A Studyon theConstruction and Management of Cloud-based Patients Accessible Hospital Information Systems

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Abstract: Efficient use of patientsaccessible hospital information systems can protect and promote the orderly conduct of the medical work. This paper combines the application environment and the present situation of cloud-based hospital information systems to make relevant recommendations from three levels: technical, organizational and government, hoping to enhance the use efficiency of information technology and cloud commuting in hospitals for improving doctor-patient relationship and management level of hospital.

Keywords: Hospital information system;technical level;organization environment;doctor-patient relationship;hospital information management

I. INTRODUCTION

Patients Accessible Hospital information system (PAHIS) is a computer application system based on cloud computing and used for both doctors and patients to deal with information management and online operation in hospital management and medical activities. It can provide integrated management about human flow, goods flow, money flow of the hospital and its affiliated units. Meanwhile, it can use some methods of collection, storage, processing, extraction, transport, aggregation to make all of those data that covering every step of medical activities generate a variety of information.

Therefore, it can provide a comprehensive, automated management information system which provides a variety of services (Yin et al., 2006) [1]. That using information technology for information disclosure has a significant positive effect means, by using the hospital information system technology, can effectively the health information's transparency will be improved under the condition of our current public health care system. Meanwhile, Patients Accessible HIS has been developed in our country, but its corresponding information technology is not perfect enough, just as the ERP. Currently Patients Accessible HIS needs pay attention to how to increase the disclose information in a good quality and quantity and as much as possible to provide information to patients and physicians.

II. LITERATURE REVIEW

This paper has given relational enlightenment of management for two types of people works in the hospital. Research has provided questionnaire and interviewed medical staff who works in a large hospital which has implement Cloud-based Patients Accessible HIS, to discuss how Cloud-based HIS can affects work efficiency and satisfaction of medical staff, and finally that Cloud-based HIS has played a promote role in improving the quality of hospital service is proved described by Hu and Chen et al. (2006, 2008) [2-3]. So for the medical staff, the hospital should improve service efficiency by motivate staff to use information technology, provide a good service for their information processing and transmission, and then can provide basic situation of raise the scientific management level, realization of medical quality's supervision and control and scientific decision.

Patients satisfaction has been surveyed about how they feel before and after the Patients Accessible HIS has been implement, comparison found that Patients Accessible HIS can improve patient satisfaction about nursing service by use it in nursing work in hospital (Wang et al., 2011) [4]. So for managers, it requires the medical institutions which they're working for to transition its service mode from the "health-centered" to "patient-centered." Patient-centered, truly treats service objective as customer and provide them humanized medical care service.

Also, He et.al [5] and Low [6] conclude some problems of traditional HIS as follows.

1) Lacking of uniform standards for data-sharing
2) High cost for independent construction
3) Difficult to management, upgrades and maintenance

Base on the above views, this paper presents the relevant enlightenment from both technology and organization and management.

III. MANAGERIAL ENLIGHTENMENT OF TECHNICAL LEVEL

The main application of modern information technology in hospital is Patients Accessible HIS, and Cloud-based Patients Accessible HIS is a human-machine system composed by computer hardware and software, network equipment, information resources and other components. It can help health service work carries on smoothly by process various information flow. Therefore, in order to make health service work carries on better by efficiency use of Cloud-

based HIS, we need to take effective measures to improve the technical level of the Cloud-based HIS:

Firstly, the fusion of multiple networks is helpful to improve the network performance through constructing a high speed network, and improve the exchange ability, as well as realize the load balancing. In this way, the smooth flow of the network is ensured and the overall operation performance of the network is improved. Also, the I/O bottleneck problem due to virtualization deployment is eliminated. This is also very useful for us to calmly face the unexpected flow problem. With the widely coverage of wireless hot-spots and the rapid development of mobile technology, hospital can increase more access point of Cloud-based HIS to ensure patients, hospital and related personnel can get the information they want anytime, anywhere.

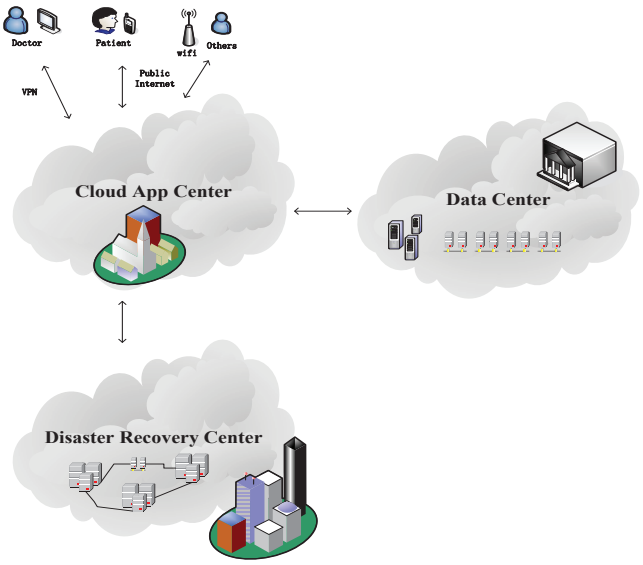

Figure. 1. A technical framework of patients accessible HIS based on cloud computing

Secondly, to set up a cloud-based patients accessible hospital information system, besides the upgrading and reconstructing for existing systems [7], the best approach is to build a cloud app center which can provide a common interface for users. This kind of app centers may be developed by hospitals or provided by cloud service providers. In this way, we not only can exploit the advantages of cloud computing cluster, but also make managerial applications more convenient.

Thirdly, this system improves the utilization of existing data. Because it can strip out the data from each application system and centralize them to the data center which will realize the centralized data storage protection, and improve the storage management level. Our proposal is a patients accessible system to store, manage and share the information between different hospitals system. In recent years, with the development of large data and cloud computing, the hospital can use existing data to establish corresponding medical cloud and case library. Cloud-based HIS can infer what disease the patient may suffered quickly and autonomous by data mining base on medical cloud and applied case base technology to case library, so as to improve the ability of patients minor illness self-care and can early diagnosis the serious illness, and enhancing the ability of hospitals intelligent decisions.

Last but not least, remote disaster backup can basically achieve the cloud computing disaster tolerant system based on real-time transfer zero downtime, minimizing any threat from catastrophic eventscaused by a system failure or others.

IV. Managerial Enlightenment of Organizational Level

Development of anything cannot do without support of people, the same, organizational system, patients and doctors and related systems user's attitude will affect the perception of using system in some extend. So in order to improve the use perceived effect of patients accessible Hospital Information Systems and related technologies, and further improve patient satisfaction, and in order to create a good organizational environment, and promote the use of the effect of cloud-based patients accessible Hospital Information Systems, we propose the following suggestions:

Firstly, social development leads to increased the service awareness of patients, the hospital should improve service processes and shorten the waiting for inspection time according to the perspective of convenient to patients but not just convenient to hospital management, to integrate the management thought of “patient-centered” into information technology, and make the patient satisfaction become a essential contents to assess the medical service. To increase the satisfaction of the patients, firstly hospital can shorten the time for non-medical time in hospital, improve the quality of service, choice medical prices can be accepted, increase the right to know of medical, obtain health education, increase channels to reflect issues by information mediums, secondly it can service more patients about education, prevention, physical examination, prognosis, rehabilitation guidance and etc. outside the hospital.

Secondly, a hospital should enhance the information’s quality of IT, and to further improve the function of patients accessibleHIS, expanding the depth and breadth of IT use and pay attention to the promotion of health information to improve all aspects of the quality of medical services, thus truly to improve patient satisfaction, purpose of improving the doctor-patient relationship.

For medical care and other services departments, to establish a full-house quality control, management and operation and maintenance platform and open this platform for the entire department, so the department can obtain information from the perspective of quality control, management and operations, and it will benefit the department's management and internal performance, promote the internal management. Establish professional statistical agencies, managed by staff who was proficient in medical or health system, centralized processing all data in the hospital such as summary, reporting, analysis, simulation, defining and etc. Open the appropriate permissions, to provide various departments (including business sector and functions) of the sector performance prediction and simulation techniques to improve the performance management capabilities of various departments. Open the appropriate permissions, to provide various departments (including business departments and functional departments) of the department performance prediction and simulation techniques to improve the performance management capabilities of various departments.

For service and administration departments should also improve the information system: including General, materials, logistics and other business departments should achieve information management (e.g. HERP), in order to achieve information management tool. By electronic means to achieve process control, such as a one-stop service via a network system that can solve back and forth to sign, seal and other issues, and that can be achieved through a variety of office systems. Depending on the facts, feel free to adjust the process of information. To prevent the situation of "mess together", it should have a dedicated system of logistics service system for recording, management and control. Such as the information center has a management system specifically for field service and logistics system has a one-stop service management system etc., can control the time, objects, results and satisfaction of service, with appropriate performance measures to punish bad excellent prize can greatly improve service quality and satisfaction. Improve monitoring system, through the information system monitoring software to achieve the monitoring of the water, electricity, coal, gas, etc. of general affairs that can prevent problems and failures and eliminate accidents in advance and avoid greater losses. Through the analysis of the data information, manually or automatically evaluate the logistical services, to rewards and punishments by administrative means. Improve quality of work, increase patient satisfaction.

Third, the hospital should pay attention to improve the relevance medical staff's acceptance of hospital information technology. Not only to be not contradict and not offensive to Cloud-based HIS, but also to be embraced and actively to use Cloud-based HIS. In addition to the establish a convenient quality control and management platform, but also need to fully complete the hospital information office platform, to achieve the information real-time access to information sources and the electronic technology about check and approve document by the platform, automation, mobility, etc. of office process. To establish administrative platform based on the personnel, take the personnel as the core to establish an administrative platform including the party, the league, government, science, education and research, to improve administrative decision-making and management efficiency, reduce administrative costs. Through the hospital's common card project, besides the advantages of user-friendly, improve efficiency and achieve the information management about business, but also achieved the integration of multiple division services, and provides information support to decision-making. So that's the only way to create a good environment, and IT was able to flourish rapidly.

V. Managerial Enlightenment of Governmental Level

Work performance, management performance, patient satisfaction and physician-patient relationship is the key variable in this study. To provide quality services, improve performance, and meet the needs of patients and to solve the problem of difficult medical services and expensive medical cost, not only needs hospital's efforts, the government should also develop appropriate policies. Hospitals and government through the introduction and training of talents and the implementation of systems and technology, on the one hand to improve the use of the effect of Cloud-based HIS, on the other hand increase the transparency of information, convenient people to seek medical treatment through go public the information, such as medical expenses, therefore propose the following suggestions:

Firstly, government should increase investment in the health-care industry. Some public hospitals in town do not have the conditions to build their own hospital information system, which hindering the development of medical information. It is necessary to popularize the Cloud-based HIS through the government's funding and technical support, which will improve the service level of the hospital in the end.

Secondly, increasing publicity and improve the utilization of information technology. Currently, the rate of reservation clinic registration is not high due to many people do not understand the ways and means to make an appointment and the information network can not fully play its role. It should increasing publicity through public media, hospitals publicity, etc., to inform people the ways and means of seek medical diagnosis and treatment convenient by information technology.

Thirdly, improve medical wisdom, played the role of boosting the reform of public hospitals. Medical wisdom means to use the new generation of internet of things and cloud computing and other information technologies through the way of perception, instrumented, intelligent, connect health-care construction related physical, information, social and commercial infrastructure, and intelligently respond to the needs of health care. Medical wisdom's important support for public hospital reform embodied in the remote consultation, counterpart support and clinical pathways pilot work. Remote consultation is an important part of medical wisdom, through the construction of remote consultation system, it can achieve the renowned experts from large hospitals and county hospitals face common to make the diagnosis and treatment of difficult diseases, and to facilitate patient find the nearest medical treatment. Counterpart support is an important measure to enhance the ability of medical services of the county hospital, through the wisdom of the medical, support real-time conduct counterpart monitoring, analysis the results achieved from counterpart support and to discover the problem immediately. Improve the medical staff's enthusiasm of implement clinical pathways pilot work, and real-time monitoring the implementation of clinical pathway, standardizing diagnosis and treatment behavior and reduce the financial burden on patients.

Fourthly, government should pay attention to the standardization work, and vigorously promote the construction of regional health networks. The urgent work need to be done immediately it not only to achieve regional economic integration, but also for all parties to strengthen cooperation between regions. In the face of incurable diseases, developed medical network can communicate more easily between regions, thereby enhancing clinical efficacy. Now, the implement of electronic medical records can spare the troubles of taking medical records and you can check the records in any hospital and it will greatly improve work efficiency. Medical wisdom is an emerging multidisciplinary industry, with the integration of life science, information technology, materials technology and other areas of larger span, involving complex technical standards, and lack of standardized criteria system. So the related standardization work should be carried out as soon as possible, accelerate the development of appropriate standards, and uniform the standards as much as possible. Establish appropriate pilot demonstration projects and applications in relatively developed regions, to avoid uneven application of the system software, has laid a good foundation for the industry standards and future healthy development, and to provide a good experience.

Fifthly, government needs effective integration of resources, strengthen supervision. Our country is geographically vast; the technology has large differences, variety of products and low market concentration. Key areas should be established to focus on supporting the development, formed in a certain area of the industry cluster groups, industry organizations and institutions through the bypass, carry out including product technical process, the market application of information, personnel training and other aspects of the exchanges and cooperation, to build and constantly improve hospital information industrial chain. Improve the relevant norms of medical information systems and play a regulatory role in health care information technology market, give full play to the tripartite advantages of the government, hospitals, software companies, security hospital information steady progress.

VI. Conclusion

This paper put forward a series of recommendations to improve Patients Accessible HIS usage rate from thinking about two groups of people and three aspects, provides a new perspective about how to make better use of the advantages of the Patients Accessible HIS to assist medical work. In the process of medical informatization, both medical staff and administrative staff are information technology's participant, and it's very important for improve the using effect of Cloud-based HIS to make full use of the two roles.

Firstly, it is necessary to ensure the quality of Patients Accessible HIS which is precondition for stable use of information system [8]. To strengthen the integrity and ensure the accuracy of information in the systems in order to fully meet the needs of medical staff, administrative staff and patients, further improve the function of the Patients Accessible HIS, and to improve the quality of the system[9]. Secondly, to training medical staff and managers IT knowledge appropriately while training medical staff professional technology, to improve the system user's computer self-efficacy, in order to avoid the negative impact of staff misuse and other issues generated by the system. Finally, in order to more fully use of Patients Accessible HIS, create a good atmosphere of the informatization is same important, make it from the task to the habit. In the early stage of implementation of the system can take system security, performance-related and other measures to cultivate awareness of the medical staff and administrative staff of use of information systems, step by step to reach a steady state of use.

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