CHAPTER IV
RESEARCH METHODS

A. Research Type and Design

The type of research used is quantitative research that uses a pre-experiment with a one-group pre-test post-test design. The intervention group, consists of cancer patients undergoing chemotherapy, which aims to determine the effect of Jacobson's Progressive Muscle Relaxation (JPMR) on alterations in anxiety.

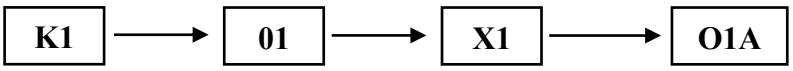

Chart 4. 1 Research Design

Description :

K = Participant receiving the intervention (to be given JPMR)

O = Pre-test (initial measurement using STAI-T before intervensi Jacobson's Progressive Muscle Relaxation diberikan)

X1 = Given Jacobson's Progressive Muscle Relaxation

O1A = Post-test (final measurement using STAI-T after diberikan intervensi Jacobson's Progressive Muscle Relaxation)

B. Research Variables

1. Independent Variables

   The independent variable in this study was Jacobson's Progressive Muscle Relaxation (JPMR).

2. Dependent Variable

   The dependent variable in this study was the level of anxiety in cancer patients undergoing chemotherapy.

C. Research Location and Time

1. Research Location

   The place where this research was conducted was in the Chemotherapy room of dr. M Yunus Bengkulu Hospital.

2. Research Time

The research time was carried out from August 2025 to June 2026. Data collection was carried out for 1 month from May to June 2026,

D. Population and Sample

1. Populasi

A population is a group of individuals who have the same characteristics, which is the basis for collecting research data (Subhaktiyasa, 2024). The population in this study is all cancer patients who are undergoing chemotherapy therapy and are experiencing Anxiety in the Chemotherapy Room of Dr. M. Yunus Hospital. Population data was obtained from hospital records for the last 7 months, namely the period from January to July, with a total of 327 patients.

2. Sample

A sample can be defined as part of a population that is systematically selected or based on specific criteria to be analyzed in the study (Subhaktiyasa, 2024). In this study, the sample consisted of patients undergoing chemotherapy.

The calculation of the number of samples in this study uses the formula for the difference of one mean in pairs, namely:

$$n = \left(\frac{Z_x S}{E_x X_D}\right)^2$$

Description :

n = number of samples

Z = Z-value at 95% confidence level (1.64)

S = Standard deviation in previous studies

E = Determination relative desired (5%)

X_D = Average of previous research

Sample calculation is obtained:

$$n = \left(\frac{z_x s}{E_x X_D}\right)^2$$

$$n = \left(\frac{1{,}64_x 0{,}34}{0{,}05_x 1.22}\right)^2$$

$$n = (\frac{0,55}{0,06})^2$$

$$n = (9)^2$$

$$n = 81$$

To anticipate Participants who refuse to do or

Continuing the intervention, the dropout formula is used as follows

$$n = \frac{n}{1-f} = \frac{81}{1-10\%} = \frac{81}{1-0,1} = \frac{81}{0,9} = 90$$

So from the calculation of the sampling formula above, the total sample needed by the researcher was 90 cancer patients who experienced anxiety.

3. Sampling techniques

Non-probability sampling techniques are sampling methods in which members of the population do not have an equal chance of being selected as a sample. The selection of samples was carried out based on certain criteria that had been set by the researcher, not randomly. One of the sampling techniques used in this study is consecutive sampling, where all participants who meet the inclusion and exclusion criteria are taken sequentially until the required number of samples is met. The sample in this study is cancer patients undergoing chemotherapy at Dr. M. Yunus Bengkulu Hospital.

Sampling is carried out by means of Consecutive Sampling by considering inclusion and exclusion criteria, such as:

a. Criteria Inclusion

1) Participant's willingness to participate in the research.
2) An outpatient cancer patient who is undergoing chemotherapy in the Chemotherapy room of M Yunus Bengkulu Hospital.
3) Cancer patients who experienced anxiety with an anxiety value of 30-80 after being measured.

b. Exclusion Criteria

1) Participants who calm down before being given an intervention.
2) Participants cannot focus.
3) Participants who do not want to complete therapy.

E. Data Collection

1. Data Source
   a. Data Primer

      In this study, researchers obtained data on the anxiety levels of cancer patients undergoing chemotherapy using the State-Trait Anxiety Inventory (STAI) instrument given to participants before and after Jacobson's Progressive Muscle Relaxation (JPMR) intervention.

   b. Data Seconds

      In this study, the secondary data used was in the form of data on the number of cancer patients undergoing chemotherapy and participant characteristics data obtained from medical records and reports of the chemotherapy room of Dr. M. Yunus Bengkulu Hospital.

2. Data Collection Tools

   The data collection tools used in this study are:

   a. Form A : Application sheet for prospective Participants
   b. Form B : Sheet Informed Consent
   c. Form C : Participant consent sheet
   d. Form D : Demographic format sheet
   e. Form E : Lembar Format State-Trait Anxiety Inventory
   f. Form F : SOP Sheet Jacobson's Progressive Muscle Relaxation

3. Test Data Collection Tools

   Measurement of anxiety levels in cancer patients who are undergoing chemotherapy with the State Trait Anxiety Inventory Trait (STAI-T) has been tested for feasibility in the study by (Pratiwi & Ningsih, 2022) in 33 chemotherapy patients at a hospital that has an inpatient facility. The diagnostic test showed an STAI-T sensitivity of 94%, a specificity of 95%, with a positive predictive value (PPV) of 82% and a negative predictive value (NPV) of 75%, so that this instrument was able to identify patients who were really experiencing anxiety and those who were not anxious with a good level of accuracy. In addition, the charging time is relatively short (±3–7 minutes) and can be practically applied in the treatment room. Based on these findings,

STAI-T was declared valid and feasible to be used as an instrument for measuring anxiety in patients with cancer who underwent chemotherapy in nursing practice and clinical research.

4. Data Collection Procedure
   a. Data on the characteristics of the participants were collected through two methods, namely interviews and filling out questionnaires.
   b. The intervention was carried out using a standard procedure sheet (SOP) that had been set, namely Jacobson's Progressive Muscle Relaxation, to measure Participants' anxiety, which was carried out using the State Trait Anxiety Inventory (STAI-T) sheet.
   c. A State Trait Anxiety Inventory (STAI-T) instrument sheet is given to Participants before the intervention to measure the initial level of anxiety, and after the intervention to assess the alterations in anxiety that occur. This instrument consists of 20 statements, which include 10 positive statements number 1 to 10 and 10 negative statements number 11 to 20 with four answer choices, namely never, sometimes, often, and almost always. In positive statements, scoring is done on the condition that never is worth 1, sometimes is worth 2, often is worth 3, and almost always is worth 4. Meanwhile, in negative statements, reverse scoring is carried out to facilitate data processing, which is never worth 4, sometimes worth 3, often worth 2, and almost always worth 1. The scores obtained were then summed to illustrate the Participant's anxiety level.

F. Data Processing

According to Heryana (2024) data processing is a series of processes that are carried out from the input of data into storage media until the data is completely ready for analysis, so that the quality and validity of research results are maintained. In the study "The Effect of Jacobson's Progressive Muscle Relaxation (JPMR) on Alterations in Anxiety in Cancer Patients Undergoing Chemotherapy at Dr. M. Yunus Bengkulu Hospital in 2025", data processing was carried out through the following stages:

1. Editing

   The editing stage was carried out to check the completeness and consistency of the data that had been collected, including the characteristics of the participants (age, gender, and occupation) as well as anxiety scores measured with the STAI-T instruments before (pre-test) and after (post-test) interventions. The audit was carried out to ensure that there were no blank, illogical, duplication, or writing errors on the participants' characteristics sheet, STAI-T questionnaire, and JPMR implementation records.

2. Coding

   Each variable is numerically coded to facilitate the entry and analysis process. For example, gender (1 = male, 2 = female), occupation (1 = not working, 2 = working). STAI-T scores were recorded for pre- and post-intervention measurements.

3. Data Entry

   The encoded data were entered into SPSS software version 25 and grouped by study category, namely Jacobson's Progressive Muscle Relaxation (JPMR) pretest and posttest anxiety levels. The data entry process is carried out carefully to avoid data input errors.

4. Storage (Saving)

   Data is stored in digital format via Microsoft Excel and SPSS, and backed up on other storage media to prevent data loss.

5. Tabulasi (Tabulating)

   The data that has been collected is presented in several tables to facilitate the process of analyzing research results. A univariate table is used to describe the characteristics of Participants by age, gender, and occupation. The bivariate table shows differences in anxiety levels before and after the administration of Jacobson's Progressive Muscle Relaxation (JPMR). In addition, a State-Trait Anxiety Inventory (STAI) score table before and after the intervention was presented, containing the mean values, standard deviation, minimum, and maximum. Comparison of pretest and posttest STAI

scores was used to assess changes in patients' anxiety levels after being given JPMR interventions.

G. Data analysis

1. Univariate Analysis

The univariate analysis aimed to provide an overview of the characteristics of participants and levels of anxiety in the study. Numerical data in the form of State-Trait Anxiety Inventory (STAI) scores before and after the intervention were analyzed using descriptive statistics, which included mean, median, standard deviation, minimum, maximum, and 95% CI mean. Meanwhile, categorical data such as age, gender, and occupation were analyzed using frequency and percentage distributions. The data presentation of each variable is arranged in the form of a table and interpreted according to the results obtained. The percentage interpretation refers to the following criteria: 0% (none), 1–44% (a small part), 45–49% (almost partially), 50% (partial), 51–69% (more than half), 70–89% (mostly), 90–99% (almost entirely), and 100% (entirely).

2. Bivariate Analysis

The bivariate analysis aimed to determine the effect of Jacobson's Progressive Muscle Relaxation (JPMR) on anxiety levels in cancer patients undergoing chemotherapy. Before the analysis, the data were first tested for normality using the Kolmogorov-Smirnov test because the number of research samples was more than 50 participants. The results of the normality test were used to determine the type of statistical test to be used.

Based on the results of the normality test, the research data showed an abnormal distribution. Therefore, the analysis of differences in anxiety levels before and after the administration of the intervention was carried out using the Wilcoxon Signed Rank Test. Decision-making was conducted at a confidence level of 95% with a significance level (α) of 0.05. If a p-value of < 0.05 is obtained, H_0 is rejected, and H_1 is accepted, which means that there is an effect of Jacobson's Progressive Muscle Relaxation (JPMR) on anxiety levels in cancer patients undergoing chemotherapy.

H. Research Procedures and Flows

1. Research Procedure

   a. Pre-research

      This research began after the researcher obtained a letter of recommendation for a research implementation permit from various related agencies, including the Bengkulu Province Investment and One-Stop Integrated Services Office (DPMPTSP), the Health Research Ethics Commission of the Bengkulu Ministry of Health, and Dr. M. Yunus Bengkulu Hospital as the research location. After obtaining a research permit, the researcher coordinated with the head of the chemotherapy room regarding the timing of the research and the mechanism of recruitment of participants.

   b. Research

      After obtaining permission from educational institutions and Dr. M. Yunus Bengkulu Hospital, the researcher coordinated with the chemotherapy room officer regarding the implementation of the research. Participant recruitment was carried out using a consecutive sampling technique, namely all cancer patients who underwent chemotherapy and met the inclusion criteria and did not meet the exclusion criteria were recruited sequentially until the required number of samples was met.

      Before the intervention, the researcher measured the participants' anxiety levels using the State-Trait Anxiety Inventory (STAI) instrument as a pretest data. After the initial measurement was taken, participants were given Jacobson's Progressive Muscle Relaxation (JPMR) intervention for approximately 5 minutes before undergoing chemotherapy in accordance with the standard operating procedure that had been set.

      After the participants completed the chemotherapy session, the researcher again measured the level of anxiety using the STAI instrument as posttest data. The results of the pretest and posttest

measurements were then used to assess changes in anxiety levels after the administration of Jacobson's Progressive Muscle Relaxation (JPMR) intervention.

c. Post-Research

The next stage after data collection is data processing, which includes checking data completeness (editing), coding (coding), data grouping (data entry), and compiling data in the form of tables (tabulation). The data were then computerized using the SPSS version 25 program to test the research hypothesis and determine the effect of Jacobson's Progressive Muscle Relaxation (JPMR) on anxiety levels in cancer patients undergoing chemotherapy.

2. Research Flow

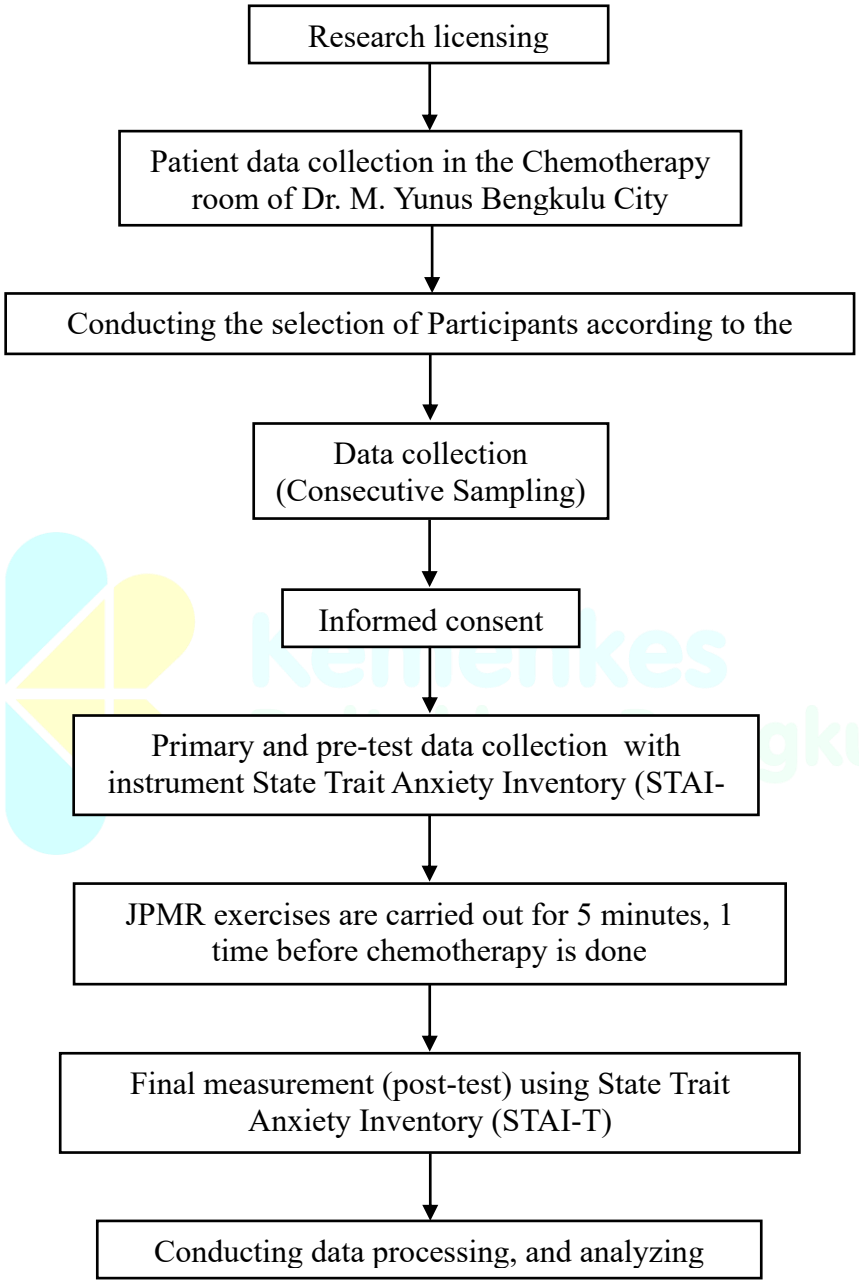

Chart 4. 2 Research flow

I. Research Ethics

In the implementation of this study, the researcher has obtained ethical feasibility approval from the Health Research Ethics Commission of the Ministry of Health of the Ministry of Health of Bengkulu with ethics number No. KEPK. BKL/299/04/2026. This research was carried out by paying attention to the following research ethical principles:

1. Right to Participate/Not to Participate (Self-Determination)

   In this study, participants were given the freedom to determine their participation in the study without any coercion. Participants have the right to refuse or withdraw from the study at any time without any consequences to the health services they receive.

2. Anonymity

   The researcher did not include the full names of the participants on the data collection sheet. The participant's identity is replaced with a participant code or number to maintain data privacy and confidentiality. The participant's signature is only included on the informed consent sheet.

3. Kerahasiaan (Confidentiality)

   All information and data obtained from Participants are guaranteed confidentiality and are only used for research purposes. Research data is stored in the form of a soft file on the researcher's device and will not be disseminated to other parties without the Participant's permission.

4. Keadilan (Justice)

   Researchers treated all participants fairly regardless of age, gender, cancer type, social status, or other characteristics. All participants received equal treatment and opportunities during the research process.

5. Beneficence Principle

   The administration of Jacobson's Progressive Muscle Relaxation (JPMR) intervention is expected to provide benefits for participants, namely helping to reduce anxiety levels and increase psychological comfort during chemotherapy.

6. Nonmaleficence

The researcher ensured that the entire research procedure did not cause any danger, discomfort, or harm to the participants either physically or psychologically. Jacobson's Progressive Muscle Relaxation (JPMR) intervention is a relaxation technique that is safe, non-invasive, and is carried out according to the established procedure.

J. The Course of Research Activities

Table 4. 1 The Course of Research Activities

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												