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Effectiveness of telegram bot medical records with dentistry manual status card for forensic identification purposes

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Abstract

Background: Based on PERMENKES 2022 Number 24, it states that all health facilities are required to use electronic medical records in accordance with the regulation of the Minister of Health by December 31, 2023. However, electronic medical records are difficult to implement at every generation level. Researchers utilize the habit of sending massages using instant messaging applications that have become a habit of every generation to create telegram bot medical records.

Purpose: To determine and compare the effectiveness of Telegram bot medical records with manual dental status cards on forensic identification with consideration of aspects of efficiency, accuracy, and speed of access to medical record data using the Telegram bot application and manual filling.

Discussion: The type of research used is observational analytic using cross-sectional study design. The data obtained were then analyzed and interpreted. To test the hypothesis using Kruskal Wallis test with variable data scale is ratio. The significance value resulting from the Kruskal Wallis test on data on filling time, calling time, and accuracy of filling telegram bot medical records and manual medical records is 0.000 sig. the P-value <0.05 means that there is significant difference.

Conclusions: Telegram bot medical record is more effective than dentistry manual status card for forensic identification purposes.

Keywords: Dentistry Manual Status Card; Forensic Identification; Forensic Odontology; Telegram Bot Medical Record

1. Introduction

Forensic identification is one of the important aspects of forensic medicine that involves the process of identifying deceased or seriously injured individuals without a clear identity. In situations such as serious accidents, natural disasters, or criminal acts, it is important to quickly identify victims to provide appropriate medical care, notify families, and fulfill legal aspects [1]. Forensic dentistry is a sub-section of forensic medicine that deals with the proper evaluation, handling, and presentation of dental evidence in court for justice [2]. In the context of forensic dentistry, dental records and patient medical records can be key in victim identification. Information such as dental identifiers, dental treatment history, and dental radiographs can be used to confirm identity. However, quick and efficient collection and access to medical data is essential in these situations [3]. In Indonesia, obtaining antemortem data is still difficult because not all individuals can have their dental data archived. Only certain professions have antemortem data such as the military. In

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the absence of antemortem data, identification cannot reach the individual level but only the approximate age, sex, race, and dental characteristics of the victim [3]. The problem becomes the basis for creating medical records that can store data and bridge the difference between the older generation and the younger generation in running electronic-based applications so that antemortem data can be completed properly which can then create convenience in forensic identification because until now, which can be the basis of forensic identification only fingerprints that are easily damaged, teeth which until now there is no dental data that can be called up quickly, and DNA which requires considerable costs.

Based on Article 32 of 2009 Law Number 36 concerning Health, which regulates the obligation to record, store and maintain patient medical records in an easily accessible, complete and safe form, which was later replaced by 2014 Law Number 36 concerning Health Workers. In addition, Article 45 of the Regulation of the Minister of Health of the Republic of Indonesia Year 2022 Number 24 states "All health facilities must organize electronic medical records in accordance with the Regulation of the Minister of Health no later than December 31, 2023". So, it is necessary and important for all health facilities to comply with these regulations [4]. Medical records are documents that contain records and data about patient identity, examination, treatment, actions, and other services that have been provided to patients [5] these documents affect the quality of services provided. A good medical record has continuous data starting from the first time the patient arrives until the end of treatment [6]. There are two kinds of medical records, namely manual medical records and electronic medical records. Manual medical records are paper-based medical records with manual filling by writing directly on the medical record sheet, this medical record is a traditional and conventional way of maintaining and recording patient data. While electronic medical records are electronic-based medical records where all patient data is recorded and accessed through computer software and systems [7].

Manual filling of dental records or patient status cards can be time-consuming and requires a high attention to detail. Human error in data entry can also occur, which can negatively impact forensic identification [8]. In addition, Tiorentap states, "Manual medical records require manual and physical searching to find the required information and are susceptible to physical damage and need to be stored carefully, which can be more time consuming and less resistant to damage than electronic searches" [9]. Therefore, the government has begun to promote the use of electronic medical records. Manual medical records have many disadvantages such as requiring paper or physical media collected in physical folders as a place to store, making it difficult to search and taking longer to find medical records if needed in the future. In terms of information sharing, Widyastuti stated "Manual medical records are more complicated and require physical printing and delivery so they are more vulnerable to unauthorized access, physical loss, and also physical damage, although security measures can also be taken in this regard". In addition, manual medical records require medical records staff to collect, record, archive, manage information, and report medical records. For this reason, an alternative that has been done is to name medical records using barcodes based on the alphabet or patient area so as to facilitate the search for medical record data, borrowing, and returning [6].

Along with the times, alternative electronic-based medical records have emerged which still have many advantages but also have disadvantages, such as fast internet access which is difficult to obtain in Indonesia, for example in areas far from urban areas because Indonesia has many places that have a mountainous structure. Fast internet access which is also quite expensive makes this electronic medical record difficult to use in areas with minimal internet networks. Electronic medical records require introductory adaptation so that they can be applied properly by each generation [10, 11]. The older generation must keep up with the times, so that the creation of electronic medical records can reach all generations by utilizing popular habits such as sending messages through applications. An example of this change is the change in long-distance communication media from paper letters written manually using ink to electronic media such as Telegram and WhatsApp. Digital technology and messaging apps like Telegram have become an integral part of modern medical practice. Telegram bot is one of the innovations that has the potential to automate and facilitate the filling of dental medical records. This convenience can be felt by dentists because telegram bots have filling efficiency, error reduction, data measurability, reminders, and reporting on proper filling of status cards. This is in line with research conducted by Maulana, who stated, "Telegram bots are very helpful in the data retrieval process by becoming a data container so that the information contained in the telegram bot can be called up through commands on the telegram bot" [11]. The purpose of this study is to determine and compare the effectiveness of Telegram bot medical records with manual dental status cards on forensic identification with consideration of aspects of efficiency, accuracy, and speed of access to medical record data using the Telegram bot application and manual filling.

2. Material and methods

2.1. Ethical Statement

This experiment uses a randomized post-test control group design. All the procedures in this research had been approved by the health commission of Institute of Health Sciences Bhakti Wiyata with number 248/FKG/EP/1/2024.

2.2. Research Design

This type of research is analytical observational research with a cross-sectional design with a simple random sampling method. The study population is the number of dentists who are at the Bhakti Wiyata Institute of Health Sciences Kediri, which is 46 dentists. Due to the large sample population, the formula calculation was carried out and from the results of the formula calculation, 32 respondents were obtained.

2.3. Data Collection Method

All research respondents involved in the study were asked to fill in the informed consent that had been submitted by the researcher, asked to fill in manual medical records and telegram bots using dummy patient data, and fill out a questionnaire with the aim of seeing the subjectivity of the research subject. The study was conducted when dentists filled out medical records by measuring the speed of filling and retrieving data. The data that has been obtained is then processed and analyzed using SPSS software using the Kruskall Wallis test. Research data processing calculates the accuracy, speed of filling time, and speed of data retrieval between manual medical records and telegram bots.

3. Results and discussion

The results of measuring the filling time, calling time, and accrual of telegram bot medical records with manual medical records that have been measured by researchers are shown in Figure 1.

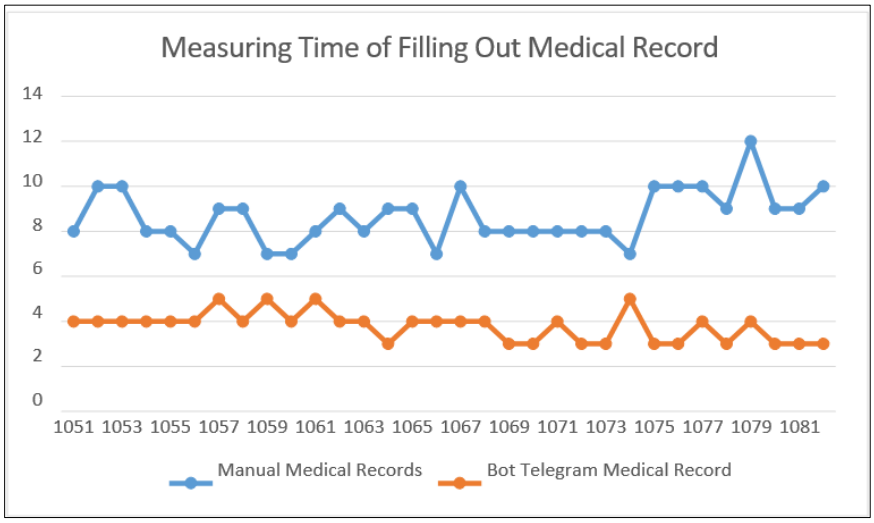

Figure 1 Comparison of Filling Time of Manual Medical Records with Telegram Bot Medical Records**.**

Based on Figure 1, a comparison of the results of measuring the time to fill in manual medical records with telegram bots shows that the time it takes to fill in manual medical records is the longest at 12 minutes and the fastest at 7 minutes, while the time it takes to fill in telegram bot medical records is the longest at 5 minutes and the fastest at 3 minutes.

Based on Figure 2 below comparison of the measurement results of manual medical record calling time with telegram bot, the time needed to search for manual medical records is the longest at 291 seconds and the fastest at 61 seconds, while the time needed to search for telegram bot medical records is the longest at 25 seconds and the fastest at 4 seconds.

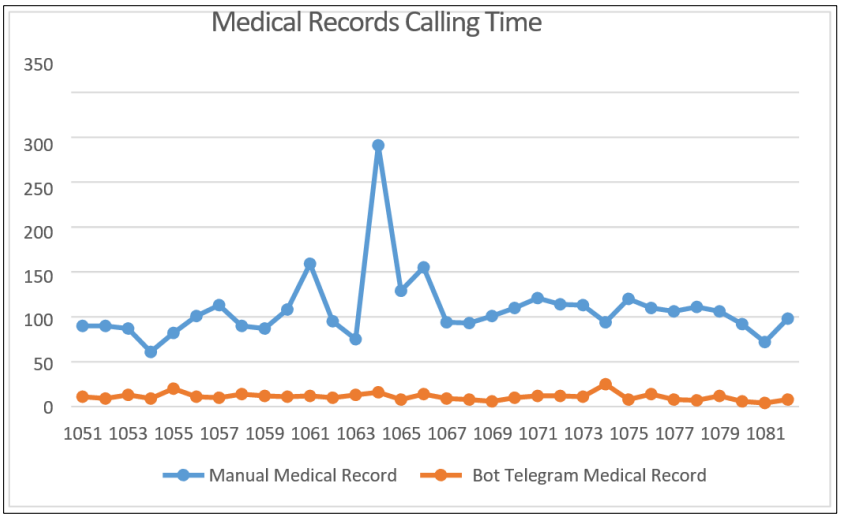

Figure 2 Comparison of Calling Time of Manual Medical Records with Telegram Bot Medical Records.

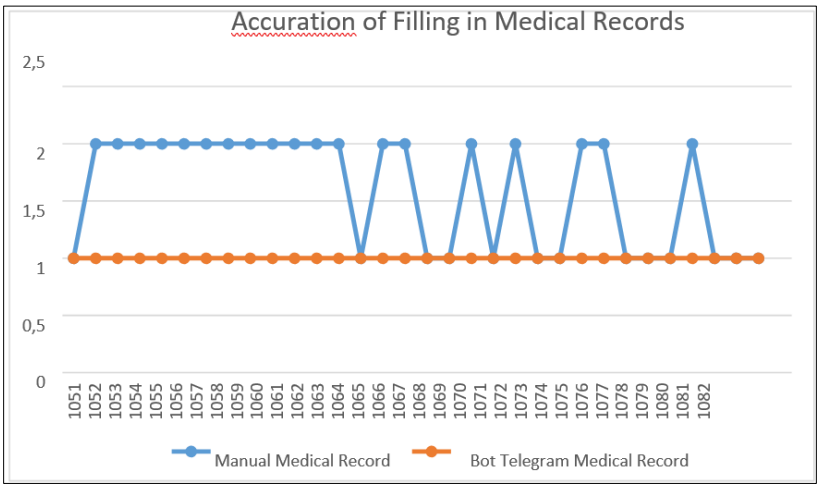

Figure 3 Comparison Result of Accuracy of Manual Medical Record Filling with Telegram Bot Medical Record

Based on Figure 3 comparison of the results of measuring the accuracy of filling in manual medical records with telegram bots, the accuracy of filling in manual medical records varies with an assessment of 2 (inaccurate) and 1 (accurate). Meanwhile, the accuracy of filling in telegram bot medical records looks constant with a value of 1 which indicates that all telegram bot medical records are accurate.

Table 1 Kruskal Wallis Hypothesis Test of the Effectiveness of Telegram Bot Medical Records with Manual Status Cards for Forensic Identification Purposes.

Methods		**Mean Rank**
Charging	Manual	121,53[a]
	Telegram Bot	80,89[b]
Calling	Manual	176,50[c]
	Telegram Bot	133,25[d]
Accuracy	Manual	42,50[e]
	Telegram Bot	22,50[f]

*Superscript letters indicate significant differences (Chi square, P<0.05)

Based on table 1, the results of the calculation of mean rank using the Kruskal Wallis test in the filling method group, manual medical records with a total of 32 observation samples obtained an average rank value in the group of 121.53. Meanwhile, telegram bot medical records with a total sample size of 32 observations obtained an average rank value in the group of 80.89. In the calling method group, manual medical records with a total observation sample of 32 were found to have an average rank value in the 176.50 group. Meanwhile, telegram bot medical records with a total observation sample of 32 obtained an average rank value in the 133.25 group. In the filling accuracy method group, manual medical records with a total observation sample of 32 obtained an average rank value in the group of 42.50. While the telegram bot medical record with a total sample size of 32 observations obtained an average rank value in the group of 22.50. From the above calculations, the hypothesis of this study can be accepted, namely that telegram bot medical records are more effective than manual dental status cards.

This study discusses the difference in the effectiveness of telegram bot medical records with dental manual medical records for forensic identification purposes. The results of measuring the filling time of manual medical records and telegram bot medical records are quite far apart. The time needed to fill in manual medical records is 7-12 minutes and for telegram bot medical records it takes 3-5 minutes. The time difference is caused by the manual medical record not having an assistant who guides the filling in the manual medical record with the condition that the medical record has a generalized filling form so that the dentist needs to match the patient's answer so that there is a pause in thinking time needed by the dentist to write down the patient's answer and to ask the next point. The telegram bot medical record has a bot assistant who can guide the filling of the telegram bot medical record with points that have been guided by the bot assistant and the dentist obeys the telegram bot's orders so that it becomes more measured and directed. This is in line with Khanizah's research which states that electronic medical records are more effective than manual medical records, because electronic medical records are more orderly and directed [12]. Comparison of the results of the measurement of filling time can also be seen in Figure 1. The manual medical record filling time of (8 out of 32 samples) exceeds the waiting time limit. According to health information quality management, the maximum time required to fill in medical record data is a maximum of 10 minutes, while in bot telegram medical records, the filling time does not exceed the waiting time limit, which is 3-5 minutes.

Telegram bot medical records are more measurable and directed, thus making telegram bot medical records easier to fill in properly and completely. This is evidenced by this study where the entire sample of telegram bot medical record filling is accurate, while the filling of manual medical records from 32 samples as many as 20 samples are inaccurate. This is because manual medical records require repeated writing in different places such as patient identity, date of recording and examination signature which are important to be written on each page of the manual medical record. However, this repetitive writing is not needed in telegram bot medical records so that it can shorten the filling time and accuracy of each filling because it only requires one part directly. Comparison of the results of measuring the accuracy of filling in medical records can also be seen in Figure 3, there is a difference in the accuracy of filling in medical records, it can be seen that the accuracy of filling in medical records tends to be at number 2 which indicates inaccurate filling while the accuracy of filling in telegram bots is constant at number one which indicates that the filling is accurate. The results of measuring the call time where manual medical record searches take about 61-291 seconds and online medical records only take 4-25 seconds. This difference can occur because manual medical records need to search manually without the help of a search engine assistant so that the greater the number of medical records the longer the search for medical records. Meanwhile, the telegram bot medical record with output in the form of a spreadsheet is equipped with a search engine assistant so that the search for medical records can be faster and the search time tends to remain the same even though the number of medical records continues to increase. In this study, respondents only searched for 50 medical records but the search time had reached 291 seconds, the search time could be longer if searching for hundreds or more medical records such as in hospitals and other health facilities.

This is in line with Kusumah's research, which states that manual medical records are more prone to misfiles or lost files in the storage room and also take longer to search for manual medical records than electronic medical records that have been equipped with search engines in electronic storage rooms [7]. Comparison of the results of the measurement of the calling time can also be seen in Figure 2, there is a difference in the time it takes to search for medical records using the manual method and telegram bots with the results of the comparison of the manual medical record calling time being above 60 seconds while the telegram bot medical record calling time is below 30 seconds. It can also be seen from the graph in this study that the manual medical record takes longer to fill and call and the filling results are not accurate compared to the telegram bot medical record. This can be caused by the amount of unnecessary data, repetitive writing, and the absence of assistants who help direct filling in manual medical records. However, in telegram bot medical records, the data that needs to be inputted is simpler and more practical, besides that telegram bot applications based on chat applications are more often used in daily life than writing. The use of internet data on telegram bots is also very minimal so that it is minimally disturbed if the network is weak and makes telegram bot medical records easy to use. This is in line with Kusumah's research which states that the ease of accessing and editing electronic medical

records is a progress that follows the changing times so as to provide maximum service speed compared to the manual system [7].

The effectiveness of telegram bots in our study, both in terms of filling time, calling time and filling accuracy, obtained significant results indicating that telegram bot medical records are more effective than manual medical records with a telegram bot medical record filling time of 3-5 minutes while manual medical records are 7-12 minutes, telegram bot medical record calling time of 4-25 seconds is far adrift with manual medical record calling 61-291 seconds, and the accuracy of filling telegram bot medical records is less with the results of 32 samples all filling is accurate while manual medical records from 32 samples as many as 20 samples are inaccurate. The results of this study are the same as the results of research conducted by Eryanan with 100 samples of medical records conducted at MRCCC Siloam Hospital showing that electronic medical records are more effective than manual medical records [13]. Mahendra stated that manual medical records still contain complicated medical sheets with coding and indexing, requiring analysis of the contents of medical records [14]. Electronic medical records are made simpler and more automated, but it takes time and effort to create the medical record application itself and requires mastery of electronic media. In addition, filling in manual medical records by writing also takes longer than typing on telegram bot medical records. This statement is in line with Trismanto's research which states that writing must be readable and accountable, writing quickly generally results in writing that is difficult to read while writing well and easily readable takes longer [15]. With the development of technology, typing has become an alternative to writing that can certainly be read.

There are three things that can be used in forensic identification, namely fingerprints that are easily damaged, dental medical records that are difficult to find, and DNA that is expensive. Based on the results of this study, telegram bot medical records can provide effectiveness in forensic identification purposes compared to manual medical records by providing medical records that are easy to fill in, called with good filling accuracy. The convenience provided by telegram bot medical records makes it easier for dentists to no longer have difficulty filling out medical records so that each patient's medical record data can be recorded properly and access to medical data is fast and efficient but still safe. The forensic identification process when conducting reconciliation using dental data, which must match antemortem data with postmortem data, has difficulties due to incomplete antemortem data [16]. Antemortem data such as photos of victims during life are easy to find but the data is secondary data, while the victim's primary data such as dental medical data is difficult to obtain because dentists do not fill out medical records completely. With the telegram bot medical records, dentists can easily complete medical records so that each dentist can make dental data from each individual archived so that if the data is needed at any time for forensic identification purposes, data can be called up easily, quickly, and efficiently with accurate content. Electronic medical records are more accessible with minimal data loss [17].

4. Conclusion

Telegram bot medical record is more effective than dentistry manual status card for forensic identification purposes.

Compliance with ethical standards

Acknowledgements

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Disclosure of Conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

This experiment had been approved by the health commission of Institute of Health Sciences Bhakti Wiyata with number 248/FKG/EP/1/2024.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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