

Original Research Paper

Electronic medical record (EMR) at physiotherapy clinic

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Abstract

The development of the digital world is accelerating with the presence of the COVID-19 pandemic around the world. The need for digitization is also needed in the health sector, such as EMR (Electronic Medical Records) to facilitate services in recording patient medical data. The Regulation of Physiotherapy Service Standards aims to provide a reference for the implementation of quality and accountable physiotherapy services to improve the quality of physiotherapy services to patients which is one of the technological advances in the industrial revolution 4.0 by providing EMR. With this EMR, it is hoped that it can facilitate physiotherapists' access to medical record data from patients that is neatly structured. EMRs with structured data can also help clinic owners make new decisions based on stored data. This research was conducted by observation, interview, and discussion methods for analysis and design. The results of the discussion and analysis of this study are structured, neat data according to the concept of relational data. 12 Entities generated from structured data and relationships from each entity that connects one to the other consist of 10 relationships. This study resulted in a pilot system for ERM specifically for Physiotherapy Clinics because it has structured and clearly documented data such as database design using ERD (Entity Relational Diagram) and DOD (Data Object Description), as well as system design and display.

Keywords: database design; EMR; physiotherapy clinics; physiotherapy medical records; physiotherapy service standards

1. Introduction

The development of the digital world is accelerating with the presence of the COVID-19 pandemic around the world. The need for digitalization is also needed in the health sector, such as medical records and patient data presented in digital form. ERM (Electronic Medical Record) to facilitate services in recording patient medical data. ERM is a medical information center that makes it easier to enter, manage and make medical decisions in health services.

According to the Minister of Health, Number 269 of 2008 concerning medical records in article 6 which essentially contains: "those responsible for medical records are doctors, dentists and/or certain health workers". Health workers here without exception physiotherapy (Kuswardani et al., 2021; Peraturan Menteri Kesehatan, 2008).

Physiotherapy that can be independent physiotherapy is professional and specialist physiotherapy in accordance with the Regulation of the Minister of Health Number 80 of 2013 concerning the Implementation of Physiotherapy Work and Practice in Article 7. Independent physiotherapy is physiotherapy that provides health services to individuals or groups with the aim of developing, maintaining, and recovering movement with a promotive (promotional), preventive (handling), curative (preventive) and rehabilitative (rehabilitative) approach in accordance with the competence possessed by physiotherapists who open physiotherapy service places (Kuswardani et al., 2018; Peraturan Menteri Kesehatan, 2013).

According to the Regulation of the Minister of Health of the Republic of Indonesia No. 65 of 2015, what is meant by physiotherapy is a form of health service aimed at individuals and/or groups to develop, maintain, and restore movement and body function throughout the life span by using manual handling, improvement of movement, equipment (physical, electrotherapeutic and mechanical) functional training and communication (Peraturan Menteri Kesehatan Nomor 65, 2015).

Physiotherapy Clinic Ftr. Setyawan, AIFO. located in Tempel, RT. 09 RW. 03 No. 317, Tempel, Caturtunggal, Depok District, Sleman Regency, Special Region of Yogyakarta 55281 with SIPF number 446/12957/4311/II-24. This clinic focuses on stabilizing or correcting impaired motor or body functions that are impaired as a result of the painful process due to the pathological nature of a disease.

The Regulation of Physiotherapy Service Standards aims to provide a reference for the implementation of quality and insurmountable physiotherapy services to improve the quality of physiotherapy services to patients which is one of the technological advances in the industrial revolution 4.0 by providing EMR (Ikatan Fisioterapi Indonesia, 2014; Sutandra & Sulaiman, 2019).

Medical record data in the clinic still uses manual recording using books. Clinical physiotherapists face difficulties when looking for patient medical record info to make exercise prescriptions for patients. Existing medical records are also still difficult to trace, as a result of which many patient medical record files are vulnerable to damage. With this ERM, it is hoped that it can facilitate access for physiotherapists in finding medical record data from patients that is neatly structured. ERM with structured data can also help clinic owners make new decisions based on stored data.

This research will focus on analyzing medical record data from clinics that are still manual, then analyzed to be converted into structured relational data and then implemented in the form of a system. Based on the background of the problem here, the problem formulation of this study is "How to Implement Electronic Medical Records in Physiotherapy Clinics?".

The purpose of this study is the Implementation of Electronic Medical Records in Physiotherapy Clinics to present a database design using ERD (Entity Relational Diagram) and DOD (Data Object Description), as well as system design and display. In addition, it can also benefit from the results of this research, which is expected to increase knowledge and information in the field of health in electronic medical records. The results of this study can also be used as a reference to find the need for information systems in the Physiotherapy Clinic (Pohan et al., 1997).

This study describes in detail the implementation of Electronic Medical Records (RME) through two main components, namely Entity Relational Diagram (ERD) and Data Object Description (DOD). The ERD will present a visual structure that describes the entities in the RME system, including the relationships between those entities. This will provide a better understanding of how data is interconnected in systems and how information can be accessed and manipulated. The DOD will provide a further description of each data object in the system, including the associated attributes and classes needed to manage the data efficiently (Date, 2000; Fathansyah, 2007; Silberschatz, 2002) (Silberschatz, 2002; Tyas, 2010).

The literature review used, namely Purwanto & Tegariato's Research, 2021, designed and built a system to overcome administrative problems, where in this system the reservation process can be done online so that patients do not need to queue and also officers can enter medical records in a more structured manner. In addition, the automatic payment and memo printing system makes it easier for officers to bill for the actions taken and patients can also see the history of the physiotherapist's actions that have been taken. In contrast to the research conducted by Rostriani, 2021 in the research that will be carried out the researcher will design and build a system to overcome registration problems, patient disease data, and medical record data, where in this system the reservation process can be done online so that patients do not need to queue and also officers can enter medical records in a more structured manner (Purwanto & J. Tegariato, 2021; Y. Rostriani, 2012).

Research by Mitha Amelia Rahmawati, Novita Nuraini, and Donny Adhasari Hasan in 2021 identified factors causing delays in the provision of outpatient medical record documents at Haji Surabaya Hospital, including 5M management factors. The results showed that the lack of knowledge of officers, lack of document storage shelves, and lack of SOPs were some of the main factors. Another research by Fahmi Ridwan and Irda Sari in the same year designed a web-based Electronic Medical Record at the Medical Rehabilitation Polyclinic of Cipto Mangunkusumo Hospital Jakarta, facilitating efficient management of patient data. Meanwhile, the research of Rejalana Bayu Kurniawan, Nadiyahari Agitha, and Royana Afwani from the University of Mataram discussed the development of a Physiotherapy Consultation and Scheduling Information System for Bell's Palsy disease at the Griya Physiotherapy Clinic. They used the Rational Unified Process (RUP) method to overcome the problem of scheduling physiotherapy and recording medical records, with results that were feasible for use (Ridwan & Sari, 2021; Rahmawati et al., 2020; Kurniawan et al., 2021).

A 2017 study by Novlinda Susy Anrianawati Manurung from the Christian University of Indonesia observed the physiotherapy process at a private hospital in East Jakarta, finding that physiotherapists had carried out the management process correctly by regulations in SOAP format. Other research by Tias Agustin Ayuningrum, Rossalina Adi Wijayanti, Atma Deharja, and Maya Weka Santi from the Jember State Polytechnic identified the problem of suboptimal management of medical records at Mitra Sehat Situbondo Hospital, characterized by incomplete filling of medical records, return of BPJS claims, and lack of adequate storage facilities (Manurung, 2020; Ayuningrum et al., 2020).

The research conducted by Kuswardani, Sigit Sugiharto, and Dwi Nur Astuti from Widya Husada University Semarang aims to improve the ability of professional organizations of the Indonesian Physiotherapy Association Semarang City branch in recording medical records by the regulation of the Minister of Health number 269 of 2008. They use mentoring methods to improve physiotherapists' skills in making medical records, both manual and electronic. Another research conducted by Suci Ariani from the Health Information Management Study Program at University of Muhammadiyah Sidoarjo discussed the analysis of the success of the implementation of electronic medical records in improving the efficiency and quality of health services. Through a literature review, this study found that the implementation of electronic medical records improves work effectiveness in medical record units, improves user satisfaction, and supports patient case management. Meanwhile, in the research of Hartati and Rafika Aini from Dr. M. Djamil Padang Hospital and STIKES Dharma Landbouw Padang, discussed the benefits of implementing electronic medical records for hospital management in Indonesia through a literature review. They highlighted the importance of implementing electronic medical records with a focus on data security and confidentiality and laid out a phased approach to achieving high-quality RME. (Ariani, 2023; Hartati & Aini, 2023; Kuswardani et al., 2021)

2. Research Methods

2.1.Data Collection

The Medical Record Data that will be analyzed and designed is medical record data from the Clinic. To collect information about the needs of data analysis and design, the author collects data by observation at the research site. The author went directly into the field to find out the current business process. This needs to be done so that the author can analyze the manual medical record system that has been running and determine a new data design.

2.2. Interview

In this interview, the author conducted interviews with clinic employees and clinic owners for the business process of recording medical records which has been carried out until now is still manual. In addition, interviews are also conducted to find out what kind of medical record system the Clinic wants.

2.3. Analysis, Data Design and System Implementation

Data analysis is carried out to translate the needs of the Clinic with the concept of database theory so that a good and appropriate database design can be found that can be implemented into the system. Database design, done after data analysis, is necessary because it makes it easier to design the system. At this stage of planning, the author uses ERD and DOD. as tools. The ERD created will be implemented into the MySQL database management system (DBMS). System Implementation uses a CI framework.

2.4. Research Subject

The research was conducted at the Ftr. Setyawan Physiotherapy Clinic, AIFO. with data from 2020-2021.

2.5. Research Outline

Interviews and Observations in the Clinic, Physiotherapist Expert Consultation, Medical Record Expert Consultation, Physiotherapy Medical Record Data Analysis, Results of Physiotherapy Medical Record Data Analysis with ERD and DOD, Implementation of Physiotherapy Clinic Electronic Medical Records using the CI Framework.

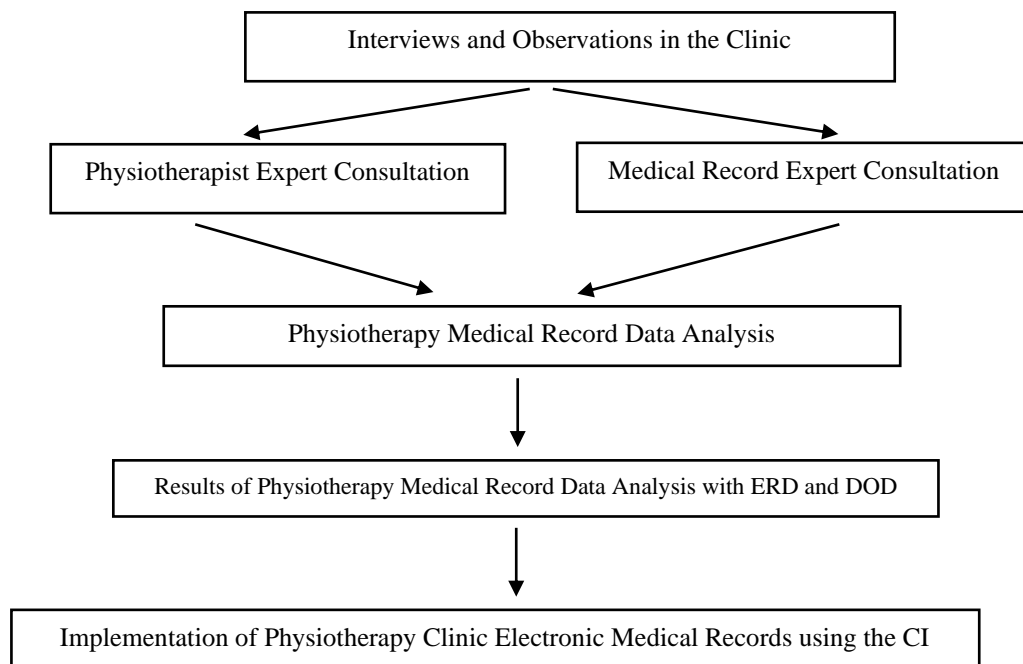


Figure 1. ERM Research Framework in Physiotherapy Clinic

3. Results and Discussion

This study uses a data analysis approach using ERD, DOD and Database Design using MySQL DBMS. An ERD is a diagram that depicts the relationships between sets of entities. There are several sets of entities that are needed for physiotherapy medical record data needs, namely the set of admin, doctor, physiotherapist, patient, peng_khusus, pem_subjektif, pem_fisik, check, pem_sistemik,

progress, data_penunjang, and assessment entities. For the existing entity set, it is explained in more detail in Table I.

Table 1. Set Of Entities in Physiotherapy Medical Record Data

| Entity | Description |
|-----------------|---|
| admin | Information Regarding admin data in the form of admin id, admin name, etc. |
| doctor | Information about doctor data in the form of NIP, doctor's name, etc. |
| Physiotherapist | Information about physiotherapists who perform physical therapy |
| patient | Information about the patient undergoing therapy such as NIK, patient's name, date of birth, etc. |
| peng_khusus | Information on special systemic examinations such as Musculoskeletal etc. |
| pem_subjektif | Information about special examinations such as musculoskeletal, neuromuscular, etc. |
| pem_fisik | Information about physical examinations such as blood pressure, temperature, pain score, etc. |
| check | Information about check data such as NIK, references, check dates, interventions, and status |
| pem_sistemik | Information on special systemic examinations such as Musculoskeletal etc. |
| Progress | Information on the progress of therapy |
| data_penunjang | Information about supporting data such as radiology, etc. |
| Assessment | Information about assessments, such as diagnosis, impairment, functional, and participial |

Another result obtained is the formation of relationships from each entity that connects one with another consisting of 10 relationships. Interconnected entities and relationships form ERDs as shown in Figure 2 and Figure 3 presents the database design in MySQL.

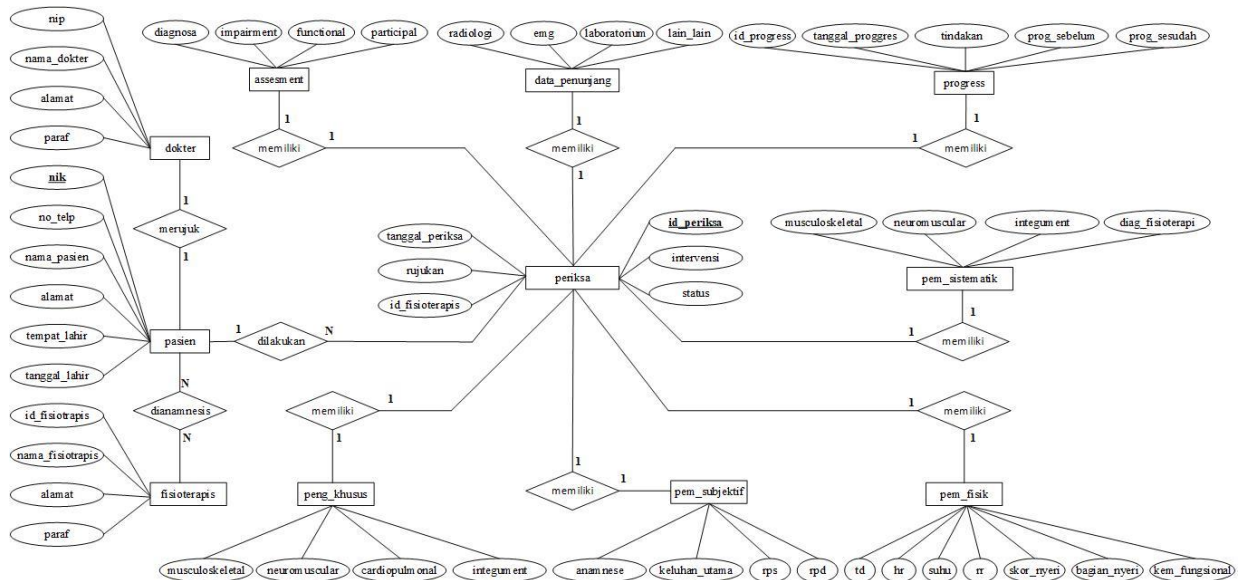


Figure 2. Entity Relationship Diagram Clinic

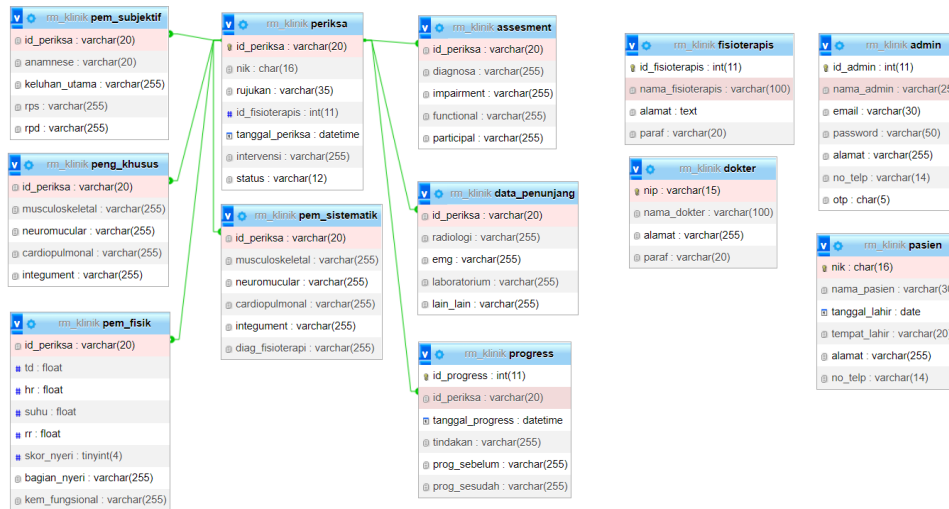


Figure 3. Database Design Framework

The data Object Diagram (DOD) describes the relationship set it has with the check entity set and peng_khusus.



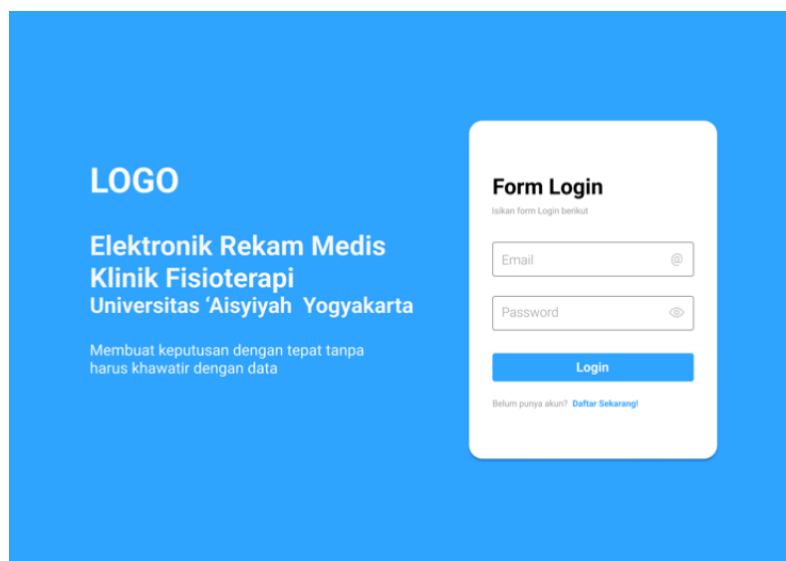
Relational schema : check (id_periksa, NIK, referral, id_fisioterapis, tanggal_periksa, intervention, status)

peng_khusus : (musculoskeletal, neuromuscular, cardiopulmonal, integument)

Cardinality :

1-1, means that one check can only have one peng_khusus, and vice versa, each peng_khusus has only one check.

Design Design is made using Figma to make it look more real, some design designs are presented in Figure 4. Design for login form and Recording of patient complaint menu.



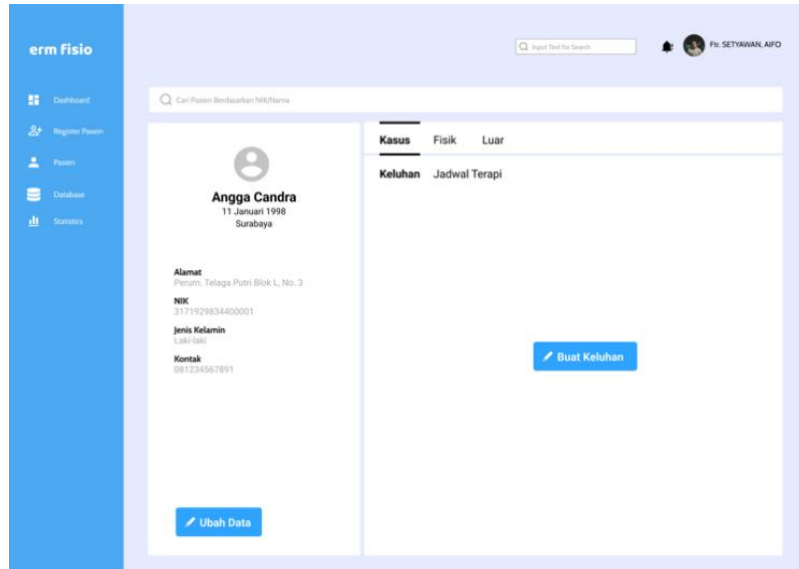


Figure 4. Design Display Design using Figma

The System implementation using the CI Framework for the dashboard and complaint logging is presented in Figure 5.

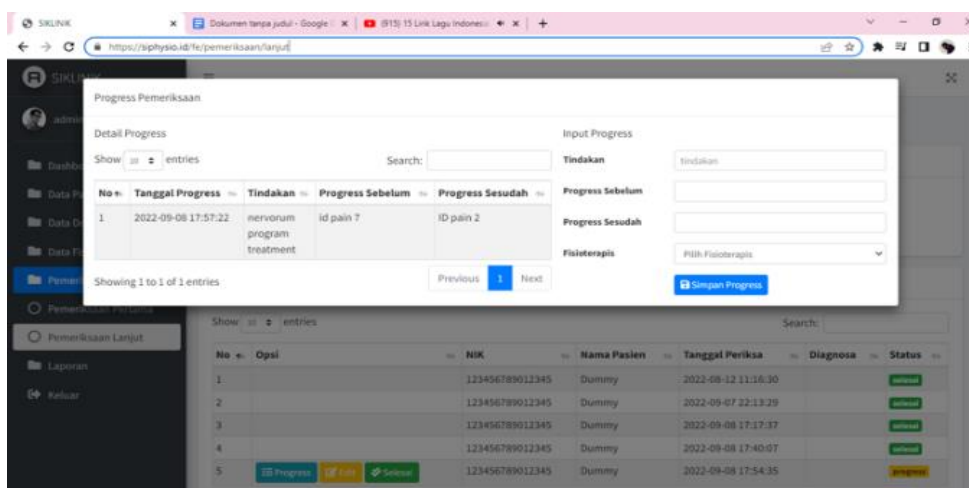
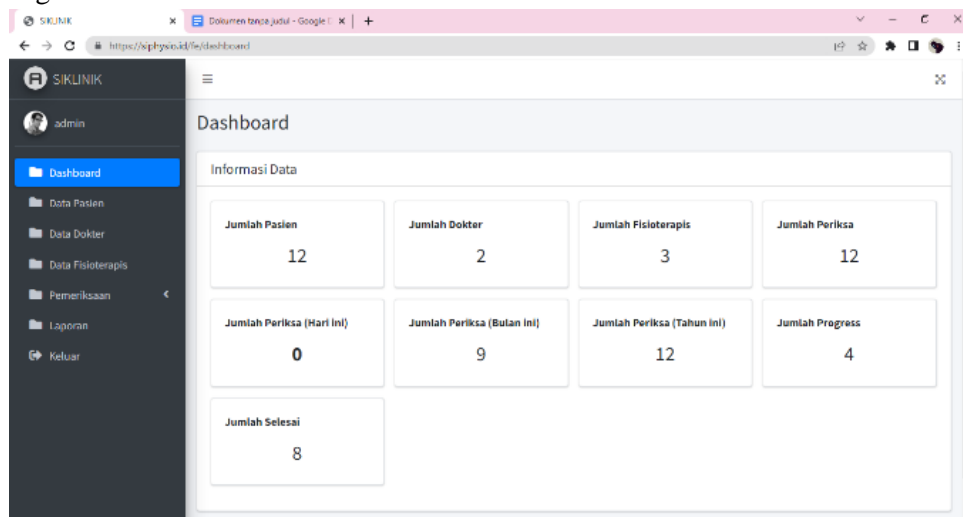


Figure 5. Implementation of an Electronic Medical Record System for Physiotherapy Clinics

4. Conclusion

This research is structured, neat data according to the concept of relational data is needed for the management of medical record data of the Ftr. Setyawan Physiotherapy Clinic, AIFO. The resulting Electronic Medical Records in the Physiotherapy Clinic present documentation of the database design using ERD (Entity Relational Diagram) and DOD (Data Object Description), as well as the design and display of the system. This research resulted in a pilot system for ERM specifically for Physiotherapy Clinics and can be developed for cooperation and payment in the future.

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