

**RESEARCH**

Analysis of medical records of a university hospital in Mogi das Cruzes, São Paulo, Brazil

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Abstract

The medical record is a basic document in healthcare that permeates all assistance, administrative, research and teaching activities, in addition to allowing communication between health professionals. However, we should emphasize the difference in the quality of these records produced by different institutions. This study aimed to analyze the quality of this data in a teaching hospital in the city of Mogi das Cruzes, São Paulo, Brazil. A total of 191 medical records dated from 2016 were included in the evaluation, which consisted in applying an instrument that ascribe a score to each obligatory item in the medical record. Although the total scores obtained were not low, the results show that the quality of medical records varies, and that the teaching hospital should improve how they are filled out.

Keywords: Medical records. Education, medical. Codes of ethics.

Resumo**Análise de prontuários de hospital universitário de Mogi das Cruzes**

O prontuário médico é, na área da saúde, documento básico que permeia toda a atividade assistencial, administrativa, de pesquisa e de ensino, permitindo a comunicação entre os diversos profissionais que participam do cuidado do paciente. Destaca-se, no entanto, a diferença de qualidade dos registros produzidos por cada instituição. Considerando essa variedade, o objetivo desta pesquisa foi analisar prontuários de um hospital de ensino de Mogi das Cruzes/SP. Foram avaliados 191 prontuários, datados a partir de 2016. A avaliação consistiu na aplicação de instrumento que atribui escores considerando os itens obrigatórios do prontuário. Apesar de os escores totais obtidos não serem baixos, os resultados demonstram que a qualidade dos prontuários varia e que o hospital-escola deve aperfeiçoar seu preenchimento.

Palavras-chave: Registros médicos. Educação médica. Códigos de ética.

Resumen**Análisis de historias clínicas de un hospital universitario de Mogi das Cruzes, São Paulo, Brasil**

La historia clínica es un documento básico en el área de la salud que impregna todas las actividades de asistencia, administrativas, de investigación y de enseñanza, además de permitir la comunicación entre los diversos profesionales responsables de los pacientes. Sin embargo, se destaca la diferencia en la calidad de los registros producidos por cada institución. Considerando esta variedad, el objetivo de esta investigación fue analizar los registros médicos de un hospital docente en Mogi das Cruzes, São Paulo, Brasil. Se evaluaron 191 historias clínicas, fechadas en 2016. La evaluación consistió en la aplicación de un instrumento que asigna puntajes considerando los ítems obligatorios de la historia clínica. Aunque las puntuaciones totales obtenidas no son bajas, los resultados demuestran que la calidad de las historias clínicas varía y que el hospital docente debe mejorar su cumplimentación.

Palabras clave: Registros médicos. Educación médica. Códigos de ética.

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The Brazilian Ministry of Health defines “hospital” as *an integral part of a medical and social organization, whose primary function is to provide the population with comprehensive, curative and preventive healthcare, under any care regime, including home care, also constituting a center of education, training of human resources and health research, as well as center for patient referral, being responsible for supervising and guiding the health units technically linked to it*¹. “General hospital” is considered the one *intended to assist patients with diseases of various medical specialties*¹. The “teaching hospital,” or “university hospital,” would be a *general hospital with the characteristics and functions of the base hospital, used by schools of health sciences as a professional training center*².

A hospital is a complex organization with highly bureaucratic and interdependent structure. One of its tools is the medical records, which should provide efficient communication among health professionals. This document is intended for recording data from patients, results of medical examinations, and the conducts adopted by medical staffs. The Federal Council of Medicine (CFM), in Article 1 of Resolution CFM 1,638/2002, characterizes *medical record as a legal, confidential and scientific, and individual document consisting of a set of recorded information, signs and images generated from facts, events and situations about the patients’ health and the assistance provided to them, which allows communication among members of the multidisciplinary team and the continuity of the assistance provided to the individual*³.

Tavakoli and Jahanbakhsh reiterate that *medical records serve many diverse purposes in the daily operations of a health care organization. It allows patient’s health care providers to communicate with one another; provides a basis for planning a patient’s course of treatment; documents the quality of care for review at a later time; provides a source of information for statistical analyses; and establish a basis for the billing process and the generation of financial reports*⁴.

The Code of Medical Ethics (CEM)⁵ guides professional conduct, including that related to medical documents. In Article 88, the CEM prohibits the doctor from *denying patients access to their medical record, or not providing them a copy when requested, as well as not giving them explanations*⁵. It is, therefore, a record that belongs to the patient, and must be legible, as emphasized in Article 87 of the same code⁵.

As it is also used for legal purposes, this document must always be updated. It is through it that one can know if the care delivered was correct or not. If the information is not recorded properly or omitted, health professionals may not prove their actions. Reason why all information gathered by the health team about the patient must be included in the document, whose content is confidential. As provided for in Article 85 of the CEM, *the handling and knowledge of medical records by persons not bound by professional secrecy*⁵ is prohibited, and doctors must not, according to Article 89, *release copies of the records under their custody, except when authorized in writing by the patient, or to attend court order for their own defense*⁵.

According to Thomas⁶, this information should be properly kept for at least two purposes: to scientifically assess the patient’s profile, through the analysis of treatment outcomes and protocol planning; and to help plan government health strategies. Therefore, it is a document of individual and collective relevance. The preamble of Resolution CFM 1,638/2002 considers the medical record as *valuable for the patient, attending physician and health institutions, as well as for teaching, research and public health services, in addition to [being] an instrument of legal defense*³.

The quality of medical records is closely related to communication. As Mesquita and Deslandes point out, this is a document of *collective construction, which implies multiple actions of specialized register in a universe of languages and complex relationships between the knowledge and practices of health teams, as to make procedures transparent in the services provided to users, improving the quality and effectiveness of patient care*⁷.

Since efficient communication is essential, many institutions have tried to modernize their services by adopting, for example, the electronic health record (EHR). According to Martins and Lima, *EHR provides numerous advantages, including: agility in accessing information, information exchange, space-saving, reduced consumption of printed documents, fast and accurate management information, and increased time for professionals to treat patients*⁸, also ensuring the legibility of data. But the authors also point out *some disadvantages, such as the high cost of implementation (equipment and training), the possibility of the system being inoperable, and the resistance of the team*⁸. In view of this,

this study aims to evaluate the filling of medical records in a teaching hospital to determine if this institution had complete records with well-presented information.

Method

We evaluated 191 medical records dated from 2016 onwards for patients who have already been discharged. A teaching hospital in the city of Mogi das Cruzes, São Paulo, Brazil, provided all medical records. Forms in the areas of adult internal medicine, pediatrics and obstetrics-gynecology were analyzed, considering the following items: patient identification, anamnesis, physical examination, diagnosis, and professional conduct and identification. The final medical record was also evaluated by the item “forms to be filled out by the doctor.”

In the evaluation, we applied a questionnaire established by Silva and Tavares Neto⁹, resulting in a total score from the sum of partial scores related to the completion of each item in the document. This instrument was chosen for being used to analyze medical records from 105 institutions affiliated to the Brazilian Association of University Hospitals and Teaching Entities⁹. In addition, the questionnaire covers all the elements that must be included in a medical record, in any medium (electronic or physical), as defined in Article 5 of CFM Resolution 1,638/2002³:

a. patient identification – full name, date of birth (day, month and year with four digits), sex, mother’s name, place of birth (indicating city and state of birth), full address (street name, number, complement), district, municipality, state and zip code);

- b. anamnesis, physical examination, requested complementary exams and their respective results, diagnostic hypotheses, definitive diagnosis and treatment provided;*
- c. daily evolution of the patient, with date and time, discrimination of all procedures to which they were submitted and identification of the professionals who performed them, electronically signed when implemented and/or stored electronically;*
- d. in paper-based patient records, handwriting legibility of the professional who attended to the patient is mandatory, as well as the identification of healthcare providers. Signature and respective CRM number are also mandatory;*
- e. in emergency cases, when it is impossible to collect the patient’s clinical history, a complete medical report of all procedures performed and which have enabled the diagnosis and/or removal to another unity must be included.*

In the instrument used by Silva and Tavares Neto⁹, the scores for each item ranged from 0 to 4, with the zero value being assigned if the information did not exist or there was no space for its record in the document. The final score is the result of the sum of partial scores. In our study, the medical records to be filled out by doctors were considered as “consolidated.” The forms filled out by other health professionals were not analyzed. Each categorical variable was described by frequency and analyzed using the chi-square test. Quantitative variables without normal or discrete distribution were described by the mean (\pm standard deviation) and median, and analyzed by the Mann-Whitney test, comparing the respective mean rankings. The result was considered significant when the probability (p) of the occurrence of type I error (alpha) was less than 5% (or $p < 0.05$). Table 1 shows the results.

Table 1. Descriptive statistics for the data obtained from medical records, based on the instrument by Silva e Tavares⁹, in a teaching hospital (Mogi das Cruzes, São Paulo, Brazil, 2016-2019)

		n	μ	Median	σ	SEM	Min.	Max.
Internal medicine	Gynecology and obstetrics	27	46.2	48	6.48	1.250	28	53
	Adult internal medicine	123	41.8	43	8.35	0.753	14	61
	Pediatrics	41	45.5	45	7.25	1.130	29	57
Consolidated medical record	Gynecology and obstetrics	27	13.5	13	1.60	0.308	10	16
	Adult internal medicine	123	11.4	12	2.53	0.228	3	18
	Pediatrics	41	11.6	11	2.50	0.390	5	17
Overall score	Gynecology and obstetrics	27	59.7	62	6.79	1.310	42	67
	Adult internal medicine	123	53.2	55	9.51	0.858	24	78
	Pediatrics	41	57	58	8.69	1.360	36	71

n: number of observations; μ : sample mean; σ : standard deviation; SEM: standard error of the mean; min.: minimum; max.: maximum

From the collected data, we verified the presence of outliers, but none of them generated bias. The dependent variables were internal medicine score (IMS), consolidated medical record score (CMRS), and overall score (OS). Since they are characterized as discrete and continuous, that is, assume only integer values, such variables are counting data and lack a Gaussian probability distribution (normality), and thus were tested for normality of distribution. The Shapiro-Wilk, Anderson-Darling, Cramér-von Mises and Lilliefors (Kolmogorov-Smirnov) tests were used, and the probability density graph was analyzed. The tests are based on confronting the null hypothesis ($\mu_{data} = \mu_{normal}$) with the alternative ($\mu_{data} \neq \mu_{normal}$). As we obtained a $p < 0.05$ (Shapiro-Wilk normality test, $p = 0.0004352$), the alternative hypothesis was accepted, and the data differed from a fictitious normal distribution. Therefore, the values of all variables are not normal.

We used two non-parametric tests – Kruskal-Wallis and Mann-Whitney – to compare the respective mean rankings. The Kruskal-Wallis test shows that there is a difference between sectors for all variables (IMS, CMRS and OS). As the p value was less than 0.05 ($p = 0.0003463$), the alternative hypothesis that the medians between sectors for IMS, CMRS and OS scores differ from each other was accepted. To further detail the results, the pairwise Mann-Whitney test was performed. The significant differences in medians between

hospital sectors ($p < 0.05$) in the general score were between gynecology-obstetrics and adult internal medicine ($p = 0.0001284$), and pediatrics and adult internal medicine ($p = 0.03569$).

This article complies with CNS Resolution 466/2012¹⁰ and the principles of the *Declaration of Helsinki*¹¹.

Results

The medical records provided by the teaching hospital were of the conventional, non-electronic type. We analyzed 123 forms of adult internal medicine, 27 of gynecology-obstetrics and 41 of pediatrics, totaling 191 records. The expected score was 73 points for all areas, but the maximum observed was 78 for adult internal medicine, 71 for gynecology-obstetrics, and 67 for pediatrics.

The means found in the overall score of the gynecology and obstetrics forms, adult internal medicine and pediatrics were, respectively, 59.7, 53.2 and 57, and the medians were 62, 55 and 58. Therefore, there was little difference between the means and medians found, mainly in pediatric forms. Table 2 presents the means and medians of the sectors of the analyzed teaching hospital and their respective p values.

Table 2. Means and medians regarding the results found in the scores of the teaching hospital sectors (Mogi das Cruzes, São Paulo, Brazil, 2016-2019)

Hospital sectors	Internal medicine score		Consolidated medical record score		Overall score	
	Mean (SD)	Median**	Mean (SD)	Median	Mean (SD)	Median
Gynecology and obstetrics (n = 27)	46.2 (6.48)	48 ^a	13.5 (1.60)	13 ^a	59.7 (6.79)	62 ^a
Adult internal medicine (n = 123)	41.8 (8.35)	43 ^b	11.4 (2.53)	12 ^b	53.2 (9.51)	55 ^b
Pediatrics (n = 41)	45.5 (7.25)	45 ^a	11.6 (2.50)	11 ^b	57 (8.69)	58 ^a
P value*	0.004		0,00007		0.0003	

*Kruskal-Wallis test; **Mann-Whitney test; letters "a" and "b" in the same column differ with a 95% significance level; SD: standard deviation

Discussion

The teaching hospital showed interest in participating in the study, which may be due to the *growing concern regarding the correct record of services provided in healthcare*¹², as well as the fact that one of the purposes of the institution is to train new professionals or offer continuing education for medical staffs. A proof that the topic addressed has received more and more attention is the requirement,

imposed by CFM³, of the Medical Records Review Committee in health institutions. It is up to them to observe if all the necessary items are in the medical record and ensure that the data is correctly filled out, kept and handled, which are the responsibility of the attending physician, the team leader, the clinic head and the technical board of the unit.

The mean scores achieved – 53.2 for adult internal medicine, 59.7 for gynecology-obstetrics, and 57 for pediatrics – were below the expected 73

points, which shows quality problems in the patient records evaluated. These gaps can harm not only the quality of care provided, but also the teaching and research activities, besides generating risks in the legal scope and preventing relevant data from informing public policies.

Regarding specific items, it is a matter of concern that information on anamnesis and physical examination was missing or incomplete. Anamnesis is an essential part of clinical history, through which the doctor guides himself in the physical examination – of paramount importance for the staff to formulate or confirm diagnostic hypotheses. When anamnesis is poorly performed, all patient care is compromised.

The forms that are to be filled by the team also raise concern, indicated by the items “evolution of nursing,” “physiotherapy,” “social service,” “psychology” and “occupational therapy.” Most of the medical records had a score of 1 (“present”) in relation to “evolution of nursing,” presenting unsatisfactory results in the other items. This data indicates little service from these teams, either due to lack of referrals or professionals in the area at the hospital, resulting in poor communication between the multidisciplinary team and affecting patient care.

Data failures were also detected on epidemiology, immunization, background of endemic diseases, accidents or violence, and physiological history. In most medical records, these items were discarded, receiving low or even zero scores, indicating their absence.

In short, the analysis observed problems of form and content in many medical records. Although the mean of the obtained scores is not so low, the gaps in some specific variables are worrisome. The analysis of medical records *allows a critical reading about the practices that professionals internalize and reproduce from their training, as well as about the operational conditions and circumstances that are presented to them and to which, for many reasons, they end up submitting themselves*¹³. Thus, it is important to structure this data with mandatory

fields that standardize the document regardless of the diverse backgrounds of professionals working in the hospital team.

We must highlight that the researched hospital, up to the time of data collection, had not yet implemented the EHR, which could speed up the completion of the document, and give more time to health professionals to treat patients. Moreover, the electronic health record would facilitate research studies like this, which aim to analyze the quality of these documents. EHR implementation, however, would also require a cultural change, as *management should seek to identify the advantages and disadvantages for the organization, ensuring the process within the institution*⁸. Therefore, it is a process that demands *human and financial investment, due to the need for implementing information technology and training multidisciplinary teams*⁸.

Final considerations

According to a publication by the Regional Council of Medicine of São Paulo, *the medical record, actually the patient's record, is the set of standardized, ordered and concise documents, intended to record all information regarding the medical and paramedical care provided to the patient*¹⁴. The quality of care is directly influenced by this document, since all information necessary for medical assistance must be recorded in it, in an organized and clear way to facilitate the understanding and exchange of information among health professionals.

Given the importance of the patient records, although the scores achieved in the analysis were not so low, we concluded that improvements are needed. The inefficient record creates obstacles for the hospital's scientific production – since biases can influence analysis – and impairs patient referral, for other professionals will find difficulties in following the patient's evolution. All of these factors make diagnosis and prognosis difficult and, without changes, they can compromise student development and the quality of the health system.

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Participation of the Authors

Mariana Cuccato Ribeiro, Bruno Skawinski Dalaneze and Mariah Padovan de Oliveira Peruchi collected and analyzed the data and wrote the article. Raquel Barbosa Cintra supervised the work and revised the manuscript.


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