

CHAPTER III

RESEARCH METHODS

3.1 Research Design

According to Syapitri et al., (2021) research design is a systematic way used to obtain answers to research questions. Research design contains rules that must be met throughout the research process. From the title created by the author, it can be concluded that the author uses quantitative research. Quantitative research is a research methodology that uses scientific techniques to collect numerical data, conduct statistical analysis, and draw conclusions based on findings (Candra Susanto et al., 2024).

With this, the author determines the research design using cross-sectional studies, namely a type of observational study design that involves looking at data from a population at a certain point in time (Wang & Cheng, 2020). In cross-sectional studies, researchers measure the outcomes and exposures of research subjects at the same time. This study explains the relationship between mobility and timing of UTI incidence in elderly people with urinary catheters in the Inpatient Room of IHC Lavalette Hospital, Malang City.

3.2 Time and Place of Research

3.2.1 Research Place

The research will be conducted in the Inpatient Room of IHC Lavalette Hospital, Malang City.

3.2.2 Research Time

The research process was carried out for two weeks to 1 month in the Inpatient Room of IHC Lavalette Hospital, Malang City.

3.3 Population and Sample

3.3.1 Population

According to (Syapitri et al., 2021), population is a generalization area consisting of objects/subjects that have certain qualities and characteristics determined by researchers to be studied and then conclusions drawn. The population in this study were elderly people who had catheters installed in the Inpatient Ward of IHC Lavalette Hospital, Malang City.

3.3.2 Sample

The sample in this study consisted of 15 elderly respondents with catheters.

3.3.3 Research Sampling

The research sampling used in this study uses purposive sampling technique. Purposive sampling is one of the techniques in non-probability sampling where researchers select samples based on certain predetermined criteria. This technique is designed to ensure that the selected samples have characteristics that are relevant to the research objectives. (Adeoye, 2023). Non-probability sampling is a sampling method in which not all members of the population have an equal chance of being selected. Sample selection is based on subjective considerations from the researcher, not randomly. This results in research results using this technique not always being generalizable to the entire population (Adeoye, 2023).

3.3.4 Inclusion and Exclusion Criteria

1. Inclusion criteria:

The inclusion criteria for this research are as follows:

- a. Elderly aged ≥ 60 years.
- b. Using a urinary catheter for 48 hours.
- c. Elderly patients who underwent urinalysis and urine culture
- d. Willing to participate in research by signing an informed consent.
- e. Elderly patients who are aware or accompanied by family to provide information regarding mobility.

2. Exclusion Criteria:

The exclusion criteria for this study are as follows:

- a. Elderly patients with severe cognitive impairment who do not allow for completion of questionnaires or interviews.
- b. Elderly with pre-existing urinary tract infection conditions prior to catheter insertion.
- c. Elderly patients who experience terminal conditions or require special intensive care.

3.4 Data Collection Method

3.4.1 Primary Data

Primary data obtained by researchers directly from respondents through methods such as interviews, observations and filling out questionnaires. Researchers communicate directly with the elderly or their families to obtain information about mobility and history of urinary tract

infections. Researchers also observe the vital signs of respondents by recording information in a questionnaire that has been created by researchers.

3.4.2 Secondary Data

Data obtained by researchers from other sources, such as medical records, health reports, and related literature. Researchers conduct documentation, namely collecting data from relevant medical and administrative records, such as patient health history, type of catheter used, and records of previous infections and clinical data of respondents.

3.5 Data Collection Tools

3.5.1 Research Instruments

This research uses several instruments, including:

1. Measurement of mobility level using the Barthel Index questionnaire.

The Barthel Index questionnaire is a measuring tool used to assess the level of individual independence in performing daily activities, especially in patients who experience dependence or difficulty in motor function. This questionnaire is designed to evaluate a person's ability to perform basic daily activities (Activity of Daily Living). It covers various aspects of assessment such as Feeding, Bathing, Grooming, Dressing, Bowels, Bladder, Toilet Use, Transfer (bed to chair and back), Mobility (on level surfaces), and Stairs. Each item is scored differently, with the total score ranging from 0 (total dependence) to 100 (completely independent). The measurement result categories include:

- 1) Score 0-20: Total dependency
 - 2) Score 21-60: Heavy dependency
 - 3) Score 61-90: Moderate dependence
 - 4) Score 91-99: Mild dependence
 - 5) Score 100: Independent .
2. Observation to review information about initials, age, gender, medical history, history of catheterization, clinical symptoms, vital signs examination, and UTI clinical data. Observation in this study is divided into:
- 1) Observation on the characteristics of the respondents. For this study, the initials of the name, age, gender, previous medical history, previous history of UTI, use of catheters, respondents were asked.
 - 2) Observation of the respondent's medical history. For this study, the main complaint of MRS, the presence or absence of signs of infection before MRS.
 - 3) Observation of the respondent's catheter installation history. For this study, such as, catheter installation history yes/no, analysis of infection events including installation date and removal date, catheter number, catheter type, length of days of device installation.
 - 4) Observation of clinical symptoms felt by respondents such as fever, dysuria, suprapubic pain, cloudy or bloody urine, urinary frequency, bradycardia.

- 5) Observation of the respondent's vital signs such as blood pressure, body temperature, pulse, and abdominal examination (presence of tenderness or distension).
- 6) Observations on UL laboratory results include leukocytes, erythrocytes, urine culture results, and microbial types.

From the results of the observations above, the researcher used the UTI questionnaire which was developed and referred to research according to Nafidatul Khoiroh, et al (2020) in *Jurnal Rekam Medik Dan Informasi Kesehatan* entitled “Desain Formulir Pendukung Surveilans Infeksi Nosokomial Di Rumah Sakit Baladhika Husada Jember”(Nafidatul Khoiroh et al., 2020).

3.5.2 Data Collection Procedure

A. Preparation Stage

- 1) Researchers prepare research proposals according to the specified format.
- 2) The researcher determined the research location, namely in the Inpatient Room of IHC Lavalette Hospital, Malang City. The researcher submitted a preliminary study permit application from the Health Polytechnic of the Ministry of Health, Malang, Applied Nursing Undergraduate Study Program, Malang to IHC Lavalette Hospital, Malang City.
- 3) Researchers conducted a preliminary study in the Inpatient Ward of IHC Lavalette Hospital, Malang City on December 19, 2024.

- 4) Researchers conducted interviews with the head of the room to obtain data on elderly people who had catheters installed and were indicated to have urinary tract infections in the Inpatient Ward of the IHC Lavalette Hospital, Malang City.
- 5) Researchers attend the proposal seminar session according to the set schedule and make improvements according to the results of the proposal seminar.
- 6) The researcher submitted a data collection letter to the IHC Lavalette Hospital in Malang City.
- 7) Researchers conducted the research on the date confirmed by the hospital.

B. Implementation Stage

- 1) Researchers selected respondents according to the inclusion criteria as research samples according to permission from the IHC Lavalette Hospital, Malang City.
- 2) The researcher conducted this research activity himself without using an enumerator.
- 3) Researchers conduct research processes.
- 4) Before the researcher conducted the research, the researcher was assisted by the Head of the Inpatient Room to obtain information on patients with catheters.
- 5) Once the researcher has determined the respondents, the researcher will explain the research information sheet and informed consent sheet.

- 6) Researchers will fill out the observation sheet if the patient has agreed to become a respondent.
- 7) The researcher will fill in the observation sheet that has been created by the author using secondary patient data.

C. Completion Stage

- 1) Researchers will process and analyze data on the results of observation answers.
- 2) Performing data processing starting from editing, coding, data entry, data tabulation, processing, and cleaning.
- 3) Researchers compile research results reports according to the data obtained and consult with supervisors.
- 4) Process and analyze data using statistical tests.
- 5) Presentation and compilation of research results from statistical tests.
- 6) Displaying data results, namely describing and compiling data and providing explanations.
- 7) Writing the final report.
- 8) Submission of research report results.
- 9) Conducting research results hearings and research validation.

3.6 Variables

Research variables are objects that are attached or owned by objects that have different values and are then measured based on other objects for research purposes. Research objects are people, objects, interactions or events

collected from research objects that can reveal the meaning and value of each research object (Syapitri et al., 2021).

3.6.1 Dependent Variable

Dependent Variables Dependent variables or also called dependent variables are variables that are scientifically defined as factors that influence changes in other variables. These dependent variables are the main area of the researcher or the main problem that he wants to study (Syapitri et al., 2021). The dependent variable in this study was the timing of incidence of UTI in elderly people with catheters.

3.6.2 Independent Variable

Independent variables or free variables, are variables that have an impact on dependent variables, or dependent variables. Usually, the independent variable appears first and is then followed by other variables (Syapitri et al., 2021). The independent variable in this study is the level of mobility of the elderly.

3.7 Operational Definition

The matrix containing variables, variable descriptions, measuring instruments, measurement results, and scales used (nominal, ordinal, and interval) is an operational definition. This matrix also includes the limits and measurement techniques of the variables to be studied. To prevent misinterpretation and reduce the scope, operational definitions are used to

simplify and ensure the data collection process remains consistent (Syapitri et al., 2021).

Table 3.1 Operational Definition of the Relationship Between Mobility and the Incidence of Urinary Tract Infections in Elderly Patients with Catheters in the Inpatient Room of IHC Lavalette Hospital, Malang City.

Variables	Operational Definition	Parameter	Measuring Tools or Instruments	Measuring Scale	Score
Level of Mobility	Level of Mobility is the degree of a person's ability to move or perform physical activities, either independently or with assistance. This assessment reflects how well an individual can transfer, walk, or carry out daily activities.	Elderly Movement Frequency	Barthel Index	Ordinal	<ul style="list-style-type: none"> - Score 0-20: Total dependency - Score 21-60: Heavy dependency - Score 61-90: Moderate dependency - Score 91-99: Mild dependency - Score 100: Independent
Timing of UTIs Incidence	The timing of urinary tract infections is affected by the duration of urinary catheterization	Laboratory results date	Observation And sekunder data.	Ordinal	<ul style="list-style-type: none"> - 3-5 Days - 6-8 Days - 9-11 Days - 12-14 Days - 15-16 Days - 17-20 Days

3.8 Operational Framework

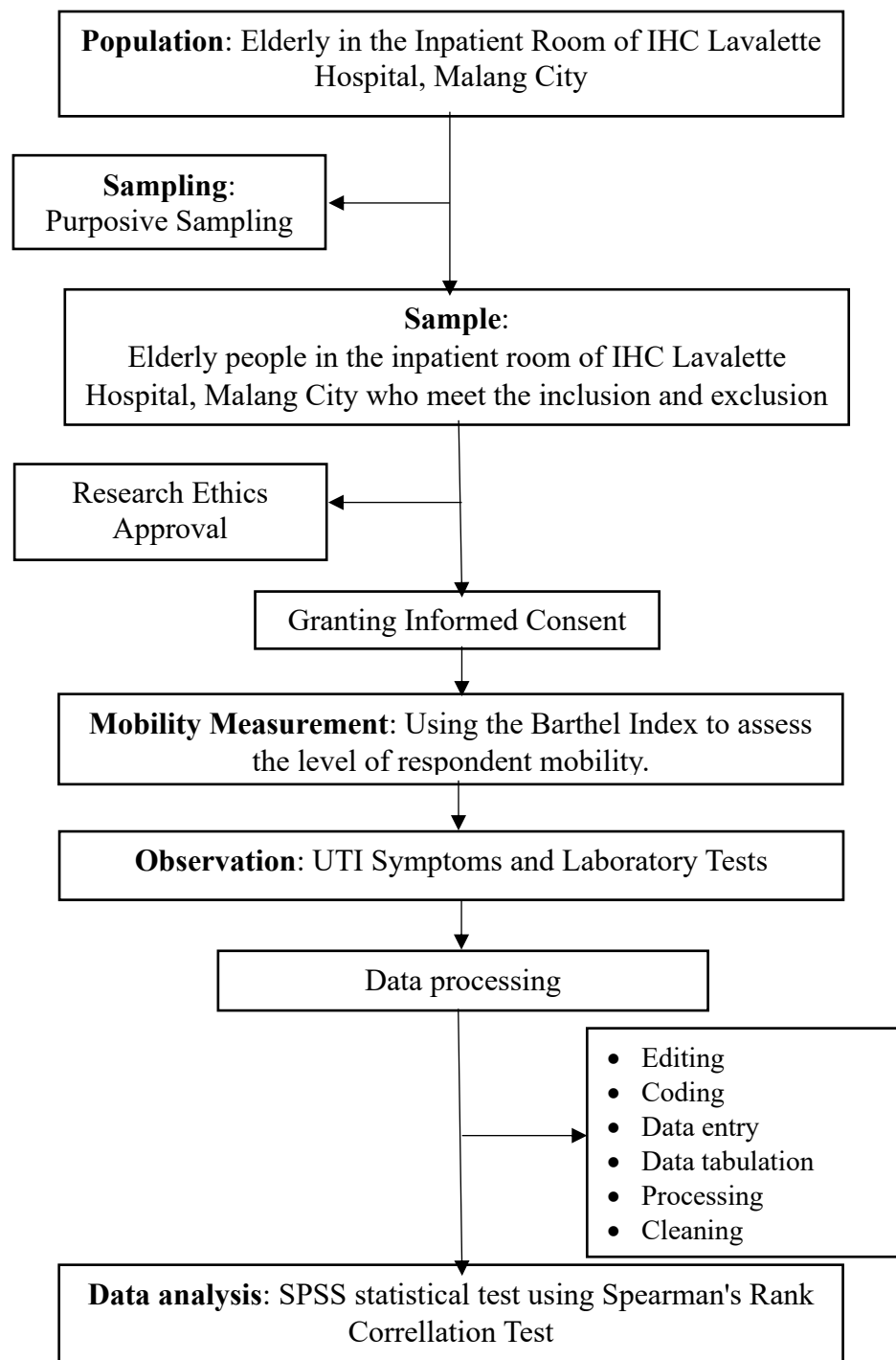


Figure 3.1 Operational Framework of the Relationship Between Mobility and Timing The Incidence of Urinary Tract Infections (UTIs) in Elderly Catheters in the Inpatient Room of IHC Lavalette Hospital, Malang City

3.9 Data Processing and Analysis Methods

3.9.1 Data Processing Techniques

Data processing is defined as the actions taken on data that has been obtained and produces useful information for the purpose of the research project. Data processing also includes a combination of various types of data management to produce the desired results.(Syapitri et al., 2021).

The data processing methods used in this study are as follows:

1. Editing

Data editing is the process of filling out a questionnaire to determine whether or not the research questions are answered or whether the requirements for hypothesis testing are met.

2. Coding

Converting data into a spreadsheet or graph taken from the measuring instrument used and based on similar data points is known as coding. After the observational data was collected, data processing was carried out with the following details:

a. Level Mobility

- Score 0-20: Total dependency
- Score 21-60: Heavy dependency
- Score 61-90: Moderate dependence
- Score 91-99: Mild dependence
- Score 100: Independent

b. Timing Of UTIs Incidence

- “1” = 3-5 Days
- “2” = 6-8 Days
- “3” = 9-11 Days
- “4” = 12-14 Days
- “5” = 15-16 Days
- “6” = 17-20 Days

c. UTIs

- “1” (urinary tract infection with UL)
- “2” (urinary tract infection with UL+Culture)

d. Gender

- “1” Male
- “2” Female

e. Age

- 60-64 years old
- 65-70 years old
- >70 years old

3. Data entry

The data was entered into the system according to the existing variables.

Next, the data obtained was analyzed according to the type and use of the data. In this study, the researcher used IBM SPSS Statistics 27.0. The data processed was patient mobility level data and the time of UTI Incidence.

4. Data tabulation

Creating data tables suitable for research purposes using data obtained from previously used measuring instruments. This aims to determine the distribution and frequency of each piece of data obtained.

5. Processing

Processing is the task of data processing and analysis is to find answers to research questions and determine the validity of the hypothesis. Data is processed using the SPSS program, researchers conduct data analysis, including:

- b. Analysis of respondent characteristics in the elderly who were indicated to have urinary tract infections using SPSS univariate analysis.
- c. Analysis of mobility levels related to timing the incidence of urinary tract infections in elderly people with catheters using SPSS bivariate analysis.

6. Cleaning

Cleaning namely actions to prevent data loss by checking whether the data entered is correct and whether errors occurred during data entry or the data entry process.

3.9.2 Data Analysis Techniques

1. Univariate Analysis

Univariate analysis was conducted to describe the characteristics of each variable studied separately. The purpose of this analysis is to provide an overview of the data collected (Syapitri et al., 2021).

In this study, univariate analysis was used to identify the characteristics of the respondents. These include the level of mobility of the respondents, the age of the respondents, the gender of the respondents, and the prevalence of urinary tract infections. The frequency distribution table and the percentage of each variable were used to determine the characteristics of the respondents. The analysis was carried out after knowing the characteristics of the data taken, namely the results of observations presented in the frequency distribution table. According to the Textbook of Health Research Methodology (2021), The research results presented in the frequency distribution table will be interpreted into several categories.

2. Bivariate Analysis:

According to the Textbook of Health Research Methodology (2021), bivariate analysis is a statistical method that studies how two different but interrelated elements relate to each other. The purpose of bivariate analysis is to determine whether the relationship between two independent variables and a dependent variable is in accordance with the previous hypothesis.

The Spearman Rank correlation test results indicate the strength and direction of a monotonic relationship between two variables based on

the ranking of the data. The Spearman correlation coefficient (r_s) ranges from -1 to +1, where a positive value indicates a direct relationship (when one variable increases, the other tends to increase as well), while a negative value indicates an inverse relationship. The closer the value is to ± 1 , the stronger the relationship.

When using the Spearman Rank test, two test values are input into the SPSS program: the mobility level of elderly individuals and the time of occurrence of urinary tract infection (UTI) in elderly patients with catheters. These two values are compared, resulting in a p-value that can conclude whether there is a relationship between mobility and the time of UTI occurrence in elderly catheterized patients.

Table 3. 2 Bivariat Analysis

Independent Variables	Dependent Variables	Analysis Test	Interpretation
Level Of Mobility Of The Elderly	Timing Of UTIs Incidence	Spearman Rank Test	To analysis corelation ($p < 0.05$)

The decision-making criteria are as follows:

1. $p\text{-value} < \alpha (0.05)$ H_1 is accepted, meaning there is a relationship between mobility and the time of UTI occurrence in elderly catheterized patients.
2. $p\text{-value} > \alpha (0.05)$ H_0 is rejected, meaning there is no relationship between mobility and the time of UTI occurrence in elderly catheterized patients.

Thus, the Spearman test results help researchers understand whether and how strongly two variables are monotonically related, as well as whether this relationship is statistically reliable

3.10 Research Ethics

According to the Health Methodology Book (2023), research ethics serve as guidelines applicable to all activities involving researchers and research subjects, as well as the relationship between researchers and the benefits of the research, ensuring that respondents gain benefits from the study. This research has been conducted and has obtained an ethical review certificate with registration No. DP.04.03/F.XXI.30/00382/2025, valid from May 26, 2025 - May 26, 2026. It is declared ethically appropriate according to WHO 2011 standards and refers to the CIOMS 2016 Guidelines, which include the following principles:

1. Social Value

This research provides tangible benefits to the community or target group (respondents), aiming to improve health and knowledge that is broadly useful.

2. Scientific Validity

This study is designed and conducted using scientifically valid and reliable methods to ensure accurate, replicable, and beneficial results.

3. Fairness in the Distribution of Burdens and Benefits

The burdens and benefits of this research are distributed fairly, without excessively burdening vulnerable groups, and benefits should be enjoyed by all contributors.

4. Risk

The risks to respondents have been minimized and are proportional to the expected benefits of the study, and these risks are communicated clearly and transparently.

5. Prevention of Coercion and Exploitation

Respondents participate voluntarily, free from coercion, pressure, or exploitation, with full respect for their freedom and dignity.

6. Confidentiality and Privacy

Respondents' personal data is kept confidential by the researcher, and their privacy is respected to ensure they feel safe and protected.

7. Informed Consent

Respondents give voluntary consent after receiving complete and clear explanations about the research, with the right to withdraw consent at any time.