

METHOD BASED ON REAL-TIME MONITORING OF EMPLOYEE STATUS AND SYNCHRONOUS EARLY WARNING OF ABNORMAL DATA

TECHNICAL FIELD

[0001] The present invention relates to the field of medical management, and in particular to, a method based on real-time monitoring of an employee status and synchronous early warning of abnormal data.

BACKGROUND

[0002] At present, the personnel management and optimization of medical organizations can increase their diagnosis and treatment efficiency and improve their diagnosis and treatment process and atmosphere. The working statuses of employees in each medical post in the medical organizations are regularly inspected, summarized and analyzed, so that the organization and management ability of functional departments is better improved, and the purpose of improving the operation system of medical organizations and the diagnosis and treatment experience of patients can be finally achieved. However, the existing problems in the personnel management of the medical organizations lie in that medical and health-related organizations are involved in a large number of data exchange and function deployment, and during the actual outpatient diagnosis and treatment, there are usually problems of insufficient personnel management and operation optimization ability of medical organizations, which leads to management defects such as inadequate diagnosis and treatment services and poor treatment experience of patients.

[0003] The Chinese Patent, with Publication No. CN104156555A, provides a method and system for evaluating quality of medical reporting data. In the patent, error records of obtained outpatient data are extracted and analyzed, and after the error records and the correct records are calculated, the correct rate of the outpatient data in the outpatient department within one week is analyzed. The patent involves the work management of outpatient employees in medical organizations, but only explains correct rate evaluation, without explaining how optimization treatment is performed after the correct rate evaluation is completed. It is impossible to improve the operation of the outpatient department only by obtaining data quality.

[0004] The Chinese Patent, with Publication No. CN106485403, provides a hospital evaluation system and method based on medical big data. In the patent, multiple quality

standards affecting hospitals are evaluated and weighted to get the comprehensive score of the hospital, so as to perform rating calculation on the hospital. In the patent, various medical organizations are graded to manage the work of internal employees in the medical organizations. However, the management mode described herein is used to help patients and rating agencies make medical treatment choices, and also does not involve the application of management optimization of the medical organizations. Therefore, the improvement in hospital problems cannot be realized.

[0005] Therefore, for the problems in the operation and personnel management of the existing medical organizations, the present invention provides a method based on real-time monitoring of an employee status and synchronous early warning of abnormal data.

SUMMARY

[0006] For the above problem, the present invention provides a method based on real-time monitoring of an employee status and synchronous early warning of abnormal data, and the method specifically includes the real-time monitoring of an employee status; and the real-time monitoring of an employee status includes the specific processes: S1. establishing an evaluation standard for each medical post; S2. establishing an evaluation factor in the evaluation standard; and S3. performing real-time monitoring on the employee status in each medical post according to the evaluation standard, where the employee status includes a working status and a task completion level.

[0007] Specifically, the working status in the employee status can be indirectly evaluated by the employee task completion level in the employee status. When the employee task completion level does not reach the specified evaluation standard, the corresponding evaluation factors that do not meet the evaluation standard will be traced back to judge whether such failure to meet the evaluation standard is caused by the poor working status of the employee, so as to formulate a targeted employee incentive method.

[0008] Preferably, the medical post includes a doctor, a consultant, a nurse, a receptionist, an operation management employee, and a functional department employee; and the operation management employee includes a store manager, a dean, a regional operator, an urban general manager, and a group leader.

[0009] Preferably, the evaluation factor includes the number of initial follow-up visits and an attendance rate thereof, patient satisfaction, treatment time, the number of return visit plans completed and a completion rate thereof.

[0010] Specifically, the evaluation factors include, but are not limited to, a consultation record completion rate, a blue diagnosis addition rate, a blue diagnosis elimination rate, a performance completion rate, a flow completion rate, an electronic medical record completion rate, an electronic signature completion rate, and a medical image and data completion rate, where the blue diagnosis addition rate is that the doctor confirms the blue diagnosis status in the early diagnosis and treatment stage of the patient, and the blue diagnosis elimination rate is the probability that the doctor completes the early diagnosis and treatment of the patient.

[0011] Preferably, the evaluation standard specifically includes:

[0012] A1. collecting evaluation data in each evaluation factor;

[0013] A2. the evaluation factor being unqualified when the evaluation data is lower than a threshold data standard;

[0014] A3. the evaluation factor being qualified when the evaluation data is higher than the threshold data standard;

[0015] A4. on the basis of A2, feeding the evaluation factor back to a superior department when the evaluation data is lower than the threshold data standard, and summarizing and analyzing problem causes and making an improvement strategy by the superior department; and

[0016] A5. on the basis of A1, establishing a quality evaluation standard model for each medical post.

[0017] Preferably, the problem causes include an environmental problem and an employee problem.

[0018] Specifically, the environmental problem refers to an objective factor that the evaluation data is lower than the threshold data standard and the evaluation factor under a specified item is unqualified due to the influence of specific time nodes, specific age nodes and specific occupation nodes; and the employee problem refers to the evaluation data of employees in each medical post being lower than the threshold data standard and the evaluation factor under a specified item being unqualified due to subjective factors such as low work efficiency, unfamiliar knowledge and skills, late return visits to customers, and work mistakes.

[0019] Preferably, in the improvement strategy, a single time sequence event evaluation method is established.

[0020] Preferably, in the single time sequence event evaluation method, closed-loop control is established to evaluate the problem causes, and the evaluated problem causes are fed back to each medical post to improve an operation strategy.

[0021] Specifically, the real-time monitoring data of the employee status is subjected to extraction of the feature data and synchronous early warning analysis of the abnormal data, so as to establish an employee work analysis report; and the employee work problems obtained through analysis are transmitted to a related superior business system, where the feature data is corresponding working data under the evaluation factor.

[0022] Preferably, in the quality evaluation standard model, an analytic hierarchy process is combined with a random factor to evaluate the work quality of employees in each medical post; and evaluated results are fed back to each medical post to improve an operation strategy.

[0023] Preferably, the synchronous early warning of abnormal data includes obtaining operation data of each medical post in real time, and screening and processing abnormal data in the operation data so as not to affect the real-time monitoring accuracy of the employee status.

[0024] Preferably, the synchronous early warning of abnormal data further includes a monitoring function to avoid automatic modification of evaluation data.

[0025] Compared with the prior art, the present invention has the beneficial effects:

[0026] (1) In the present invention, an evaluation standard for each medical post is established; in the evaluation standard, a plurality of evaluation factors that affect the employee status in each medical post are established to reasonably monitor and evaluate the working status of employees in each medical post; timely work summary and operation adjustment of medical organizations are performed according to evaluated results, so as to improve operation systems of the medical organizations and improve the diagnosis and treatment experience of patients.

[0027] (2) On the basis of (1), in the present invention, the employee status data in each medical post is extracted to analyze the working status of the employee; the superior department summarizes and analyzes the problem causes and the improvement strategies according to the analysis results; and the main factors affecting the working status of the employee in are analyzed in detail by establishing the environmental problem and the employee problem.

[0028] (3) On the basis of (2), in order to further explore the influence of the working status of the employee on the operation management of the medical organizations, a single time sequence event evaluation method is further established in the present invention; and the changing trend of data under a designated node is fitted by establishing a closed-loop control method and according to the single time sequence event evaluation method, and then is fed back to each medical post to improve the operation strategy.

[0029] (4) On the basis of (3), the quality evaluation standard model for combining the analytic hierarchy process with the random factor is established in the present invention, and is used to perform quality analysis on the working status of the employee in each medical post; the traditional passive management mode of the employee is converted into the active management mode of the employee; the working quality of the employee is classified after the evaluation data of the employee is calculated; the targeted work of the employee in each medical post in the medical organizations will be further adjusted and improved according to the ranking of work quality, so that the working status of the employee in each medical post in the medical organizations is further viewed, summarized and analyzed on a regular basis, and the organizational management ability of functional departments can be further better improved.

[0030] (5) On the basis of (4), in the synchronous early warning of abnormal data according to the present invention, a synchronous early warning method of abnormal data based on an evaluation factor is further established on the basis of the traditional acquisition source data subjected to early warning of abnormal data. As an automatic monitoring method for the working status of the employee, the synchronous early warning method of abnormal data will automatically perform numerical early warning when the evaluation factor in the working status of the employee is monitored to be lower than the specified threshold range for a long time, so that the insufficient management and operation optimization ability of the medical organizations is further solved, and management defects such as poor treatment experience of patients due to the improper diagnosis and treatment services are avoided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] FIG. 1 shows a method based on real-time monitoring of an employee status and synchronous early warning of abnormal data; and

[0032] FIG. 2 shows a statistical display interface of employee working status data generated according to an evaluation factor.

DETAILED DESCRIPTION OF EMBODIMENTS

[0033] Embodiment 1:

[0034] A method based on real-time monitoring of an employee status and synchronous early warning of abnormal data according to the embodiment, as shown in FIG. 1, specifically

includes the real-time monitoring of an employee status, where the real-time monitoring of an employee status includes the specific processes: S1. establishing an evaluation standard for each medical post; S2. establishing an evaluation factor in the evaluation standard; and S3. performing real-time monitoring on the employee status in each medical post according to the evaluation standard, where the employee status includes a working status and a task completion level.

[0035] In one embodiment, the evaluation factors are divided according to the patient treatment process and specifically include:

[0036] evaluation factors in the appointment process: a list of patients under a “sun” tag for follow-up visit, the number of first visits and follow-up visits on the day, and a next appointment rate of transaction patients;

[0037] evaluation factors in attendance registration: an appointment attendance rate, an appointment default rate, and a patient data perfection rate;

[0038] evaluation factors in full-day examination: a full-day diagnosis completion rate, a per capita blue diagnosis detection rate, and a blue diagnosis detection rate;

[0039] evaluation factors in protocol communication: a consultation record perfection rate, a treatment protocol perfection rate, and a completion rate;

[0040] evaluation factors in treatment: a medical document signature rate, an electronic patient record perfection rate, an electronic patient record signature rate, and a patient record quality and compliance rate;

[0041] evaluation factors in charging: a revenue target completion rate, a flow target completion rate, a proportion of receivables, and an advance collection period;

[0042] evaluation factors in return visit: a return visit plan development rate, a return visit plan completion rate, patient satisfaction, and an adverse event; and

[0043] evaluation factors in quality management: an outpatient performance target completion rate, an urban performance target completion rate, and a refund amount.

[0044] A statistical display interface of employee working status data generated according to the evaluation factor is as shown in FIG. 2.

[0045] The evaluation standard specifically includes:

[0046] A1. collecting evaluation data in each evaluation factor;

[0047] A2. the evaluation factor being unqualified when the evaluation data is lower than a threshold data standard;

[0048] A3. the evaluation factor being qualified when the evaluation data is higher than the

threshold data standard;

[0049] A4. on the basis of A2, feeding the evaluation factor back to a superior department when the evaluation data is lower than the threshold data standard, and summarizing and analyzing problem causes and making an improvement strategy by the superior department; and

[0050] A5. on the basis of A1, establishing a quality evaluation standard model for each medical post.

[0051] The problem causes include an environmental problem and an employee problem.

[0052] In the improvement strategy, a single time sequence event evaluation method is established.

[0053] In the single time sequence event evaluation method, closed-loop control is established to evaluate the problem causes, and the evaluated problem causes are fed back to each medical post to improve an operation strategy.

[0054] In one embodiment, the single time sequence event evaluation method includes the specific evaluation processes:

[0055] B1. obtaining data values about the number of initial follow-up visits and an attendance rate thereof, the number of return visit plans completed and a completion rate thereof, a performance completion rate and a flow completion rate in the evaluation factors within a specified period; selecting the problem causes including specific time nodes, specific age nodes and specific occupation nodes in the environmental problems, where the employee problems include low work efficiency, unfamiliar knowledge and skills, and late return visits to customers.

[0056] B2. establishing a data value matrix of the evaluation data based on the problem cause as follows:

$$x = \begin{bmatrix} x_{11} & \cdots & x_{1i} \\ \vdots & \ddots & \vdots \\ x_{j1} & \cdots & x_{ij} \end{bmatrix}, \text{ a regression parameter } \omega, \text{ and a target data matrix } y = \begin{bmatrix} y_1 \\ \vdots \\ y_m \end{bmatrix};$$

[0057]

[0058] B3. solving a fitting model based on a numerical matrix and the target data matrix, where the fitting model is:

[0059] $J(\omega) = \|y - x\omega\|^2$;

[0060] B4. solving a minimum value of the fitting model $J(\omega) = \|y - x\omega\|^2$, where the minimum value is the ω parameter at $(y - x\omega) \sim 0$, so that the fitting model based on the data

value and the target data value is established; and

[0061] B5. according to the fitting model, calculating the data values about the number of initial follow-up visits and an attendance rate thereof, the number of return visit plans completed and a completion rate thereof, a performance completion rate and a flow completion rate under the problem causes in a next specified period, so as to make targeted adjustments to the operation strategies of each medical post.

[0062] In the quality evaluation standard model, an analytic hierarchy process is combined with a random factor to evaluate the work quality of employees in each medical post; and evaluated results are fed back to each medical post to improve an operation strategy.

[0063] In one embodiment, the analytic hierarchy process being combined with the random factor includes the specific calculation processes:

[0064] C1. selecting a doctor post in each medical post, where the doctor post includes doctor I, doctor II and doctor III; their corresponding evaluation factors include the number of initial follow-up visits and an attendance rate thereof, patient satisfaction, treatment time and an electronic signature completion rate;

[0065] C2. constructing a judgment matrix, where the judgment matrix is, based on the evaluation factors, used to judge the weights of comparison values among the doctor I, the doctor II and the doctor III, random factors are added to the weights of comparison values, the weights of comparison values are subject to the specifically collected evaluation data, the random factors are generated by the sudden change in the evaluation factor data caused by irresistible factors in the evaluation factors based on the number of initial follow-up visits and an attendance rate thereof, patient satisfaction, treatment time and an electronic signature completion rate, and the irresistible factors include environmental factors, social factors and hardware equipment factors;

[0066] C3. performing consistency check on the judgment matrix, and revising the judgment matrix if the consistency check result does not meet the requirements; and

[0067] C4. establishing a weight calculation method based on the arithmetic average for a single judgment matrix, and filling the calculated weight data into an employee work quality evaluation form, and sorting the employee work quality grades of the doctor I, the doctor II and the doctor III.

[0068] In one embodiment, the synchronous early warning of abnormal data according to the present invention specifically includes: synchronous early warning of abnormal values of source data collected in each medical post and synchronous early warning of abnormal values

of data recorded in the evaluation standard, where the synchronous early warning of abnormal values of source data is used for monitoring abnormal values of erroneous data, noise data, repeated data and the like in the collected data, thereby avoiding cascading errors when subsequent data is pushed to an upstream business system of a system; in addition, when the data is pushed to the upstream business system, the employees will be automatically informed of matters that need to be completed or concerned in a next stage.

CLAIMS

WHAT IS CLAIMED IS:

1. A method based on real-time monitoring of an employee status and synchronous early warning of abnormal data, specifically comprising the real-time monitoring of an employee status, wherein the real-time monitoring of an employee status comprises the specific processes: S1: establishing an evaluation standard for each medical post; S2: establishing an evaluation factor in the evaluation standard; and S3: performing real-time monitoring on the employee status in each medical post according to the evaluation standard, wherein the employee status comprises a working status and a task completion level;

wherein establishing an evaluation standard for each medical post comprises establishing a quality evaluation standard model for each medical post, in the quality evaluation standard model, an analytic hierarchy process is combined with a random factor to evaluate the work quality of employees in each medical post;

combining the analytic hierarchy process with the random factor comprises: constructing a judgment matrix to judge weights of comparison values among employees based on the evaluation factors; adding random factors to the weights of comparison values, wherein the evaluation factors comprise the number of initial follow-up visits and an attendance rate thereof, patient satisfaction, treatment time, the number of return visit plans completed and a completion rate thereof; the random factors are generated by sudden changes in evaluation factor data caused by irresistible factors comprising environmental factors, social factors and hardware equipment factors; performing a consistency check on the judgment matrix, and revising the judgment matrix if a consistency check result does not meet requirements; and establishing a weight calculation method based on an arithmetic average for the judgment matrix.

2. The method based on real-time monitoring of an employee status and synchronous early warning of abnormal data according to claim 1, wherein the medical post comprises a doctor, a doctor assistant, a consultant, a nurse, a receptionist, an operation management employee, and a functional department employee; and the operation management employee comprises a store manager, a dean, a regional operator, an urban general manager, and a group leader.

3. The method based on real-time monitoring of an employee status and synchronous early warning of abnormal data according to claim 1, wherein the evaluation standard specifically comprises:

A1: collecting evaluation data in each evaluation factor;

A2: the evaluation factor being unqualified when the evaluation data is lower than a

threshold data standard;

A3: the evaluation factor being qualified when the evaluation data is higher than the threshold data standard;

A4: on the basis of A2, feeding the evaluation factor back to a superior department when the evaluation data is lower than the threshold data standard, and summarizing and analyzing problem causes and making an improvement strategy by the superior department; and

A5: on the basis of A1, establishing a quality evaluation standard model for each medical post.

4. The method based on real-time monitoring of an employee status and synchronous early warning of abnormal data according to claim 3, wherein the problem causes comprise an environmental problem and an employee problem.

5. The method based on real-time monitoring of an employee status and synchronous early warning of abnormal data according to claim 3, wherein in the improvement strategy, a single time sequence event evaluation method is established.

6. The method based on real-time monitoring of an employee status and synchronous early warning of abnormal data according to claim 5, wherein in the single time sequence event evaluation method, closed-loop control is established to evaluate the problem causes, and the evaluated problem causes are fed back to each medical post to improve an operation strategy.

7. The method based on real-time monitoring of an employee status and synchronous early warning of abnormal data according to claim 3, wherein after combining the analytic hierarchy process with the random factor to evaluate the work quality of employees in each medical post, evaluated results are fed back to each medical post to improve an operation strategy.

8. The method based on real-time monitoring of an employee status and synchronous early warning of abnormal data according to claim 1, wherein the synchronous early warning of abnormal data comprises obtaining operation data of each medical post in real time, and screening and processing abnormal data in the operation data so as not to affect the real-time monitoring accuracy of the employee status.

9. The method based on real-time monitoring of an employee status and synchronous early warning of abnormal data according to claim 8, wherein the synchronous early warning of abnormal data further comprises a monitoring function to avoid automatic modification of evaluation data.