



DOI: <https://doi.org/10.38035/gcir.v2i2>
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Analysis of the Security of Off-Site Medical Record Storage in Relation to Patient Information Confidentiality at Hospital X

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Abstract: This study employed a qualitative descriptive design to examine how the security of off-site medical record storage protects patient information confidentiality, particularly when records are stored outside the hospital because of limited filing-space capacity. Three informants were purposively selected: the Head of the Medical Records Unit, a Medical Records Filing Officer, and a Medical Records Archiving Officer. Data were collected through observation, interviews, and documentation. Data analysis followed the Miles and Huberman framework, including data reduction, data presentation, conclusion drawing, and verification. The findings showed that the off-site medical record storage system had implemented several security measures, including restricted access to the storage area and the provision of portable fire extinguishers. However, several deficiencies remained. Closed-Circuit Television (CCTV) was not available, room temperature and humidity monitoring devices were absent, and the number of storage racks was inadequate. These conditions indicate that storage security has not yet been optimized. Therefore, improvements in supporting security facilities are required to protect physical medical records and maintain the confidentiality of patient information.

Keyword: Storage Security, Medical Records, Information Confidentiality, Off-Site Storage.

INTRODUCTION

Medical records are official documents containing essential information regarding healthcare services received by patients, including identity, examination results, diagnoses, medical procedures, therapies, and other healthcare-related information. Medical-record management must therefore ensure the security, confidentiality, integrity, and availability of information in accordance with Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022. In relation to medical records, an appropriate security system is essential to protect patient data and support healthcare service quality (Daeli et al., 2024).

Patient health information constitutes personal data that must be protected. Every healthcare facility is therefore responsible for maintaining the privacy, confidentiality, and security of patient information (World Health Organization, 2021). An effective medical-record storage system is essential to keep documents secure, facilitate retrieval, and protect patient information (Daeli et al., 2024). As patient visits increase, the number of medical-record files requiring management and storage also increases. Consequently, some hospitals use off-

site storage while considering the security of the storage environment and the confidentiality of patient information (Rosita et al., 2023).

To address limited filing-space capacity, some hospitals transfer inactive medical-record files that remain within their retention period to dedicated off-site storage areas, thereby improving the efficiency of medical-record management (Fadila, 2023). Nevertheless, off-site storage presents several risks, including physical loss or damage due to inadequate storage conditions, unauthorized access, and difficulty retrieving files when the management system does not operate effectively (Prayoga et al., 2023). Prayoga et al. (2023) stated that storage-room security can influence the confidentiality of medical records. Yanti (2022) also explained that access control, storage-room security, and staff compliance with procedures are important components in maintaining medical-record confidentiality. A robust security system at medical-record storage locations is therefore a priority. This is consistent with Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022, which requires healthcare institutions to ensure the security, confidentiality, integrity, and accessibility of medical-record data.

Comprehensive studies concerning medical-record security and privacy have been conducted in various hospitals. Previous investigations have largely focused on the security of filing rooms, the physical accessibility of medical-record documents, and the maintenance of patient information confidentiality while medical records are stored within hospital premises (Yanti, 2022).

Hospital X is a referral healthcare facility serving patients from various regions. As the number of patient visits has increased, the volume of medical-record files requiring management and storage has also grown. This condition has resulted in some inactive medical-record files being stored outside the hospital. During preliminary observation, the researcher identified several conditions at the off-site storage location: the building was a former facility converted into a warehouse, CCTV was unavailable, temperature and humidity monitoring devices were not provided, and the number of storage racks was inadequate. These conditions indicate that off-site medical-record storage still has limitations in terms of facilities and security. Based on these problems, the researcher conducted a study entitled 'Analysis of the Security of Off-Site Medical Record Storage in Relation to Patient Information Confidentiality at Hospital X.'

METHODS

This study used a qualitative descriptive approach. The approach was selected because it provides a comprehensive understanding of the phenomenon under investigation by referring to natural field conditions. It enabled the researcher to describe the off-site medical-record storage system, analyze storage-security aspects in relation to patient-data confidentiality, identify existing problems, and explain efforts undertaken to protect patient information in accordance with the research objectives (Hasan et al., 2022).

At Hospital X, inactive medical-record files are stored at a location outside the hospital premises. The research site was selected because it corresponded directly to the study topic of off-site storage of inactive medical records. The study was conducted from April to May 2026. Purposive sampling was used to select informants based on their expertise, experience, and direct involvement in off-site medical-record administration. This approach was intended to obtain relevant information concerning the storage system, security issues, constraints, and efforts to protect patient information (Hasan et al., 2022).

The study involved three informants: the Head of the Medical Records Unit, a Medical Records Filing Officer, and a Medical Records Archiving Officer. The Head of the Medical Records Unit was selected because of responsibility for medical-record policies and administration and knowledge of storage policies and procedures. The Filing and Archiving Officers were selected because they were directly involved in the storage, maintenance,

retrieval, borrowing, and return of medical-record documents. The three informants were expected to provide in-depth information regarding the security of off-site medical-record storage and measures for maintaining patient information confidentiality (Fadli, 2021).

Both primary and secondary data were used. Primary data were obtained through interviews with the three informants and direct observation of the off-site medical-record storage conditions. Secondary data were obtained from available documents relevant to the study, including the Standard Operating Procedure (SOP) for Document and Medical Record Form Retention. These documents were used to support the findings obtained through observation and interviews (Hasan et al., 2022).

The research instruments consisted of an interview guide, observation sheet, and documentation. The interview guide was used to obtain information concerning medical-record storage, security, efforts to maintain patient-information confidentiality, storage-room conditions, and security procedures. The observation sheet was used to record physical storage conditions and security measures, while documentation provided supporting research evidence (Hasan et al., 2022).

Data were analyzed using the Miles and Huberman framework, which includes data reduction, data presentation, conclusion drawing, and verification. Observation, interview, and documentary data were analyzed systematically so that the findings reflected actual field conditions (Rofiah et al., 2022). Data trustworthiness was maintained through source triangulation and technique triangulation. Source triangulation compared information obtained from the Head of the Medical Records Unit, the Filing Officer, and the Archiving Officer, while technique triangulation compared interview, observation, and documentation findings. Secondary data were also used to compare the findings with documents and regulations related to medical-record administration. Ethical considerations included obtaining permission from the relevant parties and maintaining the confidentiality of informant identities (Hasan et al., 2022).

RESULTS AND DISCUSSION

Based on observation, interviews, and documentation involving the Head of the Medical Records Unit, the Medical Records Filing Officer, and the Medical Records Archiving Officer at Hospital X, the study obtained an overview of the security of off-site medical-record storage in relation to patient information confidentiality.

Informant Characteristics

Table 1. Characteristics of Research Informants

No.	Informant	Position
1	Informant 1	Head of the Medical Records Unit
2	Informant 2	Medical Records Filing Officer
3	Informant 3	Medical Records Archiving Officer

Security of Medical Record Storage

Table 2. Observation Results on the Security of Off-Site Medical Record Storage

No.	Observed Aspect	Observation Result
1	Storage building	A former building converted into a medical-record storage warehouse.
2	CCTV	CCTV is not available.
3	Room-temperature control	No room-temperature monitoring device is available.
4	Humidity control	No humidity monitoring device is available.

5	Storage racks	The number of storage racks is inadequate.
6	Document-access supervision	Access is restricted to designated personnel, but supervision remains limited.

Table 2 shows that the off-site medical-record storage area was not equipped with CCTV, a temperature-monitoring device, or a humidity-monitoring device. Based on the interview with the Head of the Medical Records Unit, Hospital X did not yet have a specific SOP governing off-site medical-record storage. The researcher obtained the SOP for Document and Medical Record Form Retention as a supporting document; however, this SOP primarily regulates the retention process for inactive medical records and does not specifically address storage-room security. Medical records must remain secure, confidential, intact, and accessible. Physical safeguards and environmental controls are therefore required to prevent document damage and unauthorized access (Yanti, 2022). Although Regulation of the Minister of Health Number 24 of 2022 does not specifically prescribe CCTV, room temperature, or humidity requirements, it requires healthcare facilities to ensure the security and confidentiality of medical records.

Physical Condition of the Off-Site Storage Area



Figure 1. Medical Record Storage Building

The storage facility is a former building converted into a warehouse for medical-record files. The storage area is not equipped with CCTV or room temperature and humidity monitoring devices.



Figure 2. Medical Record Storage Racks

The number of storage racks is inadequate; consequently, the arrangement of medical-record files remains suboptimal.

Interview Findings Regarding the Storage System

Table 3. Summary of Informant Interview Findings

Informant	Interview Finding
Head of the Medical Records Unit	Medical-record files are stored outside the hospital because the filing-room capacity is no longer sufficient to accommodate the continuously increasing number of records. In addition, following direction from the hospital director, the previous medical-record room was to be converted into an inpatient ward; therefore, inactive medical-record files were transferred to an off-site storage location.
Medical Records Filing Officer	Providing requested files requires more time because the storage location is physically separated from the hospital.
Medical Records Archiving Officer	Supervision of the storage area is not yet optimal because adequate security facilities are not available.

The interviews indicated that medical-record files were stored outside Hospital X because the hospital filing room could no longer accommodate the continuously increasing volume of records. In addition, after the previous medical-record room was converted into an inpatient ward, the hospital used an off-site location for inactive medical-record storage. However, the separation of the storage site from the hospital complicates supervision and increases the time required to retrieve and provide records.

Constraints in Off-Site Medical Record Storage

Table 4. Constraints in Off-Site Medical Record Storage

No.	Constraint	Impact
1	The building is not a dedicated medical-record storage facility.	Protection of medical-record files is not optimal because the building was not specifically designed for document storage.
2	CCTV is unavailable.	Activities in the storage area are difficult to monitor; if loss or unauthorized access occurs, investigation and tracing become more difficult.
3	Temperature and humidity monitoring devices are unavailable.	Environmental conditions cannot be monitored periodically, increasing the risk of physical deterioration such as dampness, mold growth, or accelerated paper damage.
4	Storage racks are inadequate.	Files may accumulate or be poorly arranged, increasing the risk of damage, folding, and difficulty in retrieval.
5	The storage location is separated from the hospital.	Transporting and retrieving files requires additional procedures, making access slower when records are required for healthcare services.

As shown in Table 4, the dominant constraints relate to limitations in storage facilities and infrastructure. These conditions may affect both the physical security of medical-record documents and the confidentiality of patient information.

Discussion

Off-Site Medical Record Storage System

The findings showed that inactive medical-record files that remain within their retention period are stored outside Hospital X to address limited filing-space capacity. Off-site storage reduces the volume of records maintained in the main filing area and may improve the efficiency of medical-record management. Nevertheless, transferred medical records continue to have administrative, legal, and healthcare-service value and must therefore remain properly stored and protected (Fadli, 2021).

Interview findings indicated that off-site storage was adopted because the Hospital X filing room could no longer accommodate the increasing number of records. The hospital also used the external storage location after the previous medical-record room was converted into an inpatient ward. These conditions demonstrate that off-site storage can serve as a practical response to space limitations. However, its effectiveness depends on the implementation of appropriate management and security systems so that patient information remains secure and confidential (Rosita et al., 2023).

Security of Medical Record Storage

As illustrated in Figure 1, the storage facility is an older building converted into a warehouse and was not originally designed as a dedicated medical-record storage area. The observed storage conditions also showed that CCTV and room temperature and humidity monitoring devices were unavailable, indicating that physical security was not yet optimal. The absence of temperature and humidity monitoring may increase the risk of document deterioration (Prayoga et al., 2023).

Physical security is an important component of maintaining medical-record confidentiality. Prayoga, Novratilova, and Sukmaningsih (2023) reported that filing-room conditions that do not meet security requirements may increase the risk of document loss, physical damage, and leakage of patient information. Accordingly, medical-record storage facilities should be supported by adequate safeguards to reduce these risks.

Previous research has shown that storage-room security is one of the factors influencing medical-record confidentiality. Access supervision and other security mechanisms are therefore necessary to protect patient information. The findings of the present study indicate that the physical security of the off-site storage area has not yet fully met the needs of medical-record storage. Without adequate security systems, these conditions may increase the risk of document damage or access by unauthorized parties (Fadila et al., 2023).

Environmental Conditions of Medical Record Storage

The findings showed that no devices were available to periodically monitor environmental conditions, although temperature and humidity are important for maintaining the physical quality of paper-based medical records throughout the retention period (Yanti, 2022).

An effective medical-record storage system requires adequate storage facilities. If temperature and humidity are not controlled, documents may become damp, moldy, brittle, or experience fading of written information, thereby reducing the physical quality and usability of the records. Regular environmental monitoring is therefore necessary to maintain the safety and physical integrity of medical records (Yanti, 2022).

Availability of Medical Record Storage Racks

The findings showed that the arrangement of medical records was not yet optimal because the number of storage racks remained limited. This limitation may complicate the storage and retrieval of documents when they are required for patient services. The off-site location also increases the time needed to provide requested files (Rosita et al., 2023).

The availability and capacity of storage racks are important components of an effective filing system. Inadequate shelving may contribute to misfiling, document loss, and delays in providing medical records. Increasing storage-rack capacity is therefore an important measure for improving medical-record management at Hospital X (Yanti, 2022).

Patient Information Confidentiality

The study found that access to the medical-record storage area was limited to designated personnel. Nevertheless, deficiencies in security facilities, particularly the absence of CCTV, indicate that protection of patient information confidentiality remains suboptimal. Physical security facilities should complement access-control measures to reduce the possibility of confidentiality breaches (Fadila et al., 2023).

The findings support previous research indicating that medical-record confidentiality is influenced by document-access control, storage-room security, and staff compliance with procedures. Improving storage-room security is therefore intended not only to protect physical medical-record documents but also to maintain patient privacy and support hospital service quality (Fadila et al., 2023).

This is consistent with Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022, which requires healthcare facilities to ensure the security, confidentiality, integrity, and availability of medical-record data. Consequently, patient-data security depends not only on staff discipline but also on physical security systems and storage management that adequately support the protection of medical records.

CONCLUSION

The study showed that off-site medical-record storage is a practical solution to limited filing-space capacity at Hospital X. Inactive medical records that remain within their retention period are stored at the off-site location and managed by authorized personnel. However, the security of off-site medical-record storage has not yet been optimized. Observation showed that the storage facility is a converted building rather than a purpose-built medical-record storage area. CCTV, temperature and humidity monitoring devices, and sufficient storage racks are not available. These conditions may increase the risk of physical document damage, loss, inadequate monitoring, and difficulty in file retrieval. Patient-information security is also affected by limitations in available security facilities. Although access to the storage area is restricted to designated personnel, inadequate supervision may increase the possibility of unauthorized access and thereby threaten the confidentiality of patient information.

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