Cross-sectional Study

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Factors affecting completeness of anaesthetic record: a cross-sectional study

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Background: Anaesthesia Information Management Systems (AIMS) are of critical importance for ensuring the comprehensive recording of anaesthesia data. This study aimed to investigate the factors influencing the completeness of anaesthetic records created by various healthcare professionals including anesthesiologists, nurse anaesthetists, residents/fellows, and anaesthetic nurse trainees.

Methods: Employing an online Google Forms questionnaire, this descriptive research focused on understanding the factors contributing to the completeness of anaesthetic records. The survey was distributed to all anaesthesia personnel in the department, comprising a total of 165 participants. The questionnaire encompassed three primary aspects:(1) personal information, (2) knowledge related to recording anaesthetic records, and (3) concerns related to achieving high-quality record-keeping. To assess completeness, anaesthetic record forms were evaluated based on the 2020 Medical Record Audit Guideline of Thailand's National Health Security Office, with a completeness rate exceeding 80% deemed acceptable. Spearman's rank correlation was employed to analyze the connections between the associated factors and completeness of anaesthetic records.

Results: From August to October 2021, 165 records were examined, indicating a completeness rate of 89.7%. Several factors exhibited significant correlations with the completeness of anaesthetic records. These included age ($r = -0.223$; $P = 0.004$), job position ($r = 0.44$; $P < 0.001$), years of anaesthesia experience ($r = -0.208$; $P = 0.007$), experience in anaesthetic record training/teaching ($r = 0.181$; $P = 0.02$), and attitude emphasizing high-quality record-keeping ($r = 0.167$; $P = 0.032$).

Conclusion: While personal attributes emerged as pivotal factors influencing record completeness, continuous training and a collaborative attitude were identified as critical for maintaining sustainability and achieving record-keeping goals.

Keywords: anaesthetic record, quality improvement, complete recording

Introduction

Medical records encompass an essential collection of diverse documents containing critical information, including personal identity details, family and personal medical histories, health concerns, investigation results, treatment histories and plans, and informed consent[1]. These records can take the form of traditional written documentation or adopt the modern format of electronic medical records (EMRs) following the policies outlined by the National Health Security Office (NHSO). High-quality medical records serve as valuable evidence in the medical domain, facilitate effective communication among healthcare teams, contribute to patient care planning and continuity, enhance healthcare services, and provide valuable data for research endeavours[1,2]. Ensuring the quality of medical records is an integral aspect of hospital accreditation (HA), which centres on four core dimensions:(1) completeness, (2) accuracy, (3) specificity of detail, and (4) currency. In particular, completeness mandates the thorough completion of all data fields without omissions[3].

The Royal College of Anesthesiologists of Thailand is dedicated to optimizing the efficiency of the healthcare system, with a strong emphasis on patient safety during anaesthesia and associated procedures. Meticulous documentation is paramount in the context of surgical or medical interventions involving anaesthesia. This responsibility falls within an array of medical professionals, including anesthesiologists, nurse anaesthetists, residents/fellows, and anaesthetic nurse trainees. These professionals are tasked with documenting information across three distinct stages: pre-anaesthetic, anaesthetic, and post-anaesthetic care. Subsequent to a patient's discharge, a thorough review and quality assessment of all documents were conducted to ensure the comprehensive recording of essential data. In general, the

HIGHLIGHTS

- Personal and attitude-related factors significantly influence the completeness of anaesthetic records.
- Knowledge factors do not significantly correlate with the completeness of medical records.
- Positive attitudes of healthcare professionals improve the completeness of medical records.

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academic objective of the department of anesthesiology was to set a completeness standard that exceeded 95%. However, a quality assessment of anaesthetic records in 2020 revealed a completion rate of only 81.96%.

Anaesthesia information is characterized by both static and dynamic data, encompassing personal histories, anaesthesia and surgical details, physiological parameters, respiratory variations, and comprehensive details regarding the management of adverse events. Amidst the challenges of patient care and emergency situations, anaesthesia providers might inadvertently omit certain record entries. The incompleteness of anaesthetic recordings can potentially be attributed to a lack of knowledge regarding proper recording practices and a lack of emphasis on maintaining high-quality records. A previous study highlighted that crafting high-quality nursing records necessitates a combination of strong knowledge, skilled execution, and deep commitment to accurate documentation among nurses. Insufficient skills or knowledge in proper recording practices can result in records that lack the crucial information necessary for future utilization[4,5]. Workload intensity and a lack of concern among medical personnel could contribute to irregular and incomplete record-keeping. While one study suggested that workload might not directly correlate with the completeness of physicians' records, it did influence the timeliness of record completion. Factors such as the complexity of information and emergent tasks could impact the punctuality of physicians' record-keeping. EMRs, due to their capacity for automated data transfer, EMRs have demonstrated potential in enhancing record completeness[2,6,7]. The effective delegation of tasks is pivotal for optimal patient care and meticulous documentation. The clarity of organizational policies can support medical providers, cultivate positive attitudes, and improve work skills aligned with organizational expectations[8]. Attitude has emerged as a significant factor that influences high-quality medical records. One study underscored that healthcare personnel should recognize the significance of meticulous record-keeping, particularly in situations with legal implications.

Considering these factors, this study aimed to identify the various elements that influence the completeness of anaesthetic records in the Academic Medical Centers of Thailand. The outcomes of this investigation are poised to guide improvements in anaesthetic record-keeping practices.

Methods

Study design and setting

This descriptive study aimed to explore the factors associated with the completeness of anaesthetic records within the Department of Anesthesiology. Ethical approval was obtained from the Institutional Review Committee, of the Institute of Medicine, and the study was conducted from 1 August 2021, to 31 July 2022, in adherence to the STROCSS criteria[9].

Study population

The study population encompassed the anaesthesia care team, comprising anesthesiologists, nurse anaesthetists, residents/fellows, and anaesthetic nurse trainees, within the Department of Anesthesiology. The inclusion criteria stipulated participants with over 3 months of work experience, proficiency in the Thai language, and familiarity with the survey application. Those who were unwilling to participate or provided incomplete questionnaire responses were excluded.

Sampling and sample

The sample size was determined using the Taro Yamane sample size formula with a 95% confidence level[10]. Given that the anaesthesia care team at the Academic Medical Centers numbered 210 during the study period, a sample size of 138 was computed using this formula. Factoring in a 20% non-response rate, 165 participants were recruited for this survey.

Measures

The completeness of the medical records in the anaesthesia domain adhered to the criteria set by the Medical Record Audit Guidelines of the NHSO of Thailand[11]. The study questionnaire, developed from literature reviews, was presented as an online Google Forms survey comprising of three sections. The first section collected demographic data including age, job position, anaesthesia experience, experience in anaesthetic record training/teaching, and anaesthesia workload. The second section assessed knowledge of anaesthetic records, with correct answers marked as "yes" and incorrect answers marked as "no." The third section consisted of questions gauging attitudes toward high-quality record-keeping, rated on a 5-point scale (strongly agree, agree, neutral, disagree, and strongly disagree).

Data quality control

Seven certified anaesthetic auditors underwent training to ensure a standardized evaluation. Two auditors were randomized to evaluate the same anaesthetic datasheet to confirm the completeness of the recordings. The full questionnaire used in this study was approved by five experts in the quality standards criteria for healthcare. Content validity was ascertained through item objective congruence values, indicating good content validity, with an item objective congruence of 0.83. The questionnaire underwent pilot testing with 20 anaesthesia care team members, and Cronbach's alpha coefficient indicated acceptable internal consistency (0.75–0.93). A copy of the questionnaire can be found in the Extended Data section[12].

Data collection

Anaesthetic datasheets encompassing preoperative, intraoperative, and post-anaesthetic care unit records were audited for completeness using the Medical Record Audit Guideline from the NHSO of Thailand[11]. The checklist consists of data related to patient information and the American Society of Anesthesiologist (ASA) physical status, preoperative diagnosis, planned procedure or surgical operation, complete recording of the pre-anaesthetic evaluation form, data related to intraoperative monitoring, anaesthetic technique, and medications; completed recording of intravascular fluid, blood transfusion, urine output, and total estimated blood loss, recording the data related to post-anaesthetic care, recording data related to post-anaesthesia round, legibly handwritten record, specify the first name and last name of the anesthesiologist or nurse anaesthetists who are responsible. The online questionnaire was disseminated via public relations, and a single response was ensured through Google Forms' response-limiting feature by choosing "Limit to 1 response".

Informed consent was obtained from all participants before they were engaged in the research.

Statistical analysis

Analysis was done by using descriptive statistics to calculate percentage, mean, standard deviation, χ^2 test, and measure of dispersion. Pearson and Spearman rank correlation coefficients were used for correlation. Statistical significance was set at P less than 0.05.

Ethical and administrative consideration

The study was approved by the Institutional Review Committee of the Institute of Medicine [reference number 2021/611 Ref.1537]. Informed consent was obtained from all participants prior to data collection.

Results

A total of 165 participants were included in this study. The age group was 30–39 years old, accounting for 41.20% of the participants. The majority of participants were nurse anaesthetists (40%), followed by anesthesiologists (22.40%), residents/fellows (20.00%), and anaesthetic nurse trainees (17.60%). Regarding anaesthesia experience, the highest proportion (28.50%) had 1–5 years of experience, followed by less than 1 year (24.20%), 6–10 years (21.20%), more than 15 years (16.40%), and 11–15 years (9.70%). A significant proportion of the participants (56.40%) had received medical record training and teaching. Workload distribution indicated that most participants worked 31–45 h per week (62.40%), 24.20% worked over 45 h per week, and 6.7% worked less than 15 h per week or between 15 and 30 h per week. The completeness of the documented data from the assessed anaesthetic datasheets in this study was 89.7% (Table 1).

Table 1

Participant characteristics ($N = 165$).

Characteristics	Numbers (n)	(%)
Age		
< 30	63	38.20
30–39	68	41.20
40–49	18	10.90
> 50	16	9.70
Job position		
Anesthesiologist	37	22.40
Nurse anaesthetist	66	40.00
Resident/fellowship	33	20.00
Anaesthetic nurse trainee	29	17.60
Experience in anaesthesia (years)		
< 1	40	24.20
1–5	47	28.50
6–10	35	21.20
11–15	16	9.70
> 15	27	16.40
Experience in anaesthetic record training/teaching		
Yes	93	56.40
No	72	43.60
Anaesthetic workload (h per week)		
< 15	11	6.70
15–30	11	6.70
31–45	103	62.40
> 45	40	24.20

The participants' knowledge scores displayed a mean range of 0.95–1.00 for all questions, indicating a good understanding of anaesthesia medical recording based on the Medical Record Audit Guideline criteria from the NHSO of Thailand (Table 2).

The highest mean score for attitudes toward high-quality records was 4.91 (SD = 0.288), with the majority of participants (90.9%) strongly agreeing that "the completeness of medical records can be used as legal evidence." The lowest level of agreement pertained to the statement "anaesthetic care teams should participate in developing medical record guidelines," with a mean attitude score of 4.33 (SD = 0.898) (Table 3).

Statistical analysis revealed that personal factors (age, job position, anaesthesia experience, and experience in anaesthetic record training or teaching) and attitude factors were significantly associated with the completeness of anaesthetic records, at a significance level of less than 0.05. However, the anaesthetic workload and knowledge factors did not show a significant correlation with record completeness (Table 4).

Discussion

This study aimed to investigate the factors influencing the completeness of anaesthetic records and found a completeness rate of 89.7%, which falls short of the academic goal. The results highlighted that both personal and attitude-related factors significantly influenced the completeness of anaesthetic records.

In this study, personal factors, particularly age and experience in anaesthesia, displayed a negative correlation with completeness. These findings are consistent with those of prior research demonstrating that emergency cases and situations involving critically ill patients demanding multiple clinical interventions can lead to an increased number of parameters requiring documentation. Delays between observation and charting by senior medical staff can arise because of the urgency and complexity of patient care[13–16]. Similarly, in the emergency department context, senior doctors handling patient management, student supervision, administration, and teaching were associated with varying degrees of medical record completeness[16]. Within the context of anaesthesia, the constraints of managing emergency and critically ill patients undergoing surgery may limit the time available for proper assessment and documentation. Senior anaesthetists often prioritize patient stability over immediate record-keeping, potentially contributing to the observed negative correlation between seniority and record completeness.

Interestingly, the study found a positive association between job position and completeness of medical recording, particularly among permanent staff (anesthesiologists and nurse anaesthetists). This can be attributed to mandatory training and teaching sessions based on specific guidelines and criteria from the NHSO of Thailand. Research has supported the effectiveness of comprehensive training in improving both knowledge and attitudes towards completing medical records[15,17,18]. However, knowledge factors did not significantly correlate with the completeness of the medical records in this study. This suggests that while knowledge training is valuable, it might not be adequate on its own to drive consistent and accurate record-keeping behaviours. Organizational success often requires a work environment

Table 2

Participants' knowledge scores (*N* = 165).

Knowledge issues	No. participant's answer, *n* (%)		Mean score (SD)	Interpretation
	Correct	Incorrect		
1.General anaesthesia, spinal or epidural anaesthesia, regional anaesthesia and MAC are necessary to have anaesthetic record, except for local anaesthesia	161 (97.6)	4 (2.4)	0.98 (0.154)	Know
2.Documents for anaesthetic record consist of				
Pre-anaesthetic record	162 (98.2)	3 (1.8)	0.98 (0.134)	Know
Anaesthetic record	165 (100)	9 (5.5)	1.00 (0.000)	Know
Post-anaesthetic record	156 (94.5)	9 (5.5)	0.95 (0.228)	Know
24-h post-anaesthetic record	156 (94.5)	1 (0.6)	0.95 (0.228)	Know
3.The checklist data for completeness of anaesthetic record consist of				
Patient's status before anaesthesia	164 (99.4)	1 (0.6)	0.99 (0.078)	Know
Preoperative diagnosis which is correlated to surgeon's record	164 (99.4)	1 (0.6)	0.99 (0.078)	Know
Type and name of the operation which is correlated to surgeon's operation	163 (98.8)	2 (1.2)	0.99 (0.110)	Know
Pre-anaesthetic evaluation with history of previous anaesthesia is recorded at least 1 day before anaesthesia (except for emergency case or patient were admitted on the day of procedure, which could be evaluated within the same day)	156 (94.5)	9 (5.5)	0.95 (0.228)	Know
Record of standard monitoring parameters every 5 min during anaesthesia	160 (97.0)	5 (3.0)	0.97 (0.172)	Know
Record of intake, output, blood loss, total intake, and total output	163 (98.8)	2 (1.2)	0.99 (0.110)	Know
1-h PACU record (except in case of retained endotracheal tube which passed directly to ward/ICU)	159 (96.4)	6 (3.6)	0.96 (0.188)	Know
24-h post-anaesthetic round record with identification of any anaesthetic complications (if no complication, need to record "no complication")	161 (97.6)	4 (2.4)	0.98 (0.154)	Know
Record with legible handwriting and identifiable name of recorder	162 (98.2)	3 (1.8)	0.98 (0.134)	Know

MAC, monitored anesthesia care; PACU, post anesthesia care unit.

that empowers personnel to align with the organization's goals[19]. This aligns with the broader literature, indicating that attitude is a crucial factor influencing medical record completeness, as observed in this study[20,21].

Nevertheless, an attitude concerning the completeness of medical records is required for medical peer review for communication between healthcare teams, medical service improvement, and research. Moreover, medical records are insurance eligibility determinations; therefore, medical documents are used for medical chart reviews for medical or legal purposes[1,2]. Therefore, medical staff members, other physicians, and healthcare facilities are concerned with the completeness of medical records for the care of patients and third-party payers, the government, and other agencies.

This study underscores the necessity of cultivating positive attitudes and behavioural changes among healthcare professionals to achieve sustained improvements in medical record completeness. Strategies to achieve this goal include implementing patient safety policies, focusing on quality improvement, adhering to regular documentation practices, addressing medico-legal concerns, facilitating ongoing learning opportunities, conducting interactive educational sessions and workshops, and fostering a positive workplace environment.

Strengths and limitations

The strengths of this study include its comprehensive inclusion of the entire anaesthesia care team and its examination of various

Table 3

Attitudes toward high-quality records (*N* = 165).

Attitude of concern	Level of attitude, *n* (%)					Mean (SD)	Interpretation
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree		
1. The completeness of medical records can be used as legal evidence	150 (90.9)	15 (9.1)	0	0 (0.0)	0	4.91 (0.288)	Good
2. The completeness of medical records can be used for anaesthesia quality assessment	133 (80.6)	22 (13.3)	9 (5.5)	1 (0.6)	0	4.74 (0.583)	Good
3. The completeness of medical records can be used as communication documents between the healthcare team	140 (84.8)	20 (12.1)	5 (3.0)	0	0	4.82 (0.459)	Good
4. The completeness of medical records is useful for the anaesthesia care team to follow patient's symptoms or complications (pre/ intra/ post-anaesthesia)	144 (87.3)	18 (10.9)	3 (1.8)	0	0	4.85 (0.402)	Good
5. The completeness of medical records can be used for research data	141 (85.5)	20 (12.1)	4 (2.4)	0	0	4.83 (0.437)	Good
6. The high-quality medical record needs skills in history taking and physical examination	124 (75.2)	31 (18.8)	8 (4.8)	1 (0.6)	1 (0.6)	4.67 (0.655)	Good
7. The high-quality medical record needs skills in recording medical issues	115 (69.7)	37 (22.4)	11 (6.7)	1 (0.6)	1 (0.6)	4.60 (0.697)	Good
8. The high-quality medical record needs to follow a guideline for recording based on standards that indicated	126 (76.4)	33 (20.0)	5 (3.0)	0	1 (0.6)	4.72 (0.582)	Good
9. Anaesthetic care team should be able to participate in recording guideline development	90 (54.5)	48 (29.1)	21 (12.7)	3 (1.8)	3 (1.8)	4.33 (0.898)	Good
10. There should be a counselling system when the anaesthesia care team has question or problems with medical record	123 (74.5)	33 (20.0)	8 (4.8)	0	1 (0.6)	4.68 (0.625)	Good
11. The appropriate workload results in the high-quality medical record	128 (77.6)	31 (18.8)	6 (3.6)	0	0	4.74 (0.517)	Good
12. The high-quality medical record needs to have both direct and indirect assessment and feedback system	121 (73.3)	39 (23.6)	5 (3.0)	0	0	4.70 (0.521)	Good
13. There should be a training course on the standard criteria for medical records continuously	120 (72.7)	37 (22.4)	7 (4.2)	1 (0.6)	0	4.67 (0.586)	Good
14. There should be an example of the completeness of medical record for study	138 (83.6)	23 (13.9)	4 (2.4)	0	0	4.81 (0.450)	Good
15. The complexity or too much data in medical records are associated with recording completeness	116 (70.3)	37 (22.4)	9 (5.5)	1 (0.6)	2 (1.2)	4.60 (0.731)	Good
16. Facing a medical emergency affect to the completeness of medical record	129 (78.2)	33 (20.0)	3 (1.8)	0	0	4.76 (0.467)	Good

Table 4

Association between Personal/ Knowledge/ Attitude, and completeness of anaesthetic records.

Factors	r	P
Personal factors		
Age	− 0.223	0.004*
Job position	0.440	< 0.001*
Experience in anaesthesia	− 0.208	0.007*
Experience in anaesthetic record training/teaching	0.181	0.020*
Anaesthetic workload	− 0.064	0.416
Knowledge factors	− 0.113	0.148
Attitude factors	0.167	0.032*

*Statistical significant at *P* value <0.05.

factors influencing medical record completeness. However, this study had some limitations. The study was confined to a single tertiary university hospital, potentially limiting the generalizability of the findings to other healthcare settings with differing organizational profiles, surgical types, anaesthesia techniques, patient conditions, and data recording forms. Furthermore, the study did not differentiate between emergency and elective surgeries, overlooking the potential influence of surgical complexity and anaesthesia technique on medical record completeness. Future research should incorporate additional latent variables to achieve a more comprehensive understanding.

Conclusion

The anaesthesia care team exhibited solid familiarity with the Medical Record Audit Guideline criteria outlined by Thailand's NHSO. Nevertheless, having adequate knowledge alone did not consistently ensure the thoroughness of the anaesthetic records. It is imperative for the organization to foster a positive work culture that encourages all staff members to approach their tasks diligently. Moreover, individual factors, particularly among senior anaesthetists with extensive experience, can contribute to incomplete documentation of anaesthetic records, often owing to the demands of urgent situations. As a solution, prioritizing teamwork will facilitate a more systematic approach, minimize errors, and enhance the overall integrity of medical records.

Ethical approval

Ethics approval was obtained from Ramathibodi's Ethics Committee, Faculty of medicine, Ramathibodi hospital, Mahidol University prior to conduct of the study with reference number MURA 2021/611 Ref.1537.

Consent

Not applicable.

Sources of funding

Not applicable.

Author contribution

S.L. developed the proposal, collected and analyzed the data, and prepared the manuscript. R.S. and A.N. were involved in data collection, analysis, and revision of the manuscript and final approval of the version to be published. All the authors have read and approved the final manuscript.

Conflicts of interest disclosure

The authors declare that they have no financial conflict of interests.

Research registration unique identifying number (UIN)

This study was registered at http://www.researchregistry.com with the Research Registry UIN: researchregistry9438.

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Data availability statement

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References

[1] Raymer K. The anesthetic record: how content and design influence function in anesthetic practice and beyond. J Anesth Clin Res 2011;4:1–7.
[2] Zemedkun A, Mulugeta H, Getachew H, *et al*. Assessment of manual intraoperative anesthesia record-keeping practice at Dilla University Referral Hospital, Dilla, Ethiopia. Open Access Surg 2021;14:1–7.
[3] Yunuswangsa Q, Nimmaanrat S, Wasinwong W. Completion and accuracy in charting of anesthetic records in Songklanagarind Hospital. J Med Assoc Thai 2008;91:1002–10.
[4] Debora T, Silaen M, Nasution S, *et al*. Analysis of factors affecting the quality of inpatient medical records at Royal Prima Hospital Medan. Int J Health Pharm (IJHP) 2021;2:132–43.
[5] Chutwarat D, Nittaya P, Prasertchai A. Factors related to physicians' medical records completeness: a case study of university hospital in Central Thailand. J Royal Thai Army Nurses 2017;18:82–90.
[6] Naratchariyangkoon S, Damrongbul K, Attanath N, *et al*. Completeness and accuracy of electronic anesthesia record in neurological institute of Thailand. Thai J Anesthesiol 2022;48:231–40.
[7] Junghwa J, Seung H, Chun B, *et al*. The effects of an electronic medical record on the completeness of documentation in the anesthesia record. Int J Med Inform 2013;82:702–7.

[8] Sharifi S, Zahiri M, Dargahi H, *et al*. Medical record documentation quality in the hospital accreditation. J Educ Health Promot 2021;10:76.
[9] Mathew G, Agha R. for the STROCSS Group. STROCSS 2021: strengthening the Reporting of cohort, cross-sectional and case-control studies in Surgery. Int J Surg 2021;96:106165.
[10] Yamane T. Statistics, An Introductory Analysis. Harper and Row; 1967.
[11] The Healthcare Accreditation Institute (Public Organization). Medical record audit guideline 2563. Sahamitr Printing and Publishing; 2020.
[12] Seangrung R. The questionnaire of the factors affecting completeness of anesthetic records. figshare Dataset 2023;1:1–6.
[13] Douglas JR Jr, Ritter MJ. Implementation of an Anesthesia Information Management System (AIMS). Ochsner J 2011;11:102–14.
[14] Mashoufi M, Ayatollahi H, Khorasani-Zavareh D, *et al*. Data quality assessment in emergency medical services: an objective approach. BMC Emerg Med 2023;23:10.
[15] George M, Menon GD, Vergis S. Efficacy of multimodal intervention strategies in improving perioperative documentation at a rural tertiary care centre. Turk J Anaesthesiol Reanim 2020;48:473–6.
[16] Lai FW, Kant JA, Dombagolla MH, *et al*. Variables associated with completeness of medical record documentation in the emergency department. Emerg Med Australas 2019;31:632–38.
[17] Gebremedhn EG, Nagaratnam V. Audit on anaesthetic record completeness at a university teaching hospital operation theater of low -resource setting, 2013. J Anesth Crit Care Open Access 2017;8:00298.
[18] Anwar WA, Abo El Ezz NF, Elhossiney DM, *et al*. Measurement of completeness of medical records in family health centre in El Shorouk City. Egypt J Commun Med 2016;34:69–77.
[19] Ismawati NDS, Supriyanto S, Haksama S, *et al*. The influence of knowledge and perceptions of doctors on the quality of medical records. J Publ Health Res 2021;10:2228.
[20] Kasaye MD, Beshir MA, Endehabtu BF, *et al*. Medical documentation practice and associated factors among health workers at private hospitals in the Amhara region, Ethiopia 2021. BMC Health Serv Res 2022;22:465.
[21] Wubante SM, Tegegne MD, Melaku MS, *et al*. Healthcare professionals' knowledge, attitude and its associated factors toward electronic personal health record system in a resource-limited setting: a cross-sectional study. Front Public Health 2023;11:1114456.