

## **Abstract**

### **Background and purpose**

Lifestyle-related diseases have become the leading cause of death in Indonesia and are increasing along with overweight and obesity prevalence in adults and children. The latest publication of a nutrition survey in Indonesia was conducted almost 20 years ago, which was different from recent condition. From the recent government survey and food balance sheet, Jakarta has the highest prevalence of both overweight and obesity in Indonesia which conflicted with the estimation from food balance sheet. Another factor like sugar intake may also have an effect on health conditions. However, there is no sugar composition table for Indonesians. Therefore, in this study investigation of energy and nutrient intakes, establishment of an Indonesian Sugar Composition Table, and the sugar intake by housewives and children in Jakarta was conducted to find the relationship of intakes to overweight and obesity.

### **Methods**

Study 1: There is a community health center in every ward in Indonesia which conducts basic health examinations from infants to the elderly every month. Seven communities in Jakarta were contacted and permission from 4 communities was obtained. Housewives were approached through each community health center. Eighty-six housewives were selected as survey subjects. Anthropometric measurements were conducted at the community health centers. For the nutrition survey, 24 hour dietary recall method for 3 nonconsecutive days was conducted by visiting each house.

Study 2: Seven public elementary schools in Jakarta were contacted and permission from 3 schools was obtained. The survey subjects were 90 (42 boys and 48 girls) children of 10 years old. For the nutrition survey, 24 hour dietary recall method for 3 nonconsecutive days was conducted by visiting the schools and anthropometric measurements were done during the visits.

Study 3: Establishment of Indonesian Sugar Composition Table was done by analyzing the sugar contents (glucose, fructose, sucrose, and lactose) of 104 commercial products by enzymatic analysis methods. We also gathered 380 homemade snack and beverage recipes and calculated sucrose content, in the snacks and beverages. We had 41 categories of commercial products and 38 categories of homemade snacks and drinks for the Indonesian Sugar Composition Table.

Study 4: After the Indonesian Sugar Composition Table was established, the measurement of sugar intake was conducted using 24 hours dietary recall method for 3 nonconsecutive days data of housewives and children intakes.

### Result

The prevalence of overweight and obesity was 47% in housewives, 49% in boys and 40% in girls. The daily intakes of energy and protein were 2159 kcal and 55.7g in housewives, 2027kcal and 56g in boys, and 2109kcal and 58g in girls. Compared with Indonesian RDA, energy intake of all groups were close to RDA yet contradictory with their BMI result. The daily average lipid and saturated fatty acid intakes were 85.7g and 50.4g in housewives, 92g and 50.4g in boys, and 95g and 54g in girls. Major sources of lipids were palm oil and coconut milk. The daily fiber intake was only 9.8g in housewives, 5g in boys, and 5g in girls which were lower than the RDA of 30g/d. The daily mean total intake of sugar in housewives was 29.5g with 0.1g glucose, 0.1g fructose, 29.1g sucrose, and 0.3g lactose. The daily mean total intake of sugar in children was 32.3g/d with glucose 0.4g/d, fructose 0.6g/d, sucrose 30.3g/d, and lactose 1.1g/d, respectively. There was no relationship between sugar intake and obesity.

### Conclusion

Despite the similar energy intake with RDA, prevalence of overweight and obesity was high, which suggest that current RDA is high. Lipid and saturated fatty acid intakes were very high mainly from palm oil and coconut milk. Fiber intake was too low in all groups. The present Indonesian food habits and meals carry a high risk of life-style related diseases. We established the Indonesian sugar composition table. Although we expected that high sugar intake was one of the factors of overweight and obesity, intake was normal.

## 要旨

背景と目的：生活習慣病はインドネシアで主要な死亡原因であり、成人と子供の過体重および肥満の有病率とともに増加している。ジャカルタは、インドネシアでも、過体重と肥満の割合が最も高い。経済発展と生活習慣の変化の結果、砂糖摂取が増加したことが、肥満などの原因になっている可能性があります。しかし、インドネシアには糖類成分表がなかったので作成した。主婦と10歳の子どもの主要栄養摂取量と糖類摂取量を調査し、過体重および肥満との関係を調べた。

研究1：乳児から高齢者の健康診断を実施する地域保健センターがあります。ジャカルタの7つのコミュニティに連絡し、4つのコミュニティからの許可を得た。被験者として86名の主婦を選んだ。体位測定は地域保健センターで実施した。栄養調査は、各家屋を訪問して非連続3日間の24時間思い出し法で実施した。

研究2：ジャカルタの7つの公立小学校に調査依頼を行い、3校から許可が得られた。調査対象は、10歳の子供90人（男子42人、女子48人）であった。栄養調査のために、学校を訪問して3日間の非連続日の24時間の食事リコール方法を実施した。訪問中に体位測定を行った。

研究3：インドネシアの糖類成分表作成のために、104品目の糖含量（グルコース、フルクトース、スクロースおよびラクトース）を酵素分析法によって分析した。また、自家製のスナックと飲み物のレシピを集め、それらに含まるスクロースの含有量を計算した。糖類成分表には41種類、自家製スナックと飲み物38種類を入れた。

研究4：主婦および児童の糖類摂取量を明らかにするために、非連続3日間の24時間思い出し法で食事調査を行った。

結果：過体重および肥満率は主婦で47%、男子で49%、女子で40%であった。毎日のエネルギーとタンパク質の摂取量は、主婦では2159 kcalと55.7 g、男子では2027 kcalと56 g、女子では2109 kcalと58 gであった。インドネシアのRDAと比較して、すべてのグループはRDAに近いが、BMIの結果と矛盾していた。毎日の平均脂質および飽和脂肪酸摂取量は、主婦では85.7gおよび50.4g、男子では92gおよび50.4g、女児では95gおよび54gであった。主な脂質源はパーム油とココナッツミルクであった。1日あたりの食物繊維摂取量は主婦で9.8g、男子で5g、女子で5gで、RDA 30gより低かった。1日あたりの糖類摂取量は、主婦でグルコース0.1g、フルクトース0.1g、スクロース29.1g、乳糖0.3gで合計29.5gであった。小児の糖類摂取量は、グルコース0.4g、フルクトース0.6g、

スクロース 30.3g、ラクトース 1.1g で、合計は 32.3g であった。砂糖摂取と肥満との間には関連がなかった。

結論：エネルギー摂取量はRDAに近いものの、過体重および肥満率は高かった。そのことはエネルギーのRDAが高すぎることを示唆している。脂質および飽和脂肪酸の摂取量は、主にパーム油およびココナッツミルクの高摂取量に起因していた。繊維摂取量はすべてのグループで非常に低かった。現在のインドネシアの食習慣は、生活習慣病のリスクが高いものと言えよう。糖類成分表を作成し摂取量を計算したが、糖類の摂取量は、正常範囲で、過体重および肥満の要因ではないことが示唆された。