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Evaluation of the Implementation of the "SIMPUS" Dental Medical Record and Human Identification System in Semarang City

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ABSTRACT

The evaluation of the "SIMPUS" software in Semarang City is motivated by the existence of a dental medical record information system within the "SIMPUS" application. However, some menus are not yet aligned with the required standards. In addition, there is a new discourse on the use of dental data as a means of human identification in disaster events. The aim of this study is to provide an overview of the implementation of a standardized dental medical record information system, as well as to establish and test a system capable of supporting decision-making in human identification. This research employed a quantitative descriptive method to evaluate the use of the "SIMPUS" software in Semarang City. Data collection was carried out through interviews and observations. The research subjects were dental therapists and dentists at community health centers (puskesmas) within the jurisdiction of the Semarang City Health Office. Data were analyzed using a quantitative descriptive approach. The results showed that the "SIMPUS" software in Semarang City is user-friendly as a Dental Medical Record Information System, although some codes occasionally do not appear. The system is comprehensive, and the data output matches the input provided. However, the feature for human identification using dental charts is not yet available, and there is no display of individual baseline data related to odontogram codes. The "SIMPUS" software in Semarang City is accepted by users as a Dental Medical Record Information System that meets national dental record standards. It can be used by community health centers to manage patient registration data, medical records, and generate monthly disease reports (LB1) and dental treatment reports. However, patient search features based on odontogram codes are not yet available, and further research is needed.

Keywords: Simpus, Medical Records, Dental.

Introduction

In the practice of medicine, every physician and dentist is required to adhere to applicable standards, guidelines, and procedures to ensure that the public receives professional and safe medical services. One of the regulatory functions outlined in the Medical Practice Law pertains to the management of medical records [1]. Proper and standardized management of medical records, as regulated in the Indonesian Minister of Health Regulation No. 269 of 2008 concerning medical records, has become a primary concern among healthcare facility administrators in Indonesia over the past decade. Medical records hold significant value for administrative, legal, financial, research, educational, and documentation purposes. Therefore, both the availability and completeness of the data must be ensured, as medical records serve as a crucial reference and guideline for disease analysis and treatment planning [2,4,9,10].

The importance of managing dental medical record data accurately and according to standards is well acknowledged within the medical community, particularly because dental records have proven to be a reliable tool for human identification in various cases—especially in disasters resulting in unidentified victims. For example, during the Bali bombing, most victims were identified quickly using dental medical records. Data show that identification success rates reached 60% in the 2003 traffic accident in Situbondo and 66.7% in the Garuda plane crash in Yogyakarta [3,10,15,23].

Forensic odontology is one of the most reliable methods for determining an individual's identity. This reliability stems not only from its high accuracy—comparable to fingerprint analysis—but also from the durability of teeth and bones, which are among the most resistant biological materials to environmental changes and are naturally protected. Additionally, forensic odontology is more cost-effective than blood serology or DNA testing [3,13,14,15,17,23,28].

A preliminary study conducted from July 2009 to June 2010 on the use of dental medical records in dental healthcare facilities in Semarang City, Lamongan Regency, Surabaya City, Denpasar City, Purworejo Regency, and Bantul Regency revealed the following findings:

1. Dental medical records were compiled by dentists and dental nurses.
2. Most dental medical data were still recorded on paper-based forms, often incomplete and not in compliance with the Indonesian standards for dental medical records.
3. Out of five hospitals (including those managed by central government, provincial government, the police force, and private entities), only two used dental medical record cards in accordance with national standards—one of which had not yet implemented the system properly, and the other used paper-based storage, which hindered rapid retrieval for identification purposes.
4. None of the public health centers (puskesmas) in Semarang City used dental medical records that met the national standard.
5. All 15 private dental clinics observed did not use standardized dental medical records.

The reasons for not implementing standardized dental medical records included: the unavailability of standardized dental record forms and odontogram charts, difficulty in coding due to the need to memorize numerous codes, unfamiliarity with standard coding practices, and a perceived lack of benefit—given that patients often seek dental care at multiple facilities, resulting in scattered records.

Observations of the "SIMPUS" software in Semarang City revealed simple patient identity input and diagnostic data for general public health (BP Umum), but no structured system for dental medical data entry such as tooth element notation or dental charting/odontograms [5]. Therefore, the current system presents several shortcomings:

a.The information generated by SIMPUS does not align with standardized dental medical records

b. The data entry process in SIMPUS lacks structured guidance for completing dental medical data.

c.The existing system cannot be used as a tool for human identification via dental records, especially in disaster scenarios.

According to the Semarang City Agency for National Unity and Community Protection (Kesbanglinmas) and data from the Ministry of Health Crisis Center, from January 2009 to February 2010, Semarang experienced 24 disaster events, including landslides and flash floods, resulting in five deaths [6]. Additionally, data from the Semarang City Health Office show that from 2005 to 2009, traffic accidents were among the top five causes of death [7]. To address such scenarios, the city of Semarang has established crisis management units involving local government, military, police, Red Cross, and community organizations. As part of the Indonesian National Police, the Disaster Victim Identification (DVI) unit is capable of identifying victims in disaster situations. Based on interviews with members of the Medical and Health Division (Biddokkes) of Central Java Regional Police, up to March 2011, they had handled 1,043 cases of victim/suspect identification through visual and DNA analysis. However, forensic odontology faced difficulties due to the lack of antemortem data for comparison. Hence, optimizing various supporting systems—including collaboration among organizations—to facilitate human identification, particularly for Semarang City residents, is crucial [8].

In response to these conditions, a preliminary study was conducted in 2010 to develop a prototype Dental Medical Record Information System with Decision Support System capabilities for Human Identification. This prototype was tested at the Swadana Clinic of the

Dental Health Department at the Health Polytechnic of the Indonesian Ministry of Health in Semarang. In 2011, it was integrated into the "SIMPUS" software of Semarang City, followed by dissemination to end-users—dentists and dental nurses in Semarang. The next phase included updating all "SIMPUS" software versions across 37 geographically distributed puskesmas in 16 districts. After approximately 12 months of implementation, an evaluation of the software's use as a Dental Medical Record and Human Identification Information System became necessary.

Methods

The type of research conducted is quantitative descriptive research using observational methods and interviews. The time approach used in this study is cross-sectional, meaning that measurements were taken at a single point in time. Data collection methods included interviews and observations with dentists or dental nurses at community health centers (puskesmas), aiming to gather information on the use of the "SIMPUS" Software of Semarang City as a Dental Medical Record and Human Identification Information System. The subjects of this study were dentists or dental nurses who use the "SIMPUS" software. The research instrument used for data collection was a questionnaire, which consisted of closed-ended questions. Observations were also carried out on the "SIMPUS" software used in Semarang City.

The components of the questionnaire included questions on:

1. System usability, with answer choices: easy, moderate, and difficult.
2. System completeness, with answer choices: complete, sufficient, and incomplete.
3. System compliance with reporting standards, with answer choices: compliant, moderately compliant, and non-compliant.
4. System accuracy, with answer choices: yes, uncertain, and no.

Data processing and analysis in this study used the content analysis method, which involves data collection, data reduction, and verification, followed by descriptive presentation using inductive reasoning, beginning with the collected data. Conclusions were then drawn. Meanwhile, observational data were processed using tabulation to understand the usage of the "SIMPUS" software in Semarang City.

The research was conducted from December 2012 to January 2013, starting with the preparation of instruments, data collection, data analysis, and report writing.

Results and Discussion

Oral and dental health efforts are an integral part of overall health services, implemented through cross-program and cross-sectoral integration. Dental and oral health services at community health centers (puskesmas) in Semarang City are generally provided through both outreach (extramural) and in-house (intramural) activities. The Standard Operating Procedures (SOPs) for Dental and Oral Health Services at Puskesmas include the following steps [22]:

a. Anamnesis
b. Examination
c. Diagnosis
d. Treatment Planning

The "SIMPUS" Software of Semarang City, functioning as a Dental Medical Record and Human Identification Information System, is a web-based application. To ensure optimal performance—whether as a data center or as a client station—the system requires the following minimum hardware specifications [18,19]:

a. Processor: 2.0 GHz
b. RAM: 512 MB
c. Video display: 128 MB
d. Hard disk: 40 GB (the application package requires only 10 MB)
e. Operating system: Linux / Windows
f. Web server: Apache version 2.2.0
g. Database Management System: MySQL version 4.0
h. Web browsers: Mozilla Firefox, Google Chrome, Internet Explorer

The dental medical record information system application is structured according to the main user roles, namely: registration officer, dental nurse, and dentist. The reporting features are accessible to all main user roles.

System interface features include:

a. Patient registration display
b. Patient information display
c. Patient visit logging interface
d. Medical record input form
e. Medical record viewing interface
f. Report interface

g. Monthly disease report / LB1
h. Treatment actions
i. Odontogram search

The odontogram coding used in the system is based on the Indonesian Standard for Dental Medical Records, published by the Ministry of Health of the Republic of Indonesia in 2004 [2,14,15,21,27]. Odontogram codes stored in the cm_odontogram table consist of a string of characters using special codes, with each tooth position separated by specific control characters. Below is an example of a patient's odontogram at a given point in time:

18-C.occ|17-Fam.occ|16-C.occ|15-Z|14-Z|13-Z|12-Z|11-Z|21-Z|22-Z|23-Z|24-Z|25-Z|26-Z|27-Z|28-Z|38-Z|37-Z|36-Z|35-Z|34-Z|33-Z|32-Z|31-Z|41-Z|42-Z|43-Z|44-Z|45-Z|46-Z|47-Z|48-Z|55-Z|54-Z|53-Z|52-Z|51-Z|61-Z|62-Z|63-Z|64-Z|65-Z|75-Z|74-Z|73-Z|72-Z|71-Z|81-Z|82-Z|83-Z|84-Z|85-Z|

After the "SIMPUS" Software of Semarang City was implemented and used on computers at public health centers (puskesmas) for approximately 12 months, an evaluation was conducted to assess user acceptance of the system. The respondents consisted of 37 dental healthcare providers representing 37 puskesmas in Semarang City. The composition of the respondents was 10 dentists and 27 dental nurses.The results of respondents' answers regarding the components of acceptance of the dental medical record information system as a decision-making tool for human identification are as follows:

a. System usability

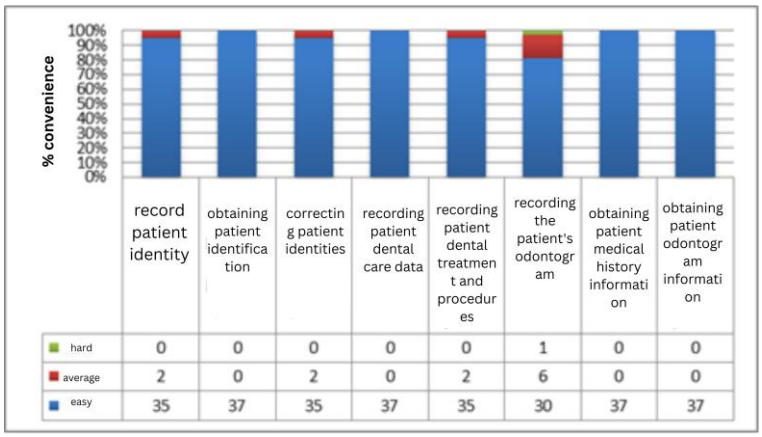

Figure 1. Graph of System Usability Component Based on User Perception

Based on the graph, it can be concluded that the "SIMPUS" Software of Semarang City is generally perceived as user-friendly and operationally accessible by its users, indicating a positive level of acceptance in terms of system usability.

b. System Completeness

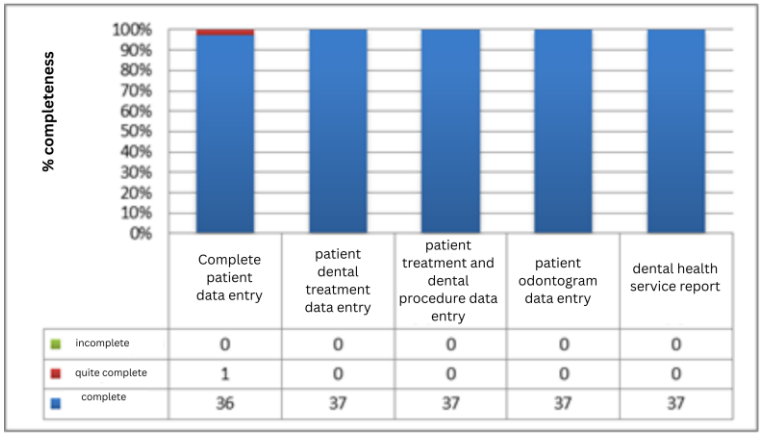

Figure 2. Graph of System Completeness Component Based on User Perception

Based on the graph, it can be concluded that the "SIMPUS" Software of Semarang City is generally perceived to have adequate data completeness, contributing to its overall acceptance by users as a Dental Medical Record and Human Identification Information System.

c. System Compliance

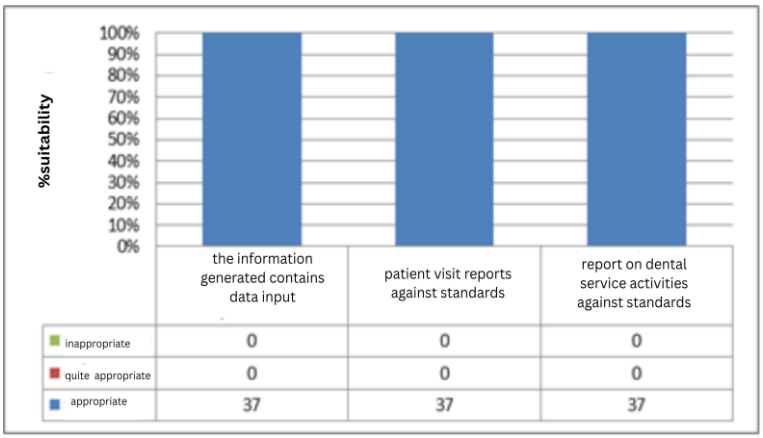

Figure 3. Graph of System Compliance Component

Based on the graph, it can be concluded that the "SIMPUS" Software of Semarang City is generally perceived by users to be in accordance with their information and reporting needs, thus supporting its acceptance as a Dental Medical Record and Human Identification Information System.

d. System Accuracy

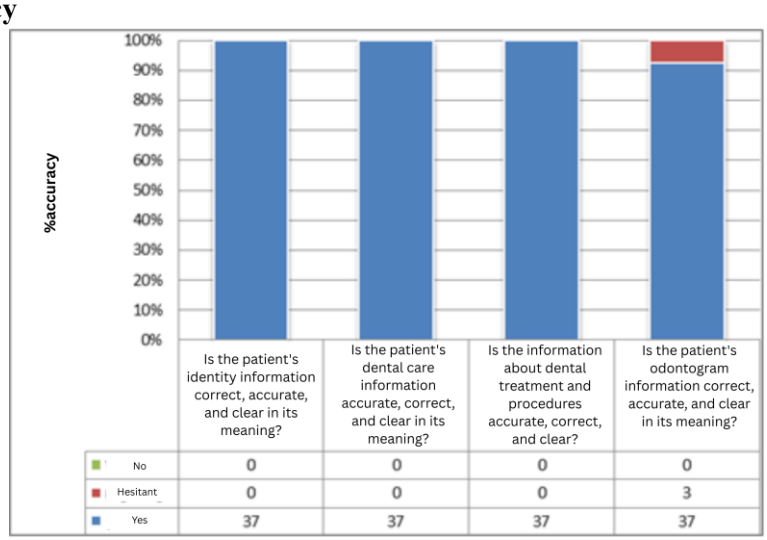

Figure 4. Graph of System Accuracy Component

The graph above indicates that, in general, the "SIMPUS" Software of Semarang City, as a Dental Medical Record and Human Identification Information System, is well accepted by users in terms of its accuracy in providing correct, precise, and clearly understandable information.

Meanwhile, in terms of system acceptance testing related to human identification using dental charts, the system has been acknowledged and approved by the relevant authority, namely the Medical and Health Division (Biddokkes) of the Central Java Regional Police (Polda Jawa Tengah).

Conclusion

The "SIMPUS" Software of Semarang City has been accepted as a Dental Medical Record and

Human Identification Information System that complies with the standards of dental medical records. This application is designed for use in community health centers (puskesmas) to manage patient registration data, record medical notes, and generate monthly disease reports (LB1), dental treatment reports, and patient search reports based on odontograms.

In addition, the "SIMPUS" software can also be utilized in the decision-making process for human identification using odontogram codes or dental charts, particularly for patients whose dental health status has been previously recorded in the system.

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