

Short Communication

Application of informationization in outpatient medical quality management

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Medical quality is a key factor in determining the success or failure of a hospital. It determines the hospital's core competitiveness as it participates in market competition and also affects patients' safety. Providing excellent outpatient and emergency medical quality management plays an important role in improving a hospital's competitiveness and management level, maintaining its positive image and reputation, improving the efficiency of medical staff, and achieving patient satisfaction.^[1]

Traditional outpatient medical quality management is the management of medical quality through inspections or random checks of paper medical records, prescriptions, and examination application forms, but this has the shortcoming of being one-sided and intermittent. In digital hospitals, outpatient medical quality management refers to the implementation of systems that supervise and control medical quality throughout the patient's course of treatment. This includes aspects such as medical operation indexes, quality of diagnosis and treatment, quality of medical technologies, and drug management, while also measuring the efficiency and effectiveness of the medical services provided and consequent patient satisfaction. Quality management is achieved by improving the hospital's relevant management system and medical quality evaluation index through a computerized and comprehensive information system of modern computer technology, additional information systems, and other means.

For this study, a literature search was conducted in the CNKI

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full-text database of journals, Wanfang database, VIP Chinese scientific journal database, and the database of the Journal of the Chinese Medical Association, using keywords such as "informatization", "outpatient quality", "outpatient management", "networking", and "medical quality". Fewer than five valid papers on managing outpatient quality through informatization were found. At present, research in domestic medical quality management focuses on the supervision of hospitalization quality.^[2] Insufficient attention has been paid to outpatient quality and there is no quality management assessment system that can be used for reference.

As early as 2010, Shengjing Hospital took the lead in launching an outpatient electronic medical record system in China, removing handwritten medical records and paper examination application forms, implementing electronic medical orders and medical billing and services such as in-hospital medical cards. To better adapt to the overall development of the hospital's information system and improve the efficiency of management personnel, the outpatient department and computer center cooperated with Neusoft's project department to design and develop an information query system suitable for outpatient medical quality management.

COMPOSITION AND INDEX INTERPRETATION OF THE OUTPATIENT MEDICAL QUALITY MANAGEMENT INFORMATION QUERY SYSTEM

Conventional assessments of outpatient medical quality focus on written medical records and doctors' notes, issuing prescriptions, ensuring outpatient satisfaction, and balancing personnel's workload, among other aspects.^[3,4] In recent years, to further improve outpatient medical services, China

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has vigorously promoted medical appointments at all levels of medical institutions. Outpatient appointment registration and whether doctors are on time for patient appointments have gradually been included in the scope of quality assessment. According to the “National Class-3 Public Hospital Performance Assessment Operating Manual”, “Liaoning Provincial Hospital Comprehensive Performance Assessment Work Plan”, and “Liaoning Province Class-2 and Higher Hospitals Inspection Work Implementation Plan”, and considering actual hospital development, the following aspects are included in the scope of outpatient medical quality assessments.

- (1) Number of outpatient visits: The “Department Registration Workload Statistics” in the outpatient management backstage is used to determine how many patients a doctor can see in a given time based on queries and visit statistics.
- (2) Outpatient medical records: The writing quality of medical documents reflects the level of diagnosis and treatment patients receive from doctors and hospitals. These documents directly affect the patient’s subsequent treatment and diagnosis and also provide important evidence regarding potential legal issues. The outpatient management backstage includes the “Outpatient Medical Record Statistical Query” and “Outpatient Medical Record Qualification Rate Statistical Query”. These queries reflect whether the doctors have entered medical records electronically and whether these records are complete, after which a rating for each department can be exported. This is an automatic computer-assisted quality control item that is implemented automatically in the feedback type of quality inspection systems. Currently, there are 10 automatic quality control items functioning in outpatient clinics. In addition, Shengjing Hospital has also established a manual system to inspect and provide feedback on electronic medical records. This allows for spot checks of the writing quality of outpatient and emergency medical records, as these are also the focus of outpatient quality management. Outpatient and emergency medical records can be screened according to time, department, and outpatient identification number, and quality control personnel can choose to inspect part or all of each medical record. The management department keeps a list of items that are frequently missing, such as not listing the time of onset of the patient’s condition, and deducts points for these items in advance. For incorrectly completed medical records, the quality control personnel can deduct points by selecting a specific item or entering the deducted value and reason manually, complete the missing information and saving the record. For manually scored mistakes, quality control personnel can click “send message” to provide direct feedback to the manager of the individual who created the incomplete record. The rules for sending feedback short message service (SMS) are the same as those for the automatic quality control feedback system. There are two levels of quality control personnel, at the hospital and department level, and management needs to determine the limits of the authority given to quality control personnel before inspecting medical records. The inspection results, records of SMS sent, and other items can be queried in real time, and quality control personnel at all levels can regularly analyze the results of statistical queries and take effective measures to swiftly rectify any issues, promoting the continuous improvement of medical quality.
- (3) Outpatient examination application form: The “Outpatient Electronic Application Form Query” program of the outpatient management backstage is used to regularly export notes from each department and perform quality control on the notes in each form. Items such as whether the doctor carefully noted the patient’s main medical history, reason for their visit, results of examinations, and preliminary diagnosis are examined to help improve the level of examinations and diagnosis quality of the relevant department.
- (4) Outpatient prescriptions: Prescriptions written during any time range can be randomly checked using the “Outpatient Prescription Query” menu of the outpatient management backstage. Quality control of prescriptions is then carried out according to the “Hospital Prescription Review Management Regulations (Trial)” requirements issued by the Ministry of Health to standardize prescription issuance, reduce or even eliminate big prescriptions, and reduce patients’ economic and mental burden.
- (5) Doctors’ attendance: The “Department Doctors’ Attendance Discipline” query in the outpatient management backstage can monitor attendance to see if doctors are punctual. The hospital records the time at which doctors receive their first patient as the attendance time and compares it with both the expected attendance time and the time for which the first patient of the day was registered. This assesses the doctor’s attendance, and punctual attendance is an important prerequisite for ensuring that outpatient medical treatment is provided in an organized way. It can reduce non-medical waiting time for patients, maintain the reputation of medical staff in patients’ minds, and influence patients’ loyalty to the hospital.
- (6) Appointment registration: The “Appointment Statistical Query” of the outpatient management backstage can export the rate of appointment registration in each department and for each doctor within a specific time period. The hospital encourages doctors to accept online appointments, encourages patients to change from traditional registration methods, and makes appointments in advance to ease registration problems.
- (7) Diagnosis certificate: Each department can use the “Electronic Diagnosis Certificate Query” program in the outpatient management backstage to examine the diagnosis certificates it has issued, determine if there are any false certificates, and prevent the phenomenon of “issuance of application for leave as a favor”.
- (8) Consultation: This includes both emergency and general consultations. Emergency consultations should be addressed within 10 minutes of arrival, and requests for

general consultations should be responded to within 48 hours. If the consulting physician cannot make a clear diagnosis or has difficulty in deciding whether to admit the patient to the hospital, they should immediately ask a supervising physician to perform a consultation. The emergency consultation department's records are spot checked through the "Outpatient Electronic Medical Record Query Preview" to determine whether consultations are timely and effective.

- (9) Clinical path: Through the "Clinical Path" menu of the outpatient management backstage, the implementation status of each clinical path within a department can be examined during a specified time period, including path name, number of diseases under an applicable path, and specific applicable departments. Shengjing Hospital uses clinical paths to regulate the diagnosis and treatment of common diseases in the outpatient and emergency departments, reduce outpatient expenses, and guide lower-level doctors toward appropriate treatments. The clinical path template contains a non-charge-related medical order that assists doctors in explaining precautions and follow-up requirements to patients, improves the work efficiency of medical staff, and enables the hospital to gain patients' trust more easily.
- (10) Drug supervision: This includes the proportions of antibiotics and other medications. "Outpatient Antibiotic Drug Statistics" of the outpatient management backstage can regularly monitor specific departments, specific doctors' antibiotic prescriptions, and the proportion of drug costs to total fees. This strengthens the management of antibacterial drugs in clinical applications and allows for the use and re-escalation of antibiotics to be restricted so that they are used only when necessary. With the reversal of drug price increases in public hospitals, it is even more important to supervise in-hospital drug use and ensure that drugs are used rationally. The capacity of pharmaceutical services must also be improved.
- (11) Satisfaction: The hospital employs a number of retirees who conduct questionnaire surveys of inpatients, outpatients, and emergency patients. The questionnaire content covers patient source, registration level, registration method, registration time, waiting time, waiting time for laboratory tests, waiting time for examination, and other items. The management department regularly gathers summary statistics through the office network satisfaction survey system, discovers problems in a timely fashion, and makes appropriate changes so that the outpatient treatment process can be further optimized.

OUTPATIENT MEDICAL QUALITY MANAGEMENT ASSESSMENT SYSTEM AND INDEX QUANTIFICATION

The medical quality evaluation index system aims to make an objective and accurate evaluation of the entire medical services process. This is done through a unification of scientific concepts

and specific numerical expressions reflecting the characteristics of medical quality.^[5] Attempting to establish a scientific and reasonable outpatient quality management system for a clinical department (Table 1) can improve the quality of outpatient medical technology and management. The outpatient department at Shengjing Hospital summarizes the commonly used quality assessment indexes to form a quantifiable index system. The management department uses clinical departments as the units to conduct monthly assessments and summaries, collect statistical feedback, and create monthly and quarterly evaluation forms for medical quality in outpatient departments, which are then published on the office network. The assessment criteria are dynamic and adjusted in real time as management objectives change. In addition, for the quality errors reflected by the indexes, feedback is provided in cycles, levels, ranges, and forms according to the level and distribution of the quality defects. The assessment and evaluation results are linked to the annual selection of excellent medical departments and the appraisal and selection of excellent medical departmental directors.

ROLE AND SHORTCOMINGS OF INFORMATIZATION IN OUTPATIENT MEDICAL QUALITY MANAGEMENT

The networking and informatization of hospital management methods have greatly improved the work efficiency of medical management personnel and made data sources more reliable, well-founded, and more objective.^[5] By using the outpatient management backstage to one-stop export the necessary data required by the outpatient medical quality management index system, data from hospital information systems, outpatient appointment registrations, outpatient electronic medical record systems, and information from other platforms are effectively integrated, maximizing management efficiency. By incorporating doctors' on-time attendance rate, appointment registration rate, patient satisfaction, and other indexes into the assessment system, there are rewards and punishments that fully mobilize each clinical department's work enthusiasm. Everyone is a participant, implementer, and supervisor within the system, forming an outpatient medical quality management culture system that enjoys participation from everyone. Outpatient quality and management levels can be continuously improved through monitoring, feedback, and improvement of management indexes such as medical record writing, prescription issuance, and clinical paths. This can make the outpatient treatment process smoother.

Informatization is the basic condition for realizing network control of medical quality. After creating the new mode of network quality control management at Shengjing Hospital, medical quality has gradually moved from extensive hands-on management to professional, refined, and scientific.^[6] Using the query regarding omissions in outpatient electronic medical records as an example, judgment conditions are given during program designing; the query is performed using time, departments, and other parameters; and problematic medical

Table 1. Outpatient medical quality assessment index system

Classification	Assessment index	Points	Calculation method
Points-addition items	Number of outpatient visits	10	Score = number of outpatient visits/that in same period last year \times 5
	Appointment rate	10	Score = (appointment rate – 50%) \times 2, the score is up to 10 points
	Clinical path	5	Score = (Number of patients entering the path \times 0.1 [up to 2 points] + number of patients completing the path \times 0.2 [up to 2 points] + number of diseases under the path \times 0.5 [up to 1 point])/5 \times 10
Points-reduction items	Random manual check of medical records	10	Score = 10 – (number of unqualified medical records in random check/number of outpatient visits \times 1000)
	Electronic medical record writing rate	5	For a rate below 98%, points will be deducted according to the corresponding standard.
	Qualification rate of electronic medical records	5	For a rate below 90%, points will be deducted according to the corresponding standard.
	Prescription management	10	Score = 10 – (number of unqualified prescriptions in random check/number of outpatient visits \times 1000)
	Diagnosis certificate management	5	2 points are deducted for every missing certificate; the minimum score is 0 points.
	Antibiotics	5	Proportion of antibiotics: no more than 40% in the emergency department, no more than 20% in the outpatient department.
	Drug proportion	5	Score = (0.8 – this year's increase over the same period in the previous year) \times 5; the upper limit is 5 points
Others	Doctors' attendance	20	Score = on-time attendance rate \times 20 + attendance defect rate \times 18 + third-level attendance accident rate \times 15 + second-level attendance accident rate \times 10 + first-level attendance accident rate \times 5
	Patient satisfaction	5	For a rate below 90%, points will be deducted according to the corresponding standard, and if there is a reasonable complaint, the item will not be scored and a double deduction will be applied.
	Emergency consultation	5	2 points will be deducted if the doctor is late for consultation and 3 points will be deducted if the consultation record is incomplete. If the doctor asks a supervising physician for consultation within the correct timeframe or assists the hospital in admitting critically ill patients to the hospital in time, points-addition will be applied as appropriate.

records can be exported at any time. Individual doctors can also be searched for in the electronic medical record system. However, in terms of content quality monitoring, automatic quality control is achieved through methods such as “yes” or “no” options, word count control, and alerts for content repetition. Computer systems cannot complete in-depth quality control content.

The self-feedback management mechanism is used to allow the treatment implementers to manage their own behavior as much as possible and to maximize medical safety and operation. However, self-feedback medical quality management is based on the complete function of the electronic medical record system and relatively complete hospital information infrastructure. Simultaneously, managers must continuously evaluate how to continually improve and enhance medical quality in the digital form of the informatization system.

OUTLOOK

After more than 20 years of informatization construction, from the introduction of the information system in 1998 to the current integrated management of three hospital areas, Shengjing Hospital has become a model digital hospital that is recognized in the industry.^[2] The staff and medical professionals at the hospital have embraced the concepts of modernization and informatization of hospital management. Medical staff have kept pace with the times by moving toward paperless record keeping, changing their thinking, and carrying out work in innovative ways. With these changes, the hospital's medical management level and quality control can be expected to move to a higher level.

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Conflict of Interest

The authors declare no conflict of interest.

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