A review of sugar intake in Southeast Asia: Consumption levels and sources of added sugar

Sofia Amarra R.D., Ph.D.

Objectives of the review

- To examine the best available evidence regarding levels of intake and sources of added sugar in SEA countries
- To identify future research needs regarding sugar intake in SEA

Sources of information

- FAO Food Balance Sheets
- **Nationwide Nutrition Surveys**
- Individual studies
- International Market Research reports

MARKET RESEARCH REPORTS
Euromonitor International (2012)


Asia Pacific region continues to emerge as the global confectionery industry’s new growth engine.


Classification of sugar and sweeteners in FAO food balance sheet

- **Sugar crops**
  - Sugar cane
  - Sugar beet

- **Sugar & sweeteners**
  - Sugar (non-centrifugal)
  - Sugar (raw equivalent)
  - Sweeteners, other
  - Honey


http://www.sucre-ethique.org/Statistics-on-World-Sugar.html

**FAO FOOD BALANCE SHEET DATA**
Trends in available sugar in SEA countries 2009-2013

![Bar chart showing trends in available sugar in SEA countries 2009-2013](http://faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor)

**Fig.1.** Available sugar (sugar crops, raw sugar, non-centrifugal sugar, other sweeteners, honey) as percentage of available total kcal/day

![Bar chart showing available sugar for different countries](http://faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor)

**Food balance sheet as a source of data**

**Advantages**
- Available on-line
- Regularly updated
- Describe the amount of food available for consumption (per capita or per person) based on a country’s food supply

**Limitations**
- Per capita consumption does not represent food consumed by specific groups
- Waste or losses are not taken into account

Proportion of available kcal from carbohydrate foods (2011)

![Bar chart showing proportion of available kcal from carbohydrate foods](http://faostat.fao.org/site/368/DesktopDefault.aspx?PageID=368#ancor)
Sugar in nutrition survey data

• Identifies actual intake of
  – Table sugar (cane sugar, brown sugar), honey
  – Foods and beverages with added sugar

• **Added sugar** = sugars and syrups added to food during preparation or processing; excludes naturally occurring sugars

Sources of added sugar

• Regular soft drink, energy drinks, sports drinks
• Candy
• Cakes, cookies, pies
• Sweet rolls, pastries, donuts
• Fruit drinks, fruit punch
• Ice cream, desserts
• Traditional Asian confectioneries

Nationwide nutrition surveys

<table>
<thead>
<tr>
<th>Country</th>
<th>Survey</th>
<th>Sample</th>
<th>Instrument</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Malaysia | Malaysian Adult Nutrition Survey (MANS) 2014 | 4000 adults aged 18-59 yrs | Semi-quantitative food frequency questionnaire (FFQ) | Sweet items consumed daily (per capita)
  - 25 gms Sugar (white, brown, Melaka)
  - 51 gm Condensed milk
  - At least 0.76 cup sweet beverages (chocolate drink, pre-mixed drink, cordial) |
| Indonesia | National Socio-Economic Survey 2014 (SUSENAS) | 75,000 households | Food Consumption Questionnaire module (quantity of selected foods consumed daily & weekly) | Sweet foods contributing the most to per capita caloric intake/day (2-4%)
  - Sugar (cane & brown)
  - Kueh (steam cake)
  - Sweet liquid milk
  - roti manis (sweet bread)
  - kue kering/ biscuits/ cookies |
### Indonesia Total Diet Study (2014)

- **Sample**: All members in 45,802 households
- **Instrument**: Single 24-hr recall

**Findings**
- Proportion of the population who consumed >50 gm sugar/day
  - 0-59 months = 1.3%
  - 5-12 yrs = 1.6%
  - 13-18 yrs = 2.0%
  - 19-55 yrs = 5.7%
  - >55 yrs = 6.8%
  - Males = 6.4%
  - Females = 3.1%
  - Urban = 4.6%
  - Rural = 3.7%

### Philippines National Nutrition Survey 2008

- **Sample**: 36,634 households
- **Instrument**: One day household food weighing

**Findings**
- Per capita intake of sugars and syrups = 17 gm/day

### Thailand Health Report Profile 2008-2010

- **Sample**: Population aged 6 yrs and over
- **Instrument**: Summary of results of various national surveys that used FFQ

**Findings**
- 31.2 kg sugar consumed/person/yr (approx. 85 gm sugar/day)
- In 2009, proportion of population consuming the ff. sweetened foods weekly:
  - Carbonated and sweetened drinks = 68.7%
  - Snacks = 51%
- Proportion of primary school children regularly consuming carbonated drinks = 31.4%

### Nutrition surveys in SEA as a source of data

**Advantages**
- Nationally representative
- More accurate than FAO food balance sheet data
- Can show food sources and consumption level of different age and sex groups
- Results can be used to guide policy

**Limitation**
- Dietary assessment methods do not provide accurate assessments of intake levels (high degree of measurement error)

**Accuracy**
- Influenced by sample size and number of days observation
Goal of dietary assessment

- To capture “usual” or long-term average intake
  - Dietary recommendations are intended to be met over time
  - Diet-health hypotheses are based on dietary intakes over the long-term

Important to use the right instrument but

- There is no perfect tool to measure usual intake
- All instruments are prone to systematic and random sources of measurement error

Instruments used in SEA nutrition surveys

**FFQ (most common)**

- Easy to administer, less expensive
- Fail to truly reflect a person’s long-term average daily intake
  - Limitations of food list
  - Cognitive difficulties in recalling intake over a long period

**24-hour recalls (less common)**

- Capture rich details about daily intake of every item consumed (when, how much, with what)
- Less prone to measurement error than FFQ
- More than one day of recall is needed to estimate usual intake (need at least 2 non-consecutive days)
- Statistical methods required to adjust for measurement error

Source: NCI Dietary Assessment Primer

An illustration (for folate) of the transformation process used in statistical modeling of usual intake

(http://www.cdc.gov/nchs/tutorials/dietary/Advanced/ModelUsualIntake/Info2.htm)
An illustration (for folate) of the transformation process used in statistical modeling of usual intake
(http://www.cdc.gov/nchs/tutorials/dietary/Advanced/ModelUsualIntake/Info2.htm)

### Ranking of Methods to Assess Level of Sugar Intake

**BIOMARKERS**
- 24 hour urinary excretion of sucrose, fructose
- Serum $^{13}$C abundance

**DIETARY ASSESSMENT METHODS**
- Food weighing
- 24 hour recall
- Food frequency questionnaire

### Conclusion

- Due to methodological limitations in the collection and analysis of dietary data in nationwide dietary surveys, insufficient evidence exists regarding levels and sources of sugar intake in SEA countries

### Recommendations

- Need for up-to-date and accurate information on sugar intake levels and sources in SEA classified by age and sex groups
- Achieved by using dietary assessment methods that increase accuracy and reduce measurement error
  - Multiple 24-hr recalls in combination with FFQ
  - Statistical modeling of 24-hr recall data
  - Validation of dietary recalls against recovery biomarker (serum $^{13}$C, urinary sucrose/fructose)
Suggested reference:
NCI Dietary Assessment Primer
available at
http://dietassessmentprimer.cancer.gov/

THANK YOU