fat** i.e. olive oil, soybean oil, rice-bran oil, etc.
- **Cooked foods**
- **Water**
Meal planning for PLHIV

- Vegetable = 1/2 plate
- Rice = 1/4 plate
- Lean meat = 1/4 plate

- 1-2 glass of milk
- 6-8 glass of water
- 3 portions of fruit
1-2 snack/day for 10% extra calorie

or

or
Exercise:
Please share your experience on how to advice clients for Symptom management......
Underweight

Miss Chintana Chaturawit
obesity
ทำไม? จึงต้อง ลด! คาร์โบไฮเดรต

ลำดับของการเผาผลาญสารอาหาร เพื่อให้เกิดพลังงาน!

1. คาร์โบไฮเดรต
2. ไขมัน
3. โปรตีน

ถ้าคาร์โบไฮเดรตไม่พอ ไขมันที่พอสมมติอยู่นาน.... ก็จะถูกดึงออกมาใช้งาน

Miss Chintana Chaturawit
Diabetes

Miss Chintana Chaturawit
Hypertension

Miss Chintana Chaturawit
ความดันโลหิตสูง

<table>
<thead>
<tr>
<th>วิธีการ</th>
<th>ข้อแนะนำ</th>
<th>ค่าเฉลี่ยความดันต่ำบานที่ลดลง</th>
</tr>
</thead>
</table>
| การลดน้ำหนัก | ดัชนีมวลกาย 
18.5-24.9 กก./ม² | ทุก 10 กิโลที่ลดลงจะสามารถลดลงได้ 5-20 มม. ปรอท |
| **DASH diet** | รับประทานผักผลไม้ให้มาก 
ลดปริมาณไขมันในอาหาร 
โดยเฉพาะไขมันอิสระ | 8-14 มม. ปocht |
| จำกัดเกลือในอาหาร | ลดเกลือให้น้อยกว่า 2400 มิลลิกรัม/วัน 
หรือ 6 กรัมของ NaCl | 2-8 มม. ปocht |

Miss Chintana Chaturawit
### TIPS ความดันโลหิตสูง

#### การปรับเปลี่ยนพฤติกรรมในการรักษาโรคความดันโลหิตสูง

<table>
<thead>
<tr>
<th>วิธีการ</th>
<th>ข้อแนะนำ</th>
<th>ค่าเฉลี่ยความดันตัวบนที่ลดลง</th>
</tr>
</thead>
<tbody>
<tr>
<td>ออกกำลังกาย</td>
<td>ออกกำลังกายชนิดแอโรบิกสม่ำเสมออย่างน้อย 30นาทีต่อวันและเกือบทุกวัน</td>
<td>4-9 มม. ปรอท</td>
</tr>
<tr>
<td>งด/ลดการดื่มแอลกอฮอล์</td>
<td>ผู้ชาย ≤ 2 drinks ต่อวัน ผู้หญิง ≤ 1 drinks ต่อวัน</td>
<td>2-4 มม. ปรอท</td>
</tr>
</tbody>
</table>
โซเดียม

- เกลือ เป็นอาหารที่มีโซเดียมถึง 40%
  - เกลือ 1 ช้อนชา (5 กรัม) มีโซเดียม 2,000 มิลลิกรัม

อาหารที่มีโซเดียมมาก

- ซอสส้มข้น
  - เกลือ น้ำปลา ซีอิ้วขาว ซอสปูข้น ซอสพริกผง ซอสหมี่ขาว ซอสไข่แดง ซอสพริกแดง ซอสมันสาระ ซอสผักกาด
  - ซอสพริก ซอสปูข้น ซอสเผ็ดข้น ซอสหมี่ขาว น้ำส้มพริกดำ น้ำจิ้มไก่ ฯลฯ

- อาหารทอดแห้ง
  - ปลาเค็ม เนื้อ หรือหมูเค็ม ปลาแห้ง กุ้งแห้ง ปลาหมู หรือเนื้อแดดเดียว ฯลฯ
โซเดียม

**อาหารที่มีโซเดียมมาก**

- **อาหารหมักดอง**
  - เนยแข็ง ไข่เค็ม กะปิ เต้าหู้ยี เต้าเจี๊ยะ แฟแนน แซน เบคอน ผักดองเปรี้ยว หอยดอง ปะการังอื่น ๆ

- **อาหารเติมเกลือ**
  - ซุปซอง ข้าวต้ม โจ๊กซอง มันทอดเติมเกลือ ถั่วทอดใส่เกลือ ข้าวโพดซุป ขนมกรุบกรอบ บะหมี่/เส้นหมี่กึ่งสำเร็จรูป เนยเนยเตย ข้าวโพดเค้า ข้าวโพดเผา ชุบเกลือ

- **เนื้อสัตว์ปรุงรส หรือแปรรูป**
  - ไส้กรอก กุนเชียง หมูแผ่น หมูยอ ไส้กรอก กุนเชียง หมูยอ ปลาปรุงรส ต่าง ๆ

- **สารเจือปนอาหาร (Food Additives)**
  - สารเคมีฟื้นฟู พร้อมผสมของโซเดียม
  - ผงชูกูมิ (Monosodium Glutamate)
  - โซดาอบขนม ผงฟู มีโซเดียมไปคาร์บอนซ์
## โซเดียม

ไม่เกิน 2400 มิลลิกรัมต่อวัน

### ปริมาณโซเดียมในอาหารปรุงรส

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<thead>
<tr>
<th>อาหาร</th>
<th>ปริมาณ</th>
<th>โซเดียม (มิลลิกรัม)</th>
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<tr>
<td>เกลือ</td>
<td>1 ช้อนชา</td>
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<td>ซีอิ/ุ์ypจ1145วขาว</td>
<td>1 ช้อนโต๊ะ</td>
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<td>ซอสหม่อนวงม</td>
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<td>ผงฟู</td>
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Dyslipidemia
องค์ประกอบของไขมันในน้ำมันพืชแต่ละชนิด

<table>
<thead>
<tr>
<th>แหล่งของน้ำมัน</th>
<th>องค์ประกอบของกรดไขมัน (ร้อยละ)</th>
<th>สัดส่วนของกรดไขมัน</th>
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<tr>
<td></td>
<td>PUFA</td>
<td>MUFA</td>
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<tr>
<td>น้ำมันจระเข้า</td>
<td>36.2</td>
<td>42.2*</td>
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<td>น้ำมันกวางหลัง ***</td>
<td>60*</td>
<td>26.8</td>
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<td>น้ำมันป่าเตอม</td>
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<td>น้ำมันเมล็ดตองทานตะวัน</td>
<td>71.5</td>
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<td>น้ำมันข้าวโพด</td>
<td>57</td>
<td>30</td>
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<tr>
<td>น้ำมันเมล็ดฝ้าย</td>
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<td>น้ำมันมะกอก</td>
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<td>น้ำมันงา</td>
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<td>น้ำมันเกลือ</td>
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<td>น้ำมันมะพร้าว</td>
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<td>น้ำมันหมู</td>
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<td>เบบ</td>
<td>4</td>
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</tr>
</tbody>
</table>

Miss Chintana Chaturawit
น้ำมันพืชที่ควรเลือกใช้

- น้ำมันถั่วเหลือง น้ำมันข้าวโพด น้ำมันระสัง น้ำมันถั่วฝั่ง น้ำมันปาล์ม

แนะนำ! การเลือกใช้น้ำมันในการประกอบอาหาร
- ใช้น้ำมันระสัง ผสมกับน้ำมันถั่วเหลือง
- หรือน้ำมันระสัง ผสมกับน้ำมันข้าวโพด
- ผัด: น้ำมันระสัง และน้ำมันปาล์ม
- ผัด: น้ำมันถั่วเหลือง และน้ำมันข้าวโพด

Miss Chintana Chaturawit
**Dietary Prevention of Dyslipidemia**

- Randomized trial of NCEP diet in adults initiating ART (N = 90)
  - 95% on ZDV/3TC
  - 75% on EFV
- 15- to 30-minute session with a dietician every 3 months
- Other outcomes
  - Reduced fat, calorie intake
  - Reduced BMI
  - Increased dietary fiber intake

---

**Table:**

<table>
<thead>
<tr>
<th>Months</th>
<th>TC (mg/dL)</th>
<th>TG (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>120</td>
<td>140</td>
</tr>
<tr>
<td>6</td>
<td>140</td>
<td>160</td>
</tr>
<tr>
<td>12</td>
<td>160</td>
<td>180</td>
</tr>
</tbody>
</table>

---


Miss Chintana Chaturawit
Big Thank You!