Estimation of Salt Intake using List-Assisted RDD Sample

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Background

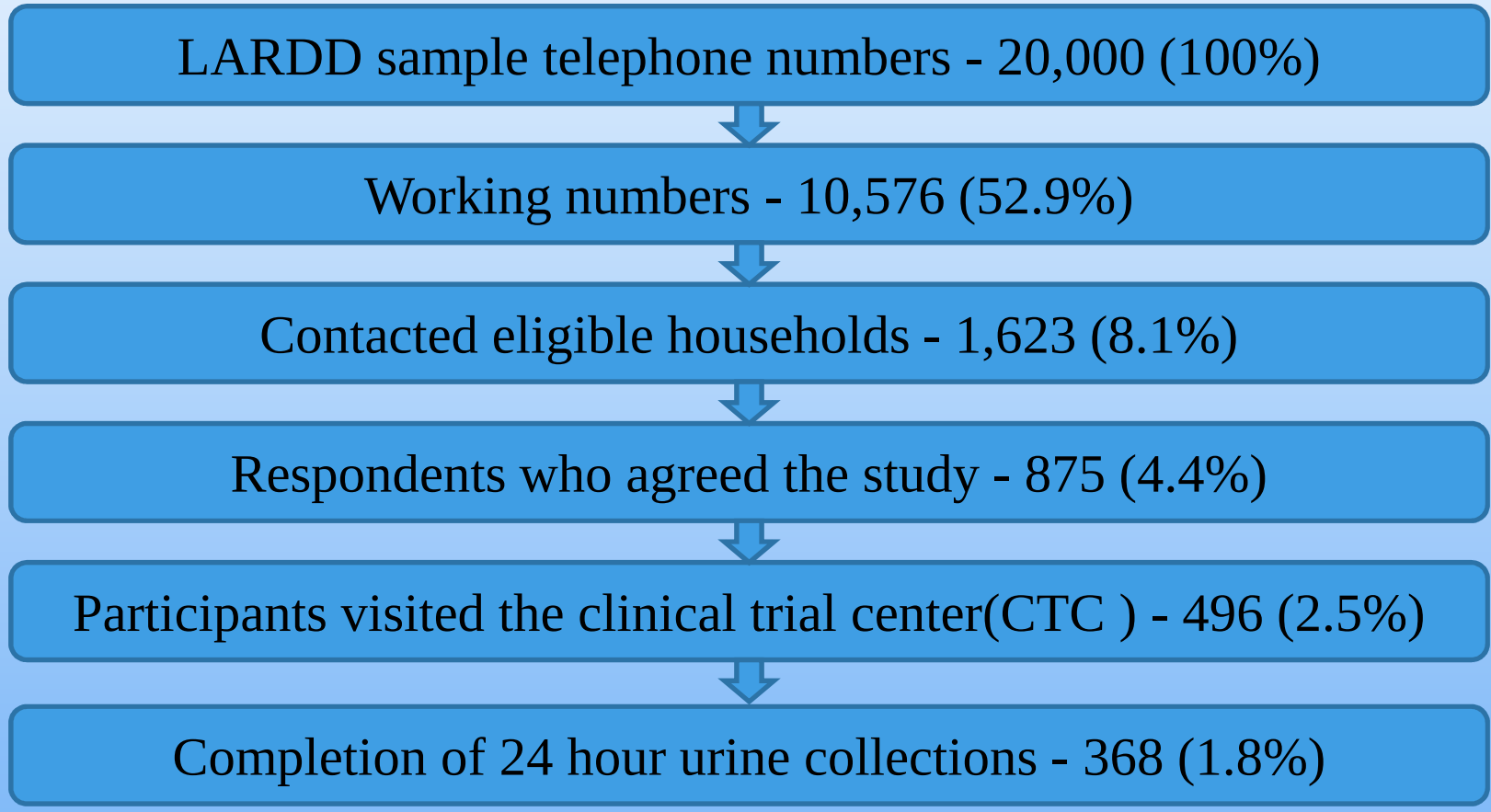
- Sodium is the essential nutrient to maintain our body homeostasis
- The sodium intake is still measured by a dietary survey with 24-hour recall method in many countries, although the method depends on the memory of the respondents
- The surveys of 24-hour urinary sodium excretion have been used in very few countries
- It is important to select a representative sample in conducting the study on salt intake

Conducting the RDD Survey

- Population: Adults aged between 20 and 65 in a large city (About 0.6 million)
- Sample Design: List-Assisted Random Digit Dialing(LARDD)

  Within-household random selection
- Target Sample Size: 500
- Survey Period: April to October, 2011
- Data Collection: Computer-assisted telephone interviewing (CATI)

Survey Protocol



Distribution by Gender

Gender	Completion		Census
	Frequency	Percent	Percent
Male	155	42.1	49.0
Female	213	57.9	51.0
Total	368	100.0	100.0

Distribution by Age Groups

Age	Completion		Census
	Frequency	Percent	Percent
20-29	20	5.4	18.7
30-39	55	14.9	25.6
40-49	163	44.3	31.3
50-59	93	25.3	18.5
60-65	37	10.1	5.9
Total	368	100.0	100.0

Distribution by Area

Area	Completion		Census
	Frequency	Percent	Percent
Deogyang-gu	134	36.4	41.8
Ilsandong-gu	122	33.2	28.9
Ilsanseo-gu	112	30.4	29.3
Total	368	100.0	100.0

Weight Adjustments

1) RDD initial weight

$$W_{initial} = \frac{\text{total number of telephone numbers in the sample frame}}{\text{total number of telephone numbers that were randomly sampled from sampling frame}}$$

2) Nonresidential numbers adjustment

$$A_1 = \begin{cases} 0 & \text{if out of scope} \\ P_{in-scope} & \text{if unresolved} \\ 1 & \text{otherwise} \end{cases}$$

Weight Adjustments

3) Household non-response adjustment

$$A_2 = \frac{\text{sum of weights for all sampled households}}{\text{sum of weights for respondent households}}$$

4) Person-level weight

$$A_3 = \frac{1}{\text{probability of within}-\text{household selection}}$$

Weight Adjustments

5) Person non-response adjustment

$$A_4 = \frac{\text{sum of weights for all sampled selected members}}{\text{sum of weights for respondent selected members}}$$

6) Person adjustment for refusal of invitation or incomple tion

$$A_5 = \frac{\text{sum of weights of respondent selected members in an age} - \text{sex category}}{\text{sum of weights of completion selected members in an age} - \text{sex category}}$$

Weight Adjustments

7) post-stratification to match the population size by age, sex and region

$$A_6 = \frac{\text{population estimate for a post}-\text{stratum}}{\text{sum of weights of completion selected members in a post}-\text{stratum}}$$

- Categories for a post-stratum

Age	20-29	Gender	Male
	30-39		Female
	40-49	Region	Deogyang-gu
	50-59		Ilsandong-gu
	60-65		Ilsanseo-gu

Weight Adjustments

- Final weight

$$W_{final} = W_{initial} \times A_1 \times A_2 \times A_3 \times A_4 \times A_5 \times A_6$$

$$\sum W_{final} = 585,236$$

Estimation

- Weighted Mean

$$\bar{y} = \frac{\sum_i W_{final} y_i}{\sum_i W_{final}}$$

Results

mmol/day

Excretion	Standard Error	95% Confidence Interval	
166.38	4.53	157.47	175.30

WHO recommendation: below 85 mmol sodium/day

Results

mmol/day

Age	Excretion	Standard Error	95% Confidence Interval	
20-29	144.45	10.87	121.69	167.20
30-39	168.28	11.09	146.06	190.50
40-49	179.14	6.51	166.28	191.99
50-59	166.47	8.15	150.28	182.65
60-65	159.62	13.60	132.03	187.20

Results

mmol/day

Gender	Excretion	Standard Error	95% Confidence Interval	
Male	182.00	8.31	165.59	198.40
Female	151.37	4.39	142.72	160.02

Discussion

- We successfully applied LARDD sampling and telephone interviews to recruit a representative sample of a large city population in Korea
- Our approach would be useful for collecting the 24-hour urinary data in a national survey