# CHAPTER IV
# RESEARCH METHODS

## A. Types of Research and Research Design

This type of research is a quantitative research with a quasi-experimental design using a pre-test post-test control group design. This design was used to study the influence of independent variables, namely *Playdough* play therapy and *loose parts play* , on dependent variables, namely cognitive development in early childhood.

Respondents were divided into 2 groups, namely the intervention group and the control group. The intervention group received *Playdough* play therapy treatment and *loose parts play* and the control group received Puzzle play therapy treatment, then measurements were taken. The results of this observation were compared between the intervention group and the control group.

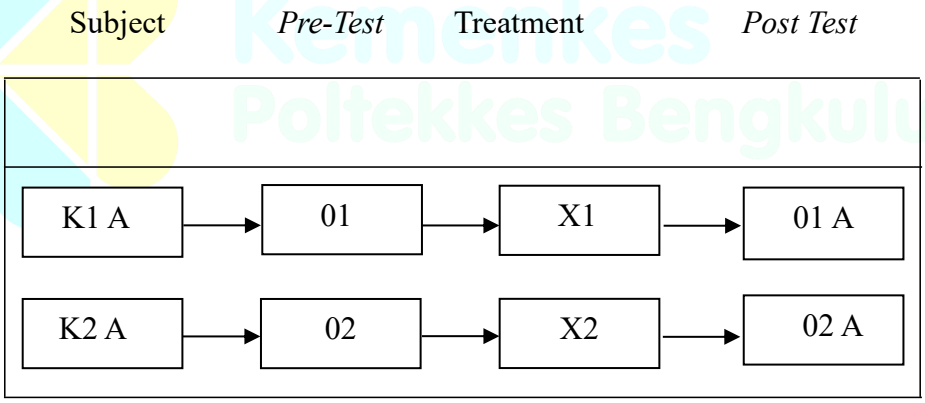


**Chart 4. 1** Research Design

**Description :**

K1 A : Respondents in the intervention group

K2 A : Respondents in the control group

01 : Calculation of cognitive development before treatment in the intervention group

02 : Calculation of cognitive development before treatment in the control group

X1 : Provided play therapy *Playdough* and *Loose Parts Play*

X2 : Provided play therapy *Puzzle*

01 A : Calculation of cognitive development after being given play therapy *Playdough* and *Loose Parts Play*

02 A : Calculation of cognitive development in the control group given play therapy *Puzzle*

## B. Research Variables

1. Independent Variables

   *Playdough* play therapy and *loose parts play*

2. Dependent Variable

   The dependent variable in this study is cognitive development in early childhood

3. Perancu Variables

   The confounding variables in this study were the child's age, gender, parents' last education, parents' work

## C. Research Location and Time

1. Location

   The research was conducted at TKIT Auladuna Sawah Lebar, Bengkulu City

2. Time

   This research was conducted on April 14 - June 14, 2026

## D. Population and Sample

1. Population

   The population in this study is all early childhood children in TKIT Auladuna Sawah Lebar Bengkulu City with an estimated number based on the number of early childhood children in the Kindergarten B group (5-6 years) at TKIT Auladuna Sawah Lebar Bengkulu City in 2026 which amounted to 175 people.

2. Sample

In this study, sample selection was carried out by *simple random sampling* or sample selection was done randomly. The sample in this study is some children aged 5-6 years or the Kindergarten B group at TKIT Auladuna Bengkulu City with inclusion and exclusion criteria, namely:

a. Inclusion criteria

1) The child is registered as a Kindergarten B student at TKIT Auladuna Sawah Lebar, Bengkulu City.
2) Age 5–6 years at data collection.
3) Children who participate in learning activities and obtain written permission from parents/guardians to participate in the research.
4) Children who are present regularly during the implementation of the intervention.

b. Exclusion criteria

1) The child is sick on the day of the pre/*post-test* or during the intervention.
2) *Drop out*: not completing the entire series (*pre-test*, minimum 80% of the intervention session, and *post-test*).
3) Refusal to participate or incomplete identity data.

According to Altman and Bland, (2003) The calculation of the number of samples in this study is determined based on the formula for difference of 2 mean as below:

$$n = \frac{\sigma^2(Z1 - \alpha/2 + Z1 - \beta)^2}{(\mu^1 - \mu^2)^2}$$

Description:

| | |
|---|---|
| $n$ | = Number of samples |
| $Z1 - \alpha$ | = Normal standard deviation for 5% (standard deviation 1.96)αα = |
| $Z - \beta$ | = Standard deviation for 90% (standard deviation =1.28)ββ |
| $\mu^1$ | = Mean score before intervention obtained from literature |
| $\mu^2$ | = Mean score after intervention obtained from the literature |

$\sigma$ = Standard deviation/standard deviation

Based on research Yuniyartika and Sudaryanti (2024), in 30 children aged 5–6 years at Kindergarten Negeri Pembina Sekayu, Musi Banyuasin (South Sumatra) who received game intervention *playdough*, obtained a score *red* before intervention (=46.77) and after intervention (=52.93), with post-intervention SD =7.79(12.00-4.21), measured using cognitive development observation sheets. $\mu^1\mu^2\sigma$

a) Search $n$

$$n = \frac{\sigma^2(Z1-\alpha/2\ + Z1-\ \beta)^2}{(\mu^1-\ \mu^2)^2}$$

$$n = \frac{7{,}79^2(1{,}96+1{,}28)^2}{(46{,}77-52{,}93)^2}$$

$$n = \frac{60{,}62(3{,}24)^2}{(-6{,}16)^2}$$

$$n = \frac{60{,}62.\,10{,}497}{37{,}95}$$

$$n = \frac{636{,}50}{37{,}95}$$

$$n = 16{,}77 = 17$$

*b)* Looking for *a drop out*

n′ = n/(1-f)

n′ = 17/(1-0,1)

n′ = 17/0.9

n′ = 18.89

n′ = 19 people per group

Based on the results of the calculation of sample needs, a minimum of 19 respondents were obtained in each group. In this study, the number of samples was increased to 20 respondents in each group. The addition of one respondent was carried out to anticipate the possibility of *drop-outs* or data that could not be analyzed and to facilitate the division of samples into two groups with the same number, so that the statistical analysis process became more optimal.

## E. Data Collection

1. Data Source

   a. Primary Data

   Primary data is data obtained directly from children aged 5–6 years (kindergarten class B) through structured observation of play activities at TKIT Auladuna Sawah Lebar, Bengkulu City in the Even Semester 2026. By taking data as follows:

   1) Data taken directly from respondents
   2) First, the researcher identified all children who met the inclusion criteria, then conducted *a simple random sampling technique* to determine the children who would be the respondents. Children who are selected through the lottery process are given an explanation to parents/guardians about the goals, benefits, procedures, and rights as research participants (*informed consent*). Parents/guardians who are willing to sign the consent sheet are then designated as respondents and then the respondents are divided into two groups, namely the intervention group and the control group.
   3) Before the intervention was given, both groups underwent *a pre-test* of cognitive development to find out the initial condition. In the intervention group, *playdough* play therapy and *loose parts play* were given 3 times per week with a duration of 15 minutes per session for 2 weeks. In the control group, puzzle playing activities were carried out with the same frequency and duration. After all sessions are completed, a *cognitive development post-test* is carried out to see the score of changes that occur after the intervention.
   4) The results of the recording are then processed by the researcher to obtain the final data that is ready to be analyzed.

   b. Secondary Data

   Secondary data were obtained from school documents (administration/report card/attendance recap) that were relevant for context description and verification of primary data, including: number of

Kindergarten B students, monthly attendance list, date of activity, and class profile (number of teachers, teacher-student ratio). Secondary data are used to validate the sample frame, check the completeness of attendance, and present an overview of the research setting.

2. Data Collection Tools

   The tool used to measure cognitive development is a cognitive development observation sheet containing a table of measurement of cognitive development.

3. Test Data Collection Tools

   Based on research Siregar (2023), the instrument of the observation sheet of the cognitive development of children aged 5–6 years used has gone through the validity test of the contents (*Content validity*) through expert scoring (*Expert judgement*) and analyzed using the Gregory Matrix, with a validity coefficient score of 0.60 which is included in the high validity category. Furthermore, the instrument has also been tested for reliability using Cronbach's Alpha and obtained a score of 0.595, so that the instrument is declared quite reliable and suitable for measuring children's cognitive development.

4. Data Collection Procedure

   The data collection procedures in this study are:

   a. Demographic data was in the form of respondent characteristics, namely initial name, age (month), gender, class (TK B), attendance status during the research period, parent/guardian education. Collected through structured interviews with parents/guardians or through short questionnaires filled out by parents/guardians/teachers.
   b. The results of measuring cognitive development scores using research instrument sheets are observation sheets of cognitive development with the categories of not yet developed (BB), starting to develop (MB), developing according to expectations (BSH), developing very well (BSB).

## F. Data Processing

According to Guo *et al*. (2023), the data that has been obtained from the data collection process will be processed using a computer program with the following steps:

1. *Editing*

   The editing stage is carried out by reviewing the completeness and suitability of the data that has been obtained. The data examined included the characteristics of the respondents (age, gender, parents' last education, and parents' occupation) as well as the results of measuring cognitive development using cognitive development observation sheets. This process aims to ensure that there are no blank, duplicate, or errors in writing.

2. *Coding*

   Provide numerical codes for data consisting of several categories so that it can speed up data *entry*. For example, gender (0 = male, 1 = female), parental education (0 = Basic: elementary, 1 = Secondary: junior high / high school/equivalent, 2 = High: D1–S3), and parental occupation (0 = working, 1 = not working). Cognitive development scores were recorded for pre- and post-intervention measurements.

3. *Entry Data*

   The data that has been coded is entered into the SPSS software version 25. All data were then grouped based on research categories, namely intervention groups and control groups. The entry process is carefully carried out to minimize input errors.

4. *Processing*

   The data that have been entered into SPSS version 25 are analyzed according to the research objectives which include univariate and bivariate analyses. Univariate analysis was used to describe respondent characteristics including age, gender, parents' last education, and parental occupation, as well as to describe the average scores of cognitive development in the intervention and control groups before and after treatment in the form of mean, standard deviation, minimum score, and maximum. Furthermore, bivariate analysis

was carried out to determine the effect of playing *therapy* and *loose parts play* therapy on early childhood cognitive development, using *the Independent T-Test* if the data were normally distributed, and *the Mann-Whitney test* if the data were not abnormally distributed at a confidence level of 95% (α 0.05).

5. *Cleaning*

   The analyzed data is checked again to ensure that there are no input errors, duplicate data, or discrepancies in results. This process is carried out by re-checking the dataset on the SPSS before the results of the study are further interpreted.

## G. Data Analysis

1. Univariate *Analysis*

   A univariate analysis was conducted to describe the characteristics of each study variable which included age, gender, parents' last education, and parental occupation, as well as cognitive development scores in the intervention group and control group before and after treatment. For numerical data such as age and cognitive development scores, univariate analysis is presented in the form of *mean*, standard deviation, median, minimum score, maximum score, and 95% *confidence interval* (CI). Meanwhile, for categorical data such as gender, parents' last education, and parental occupation, frequency and percentage distribution analysis was carried out to describe the characteristics of respondents. The results of the analysis are presented in the form of a table and interpreted descriptively according to the research findings.

2. Bivariate Analysis

   Bivariate analysis began with a data normality test using *Shapiro-Wilk* to determine the distribution of data in the intervention group and the control group. The test results showed that the data were not normally distributed so the analysis of the differences before and after treatment in each group used *the Wilcoxon* test. Furthermore, to determine the effect of *playdough* and

*loose parts play* therapy on early childhood cognitive development, the *Mann-Whitney test was used* to compare the difference in cognitive development scores between the intervention group and the control group with a confidence level of 95% (α = 0.05).

## H. Research Flow

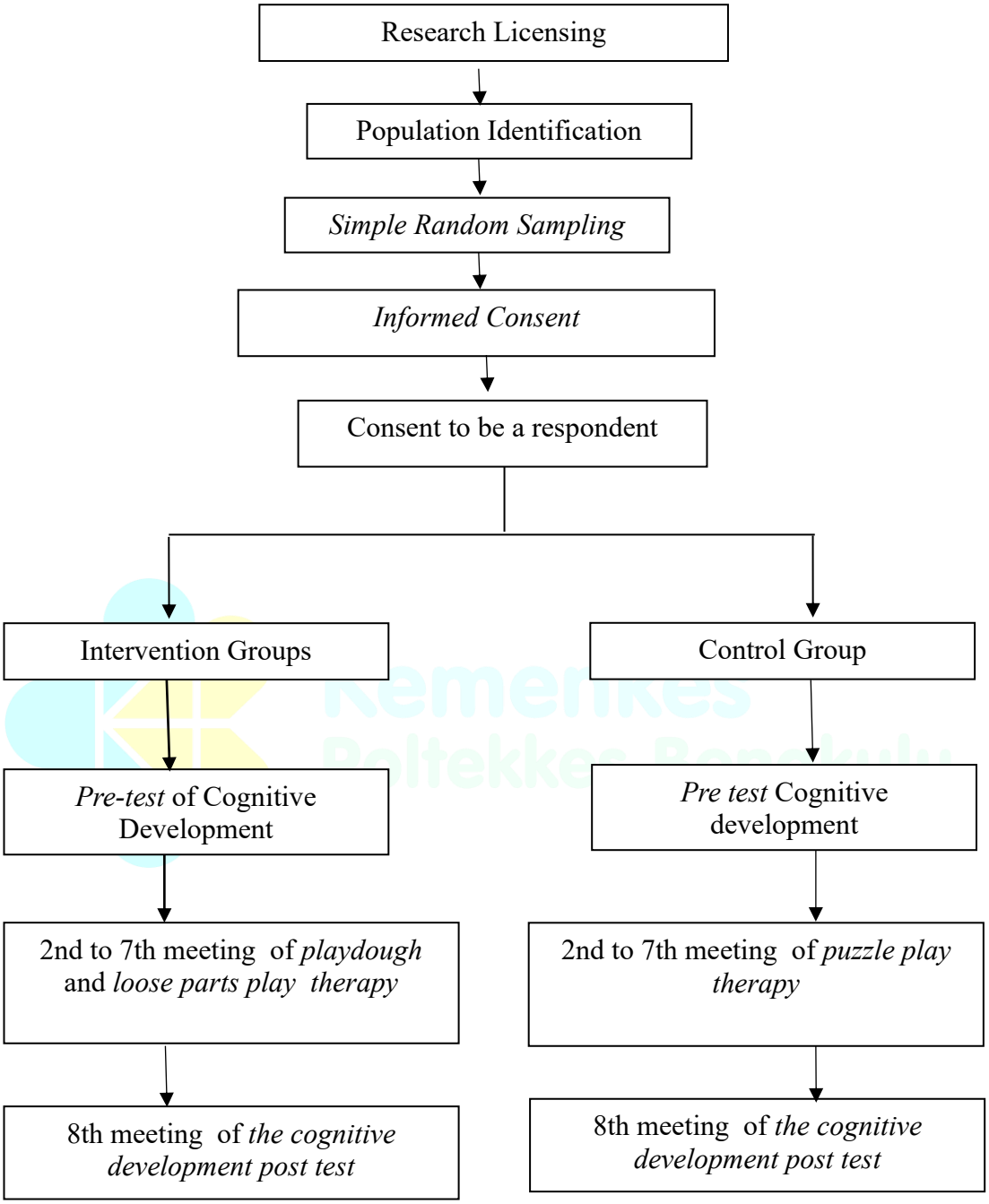


**Chart 4. 2** Research Flow

## I. Research Ethics

The research considers the ethics and legality of the research to protect respondents to avoid all dangers and physical and psychological discomfort. This research has been tested and declared ethically feasible by the KEPK Poltekkes of the Ministry of Health Bengkulu based on the certificate of Ethical Feasibility No. KEPK. BKL/132/02/2026. By considering the following:

1. Right to participate/not be a respondent (*Self determinant)*

   In this study, the parents or guardians of the respondents were given complete freedom to decide whether or not the child was willing to participate without any coercion. The researcher first explains the objectives, benefits, and procedures of the research before requesting consent through informed consent.

2. *Anonymity*

   The respondent's name was listed with the initials on the observation sheet and the researcher only used a number code. The signature is included on the approval sheet made in writing

3. Confidentiality

   The identity of the respondent was not listed in full. The child's name is only written in the form of initials on the observation sheet, while other data uses numerical codes to maintain the confidentiality of the respondents' identities.

4. Justice

   The researcher gave the same treatment to all respondents without distinguishing between background, gender, or other characteristics. All children in the intervention and control groups get the same opportunity in the research process in accordance with the SOPs that have been set. In addition, all respondents were given the same reward as a form of appreciation for their children's participation in the research.

5. The basis of *beneficiation*

   Respondents received benefits in the form of stimulation of cognitive development through *playdough play, loose parts play*, and *puzzle games* according to their respective groups.

6. *Non-Maleficent*

   The researcher ensures that all play activities are carried out according to the SOP that has been prepared, are safe, and do not pose physical or psychological risks to children. During the intervention, children are supervised by classroom teachers and assisted by members of the research team who have understood the procedure for implementing the intervention and cognitive development scoring techniques.

## J. Activity Plan

**Table 4. 1** Activity Plan

| NO | | Moon | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **9** | **10** | **11** | **12** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| 1 | Completion of Research Proposals | | | | | | | | | | | | |
| 2 | Research Proposal Seminar Exam | | | | | | | | | | | | |
| 3 | Revision of Thesis Proposal and Endorsement | | | | | | | | | | | | |
| 4 | Collection of Thesis Proposals to Study Programs | | | | | | | | | | | | |
| 5 | Ethical *Clearance Management* | | | | | | | | | | | | |
| 6 | Management of Introduction and Research Permit | | | | | | | | | | | | |
| 7 | Initial Survey | | | | | | | | | | | | |
| 8 | Implementation of research and data collection | | | | | | | | | | | | |
| 9 | Data Entry, Analysis and Interpretation | | | | | | | | | | | | |
| 10 | Preparation for Writing Results Report | | | | | | | | | | | | |
| 11 | Thesis Exam | | | | | | | | | | | | |
| 12 | Thesis Revision | | | | | | | | | | | | |
| 13 | Thesis Validation with Examiners and Head of Study Program | | | | | | | | | | | | |
| 14 | Thesis Collection to Study Program | | | | | | | | | | | | |
| 15 | Drafting Manuscripts | | | | | | | | | | | | |
| 16 | Submit Manuscripts to Scientific Journals | | | | | | | | | | | | |
| 17 | Submitting the Publication LOA to the Study Program | | | | | | | | | | | | |
| 18 | Collection of Articles That Have Been Published to Study Programs | | | | | | | | | | | | |