

CHAPTER I

INTRODUCTION

1.1 Background

Hospital is a healthcare facility that provides specialized medical treatment, care, and services to individuals in need of diagnosis, treatment, and recovery from illness, injury, or other health conditions. Hospitals are typically equipped with various medical professionals, including doctors, nurses, and support staff, and offer a range of services. (Regulation of the Minister of Health of the Republic of Indonesia, 2020). Hospitals as health service facilities are places used to organize health efforts, maintain, and improve health levels. Therefore, hospitals are expected to be able to provide effective and efficient services to the community of health service users.

Murni Teguh Memorial Hospital Medan is a prominent healthcare facility located in Medan, North Sumatra, Indonesia. Established under the ownership under PT Murni Sadar Tbk, the hospital aims to provide high-quality medical services to its community. Murni Teguh Memorial Hospital plays a significant role in the healthcare landscape of Medan, providing accessible and quality medical care to the local population. Its commitment to advanced medical practices, skilled professionals, and patient-centered services helps enhance the overall health and well-being of the community it serves.

For the continuity of the health services provided and legal importance, hospitals are required to carry out medical record activities to ultimately ensure patient safety. According to the Regulation of the Minister of Health Number 24 of 2022, Medical Records are systematic and comprehensive documentation of a

patient's data including patient's medical history, examinations, treatments, actions, and other services that have been provided to patients (Regulation of the Minister of Health of the Republic of Indonesia, 2022).

Murni Teguh Memorial Hospital Medan developed an electronic medical record to perform official patient documentation. An Electronic Medical Record (EMR) is a digital version of a patient's paper medical chart (Uslu & Stausberg, 2021). EMRs are used by healthcare providers to document, store, and manage patient information and care details in a digital format. They are designed to be used within a single healthcare organization, allowing for efficient access to patient data by authorized personnel.

In achieving optimal and professional service, the management of Murni Teguh Memorial Hospital consistently and continuously runs quality improvement programs in all areas of service to support efforts to improve quality in the hospital. One of them is by partnering a government insurance program, namely collaborating with BPJS Health.

Badan Penyelenggara Jaminan Sosial (BPJS) is a State-Owned Enterprise specifically assigned by the government to provide health insurance for all Indonesian people. BPJS serves the treatment process and provides relief in terms of financing health facilities. These health facilities are obtained at hospitals that have collaborated with BPJS (Desmiwerita, 2021). Pending claims from the BPJS can cause mismatch between payments to health facilities and the costs submitted, which would cause losses to hospitals that collaborate with BPJS. (Muroli et al., 2020).

The Indonesian-Case Based Groups tariff, hereinafter referred to as the INA-CBG tariff, is the amount of claim paid by BPJS to Advanced Referral Health Facilities for service packages based on the grouping of disease diagnoses and procedures covering all hospital resources used in both medical and non-medical services (Regulation of the Minister of Health of the Republic of Indonesia, 2023). The BPJS payment method is based on the claims made submitted to the INA-CBGs system, in which a code is needed for the diagnosis. A coder is someone who review the patients' conditions provided by the doctors and specialties and provide a series of codings for the diagnosis and procedures. The duties and authorities of the coder are to check the completeness of BPJS patient documents, determine the disease diagnosis code and actions based on ICD 10 and ICD 9 CM, clarify with doctors, data entry, coding/grouping with INA-CBGs, submitting the grouping results to the internal verifactor (Sitorus et al., 2022)

In the implementation of BPJS Health, claims will be made after a patient has completed treatment (Errisya et al., 2024). The importance of completeness of documents when making a BPJS claim at the hospital includes a recapitulation of services and patient supporting files consisting of a Participant Eligibility Letter (SEP) medical resume written by a doctor, a statement of diagnosis both initially diagnosed upon admission and finally diagnosed when the patient is discharged as determined by the doctor in charge, as well as other proof of services that must be met (Sitorus et al., 2022)

The files must be completed by the hospital before being submitted to BPJS with the aim of obtaining a replacement for patient financing during treatment in accordance with the Indonesia Case Base Groups (INA-CBG's) tariff (Errisya et al., 2024). The speed of the disbursement of claims submitted by the hospital will be influenced by several factors, one of which is the completeness of the patient's documentation during treatment. Some claims submitted may be returned to the hospital due to several factors such as coding errors, incompleteness of service evidences and administrative documents, causing the submitted claim to be labelled as pending claims (BPJS , 2014).

Based on the results of previous research conducted by Cathryn Gabriella (2020) on factors influencing the return of BPJS claims for inpatients at Fatmawati Government General Hospital in March – May 2020, there were 218 inpatient claim files returned, consisting of three types of returns, namely due to Participation Administration Factors 1.8%, Service Administration Verification 17%, and Service Verification 81.2%. The return factor caused by service verification is the most frequent return factor at Fatmawati Government General Hospital in 2020. Based on another research at Fatmawati Government General Hospital in 2016 on the return of BPJS claims for inpatients in January - April, there were 1719 claims returned, consisting of four categories, namely Administrative Improvement 19%, Borrow Status 7%, Coding Confirmation 36%, and Completeness of Resume 38%, of the four factors, the most returns were from the Completeness of Resume category 38% (Indawati, 2019).

Several studies that have been conducted by previous researcher related to pending BPJS file claims, namely research conducted by Triatmaja (2022) entitled Review of the Causes of Pending Claims of the Health Insurance Administration Agency at RSU Haji Surabaya. In this study, a problem was found in the BPJS claim process due to incomplete files, inaccuracy of the diagnosis code due to differences in perception between the coder and the verifier. This study aims to analyze the factors for pending claims of BPJS cases at RSU Haji Surabaya (Triatmaja, 2022). Factors causing pending claims such as mismatches in diagnosis codes, incompleteness of patient files, differences in medical and administrative views, and documentation practices by practitioners (Dinnillah et al., 2024). One of the factors that influence the claim process is the human element, namely the difference in perception between doctors and BPJS verifiers, which puts coders in a difficult position (Indawati, 2019).

The INA-CBGs system has a philosophy of transferring risk to health facilities where institutions bear the risk of costs if they provide services that do not comply with established procedures. This will encourage changes in the behavior and way doctors practice medicine (BPJS, 2014). According to Sadeli, doctors as professionals greatly influence hospital services. Usually, these professionals tend to be autonomous and stand alone, and not infrequently, their missions are not in line with hospital management (Sadeli et al., 2019). This also results in differences in perception between doctors and hospital coders. For example, based on feedback from BPJS verifiers, one of the medical procedural code that causes pending frequently is the ICD9 code for debridement. This causes differences in perception

between doctors, coders, and job satisfaction, BPJS verifiers.

The phenomenon gap that occurred at Murni Teguh Memorial Hospital is clearly visible from the problems faced in the BPJS claim process, especially related to high volume of late submissions and pending claim that still often occur. Based on preliminary studies, these errors are generally caused by manual processes that are prone to human error, which also leads to inaccuracy in coding diagnoses (ICD10) and medical procedures (ICD9). This causes BPJS claims to often be rejected or have to go through a time-consuming revision process, which eventually lead to operational inefficiency and increases hospital operational costs. In addition, greater expenses also occur due to inefficiencies in the claims process, where a lot of time and manpower are wasted on verifying and correcting claims.

This study aims to analyze the influence of several factors on the output of BPJS claims at Murni Teguh Memorial Hospital Medan, especially in overcoming the problem of pending claims that can hamper hospital cash flow. Based on a preliminary study which is done by conducting a field survey, it was found that there were 94 pending BPJS outpatient claim files out of a total of 15,560 claim files in the period of April, May, and June 2024. The main causes of these delayed claims were complete administration/files, errors in coding, and factors related to machine and human resources that were not optimal in the claim verification process. This condition causes delays in the claim payment process, which can ultimately disrupt the financial stability of the hospital.

To overcome this problem, a more efficient technology-based intervention is needed, namely by developing Artificial Intelligence (AI) with autoverification model. AI is a branch of computer science focused on creating systems and technologies that can perform tasks that typically require human intelligence (Sarker, 2022). These tasks include reasoning, learning, problem-solving, perception, language understanding, and decision-making. AI systems can simulate cognitive functions such as learning from experience, adapting to new information, and executing tasks autonomously.

With the robust data from the 12 years operational activities Murni Teguh Memorial Hospital have, the usage of Artificial Intelligence (AI) in the context of BPJS claims, can be applied to not only perform automatic verification but also to understand the broader context of each claim, identify errors with greater precision, and provide recommendations for improvements that can be taken with more complex actions. For example, AI can process data from multiple different sources, recognize relationships between diagnoses, procedures, and claims, and provide solutions to more complex problems.

AI Auto Verification is an artificial intelligence model that is able to automatically check the completeness of files, input diagnosis and procedural codes, and assess the validity of claims based on BPJS regulations. This model works with the automation of the validation process using machine learning algorithms and natural language processing (NLP) to detect documents that do not meet the requirements before being sent to BPJS. Figure x shows the process of building a machine learning algorithm using Historical Data from year 2022-2024

obtained from Murni Teguh Memorial Hospital fed into the AI Model and processed to perform prediction and evaluation on BPJS claim process.

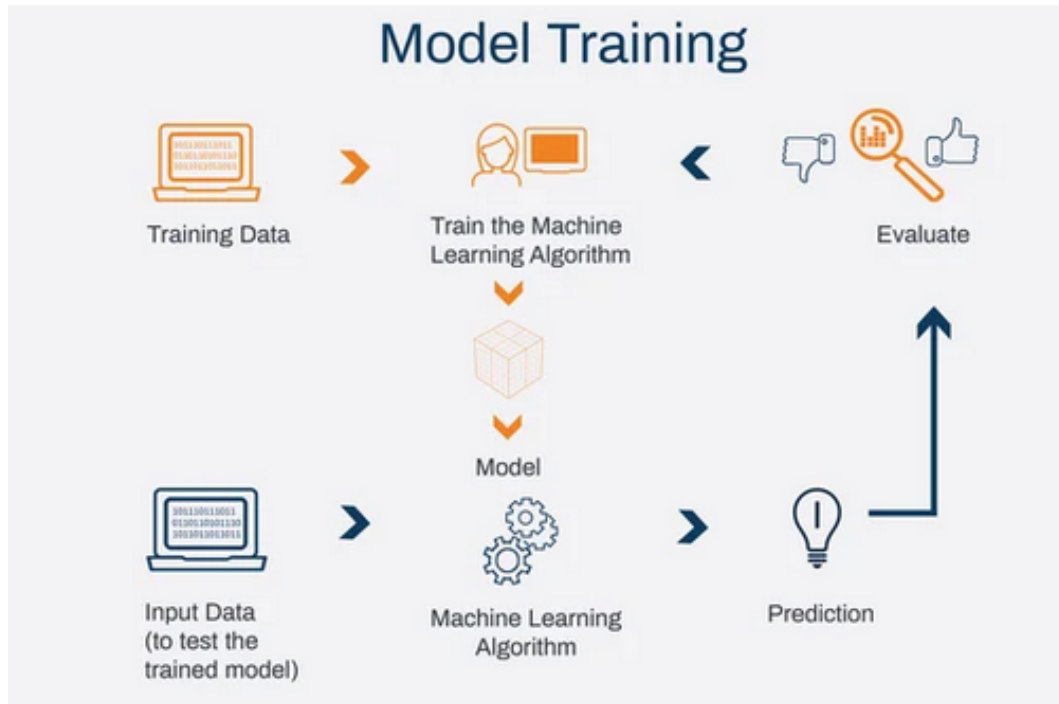


Figure 1.1 Model Training

This study performs a novel intervention by implementing a self-built AI Auto Verification. It is expected that with the novel intervention, the number of pending claims can be reduced significantly, so that hospitals can speed up the claim disbursement process and improve operational efficiency.

This study uses an experimental approach with pre-test and post-test methods to measure the effectiveness of the implementation of the AI Auto Verification model in overcoming obstacles that cause pending claims in BPJS claims at Murni Teguh Memorial Hospital Medan. This approach is carried out by comparing conditions before and after the use of AI through data collection using a questionnaire before the use of AI Auto Verification model (control) and a questionnaire after the use of AI Auto Verification model (experiment). Thus, this

study can provide a more in-depth analysis of the extent to which the application of Auto Verification model is able to overcome inhibiting factors, such as complete administration/files, errors in coding, and factors related to machine and human resources (manpower). To measure the effectiveness of AI Auto Verification model implementation, this study will use SMARTPLS, which allows significant comparisons between control and experimental groups. This analysis will evaluate changes in BPJS claim variables after the implementation of the Auto Verification model, to test whether there is an increase in the impact of file completeness, coding accuracy, and optimization of human and machine resources in the BPJS claim process. If the analysis results show a significant difference between before and after the implementation of AI, it can be concluded that the AI Auto Verification model is an effective solution to overcome various obstacles that cause pending claims. Thus, this study can provide evidence-based recommendations that the implementation of Auto Verification model in the BPJS claim process can increase efficiency and accelerate the disbursement process, hence becoming a better step for hospitals to improve BPJS claims optimally.

1.2 Research questions

The research questions were formulated based on research variables in the context of cardiac surgery services in teaching hospitals, as follows:

- 1) Is there a positive impact of complete administration files on BPJS claims output with and without AI Auto Verification model?
- 2) Is there a positive impact of coding accuracy on BPJS claims output with and without AI Auto Verification model?

- 3) Is there a positive influence of Machine on BPJS Claims output with and without AI Auto Verification model?
- 4) Is there a positive influence of Man on BPJS Claim output with and without AI Auto Verification model?

1.3 Research purposes

This study was conducted in Murni Teguh Memorial Hospital Medan, with the following objectives:

- 1) To test and analyze the positive influence of complete administration on BPJS claims output with and without AI Auto Verification model.
- 2) To test and analyze the positive impact of coding accuracy on BPJS claims output with and without AI Auto Verification model.
- 3) To test and analyze the positive influence of Machine on BPJS Claims output with and without AI Auto Verification model.
- 4) To test and analyze the positive influence of Man on BPJS Claims output with and without AI Auto Verification model.

1.4 Benefits of research

This quantitative research in the field of health service management in hospitals with a focus on the BPJS claim process and the factors that influence it is expected to provide benefits for academics and hospital management practitioners, especially in efforts to improve the efficiency of the BPJS claim process at Murni Teguh Memorial Hospital, Medan.

The benefit for academics is the availability of new instruments in BPJS claim analysis, especially in evaluating the effectiveness of the implementation of the AI Auto Verification model in improving the claim system in hospitals. This instrument can be used in further research in the field of hospital management, especially in managing claims and optimizing payment systems based on Indonesia Case Base Groups (INA-CBG's).

The benefit for management practitioners in hospital structural services, especially teaching hospitals, is obtaining evidence-based input related to the implementation of AI Auto Verification in improving the accuracy, speed, and efficiency of the BPJS claim process. The results of this study are expected to be a reference in making policies to reduce the number of pending claims, increase hospital cash flow, and improve the performance of the BPJS claim unit in handling administrative documents, coding, and utilization of human resources and technology in the hospital claim system.

1.5 Research systematics

This research was conducted in the unit Murni Teguh Memorial Hospital Medan claims, obtained from the perspectives of health workers and non-health workers. This research presents a comprehensive analysis of the systematic structure underlying academic writing. This chapter is organized into five distinct chapters, each with its own title and detailed subsections, which collectively provide a comprehensive overview of the research process from start to finish. The paper begins by outlining the background, theoretical basis, and methodology used, followed by a presentation of the research findings. A coherent flow is maintained

throughout the writing, with clear relationships between the different chapters. The structure of the thesis is arranged systematically so that it becomes a comprehensive and complete academic text.

CHAPTER I: INTRODUCTION

This chapter outlines the research topic, which includes an explanation of the research topic and the reasons for studying the research problem that focuses on factors that influence the BPJS claim process. The background subsection presents the arguments for the importance of conducting this research, along with a brief description of the conceptual framework and variables included in the research model. Furthermore, the research questions are explained based on the selected research variables, followed by the research objectives, research benefits, and a systematic description of the writing structure.

CHAPTER II: LITERATURE REVIEW

This chapter presents a review of the theoretical foundations and key concepts underlying the conceptual framework of the study. This chapter provides an explanation of the definition of variables and their relationship to other related variables. In addition, this chapter contains a review of empirical research relevant to the focus and objectives of this study. Furthermore, the development of research hypotheses is described sequentially based on references from previous scientific publications. Finally, this chapter ends with an illustration of the research model and related hypotheses.

CHAPTER III: RESEARCH METHOD

This chapter describes the methodological approach used in this study. The discussion is about the research paradigm, research object, unit of analysis, type of research conducted, measurement of research variables, population and determination of sample size, sampling technique, and data collection method. Comprehensive documentation of research methodology provides transparency and allows replication of research procedures. This chapter ends with an explanation of inferential statistics and a description of the stages of the multivariate analysis method with PLS-SEM.

CHAPTER IV: RESEARCH RESULTS AND DISCUSSION

This chapter presents the findings and analysis of research data that focuses on the effectiveness of the implementation of AI Auto Verification in improving the BPJS claim process at Murni Teguh Memorial Hospital, Medan. The analysis begins with the profile of respondents and their behavior in handling BPJS claims, followed by a descriptive analysis of the research variables, namely complete administration/files, errors in coding, and machine and human resource factors. This chapter then discusses inferential statistical analysis using the PLS-SEM method, which aims to test the relationship between variables that affect pending claims and the effectiveness of using AI Auto Verification in overcoming these obstacles. The stages of statistical analysis include reliability and validity testing, as well as hypothesis testing and interpretation to determine the significance of the relationship between variables. Furthermore, additional analysis is carried out to deepen understanding of the research findings and their managerial implications.

The results of this analysis will be tested empirically to provide evidence-based recommendations for hospital management, especially in efforts to improve the efficiency of the BPJS claim system, accelerate fund disbursement, and optimize the use of technology in hospital administration processes.

CHAPTER V: CONCLUSION

This final chapter presents the research conclusions formulated as answers to research questions based on the results of statistical analysis and hypothesis testing, especially related to the effectiveness of the implementation of AI Auto Verification in overcoming obstacles in the BPJS claim process at Murni Teguh Memorial Hospital, Medan. This conclusion provides an overview of the influence of complete administration/files, coding accuracy, machine and human resource factors on BPJS claim output and how the use of AI can improve efficiency and accuracy in the claim verification process.