

Review paper

The role of information in management of modern hospital: Experience of Medical reform in Shenmu, China

Abstract

Objective: The objective of this review is to explore the role of information technology in the construction and management of modern hospitals, and how to use information technology to promote the development and management of hospitals.

Methods: The relevant medical information and data at home and abroad were collected from the Internet, and the actual situation of the hospital, the diagnosis, treatment and management of outpatients were compared and analyzed to compare the role of medical information in hospital development.

Results. After the effective implementation of medical information in the hospital, the technical level and efficiency of diagnosis, treatment and management technology in the hospital were obviously improved, so that patients could see a doctor more conveniently, and doctors and nurses could have a higher level of diagnosis and treatment.

Conclusions: The use of medical information can significantly improve the overall management level of the hospital, make it more convenient for patients to see a doctor, and improve the construction and management of modern hospitals, which is of great significance to the improvement of the level of medical technology.

Keywords: pathology, Shenmu hospital, management of hospitals, information technology

Introduction

Shenmu is a resource-rich city located in the Loess Plateau of northern Shaanxi Province of China. Among the top 100 counties in China, Shenmu is also the first in western China, with a total GDP of nearly 130 billion yuan [1,2,10,11]. Located in northern China, it is the largest northern part of Shaanxi Province and close to Inner Mongolia. It is located in the middle reaches of the Yellow River and along the Great Wall. With a total area of 7,635 square kilometers, the city has jurisdiction over 14 towns and 5 townships and a population of 650,000. Shenmu has a long history. As early as 4,300 years ago, human beings lived and multiplied on this rich [3,4]. Shenmu was also the first place in China to introduce free medical care for all and universal 12-year compulsory education. Shenmu Hospital (Shenmu Hospital affiliated to Northwest University) is one of the first 50 pilot hospitals for the reform of county-level public hospitals by the former Ministry of Health,

and is also the first county-level "third-class B" general hospital in the province. At present, the hospital has 60 departments, 1000 beds and 1,418 medical workers /employees. In 2019, the hospital treated 920,000 outpatient and emergency patients, 34,000 inpatients and more than 10,000 inpatient surgeries. "Internet +" information makes Shenmu Hospital fly[4,5,6]. In order to let patients feel the improvement of medical services, Shenmu Hospital has taken advantage of the "Internet +" to continuously improve the service efficiency with the support of modern scientific and technological means. By providing remote consultation, online appointment registration, information inquiry and push services, mobile APP medical service platform and two-way referral information platform are built to break the regional limitations of medical services and make quality services [4,5,6,7].

Through the comprehensive implementation of appointment treatment in the hospital, patients can enjoy appointment treatment service with the help of wechat, Alipay, medical "one-card" and ID card. There is a self-service inquiry service machine in the hall of the outpatient department and inpatient department of the hospital. Patients can immediately inquire the charge items, the amount charged and the details of their expenses in the outpatient department or previous inpatient visits. Shenmu Hospital health service wechat platform, Alipay query the previous visit records, effectively maintain the patient's right to know, so that patients understand and rest assured to see a doctor. The imaging department and laboratory waiting room of the hospital shall set up self-printers for inspection and inspection reports and self-printers for X-ray and CT films. Patients can print the report and film by scanning the barcode within the agreed time, which effectively protects the privacy of patients, shortens the waiting time of patients, reduces the workload of medical staff, and greatly improves the work efficiency. Doctors can check the results of laboratory MRI,CT and other tests on the mobile phone anytime and anywhere to understand the patient's condition[6.7.8].

Shenmu Hospital has also established a remote consultation platform, which can carry out remote pathological consultation, clinical consultation, imaging consultation, ECG consultation, remote ward round, remote skin clinic, remote teaching and other services. On the other hand, consultation and referral with China-Japan Friendship Hospital, Beijing Tongren Hospital and Shanghai Children's Hospital can be realized through remote consultation system, medical alliance consultation system and ophthalmology remote consultation system. By the remote ECG system, the ECG consultation of township health centers can be realized, and the ECG diagnosis level of township health centers can be effectively improved[12,13,15].

Methods: The relevant medical information and data at home and abroad were collected from the Internet, and the actual situation of the hospital, the diagnosis, treatment and management of outpatients and inpatients were compared and analyzed to compare the role of medical information in hospital development.

First Professional medical personnel collect domestic and foreign data on information in the websites and other information dept of the government of the city , and Analysis and discussion with relevant medical staff and statisticians then statistics related personnel analyze the rules of medical information and data .

Results. After the effective implementation of medical information in the hospital, the technical level and efficiency of diagnosis, treatment and management technology in the hospital were obviously improved, so that patients could see a doctor more conveniently, and doctors and nurses could have a higher level of diagnosis and treatment.

After the application and management of medical information and data have made the clinical technical ability and management level of hospital play a very important role, which has changed a lot, making it easier for patients to get good and effective treatment in hospitals, and improving the service level.

Below the four statistical tables can show the specific changes and their results

The fund investment, the method of payment, the number and high-level of operation and the mortality have changed greatly.

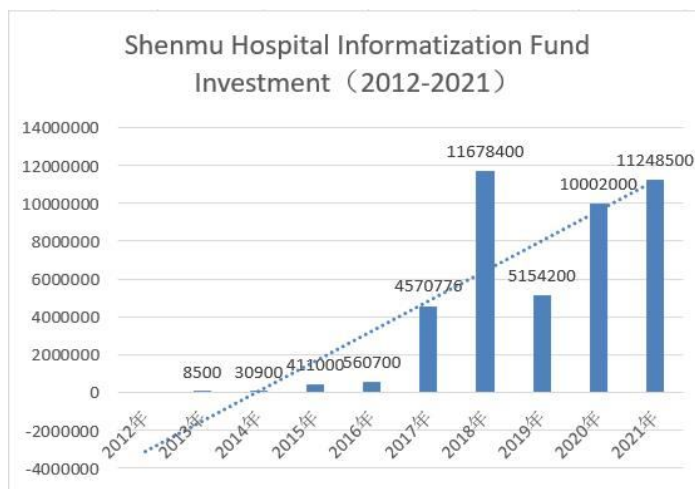


Fig 1: shenmu hospital information fund investment(2021-2022)

Improvement of medical services

Continuous improvement of medical services to build a "highway" of health care. At the 2018 National Work Conference on Improving Medical Services held in Beijing, Shenmu city hospital won the 2015-2017 national quality medical services "take advantage of information across the country to improve the medical service demonstration hospital" "strengthening humanistic care hospital" nationwide to improve the medical service model and neonatal dept won the "reasonable allocate resources across the country to improve the medical service demonstration unit", "construction of a harmonious relationship

between people nationwide to improve the medical service model" four great honor. In recent years, in accordance with the requirements of the National Health and Family Planning Commission, Shenmu Municipal Party Committee and government, Shenmu Hospital has taken the improvement of medical services as the focus of the hospital's work, mobilized the hospital's medical staff to work hard and adhere to the "patient-centered" hospital purpose. Through promoting information construction, promoting appointment diagnosis and treatment, strengthening outpatient and emergency services, optimizing service process, standardizing diagnosis and treatment behavior, deepening the connotation of high-quality nursing, and paying attention to humanistic care, efforts have been made to improve medical services and medical quality, and remarkable achievements have been made[7.9.10,15].



Fig 2: Opreation volume in shenmu hospital (2021-2022)

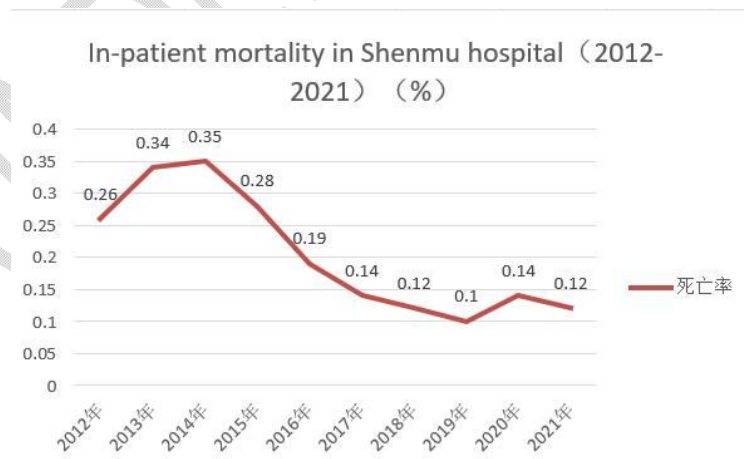


Fig3: In-patient mortality in shenmu hospital (2012-2021)

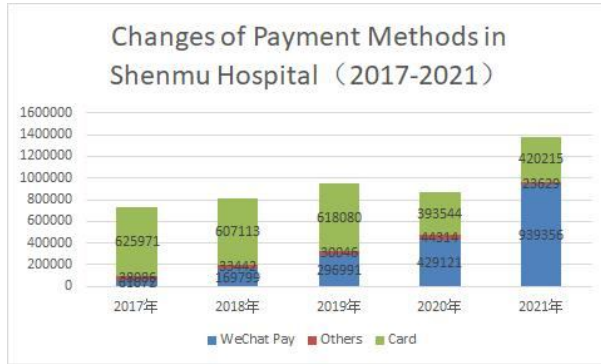


Fig 4: changes of payment methods in shenme hospital (2017-2021)

Continuous improvement of medical services to build a "highway" of health care excellence is the driving force for the sustainable development of the department. The emergency department has become an important "window" to show the discipline level of the hospital due to its characteristics of running against time and the need to cooperate with multiple disciplines. The emergency department of the hospital is open 24 hours a day, opening a barrier-free channel to save the lives of critically ill patients. Through the opening of "Chest Pain Center" and "Shaanxi Provincial Center for the Treatment and Referral of critically Ill Pregnant Women" and other first aid channels, the hospital has laid a "highway" for the life treatment of all kinds of critical patients. Strengthen system construction, reasonable allocation of resources, smooth emergency "green channel". The hospital implements the classification and treatment of emergency patients according to the severity of their condition. All kinds of critical patients, such as acute cardiovascular and cerebrovascular diseases, severe trauma, critically ill pregnant women, critically ill elderly patients, and critically ill pediatric patients, are treated first and paid later. Strengthen pre-hospital emergency services. After receiving a call for help, the ambulance will arrive at the scene for treatment and transport within 10 to 15 minutes without special circumstances. The application of helicopters to transport critically ill patients, 5 hours of the helicopter only 26 minutes to arrive, emergency rescue, the whole process is completely free, injured villagers did not spend any extra money[6.8.10].

DISCUSSION

Medical reformation

Shenmu Hospital actively responds to the call of national medical reform and takes measures to radiate high-quality medical resources to a wider range. The establishment of medical community, carry out pairs of support. Shenmu Hospital takes the initiative to undertake social welfare responsibilities and is the first to launch a medical community in the city. At present, the hospital has partnered with Daliuta and other 8 central health centers to carry out the county-town integration construction, and established medical community with 5 township health centers to provide staff training, equipment support and expert medical support. At the same time, the remote ECG consultation system has been established with 21 health centers. At present, the township health centers assisted by the aid can carry out routine B ultrasound, three routine examination and other items, and the remote ECG consultation has been carried out for more than 35,000 times. Community of Medical Services (Community of Medical Services). It is to deepen cooperation with provincial and municipal tertiary public hospitals, strengthen personnel training and specialty construction, and improve regional medical and health service capacity. To establish a unified management system for medical communities, guide the subsidence of medical resources, promote more rational and efficient allocation of regional medical resources, and improve the overall capacity of primary medical services[8.10.11.14].

We will optimize regional medical resources, establish cooperative units of district hospitals and medical communities of district hospitals and town and street health centers (community health service centers), and improve the service capacity of district hospitals and primary medical and health institutions. With Shenmu Hospital as the core, relying on the advantages of technology, personnel and equipment, we will strive to build a hierarchical diagnosis and treatment model of primary diagnosis, two-way referral, separate treatment of urgent and slow, and linkage between upper and lower levels. In this way, experts in 21 towns and townships in the city will run away and the people will be relieved of their worries, so that the majority of patients will not leave the city when they are seriously ill, and the burden of transportation, accommodation, and accompanying relatives will be reduced when people go to out-of-town **Class A hospitals** to see a

doctor. During the epidemic of COVID-19, all the staff of Shenmu City Hospital, under the leadership of the relevant government departments, went all out to actively hard work, and achieved good results.

Conclusion

Through hard efforts, Shenmu Hospital has become the "benchmark" of medical institutions and the "leader" of regional medical and health work in the Shanxi, Shaanxi and Mongolia bordering areas. In the future, the hospital will aim to establish a modern hospital management system and a high-quality and efficient medical and health service system, further apply new concepts and technologies, and innovate the medical service model. Medical Information plays an important role in medical management and the development of modern hospitals. We must make use of the application and management of effective medical information to better serve the people's health and the development of modern hospitals.

References

- 1) <http://www.sxsm.gov.cn/>
- 2) <http://app.ylrb.com/?app=article&controller=article&action=show&contentid=568331>
- 3) Gao Kun, Liu Hong, Liu Yonglin, et al, Prevention and Control Measures and Effects of COVID-19 in Shenmu City Hospital, China, International Journal of TROPICAL DISEASE & Health 41(8): 18-24, 2020
- 4) <https://xw.qq.com/amhtml/20220806A00PXR00>
- 5) <https://med.nwu.edu.cn/info/1040/1596.htm>
- 6) Abu Taiub Mohammed, Yonglin Liu, Fuyong Jiao, Case Report on a Misleading Case of Appendiceal Perforation Presented with Severe Generalized Convulsion, Transl Pediatr, 9(1): 81–85, 2020
- 7) Juan Liu¹, Yonglin Liu, Juana Liu, et al. The Change of Children and Adolescents Growth and Development in 20 Years in Shenmu City, China, International Journal of Clinical and Medical Cases, 3:(4) 12-4, 2020
- 8) Juan Liu¹, Yonglin Liu, et al. Analysis of Correlation Between Respiratory Tract Disease and Vitamin D Changes of Growth and Development of Children and Adolescents in Shenmu City in the Past 20 Years. 3:(5) 16-19, 2020
- 9) Yanmei Qiao, Fenglan Wang, Zhongming Yun, et al Analysis of 157 Cases of Congenital Heart Disease in Shenmu, Clinical Research in Pediatrics • 3 (1) 37-28, 2020
- 10) Schmitz, Rüdiger; Werner, Rene; Repici, Alessandro; et al Artificial intelligence in GI endoscopy: stumbling blocks, gold standards and the role of endoscopy societies, Gut, 71 (3) 451-454, 2022.10.
- 11) Libby M Ward, Chelsea A Sykora, Yash Prakash, et al. Parental Views on the Role of Social Media in Pediatric Otolaryngology, The Annals of otology, rhinology, and laryngology, 131(6) 640-646, 2022
- 12) Wang George Sama, Reynolds Kate M., Banner William et al, Adverse Events Related to Accidental Unintentional Ingestions from Cough and Cold Medications in Children[J]. Pediatric Emergency Care., 38(1): 2022. E100-E104.
- 13) Marcela Daniela Ionescu, Mihaela Balgradean, Cristina Filip et al The role of lung ultrasonography in predicting the clinical outcome of complicated community-acquired pneumonia in hospitalized children[J]. Medical ultrasonography, 24(1): 19-26. 2022

14) Colin J McMahon, Justin T Tretter, Andrew N Redington et al, Medical education and training within congenital cardiology: current global status and future directions in a post COVID-19 world[J]. *Cardiology in the young*. 32 (2): 185-197. 2022

15) Diskin C, Byrne D, Normand C et al, The early experience of doctors training in pediatrics: patient safety culture and the role and influence of the registrar. *Irish journal of medical science*, 191 (1) 271-278, 2022

1) <http://www.sxsm.gov.cn/>

2) <http://app.ylrb.com/?app=article&controller=article&action=show&contentid=568331>

3) Gao Kun, Liu Hong , Liu Yonglin, et al , Prevention and Control Measures and Effects of COVID-19 in Shenmu City Hospital, China, *International Journal of TROPICAL DISEASE & Health* 41(8): 18-24, 2020

4) <https://xw.qq.com/amhtml/20220806A00PXR00>

5) <https://med.nwu.edu.cn/info/1040/1596.htm>

6) Abu Taiub Mohammed , Yonglin Liu, Fuyong Jiao, Case Report on a Misleading Case of Appendiceal Perforation Presented with Severe Generalized Convulsion, *Transl Pediatr*, 9(1): 81–85 ,2020

7) Juan Liu¹, Yonglin Liu, Juaa liu , et al . The Change of Children and Adolescents Growth and Development in 20 Years in Shenmu City, China, *International Journal of Clinical and Medical Cases*, 3:(4) 12-4, 2020

8)) Juan Liu¹, Yonglin Liu , et al . Analysis of Correlation Between Respiratory Tract Disease and Vitamin D Changes of Growth and Development of Children and Adolescents in Shenmu City in the Past 20 Years. 3:(5) 16-19, 2020

9) Yanmei Qiao , Fenglan Wang , Zhongming Yun , et al Analysis of 157 Cases of Congenital Heart Disease in shenmu , *Clinical Research in Pediatrics* • 3 (1) 37-28, 2020

10) , Schmitz, Rüdiger ; Werner, Rene ; Repici, Alessandro ; et al

Artificial intelligence in GI endoscopy: stumbling blocks, gold standards and the role of endoscopy societies, *Gut*, 71 (3) 451-454, 2022.10.

11) , Libby M Ward , Chelsea A Sykora , Yash Prakash , et al . Parental Views on the Role of Social Media in Pediatric Otolaryngology , *The Annals of otology, rhinology, and laryngology* , 131(6) 640-646, 2022

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12) , Wang George Sama, Reynolds Kate M., Banner William et al , Adverse Events Related to Accidental Unintentional Ingestions from Cough and Cold Medications in Children[J]. *Pediatric Emergency Care*., 38(1): 2022. E100-E104.

13) , Marcela Daniela Ionescu,Mihaela Balgradean,Cristina Filip et al The role of lung ultrasonography in predicting the clinical outcome of complicated community-acquired pneumonia in hospitalized children[J].Medical ultrasonography ,24(1): 19-26.2022

14) , Colin J McMahon ,Justin T Tretter,Andrew N Redington et al , Medical education and training within congenital cardiology: current global status and future directions in a post COVID-19 world[J].Cardiology in the young.32 (2): 185-197. 2022

- 15) , Diskin C,Byrne D,Normand C et al ,The early experience of doctors training in pediatrics: patient safety culture and the role and influence of the registrar. Irish journal of medical science, 191 (1) 271-278, 2022
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