

Hospital Information Society to Enhance the Patient Care Applied on Ahmed Maher Teaching Hospital

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ABSTRACT

Background: Information provides knowledge, awareness, and power. Virtual organizations are developing and growing in every facet of our communities. Geographic boundaries are no longer a barrier for organizations. As virtual societies develop, it will be feasible to find answers to any questions at anytime, anywhere. **Objective:** The aim of the current study was to evaluate the impact of transition from paper forms to electronic forms and activation of Hospital Information System on increasing the speed and accuracy of workflow.

Patients and methods: A cross sectional study included 50 staff members by evaluating the quality of service and staff learning obstacles before implementing Hospital Information System programs package during July and August 2022 and after implementing Hospital Information System programs package during February and March 2023 using formulated Key Performance Indicator to measure Internal Processes KPIs and Capacity KPIs and Customer Satisfaction KPIs. **Results:** A hospital information system seeks to improve workflow, clinical judgment, and data security as hospitals look to automate and optimize their activities. To increase overall profitability, a compliant cloud-based hospital management software system may contain a health billing platform with strong encryption, denial management capabilities, and multiple user components. Every hospital has different demands, therefore it's important to carefully analyze each one to lay a solid foundation for future success. **Conclusion:** Those results show that Hospital Management Information System represents a safe and effective tool to achieve significant improvement in work cycle time and decrease workload. Hospital Management Information System appears to have a real and significant impact on both workers and patient satisfaction in the form of decrease staff absentee rate and increase patients' applause rate.

Keywords: Hospital Management Information System, Information Society, Society 5, Ahmed Maher Teaching Hospital, Egypt.

INTRODUCTION

Virtual organizations are expanding in all different aspects of our societies. Without geographic borders, enabling companies operate globally on limited physical resources. In other words, we are indeed living in information age ⁽¹⁾.

Public authorities begin to automat clerical and administrative tasks, through the use of decision-support systems and through the development of electronic payment systems ⁽²⁾.

Information is now seen as a valuable resource within organizations, If properly managed and used can stimulate innovation, speed product development, raise levels of productivity, ensure consistent standards of quality and, through all these means, raise the relative level of competitiveness ⁽³⁾. The aim of the current study

was to evaluate the impact of transition from paper forms to electronic forms and activation of Hospital Information System on increasing the speed and accuracy of workflow.

PATIENTS AND METHODS

Patients' Selection:

A cross sectional study included 50 staff members and 50 patients by evaluating the quality of service and staff learning obstacles before implementing Hospital Information System programs package during July and August 2022 and after implementing Hospital Information System programs package during February and March 2023 using formulated Key Performance Indicator to measure Internal Processes KPIs and Capacity KPIs and Customer Satisfaction KPIs.

Table (1): KPIs used in the current study.

Customer Satisfaction	Internal Processes	Capacity
Customer Satisfaction Index by answering a survey to the customers after they have completed on-patient admission process.	Cycle Time by measuring the total amount of time needed to complete a process from start to finish.	Employee Satisfaction Index by measuring net promoter scores (which ask employees how likely they'd be to refer others to your company), employee survey and absentee rates.
Number of Support Tickets & Complaints by assessing the number of new issues/support tickets/complaints being generated weekly.	Cycles measured: <ul style="list-style-type: none"> • Patient admission from Emergency Department. • Patient admission from Out-patient Clinics. • Laboratory order to result arrival time. 	

Methods:

This cross-sectional study evaluated the quality of service and staff learning obstacles before and after implementing Hospital Information System programs package. The quality of service and staff learning obstacles was assessed by a Key Performance Indicator to assess customers satisfaction, staff impression and learning obstacles using:

- Self-reported questions answered by the customers and the employees.
- Review of accomplished work amount before and after implementing the system.

Inclusion Criteria:

- All full-time working staff that have direct contact with Hospital Information System programs and has been working in the hospital for at least 1 year before implementing Hospital Information System programs package and still.
- All full-time working staff that has been working in the hospital for at least 1 year before implementing Hospital Information System programs package and still.

Exclusion Criteria:

- Employees unwilling to participate.
- All part time working staff.
- Incomplete questionnaire answers may result in questionnaire exclusion.
- All full-time working staff that has been working in the hospital for less than 1 year before implementing the Hospital Information System programs package.

Ethical consent:

The study was authorized by General organization of Teaching Hospitals and Institutes ethical institutional review board. All study participants provided written informed permission after being informed of our research’s goals. The declaration of Helsinki for human beings, which is the international medical association’s code for ethics, was followed during the conduct of this study.

Statistical analysis

Recorded data were analyzed using Statistical Package for Social Sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Qualitative data were defined as numbers and percentages. Chi-Square test and Fisher’s exact test were used for comparison between categorical variables as appropriate. Quantitative data were tested for normality by Kolmogorov-Smirnov test. Normal distribution of variables was described as mean and standard deviation (SD), and independent sample t-test was used for comparison between groups. P value ≤0.05 was considered to be statistically significant.

RESULTS

Table (2): Distribution of studied patients regarding their demographics *before* Hospital Information Management System.

Demo-graphic	Distribution	No. of patients	Percent-age
Gender	Male	18	36%
	Female	32	64%
Age	20 th	15	30 %
	30 th	17	34%
	40 th	10	20%
	50 th	8	16%
Admission department	Orthopedic	13	26%
	Surgery	9	18%
	Internal	18	36%
	Medicine	10	20%

Table (3): Distribution of studied patients regarding their demographics *after* Hospital Information Management System.

Demo-graphic	Distribution	No. of patients	Per-cent-age
Gender	Male	14	28%
	Female	36	72%
Age	20 th	13	26 %
	30 th	16	32%
	40 th	14	28%
	50 th	7	14%
Admission department	Orthopedic	11	22%
	Surgery	13	26%
	Internal	14	28%
	Medicine	12	12%
	Other		

Table (4): Distribution of studied patients regarding Customer Satisfaction Index before and after Hospital Information Management System

Variable	Before		After		P value
	No.	%	No.	%	
Excellent	30	60%	39	78%	0.182 ^{NS}
Good	15	30%	6	12%	
Medium	2	4%	3	6%	
Poor	2	4%	2	4%	
Very Bad	1	2%	0	0%	

Table (5): Number of Support Tickets and Complaints Distribution before and after Hospital Information Management System.

Variable	Before No.	After No.	P value
Issues	43 (87%)	20 (40%)	<0.001 ^{HS}
Support tickets	27 (54%)	5 (10%)	<0.001 ^{HS}
Complaints	14 (28%)	1 (2%)	<0.0002 ^{HS}

Table (6): Distribution of studied staff regarding their demographics.

Demographic	Distribution	No. of patients	Percentage
Gender	Male	9	18%
	Female	41	82%
Age	20 th	30	60%
	30 th	12	24%
	40 th	6	12%
	50 th	2	4%

Table (7): Distribution of studied staff Employee Satisfaction Index *before* and *after* Hospital Information Management System.

Variable	Before		After		P value
	No.	%	No.	%	
I love my job	8	16%	30	60%	<0.001 ^{HS}
It pays my bills	9	18%	10	20%	
Cannot wait to Friday	17	34%	6	12%	
Work sucks	10	20%	4	8%	
Please kill me	4	8%	0	0%	
I am loading my weapons	2	4%	0	0%	

Table (8): Distribution of studied staff absentee rates *before* and *after* Hospital Information Management System.

Variable	Before NO	After NO	P value
Sick leave	70	20	<0.001 ^{HS}
Casual vacation	30	12	0.004 ^S
Usual vacation	20	18	0.740 ^{NS}
Total	120	40	---

Table (9): Distribution of Cycle Time *before* and *after* Hospital Information Management System.

Variable	Before Minutes	After Minutes	P value
ED admission	20 ± 5.4	12 ± 3.03	<0.001 ^{HS}
OPCs admission	40 ± 10.9	15 ± 3.03	<0.001 ^{HS}
Lab. Time	60 ± 7.2	30 ± 6.1	<0.001 ^{HS}

DISCUSSION

Virtual organizations are developing and growing in every facet of our communities. Geographic boundaries are no longer a barrier for organizations. Businesses can now operate globally while using less physical resources thanks to e-commerce and e-business. To grow their firm, they are no longer required to add more physical resources. In other words, if the data we require does exist, it is accessible at any time and from any location. Yes, we are in the information age, when every human society is transforming into a single, global information society. A society built on knowledge and information is known as an information society⁽¹⁾.

National and local public bodies are starting to realize how drastically information can alter how they operate. At a basic level, it gives them the opportunity to increase their overall effectiveness in methods that are comparable to those employed in commercial organizations: by automating clerical and administrative work, using decision-support systems, and developing electronic payment systems. Additionally, some are starting to provide electronic transactions services so that individuals can electronically access departments, fill out forms, and submit claims⁽²⁾.

The impact of information on health is anticipated to be substantial, ushering in advancements in health information dissemination that will significantly elevate public health standards. This will be achieved through three distinct methods. Firstly, healthcare professionals such as doctors and nurses will witness an enhancement in their knowledge base. They will become more acquainted with their patients and gain effortless access to a wealth of information concerning various illnesses and available treatment options. Furthermore, they will be able to consult with medical experts in different locations, potentially spanning across cities or even countries, to address unique cases.

In contemporary organizational contexts, information is regarded as a valuable asset. Effective management and utilization of this resource can fuel innovation, expedite product development, bolster productivity levels, ensure consistent quality standards, and, through these avenues, enhance overall competitiveness⁽³⁾.

The Society 5.0 goal is realizing a society where people live life to the fullest is the aim. That is the objective of economic progress and technical advancement, not the wealth of a small group of people. Numerous initiatives have started in Japanese academic and industrial circles in line with the government's perspective. Although Society 5.0 was developed in Japan, its aim is not limited to the development of a single nation. Without a doubt, the frameworks and technology created here will help to find solutions to social problems all around the world⁽⁴⁾.

A hospital's clinical, financial, laboratory, inpatient, outpatient, pharmaceutical, and other operations can all be managed using a hospital management information system. The Hospital Management Information System allows healthcare professionals to concentrate more on giving patients high-quality care.

An information system for hospitals aids medical professionals in optimizing their operations, which includes scheduling appointments, managing patient health records (EMR/EHR), billing, diagnostics, and much more.

The main functions of HIMS are to keep track of health-related information and evaluate the degree of care at various levels. The idea of valuing patients' opinions in raising the standard of healthcare includes the significance of patient assessment.

Hospital Information System benefits involve promoting satisfaction of patient through improved communication; higher provider sensitivity towards patients; increasing community awareness about the services' quality; and better use of the health system services.

Healthcare management software is a digital system that assists in management of Patients' health information in a healthcare facility.

Digitalization of social and industrial Infrastructure is increasing at the same time. Challenges on a global scale, such as resource depletion, climate change, widening economic gaps, and terrorism, are becoming more and more prevalent. We are currently living in a hard time of uncertainty and increasing complexity.

In order to effectively and efficiently solve societal problems, improve people's lives, and maintain strong economic growth, it is crucial that we fully utilize information and communications technology (ICT). By connecting "people and things" and the "real and cyber" worlds, we can gain new knowledge and create new values. It would be crucial to overcome these obstacles by involving diverse stakeholders at various levels to share a similar future vision in order to actualize such a society through digitalization. The Sustainable Development Goals (SDGs), which form the basis of the 2030 Agenda for Sustainable Development, were endorsed by the United Nations in September 2015. It is difficult to establish an all-encompassing system whereby all nations cooperate for a sustainable world that seeks to achieve both economic development and societal concerns solutions. To achieve peace and prosperity for all people and the world, the main guiding principle is to respond to difficulties with inclusivity that "leaves no one behind"⁽⁵⁾.

In the "Investment for the Future Strategy 2017," Japan identified five crucial areas where it could leverage its strengths to gain a competitive edge globally. These areas are: "Extension of healthy lifespan," "Real-

ization of mobility revolution," "Creation of next-generation supply chains," "Building and development of pleasant infrastructure and towns," and "FinTech." Taking the "Extension of a healthy lifespan" as an illustrative example, Japan stands as one of the pioneers in facing the challenges posed by an aging population. Furthermore, its universal healthcare system and nursing care insurance scheme have endowed it with an extensive database. Consequently, Japan is poised to establish a "new health system" that revolves around medical and nursing care, prioritizing health management, disease prevention, and self-sufficiency. This endeavor encompasses vital overarching themes such as the cultivation of human resources and the advancement of digitalization, both of which have been seamlessly integrated into concrete initiatives ⁽⁶⁾.

The most significant federation in Japan is called Keidanren (Japan Business Federation). It fits in perfectly with this revolutionary project. The "Realization of a Sustainable Society" section was added to Keidanren's updated Charter of Corporate Behavior on November 8 with the primary goal of proactively achieving the Sustainable Development Goals through the development of Society 5.0 ⁽⁷⁾.

CONCLUSION

Those results show that Hospital Management Information System represents a safe and effective tool to achieve significant improvement in work cycle time and decrease workload.

HMIS appear to have a real and significant impact on both workers and patient satisfaction in the form of decrease staff absentee rate and increase patients applause rate .

RECOMMENDATION

Further studies have to be applied to a larger number of patients for a longer period of follow up.

Conflicts of interest: nil.

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REFERENCES

1. **Isazadeh A (2003):** Beyond the information age, A philosophical perspective, Applied and Computational Mathematics, 2:77-85.
2. **Losee R (2018):** Knowledge, information, and information science, Journal of the American Society for Information Science, 48:254-69.
3. **Peters J (1988):** Information, Notes toward a critical history, Journal of Communication Inquiry, 12:9-23.
4. **Farradane J (2017):** Knowledge, information, and information science, Journal of Information Science, 2:75-80.
5. **Dretske F (2015):** knowledge and the flow of information, Behavioral and Brain Sciences, 6:55-90.
6. **Prime Minister's Office of Japan (2017):** Investment for the Future Strategy. Pp. 18-26. http://www.kantei.go.jp/jp/singi/keizaisaisei/pdf/miraitousi2017_summary.pdf.
7. **Clean Asia Initiative (2016):** Japan's Science and Technology Basic Policy Report <http://www8.cao.go.jp/cstp/english/basic/5thbasicplan.pdf>.