

## **BAB III**

### **RESEARCH METHODS**

#### **3.1 Types of Research**

In this study, the author used a quantitative research method. According to Sugiyono (2018), quantitative research is a type of research that aims to study a specific population or sample. Sampling is done randomly, and the instruments used to collect data are used to analyze the data. The quantitative research paradigm considers how research variables are causally related to each other (Sugiyono, 2018).

The author collected data using a survey method. A survey is a type of research that uses a questionnaire as a data collection tool. A questionnaire is a list of written questions or statements that respondents must answer or complete according to instructions (Sanjaya, 2015).

#### **3.2 Research Time and Research Place**

In this study, the author chose at SDN Tasikmadu 1 Malang, located in the Tasikmadu sub-district, Mojolangu district, Malang city. The author conducted the research in Mei 2025. The author chose this location because, based on initial observations made by the researcher, one of them was that many children had found bad eating patterns at the school, and they already understood the situation and conditions in the school's surroundings. Therefore, the researcher chose at SDN

Tasikmadu 1 Malang as the location for conducting the Final Project research.

### **3.3 Research Population and Sample**

#### **3.3.1 Population**

According to Sumargo (2020), a population is a collection of units or objects that share similar characteristics. Meanwhile, according to Roflin and Liberty (2021), a population is a term that refers to the individuals being studied or their characteristics being studied.

According to Sugiyono in Hermawan (2019), a population is a general area consisting of subjects or objects that have certain characteristics that have been determined by researchers to be studied and conclusions drawn about them. The population includes not only the number of subjects or objects examined, but also humans and other natural objects. Researchers must be able to define their research population with clear boundaries. The number of people studied is called the population size or population size, and  $N$  is the symbol for population size. This study involved 145 respondents from grades 4-6 at SDN Tasikmadu 1 in the Tasikmadu area.

#### **3.3.2 Sample**

A sample is a subset of a population. This phrase has two meanings. First, every unit in the population must have a chance of being used as a sampling unit. Second, the sample must be drawn from a small

population or from an estimate of it, meaning the sample size must be sufficient to represent the population (Roflin and Liberty, 2021).

According to Pabundu Tika in Hermawan (2019), a portion of the subjects or objects that represent a population is called a sample. A sample that does not match the quality and characteristics of the population can cause research to be biased and unreliable, leading to incorrect conclusions. This is because it cannot represent society. The sample for this study consisted of 100 respondents taken from the population of students in grades 4-6 at SDN Tasikmadu 1 Malang. The sample in the study must meet the criteria set by the researcher with inclusion and exclusion criteria, so that it is in accordance with the researcher's criteria.

How to calculate the number of samples using the Slovin formula according to Wahyudi (2017), as follows:

$$n = \frac{N}{1+Ne^2}$$

Information :

n = Sample Size

N = Population Size

e = Selected error rate

Calculation of sample size:

$$n = \frac{N}{1+Ne^2}$$

$$n = \frac{145}{1+145 (0,05)^2}$$

$$n = \frac{145}{1+145 (0,0025)}$$

$$n = \frac{145}{1+0,3625}$$

$$n = \frac{145}{1,3625}$$

$$n = 100$$

So, the sample taken was rounded up to 100 respondents with an addition of 5% to prevent sample reduction.

### 3.3.3 Inclusion and Exclusion Criteria

#### a. Inclusion Criteria

Inclusion criteria are characteristics of research subjects from a target population that are within the scope and are being studied (Nursalam, 2017). Inclusion criteria in research include the following:

- 1) Willing to be a research respondent
- 2) Composmentis consciousness

- 3) Students in grades 4-6 at SDN Tasikmadu 1 Malang
- 4) Cooperative in research

#### b. Exclusion Criteria

Exclusion criteria are characteristics of research subjects from a target population that cannot be reached or used for research (Nursalam, 2017). Exclusion criteria in research include the following:

- 1) Sick student.
- 2) Students who were not present during the study.
- 3) In addition to students in grades 4-6 at SDN Tasikmadu 1 Malang

#### **3.3.4 Sampling**

Sampling techniques are the methods used to obtain samples. Various sampling techniques are used to determine the sample size for research. Sampling methods are essentially divided into two groups: probability sampling and non-probabilistic sampling (Sugiyono, 2018).

This research uses the technique *sampling nonprobability* with the total sampling technique, namely the number of samples is determined according to the population size.

### **3.4 Methods of Data Collection**

#### **3.4.1 Data Primer**

Primary data is data collected or obtained directly by the author. According to Nazir in his book, "Research Data Analysis" (2019), primary data is data collected or obtained directly from the research subject or field, such as through measurements, observations, or interviews.

Primary data was collected from respondents who met specific criteria for this study. A questionnaire from grades 4-6 at SDN Tasikmadu 1 Malang served as the primary data source for this study. This primary data was obtained through questionnaires distributed and completed by selected individuals. The primary data for this study were respondents' responses to their dietary patterns.

#### **3.4.2 Data Seconds**

Secondary data is used to supplement existing data from primary data or previous research (Sugiyono, 2019). In this study, the secondary data used by the author was obtained from previous research, such as books, journals, articles, and the like. Secondary data consists of writings that support or strengthen the existing primary data.

### 3.5 Data Collection Tools

A research instrument is a measuring tool that can assist in collecting data. The instruments used in data collection are as follows:

a. Questionnaire A

It is a measuring tool used to record respondent characteristics such as name (initials), age, gender, education, and behavioral assessments regarding nutritional needs.

According to Purwanto (2012), the scores for the answers to the questionnaire describing eating patterns using the Likert scale are:

- a) Always = 5,
- b) Often = 4,
- c) Sometimes = 3,
- d) Seldom = 2
- e) Never = 1

b. Questionnaire B (FFQ)

Measuring eating patterns in DM patients using a *Food Frequency Questionnaire (FFQ)* This questionnaire consists of several questions regarding the patient's daily food intake, meal schedule, type of food, and quantity (Suprapti, 2017). Code 1 indicates high, code 2 indicates moderate, and code 3 indicates low. This FFQ questionnaire uses a formula that can be categorized. For manual calculations, the formula is: weight of the ingredient/100 x

nutritional content in the TKPI.

According to Sirajuddin et al. (2018) the FFQ answer scores

are:

- a) Never = 0,
- b) 2x/month = 1,
- c) 1-2x/week = 5,
- d) 3-6x/minggu = 15,
- e) 1x/day = 25
- f) >3x/hari = 50

FFQ measurements are divided into 3 categories, namely:

- a) High (> 452)
- b) Medium (236-452)
- c) Low (< 236)

c. Questionnaire C (*FINDRISC*)

The Finnish Diabetes Risk Score (*FINDRISC*) was developed by Lindström and Tuomilehto for the Finnish Diabetes Association. This measurement tool is simple, inexpensive, non-invasive, reliable, and rapid. It has been validated to identify individuals at high risk for type 2 diabetes mellitus based on 10 years of prospective data from a population-based cohort (Lindström & Tuomilehto, 2003). This detection is necessary to identify individuals at risk of diabetes mellitus and enable them to

begin adopting a series of necessary lifestyle changes in the short term to inhibit the progression of the disease to diabetes mellitus.

Detection of the development of type II diabetes mellitus using the validated *FINDRISC* measuring tool, which contains eight components including: body mass index (BMI), waist circumference, physical activity, vegetable and fruit consumption, family history of DM, maternal history of gestational DM, birth weight, *screen time*. At the end of the risk assessment process, each respondent will be informed of their health and well-being score. The participant's total risk score is summarized from the scores of each of the different components, followed by analysis and comparison. The total risk score is classified as follows:

- a) < 4 (low risk);
  - b) 5 - 9 (moderate risk);
  - c) > 10 (high risk).
- d. Nutritional status

Nutritional status is determined by measuring weight and height using paper and pen. The weight measurements are processed and converted into standard values for child anthropometry. Weight can also be combined with height to determine a child's BMI. The classification of BMI data for nutritional status uses the following categories according to the Indonesian Ministry of Health (2014):

- a) Obese ( $> 26$ ).
- b) Fat (23.8 - 26.0).
- c) Normal (14,6 - 23,8).
- d) Thin ( $< 14.6$ ).

### **3.6 Research Variables**

#### **3.6.1 Independent Variables**

According to Sugiyono (2017) "Independent variables in Indonesian are often referred to as free variables. The free variable (X) is a variable that influences or gives rise to the dependent variable (bound variable).

Therefore, the independent variable, or free variable, is the factor that causes the dependent variable, also known as the dependent variable. Diet is the independent variable in this study.

#### **3.6.2 Dependent Variable**

According to Sugiyono (2017), "Dependent variables in Indonesian are often referred to as bound variables. The bound variable (Y) is the variable that is influenced or the variable that is the result of the presence of the independent variable.

So, the variable that arises from the presence of the independent variable is the dependent variable. Here, the dependent variable is the risk of developing diabetes mellitus.

### 3.7 Operational Definition

Operational variables are the parts that determine the variables that can be measured by looking at the dimensions (indicators) of the variables (Juliansyah Noor, 2017).

Table 3.1 Operational Definition of the Relationship between Diet and the Risk of Diabetes Mellitus in Elementary School Children Grades 4-6 at SDN Tasikmadu 1 Malang.

NO	Research Variables	Operational Definition	Parameter	Instrument	Scale	Score
1	Independent Variables: Dietary habit	Assessment to regulate the amount and type of food consumed by the body to maintain health and nutritional status	1) Type of food 2) Meal frequency	Questionnaire sheet (FFQ)	Ordinal	1 = High (> 452) 2 = Moderate (236-452) 3 = Low (< 236)
2	Dependent Variable: Risk of developing DM	Assessment to determine the risk of developing DM	1) IMT 2) Waist circumference 3) Dietary habit 4) Physical activity 5) Family history of DM 6) Maternal history of gestational diabetes mellitus 7) Birth weight 8) <i>Screen time</i>	<i>FINDRISC</i> questionnaire sheet	Ordinal	1= Low risk (<4) 2= Moderate risk (5-9) 3= High risk (>10)

### 3.8 Operational Framework

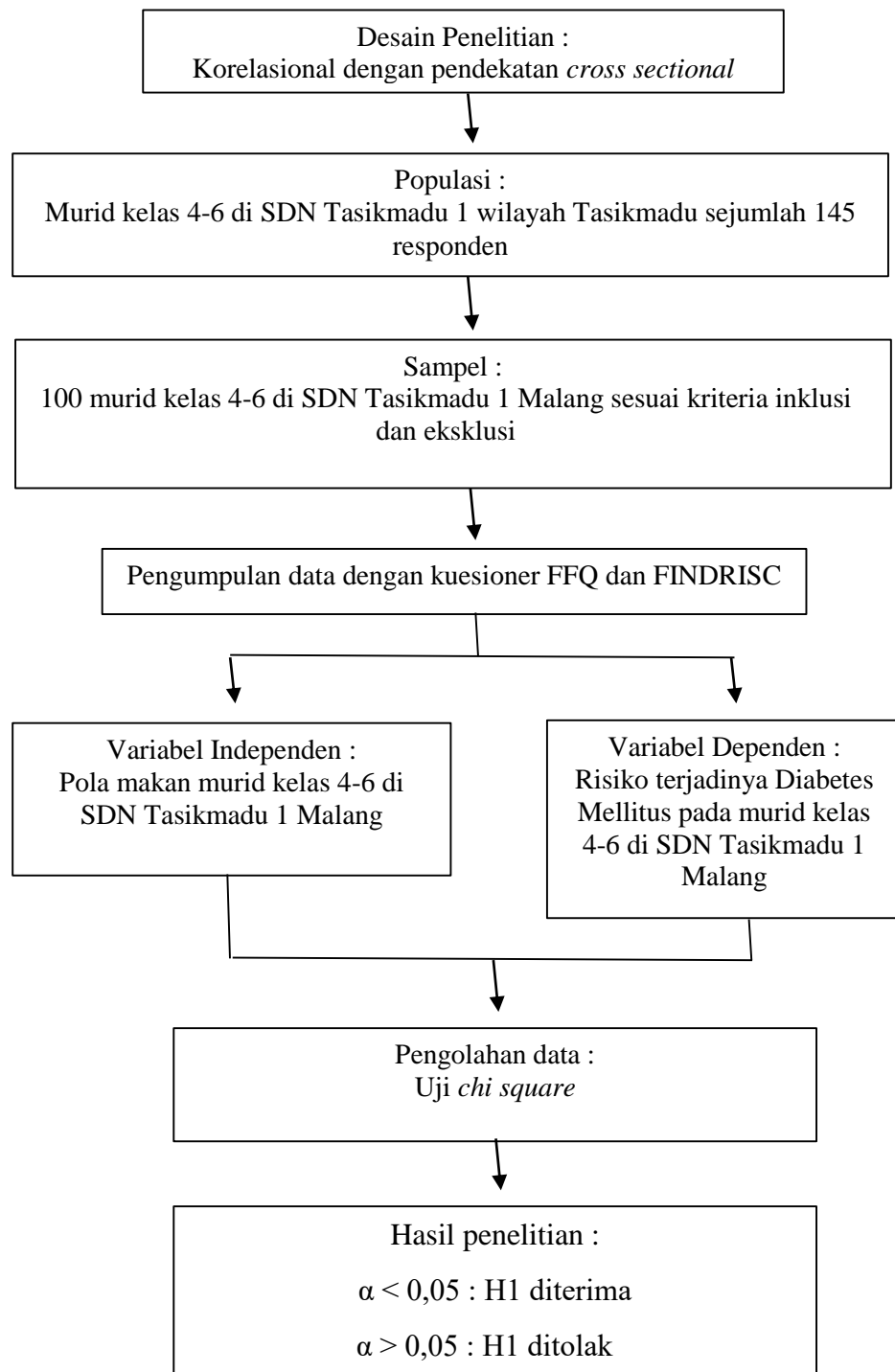


Figure 3.1 Operational Framework of the Relationship between Diet and the Risk of Diabetes Mellitus in Elementary School Children Grades 4-6 at Elementary School Tasikmadu 1 Malang

### 3.9 Data Processing and Analysis Methods

#### 3.9.1 Data Processing Method

a. Editing data

Editing means checking the accuracy of data obtained or collected from respondents through a dietary questionnaire. Editing can be done once the data has been collected. (Swarjana, 2015)

b. Coding data

This stage is where researchers convert letter-based data into numbers. Coding speeds up data entry and facilitates analysis. (Swarjana, 2015)

c. Scoring

Determining a score or value for each question item and determining the lowest and highest values. This stage is carried out after determining the answer code or observation results so that respondents' answers or observations can be scored.

According to Sirajuddin et al. (2018), the scores in dietary patterns (FFQ) are:

- a) Never = 0,
- b) 2x/month = 1,
- c) 1-2x/week = 5,
- d) 3-6x/minggu = 15,
- e) 1x/day = 25
- f) >3x/hari = 50

Measurement of consumption patterns is divided into 3 categories, namely:

- a) High ( $> 452$ )
- b) Medium (236-452)
- c) Low ( $< 236$ )

Measurement of total risk score is divided into 3 categories, namely:

- a) Low risk ( $< 4$ )
- b) Moderate risk (5 - 9).
- c) High risk ( $> 10$ ).

Classification of BMI data on nutritional status using categories according to the Indonesian Ministry of Health (2014) is as follows:

- a) Obese ( $> 29$ ).
  - b) Fat (23.8 - 26.0).
  - c) Normal (14,6 - 23,8).
  - d) Thin ( $< 14.6$ )
- d. Tabulating

This is very important because it will facilitate statistical data analysis. Tabulation can be done manually or by using various software or programs available on the computer (Swarjana, 2015).

### 3.9.2 Data Analysis and Presentation

#### a. Univariate analysis

It is an analysis data obtained from collecting data results displayed in the form of a frequency distribution table, central tendency measure or graph. If the data has a normal distribution, then the mean is used with the measure of severance and the standard deviation (SD) is used as the spread, while data that is not normally distributed then the mean value should be used as the measure of severance and the maximum-minimum is used as the spread (Saryono & Anggraeni, 2013). The univariate analysis test of the characteristics research used is age, gender, education, occupation using a nominal scale and the data analysis is the mode value, mean, minimum-maximal, and standard deviation (SD).

#### b. Bivariate analysis

This is an analysis used to respond to the interaction of 2 or more variables, comparative, associative or correlative. In bivariate analysis tests, there are also parametric and non-parametric tests (Saryono & Anggraeni, 2013).

This research uses a correlative hypothesis statistical test to determine the relationship between the independent and dependent variables, both nominal and ordinal. One statistical test that can be used in this analysis is the chi-square test, which is used to test the agreement between observed frequencies and expected frequencies.

Furthermore, the chi-square test can be used to test the hypothesis that population characteristics are the same or uniform (homogeneous), also known as the homogeneity test. In this study *Uji Chi Square*. Using a homogeneity test approach, this was used to determine whether there was a relationship between respondents' dietary patterns and their likelihood of developing diabetes mellitus. The results of the test analysis were as follows:

1. Significant results indicate a relationship with the sample studied. If the significance level is less than 0.05, it can be concluded that  $H_0$  is rejected, otherwise  $H_1$  is accepted.
2. An insignificant result means there is no relationship with the sample studied. If the significance level is greater than 0.05, it can be concluded that  $H_0$  is accepted, otherwise  $H_1$  is rejected.

### **3.10 Research Ethics**

According to Hidayat (2014), research ethics are needed to avoid unethical actions in conducting research, so the following principles are applied:

- 1) Informed consent form

The consent form contains an explanation of the research being conducted, its objectives, the research procedures, the benefits to respondents, and potential risks. The statements in the consent form are clear and easy to understand so that respondents know how the

research will be conducted. Respondents who are willing to participate must complete and sign the consent form voluntarily.

2) Anonymity

To maintain confidentiality, researchers do not include the names of respondents, but only code the sheet.

3) Confidentiality

Confidentiality means not informing data and research results based on individual data, but data is reported based on groups.

4) Voluntary

The researcher is voluntary and there is no element of coercion or pressure, directly or indirectly, from the researcher to potential respondents or samples to be studied.