Medical Record Review for Faculty Promotion: A Cohort Analysis

Chien-Da Huang[1,2], Chang-Chyi Jenq[1,3], Liang-Shiou Ou[1,4], Alvin C. Chen[5], She-Hung Chan[6], Jing-Long Huang[1,4], San-Jou Yeh[1,7], Shih-Tseng Lee[1,6]

Background: A medical record is an important source of information regarding medical care and medical record review plays an important role in the evaluation of the teaching proficiency. The study analyzed the difference between internal and external auditing when conducting medical record review for faculty promotion in a study institute.

Methods: We analyzed the scores related to the medical records maintained by applicants for the faculty promotion of attending physicians during the period between 2008 and 2010 at the Chang Gung Memorial Hospital. The scores were obtained from one internal reviewer of the study institute and two external reviewers from other medical centers, and routine scores were obtained from the Committee of Medical Record 1 year before application. Pearson's correlation coefficient was used to analyze the correlation and statistical significance.

Results: There were 259 applicants for faculty promotion enrolled in this study [professors (n = 33, 13%), associate professors (n = 63, 24%), assistant professors (n = 90, 35%), lecturers (n = 73, 28%)]. The scores of the external reviewers 1 and 2 were correlated with routine scores (r = 0.187, p = 0.002; r = 0.198, p = 0.001; N= 259), respectively. The correlation between external reviewers' average and ordinary scores was significant for assistant professor (r = 0.334, p = 0.001, n = 90) and professor grades (r = 0.469, p = 0.006, n = 33). However, the internal reviewer scores did not correlate with the routine scores (r = 0.073, p = 0.241, N = 259).

Conclusions: The scores from external reviewers correlated more with routine scores than the scores from internal reviewers, suggesting that utilizing an external auditing system of medical records for the faculty promotion of attending physicians is quite feasible and balanced. *(Biomed J 2015;38:456-461)*

At a Glance Commentary

Scientific background of the subject

Medical records are comprehensive illness data files regarding medical care. Medical record review plays an important role in the evaluation of the teaching proficiency. The study analyzed the difference between internal and external auditing when conducting medical record review for faculty promotion in a study institute.

What this study adds to the field

The scores from external reviewers correlated more with routine scores than the scores from internal reviewers, suggesting that utilizing an external auditing system of medical records for the faculty promotion of attending physicians is quite feasible and balanced.

Key words: attending physician, audit, faculty promotion, medical education, medical record review

From the [1]Department of Medical Education, Chang Gung Memorial Hospital at Linkou, Chang Gung University College of Medicine, Taoyuan, Taiwan; [2]Department of Thoracic Medicine, Chang Gung Memorial Hospital at Linkou, Chang Gung University College of Medicine, Taoyuan, Taiwan; [3]Department of Nephrology, Chang Gung Memorial Hospital at Linkou, Chang Gung University College of Medicine, Taoyuan, Taiwan; [4]Department of Pediatrics, Chang Gung Memorial Hospital at Linkou, Chang Gung University College of Medicine, Taoyuan, Taiwan; [5]Department of Orthopaedic Surgery, Chang Gung Memorial Hospital at Linkou, Chang Gung University College of Medicine, Taoyuan, Taiwan; [6]Department of Neurosurgery, Chang Gung Memorial Hospital at Linkou, Chang Gung University College of Medicine, Taoyuan, Taiwan; [7]Department of Cardiology, Chang Gung Memorial Hospital at Linkou, Chang Gung University College of Medicine, Taoyuan, Taiwan

Received: Mar. 20, 2014; Accepted: Jan. 20, 2015

Correspondence to: Dr. Shih-Tseng Lee, Department of Neurosurgery, Chang Gung Memorial Hospital at Linkou. 5, Fushing St., Gueishan, Taoyuan 333, Taiwan (ROC). Tel: 886-3-3281200, Ext. 2001; Fax: 886-3-3272474; E-mail: yun0710@adm.cgmh.org.tw

DOI: 10.4103/2319-4170.151028

Medical records are comprehensive illness data files including important medical data and information which present the medical history and status of the patients and also have educational and research value.[1] The main purpose of the medical records is to record the medical conditions correctly and to show who, when, where, which condition, and what treatment is being done in a real-time manner. The medical record not only reflects the care of the patients but also has become a communication tool to a wide variety of players including colleagues, Health Maintenance Organization (HMO), and in the worst case scenario, a plaintiff's attorney.[2] Medical records lie at the heart of communications with patients, with other doctors in the hospital, and with general practitioners in clinical practice, and they are needed for audit and research.[3] Medical note writing was considered as one of the 10 essential skills for interns' ability.[4]

Medical record review can be a very useful educational tool, can potentially change behavior, and can provide useful information when explicit criteria for review are utilized. In addition, it can also be used to assess the effectiveness of educational interventions in the clinical training setting. In the United States, the Residency Review Committee (RRC) of the Accreditation Council for Graduate Medical Education (ACGME) requires medical record audits as part of the training program's evaluation.[5] Medical record audits are an essential element in the evaluation of the new competency of practice-based learning and improvement (PBLI). The American Association of Medical Colleges also endorses the importance of skills in medical records for medical students.[6] Therefore, a good system for medical record review could ensure the integrity of the medical records in relation to accuracy, comprehension, consistency, and legal nature, and thus provides complete information for the physicians in the diagnosis, treatment, research, and teaching and strives to help enhance the quality of health care and medical education.[7,8]

The attending physicians play the most important role in the recording of medical charts, and should be the supervisors and guides of residency or internship medical students to enhance the quality of medical records.[9] Using the medical record review checklist and reward system in the academic promotion of attending physicians, the quality of medical records, including medical record completeness, correctness, comprehensiveness, and consistency could be improved. It could also achieve the objectives of medical education, and thus enhance the quality of medical education. For the academic promotion of attending physicians every year in the Chang Gung Memorial Hospital (CGMH), the quality of medical record plays an important role in the audit process. The Committee of Medical Record and the Department of Medical Education of CGMH assigned two reviewers from other hospitals (external reviewers) and one reviewer from the study hospital (internal reviewer) to review the medical records of applicants for academic promotion. The review system aims to enhance the inter-hospital exchange and upgrade the quality of medical records. However, the reliability and validity of the medical record review system are still not well evaluated. The purpose of this study was to analyze the internal and external reviewers for medical record review for the academic promotion of attending physicians in the study institute.

METHODS

Study population

There were a total of 337 applicants for academic promotion during the period between 2008 and 2010 in CGMH, Linkou branch, a medical center in northern Taiwan. Seventy-eight applicants without the reference routine scores of ordinary assessments by the Committee of Medical Record were excluded from this study (exclusion: 78/337 = 23%). So, 259 applicants enrolled in this study [professors (n = 33, 13%), associate professors (n = 63, 24%), assistant professors (n = 90, 35%), lecturers (n = 73, 28%)] [Figure 1].

Routine medical review

Medical records for reviewers included outpatient, emergency, and inpatient medical records. The medical record review checklists were approved by the Committee of Medical Record according to the hospital accreditation standards and government regulations with annual review. Any modification in the medical review system would not be implemented until approved by the Presidency of CGMH.

The cycle of the medical record review was on a quarterly basis. Medical records were randomized to be selected from outpatient clinics, emergency room (ER), and wards,

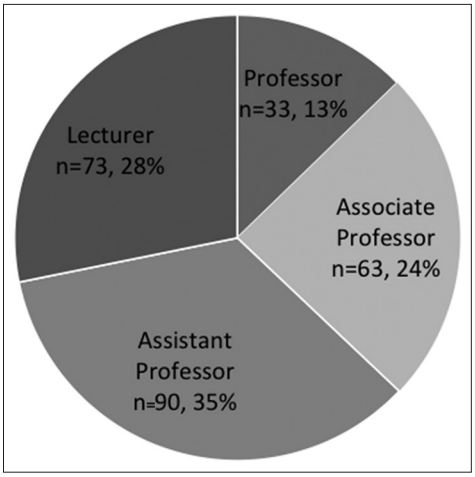

Figure 1: Two hundred and fifty-nine applicants for academic promotion were enrolled in the study in the period between 2008 and 2010 [professors (n = 33, 13%), associate professors (n = 63, 24%), assistant professors (n = 90, 35%), lecturers (n = 73, 28%)].

respectively, for physicians. Outpatient medical record sampling included the first visit and sequential outpatient clinics records (including post-discharge outpatient clinics follow-up), excluding the baby clinic records, outpatient surgery records, or medical certificate. The principle of ER medical record sampling was that one medical record was selected for every physician in the ER treatment area. In the ER observation area, for pediatricians, medical records were selected for review if pediatric patients stayed for more than 3 h. For internal medical doctors, medical records would be reviewed if emergency medicine care was given ≧48 h. The main principle of hospitalized medical record sampling was that the number of days of hospital stay was less than 3 days without the change of service of the attending physicians. Medical records from chronic neonatal wards, day care wards, and admission for chemotherapy were excluded.

The physicians were appointed as routine medical record reviewers by the Chairman of the Committee of Medical Record according to the annual plan, which was approved by the Presidency of CGMH with an appointment for a 1-year term and they could be reappointed. Their medical record review achievements should have at least once be rated as excellent in the past 3 years, and the rankings should be among the top 30% in the previous year. For priority selection purposes, the reviewers were to be selected from senior attending physicians or those previously serving as members of the Committee of Medical Record, Medical Education Committee, or by the attending physician with the academic position of lecturer level or above. The reviewers were instructed with a structured checklist before medical record review was conducted.

Special medical review system for faculty promotion

The qualification for academic promotion of attending physicians in CGMH included patient care, medical record quality, the attitude of teaching, and the performance of medical research. Medical record review was the first part of qualifying for academic promotion of the attending physicians. At least 15 medical records of each applicant in the latest 3 years would be reviewed. There were three adjudicators in this assessment, including one adjudicator of CGMH (internal reviewer) and two adjudicators from other hospitals (external reviewers) invited by the Chairman of the Department of Medical Education. The reviewers were assigned using randomization method and instructed with a structured checklist before medical record review was conducted. The average scores were obtained from one internal reviewer and two external reviewers according to the same checklists. The assessment items in the medical review checklists were clearly defined and approved by the Committee of Medical Record in accordance with the hospital accreditation standards and government regulations with an annual review. Any modification in the medical review system would not be implemented until approved by the Presidency of CGMH.

The reference routine scores of applicants were also obtained from the Committee of Medical Record 1 year before application. We analyzed the scores of medical records of the applicants for academic promotion of the attending physicians and compared the correlation between the scores of internal/external reviewers and routine scores.

Statistical analysis

All data are expressed as mean values and standard deviation (SD) or as numeric values (%). One-way analysis of variance (ANOVA) was used to compare mean values of more than two experimental groups. If there was variance among groups, the Bonferroni test was used to determine significant differences between specific points within groups. Some data were also analyzed by the Student's *t*-test for paired or unpaired data. Pearson's correlation coefficient was used to analyze the correlation and statistical significance. The level of statistical significance was set at $p < 0.05$. All analyses were conducted using SPSS software (version 13.0; SPSS, Chicago, IL, USA) and Prism 5 for Windows (version 5.03; GraphPad Software Inc., San Diego, CA, USA).

RESULTS

The scores rated by reviewers

The scores rated by internal reviewer, external reviewer 1, external reviewer 2, and the external reviewers' average were 84.0 ± 4.1, 83.4 ± 4.1, 84.2 ± 4.2, and 83.8 ± 3.0, respectively, with the average score being 83.9 ± 2.6. The professor grade got the highest score in routine rating, score of external reviewer 2, and external reviewer's average. The associate professor grade got the highest score in internal reviewer and all average. The assistant professor grade got the highest score in external reviewer 1 [Table 1].

The correlation among internal, external reviewers', and routine scores

The external reviewer 1 score, reviewer 2 score, external reviewers' average, and all average scores were correlated with reference routine scores ($r = 0.187$, $p = 0.002$; $r = 0.198$, $p = 0.001$; $r = 0.265$; $p < 0.001$; $r = 0.245$, $p < 0.001$, respectively; $N = 259$). The correlation between external reviewers' average and routine scores was significant in assistant professor ($r = 0.334$, $p = 0.001$, $n = 90$) and professor grades ($r = 0.469$, $p = 0.006$, $n = 33$), but not in associate professor ($r = 0.200$, $p = 0.116$, $n = 63$) and lecturer grades ($r = 0.139$, $p = 0.242$, $n = 73$) [Table 2]. However, the

Table 1: The scores rated by reviewers

	Routine	Internal reviewer	External reviewer 1	External reviewer 2	External reviewers' average	All average
Professor (*n*=33)	86.2±2.1*	83.5±3.5	83.4±4.3	85.6±4.4*	84.5±3.2*	84.1±2.3
Associate professor (*n*=63)	86.0±2.6	85.0±4.0*	83.8±3.2	84.6±3.8	84.2±2.6	84.4±2.3*
Assistant professor (*n*=90)	84.9±3.1	83.9±4.0	83.9±4.3*	83.2±4.5	83.5±3.1	83.7±2.5
Lecturer (*n*=73)	85.2±3.4	83.6±4.7	82.5±4.5	84.5±4.1	83.5±3.3	83.5±3.0
All (*N*=259)	85.4±3.0	84.0±4.1	83.4±4.1	84.2±4.2	83.8±3.0	83.9±2.6

Data shown as mean±SD. *The highest score in each rater system

Table 2: The correlation among scores of internal, external reviewers, and ordinary scores

Routine vs.	Internal reviewer	External reviewer 1	External reviewer 2	External reviewers' average	All average
Professor (*n*=33)					
Pearson correlation	0.036	0.435*	0.255	0.469**	0.414*
p	0.843	0.011	0.153	0.006	0.017
Associate professor (*n*=63)					
Pearson correlation	0.001	0.218	0.083	0.200	0.147
p	0.996	0.086	0.518	0.116	0.250
Assistant professor (*n*=90)					
Pearson correlation	0.010	0.215*	0.254*	0.334**	0.279**
p	0.927	0.042	0.016	0.001	0.008
Lecturer (*n*=73)					
Pearson correlation	0.175	0.094	0.122	0.139	0.191
p	0.139	0.429	0.302	0.242	0.106
All (*N*=259)					
Pearson correlation	0.073	0.187**	0.198**	0.265**	0.245**
p	0.241	0.002	0.001	<0.001	<0.001

*$p<0.05$, **$p<0.01$

internal reviewer scores were not correlated with reference routine scores ($r = 0.073$, $p = 0.241$, $N = 259$) [Table 2]. This study shows that external reviewer's scores correlated more with routine scores than the internal reviewer scores. The finding suggests that an external monitoring system for the qualification of medical records in relation to the academic promotion of attending physicians may be feasible and balanced.

DISCUSSION

The attending physicians are not only the main providers of hospital care but also the chief tutors of medical record writing for residents and medical students. Medical record review is one of the most important parts for the assessment of teaching achievements of the attending physician. Thus, re-assessment of medical recording is designed as the first and compulsory step to qualify for academic promotion in the case of attending physicians at the CGMH. Thus, fairness is an important issue. There were three adjudicators in this assessment, including one professor of CGMH (internal reviewer) and two adjudicators from other hospitals (external reviewers). Our study shows that external reviewer scores correlated more with routine scores than the internal reviewer scores, suggesting that external monitoring system for qualification of medical records in academic promotion of attending physicians may be feasible and balanced.

Quality in medical records has been described as having the attributes of legibility, accuracy, completeness, and meaning.[10,11] Maintaining high-quality medical records is an important indicator of the quality of medical care and clearly an essential part of good clinical practice. They are needed not only for good clinical communication but also to build the complete picture required in order to make an appropriate diagnosis and treatment.[3,9] The system of medical record review is conducted by the Committee of Medical Record of CGMH in this study. Eligible physicians are selected every 6 months to review the quality of medical records. This system is not only significant to enhance the quality of care but also plays an important role in the course of assessment of learning and teaching. Previous study has shown that a prior structured program can identify whether there are inconsistencies and contradictions between the contents of the medical records.[12]

There are two typical audit systems, internal and external audit systems.[13] In the internal audit system, internal auditors belong to the same organization as auditees and possess abundant information on the activity of the auditees, which is not limited to the scope of auditing. Since they can provide both auditing and non-auditing services, the opportunity cost of the auditing function is low. In contrast,

the external auditors belong to a different organization from auditees. They have less information on the activity of auditees and the opportunity cost of the auditing function is high. The internal audit system is superior to the external one from the viewpoint of cost of auditing. Nevertheless, the risk of collusion is relatively higher in the internal audit system compared with the external one. This is because internal auditors are likely to suffer pressures in hiding and covering unfavorable results from the audit in favor of their organization. However, in the external audit system, in which the external auditors and auditees are independent of each other, external auditors can disregard such pressures.[14] The reviewers from other medical centers (external qualification) for medical record review, in fact, can not only reduce the bias from colleagues of the same hospital with the same review blind spot but also enhance the effectiveness of peer review, helping to improve the performance of the audit. In our study, the scores from external reviewers correlated more with the routine scores than the scores from internal reviewers. The result is compatible with previous financial audit findings. In this study, the explanation for lesser correlation obtained with reference routine scores is that there was only one internal reviewer for each applicant and the internal reviewers were ra ndomized as reviewers by the Committee of Medical Education, who were probably less experienced and less instructed when compared with routine reviewers and external reviewers. Whether the routine scores are really a reference standard could possibly be explained by the fact that the routine medical reviewers were s elected from medical attending physicians who performed well and were pre-instructed with a prior structured checklist before conducting medical record review. Inversely, the external reviewer scores consistent with routine scores may further explain the doubt since the risk of collusion is relatively lower in the external audit system compared with the internal one. Thus, routine medical review system may be another good tool as a reference for academic promotion of the attending physicians. However, since not all applicants have routine scores before application of academic promotion in this study, a good well-randomized medical review system should be set up in the future. The coordination of internal audit activity with external audit activity is another important issue from both points of view. The ideal situation is when the internal and external auditors meet periodically to discuss common interests; benefit from their complementary skills, areas of expertise, and perspectives; gain understanding of each other's scope of work and methods; discuss audit coverage and scheduling to minimize redundancies; provide access to reports, programs, and working papers; and jointly assess areas of risk.[15] Our medical record review system deserves further implement for faculty promotion since it is combined with internal and external qualification and is feasible.

This study has several limitations that are worth noting. It is a study of single medical center, hence may not be generalized to other hospitals with different cultures. There are many factors affecting the quality of medical chart, such as the exact writer of medical chart. Many of the medical records are made by medical students or residents, rather than from the applicants themselves. Medical record review can be made only on what is recorded and this may not be an accurate judgment of what was actually done in teaching proficiency. There is difference between medical and surgery departments; thus, the medical records audit review checklists cannot be completely unified and bias may occur. We consider that a simple correlation of total assessment scores between reviewers may not be suitable to reflect the variation of assessment between reviewers and analyzing the variance of each evaluation item by item may be more helpful to find out the discrepancy. However, the purpose of the study was to analyze the holistic correlation between internal and external auditing systems and the consideration may be beyond the scope of this study. Thus, further prospective study needs to be done to clarify the question. There were many different external adjudicators as external reviewer 1 and reviewer 2, which is a limitation for the survey of correlation between two extramural a uditors for the same applicants and could not provide insight into the justification of assessment. In addition, these results only show the correlation between routine scores and external qualification. They cannot assess the correlation between attending physicians with success or failure in academic promotion. This study excludes the attending physicians of non-hospitalized divisions and the attending physicians without reference routine scores (exclusion rate: 23%) from the Committee of Medical Record. It also affects the representativeness. The correlation between external reviewers' average and routine scores was significant in assistant professor and professor grades, but not in associate professor and lecture grade s. It deserves to be studied further.

In summary, this study shows that the external reviewer scores correlated more with routine scores than the internal reviewer scores. The finding suggests that external monitoring system for qualification of medical records in academic promotion of attending physicians is feasible and balanced. It is worth continuing to implement the combined internal and external audit of medical record review system for faculty promotion of attending physicians by utilizing checklists.

ACKNOWLEDGMENTS

The authors would like to thank the Department of Medical Education of CGMH for supporting this study. They also thank

Dr. Ming-Hsun Lee, Chairman of the Committee of Medical Record of CGMH for his contributions.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. vonKoss Krowchuk H, Moore ML, Richardson L. Using health care records as sources of data for research. J Nurs Meas 1995;3:3-12.
2. Murphy BJ. Principles of good medical record documentation. J Med Pract Manage 2001;16:258-60.
3. Mann R, Williams J. Standards in medical record keeping. Clin Med 2003;3:329-32.
4. Chen YC, Fang JT, Lin JD, Cherng WJ. Evaluation of problem-based learning education after clerkship at the Chang Gung University School of Medicine. Chang Gung Med J 2002;25:758-63.
5. Accreditation Council for Graduate Medical Education: Program requirements. Available from: http://www.acgme.org [Last accessed on 2013 Oct 04].
6. American Association of Medical Colleges. Available from: http://www.aamc.org [Last accessed on 2013 Oct 04].
7. Huang YC, Lai SF, Kao YC, Soon MS. Quality Improvement Practice of Active Medical Records at Certain Medical Center. J Med Rec Manage 2009;9:1-17.
8. Chang YJ, Hwang KL, Soon MS, Lee HJ, Wang SJ. The Effect of Peer Review on the Quality of Medical Records-The One-year-experience in Changhua Christian Hospital, Taiwan. Changhua J Med 2002;7:38-49.
9. Huang CD, Chu CN, Lee MH, Ou LS. Medical record review and clinical log. In: Lee ST, editor. Guideline of Clinical Competence Assessment. Taipei: Elsevier Taiwan LLC; 2012. p. 247-88.
10. Logan JR, Gorman PN, Middleton B. Measuring the quality of medical records: A method for comparing completeness and correctness of clinical encounter data. Proc AMIA Symp 2001:408-12.
11. Romm FJ, Putnam SM. The validity of the medical record. Med Care 1981;19:310-5.
12. Huston JL. The need for mandatory clinical recording standards. Clin Med 2004;4:255-7.
13. Kofman F, Lawarree J. Collusion in hierarchical agency. Econometrica 1993;60:410-27.
14. Fukumoto JY. External Audit System of Project Evaluation: Optimal Structure and Audit Quality. Interdiscip Inform Sci 2005;11:91-103.
15. Dobroteanu L, Dobroteanu CL. Audit-Concepts and Practices. National and International Approach. Bucharest: Economica Publishing; 2002.