III. MATERIAL AND METHODS

A. TIME AND PLACE

The research was conducted in Bogor rural area, which specifically located in three sub-district; Dramaga, Ciampea, and Ciomas. The study began in June 2012 and completed in November 2012. Bogor rural area was selected because of its highest prevalence of CHD among other areas in West Java province, amounting to 12.1% (Riskesdas 2007).

B. DESIGN

The study was conducted with a cross sectional design, which describe the prevalence of intake in the population at a point in particular time. The selection of design was done because the data collection was performed at one time to describe the sample characteristics and the relationships between variables (Singarimbun & Effendi 1989). The consumption data from individual subject was collected by using Food Frequency Questionaire methods.

C. RESEARCH STAGES

The research was conducted through several major stages; determination of respondent, data collection, and data processing and analysis.

1. Determination of Respondent

The target population was a group of men and women live in Bogor rural area, West Java Province. The number of samples was determined based on the estimated proportion of the population variable with 95% confidence level and was calculated using the following formula (Snedecor & Cochran 1967),

\[ N = \frac{Z^2 \times P(1 - P)}{d^2} \]

where,

\( N \) = optimum sample size
\( d \) = Maximum error or difference between the sample mean and the population mean
\( P \) = True proportion of factor in the population, or the expected frequency value, in this study is CHD prevalence in Bogor rural area
\( z \) = Area under normal curve corresponding to the desired confidence level

The research was expected to have d value of 10%. The Z value for confidence level 95% is 1.96. The prevalence of CHD in Bogor district is 12.1% (Riskesdas 2007), thus,

\[ N = \frac{1,96^2 \times 0,121(0,879)}{0,1^2} = 41 \]
Based on calculations above, the minimum number of samples which representative to the population was 41 persons, which was rounded up to 50 to anticipate subjects drop out hence the total respondent was 100. Respondents were chosen based on several limited conditions; age between 25-65 years old, body mass index range from 18-27, healthy or not being in treatment to cure a disease in the research time, and willing to participate as respondent.

2. Data Collection

a. Data Type and Method of Collection

There were two types of data collected; primary and secondary data. Primary data consisted of respondent socioeconomic and nutritional status, food consumption, blood pressure, and total blood cholesterol level. Meanwhile, secondary data collected including Bogor sociodemographic characteristic and food composition database of plant sterol content. The plant sterol database was required to estimate the intake of plant sterols in respondents. Briefly, data type and method of collection are depicted in the Table 7.

<table>
<thead>
<tr>
<th>No</th>
<th>Data</th>
<th>Method of Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary Data</td>
<td></td>
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<tr>
<td>1</td>
<td>Socioeconomic status of respondents</td>
<td>Interview by using questionnaire</td>
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<td></td>
<td>(see Appendix 1)</td>
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<td>2</td>
<td>Food consumption</td>
<td>Interview by using food frequency questionnaire</td>
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<td>3</td>
<td>Nutritional status based on body mass index</td>
<td>Anthropometric measurement by using microtoise (d = 0,1 cm) for body height and body weight scale (d = 0,1 kg)</td>
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<td>4</td>
<td>Blood pressure</td>
<td>Blood pressure measurement, performed by medical professional</td>
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<tr>
<td>5</td>
<td>Total blood cholesterol</td>
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<tr>
<td></td>
<td>Secondary Data</td>
<td></td>
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<td>6</td>
<td>Bogor sociodemographic characteristic</td>
<td>The website of Bogor rural area and Bogor Regional Census 2010</td>
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<td>7</td>
<td>Data of plant sterols content in foods</td>
<td>- USDA SR-24 food database and other related journals or scientific publication</td>
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<td></td>
<td></td>
<td>- Calculation based on recipe</td>
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</tbody>
</table>

b. Food Frequency Survey (Suparias et al. 2001)

The principle of this method is to record the consumption frequency of certain foods or food ingredients during a month backward. Recapitulation then performed to get an overview of food consumption patterns qualitatively. To obtain
quantitative data, the number of individual food consumption was asked by using household scale (spoon, bowl, etc) or other measures commonly used in everyday life and then converted to units of weight (grams). The preparation and food brand was also recorded.

Interview was done by using a set of questionnaire or Food Frequency Questionnaire (FFQ) (see Appendix 2) and a list of several plant sterols containing food products grouped according to the main raw materials, consumption, and processing (see Appendix 3). Since the plant sterols are exist in almost all plants and food products containing plant material (Piironen & Lampi 2004), the question was not limited to the list.

3. Data Processing and Analysis

Prior to the data processing and analysis, checking the completeness of data in the questionnaires, entry, and cleaning are part of data management which should be performed carefully. The entire primary data inputted to Microsoft Office Excel 2010 for Windows and then coded to facilitate data cleaning and processing. Cleaning data was performed to check the consistency of data and clean up all the data from error which probably occurred in the input stage. Processing and analysis then performed to data which had been cleaned and tabulated.

The data for analysis of food consumption and plant sterols intake were re-categorized into 12 food groups; (1) beverages, (2) cereals and cereal products, (3) egg and egg products, (4) fish and fish products, (5) fruits and fruit product, (6) herbs, spices, and condiments, (7) meat and poultry products, (8) legumes and legume products including nut, (9) plant sterols fortified products, (10) snack foods, (11) supplements, (12) vegetables and vegetable products. The data analysis included respondent characteristics, food consumption, calculation of plant sterols content in food consumed, daily intake of plant sterols, and correlation between plant sterols intake with blood cholesterol levels. Food consumption and plant sterols intake of each group was calculated for total respondent per capita per day and eater only.

a. Respondent Characteristics

Respondent characteristics including socioeconomic and health characteristics of the respondents were analyzed descriptively. Variables processed including age, education level, occupation, family size, income per capita, BMI, blood pressure, and blood cholesterol levels. Descriptive analysis performed by using PASW Statistics 18 software from SPSS Inc.

b. Plant Sterols Content in Foods

The amount of each food consumed data obtained from questionnaires was converted to grams and calculated its plant sterol content. The calculation was done using plant sterols database compiled from various sources, including the USDA SR-24 food database and other scientific journals or publications. The conversion is done by the following formula,
\[ PSC_j = W_j \times (P_j/100) \times (F/100) \]

where,

- \( PSC_j \) = plant sterols content in food-j
- \( W_j \) = weight of food-j consumed (g)
- \( P_j \) = plant sterol content in food-j according to database (mg/100 g edible portion)
- \( F \) = edible percentage of food-j

Although the content of plant sterols in food materials or products \( (PSC_j) \) could be obtained from various sources including USDA SR-24 food database and other scientific journals or publications, there was a possibility of secondary data is not available for some food items consumed by respondents. For these items, several methods were performed.

1. Assigned values from similar products or proportions of products listed in secondary data
2. Assigned values based on calculations of standard recipes with ingredients listed in secondary data. The recipes were obtained from interview using FFQ.
3. Plant sterols content was set to zero due to pure animal origin or due to ingredients not containing plant sterols

### c. Plant Sterols Intake

Daily plant sterols intake was calculated by using formula as followed,

\[ DPI_j = PSC_j \times F/30 \]

where,

- \( DPI_j \) = daily plant sterols intake from food j
- \( PSC_j \) = plant sterols intake from food-j
- \( F_j \) = the consumption frequency of food-j in a month

Once daily intake of plant sterols obtained, the score between the groups (male and female) was statistically compared by Independent Sample T-Test using PASW 18 software from SPSS Inc. to figure whether there are a significant difference between plant sterols intake in male and female respondent.

### d. Analysis of Relationship between Plant Sterols Daily Intake and Total Blood Cholesterol

The relationship between daily plant sterols intake and total blood cholesterol was analyzed using Pearson correlation test using software PASW 18 SPSS Inc.