

## Acceptance of Hospital Information Management to Improve the Quality of Healthcare in a Teaching Dental Hospital of Visakhapatnam City: A Mixed-Method Study

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### Abstract

A health information management system (HIMS) has a set of components (technical, organizational, behavioral) and procedures "organized to generate information to improve health management decisions at all levels of the health system" and also for decision-making process in hospital. Engaging clinicians and other hospital personnel, including nurses, as well as providing strong institutional support, is critical to the successful implementation and operation of a HIMS in hospitals.

### Aim:

To assess the acceptance of a hospital information system to improve healthcare quality in a teaching hospital of Visakhapatnam city.

### Methodology:

An Institution-based mixed-method study both quantitative and qualitative data collection methods was conducted at Teaching Hospital of Visakhapatnam city for duration of 3 months. A total sample of 80 health care workers (HCWs) working in Teaching Hospital, who were managing administrative hospital staff, heading sub-process, departments, and nurses were enrolled in the present study.

### Results:

Most (38.40%) of our participants belonged to the age group of 25-35 years. The majority (45.60%) of them were females. The majority (69.70%) of them had bachelor's degrees and 65% had work experience from 0-5 years.

**Keyword:** Hospital Information Management; HIMS; Mixed-method; Quality of Healthcare; Acceptance.

## INTRODUCTION

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Information is the crux of overall building blocks of health systems strengthening and availability of information will enable health managers to utilize the same for better policy-making, planning, implementation, and monitoring and evaluation of health care services provided in a hospital. The goal of computerized HIS is to use computers and communication equipment to collect, save, process, extract, and link patient care information to management information; in other words, in this system, data are simultaneously saved in a database, so that they can be available for authorized users with a structure adapted to

the user's specific needs, where and when needed.<sup>1</sup> Hospital information systems (HIS) can support the improvement of healthcare delivery, patient safety and satisfaction, and clinical practice. HIS could be a relevant tool to inform hospital managers, support better management decisions in healthcare, and, consequently, increase efficiency. With the extensive developments in medical technology and the rise in patient expectations, a greater need for using HIS in the hospital has emerged, and in the twenty-first century, hospitals that lack HIS will be unable to compete with others.<sup>2</sup> The HIS structure is formed on the basis of each department's expectations of the computerized HIS; because this structure is unavoidably complex, it is referred to as the mother industry. Since the early 2000s, HIS has changed and evolved from an inconsistent system to a consistent one with an axis called patient electronic records. An ideal system should have many technical features, including the ability to identify medical trigger events, compliance with medical informatics standards, and the ability to use expert systems, as well as great flexibility in adapting to the culture and hospital workflow. HIS has many capabilities and added values, and it has the potential to revolutionize hospital services. Hence it is re-emphasized about the strategies which advocate appropriate application of Health information Systems (HIS) and communication technology for strengthening of data-sharing, analysis and utilization at all levels of hospital by bolstering data collection and unitization in a decentralized system as well as supported by research evidence.<sup>3</sup>

A HIS can be defined as a computerized or manual system (on paper) that is designed to meet all the information needs within a hospital. This includes different types of data (heterogeneous information), such as patient information, billing, finance and accounting, staffing, scheduling, pharmacy ordering, prescription handling, supplies, inventory, maintenance, order management, diagnostic reports related to laboratory, and patient monitoring, as well as providing decision support.<sup>4</sup>

Therefore, it is of fundamental importance that Health information systems (HIS) would make suggestions to build explanatory chain of information system problems, thus increasing the capacity of decision-making, since the information is essential to the decision, so that gives the manager knowledge of living conditions and health of the population.<sup>5</sup>

A health information management system (HIMS) has a set of components (technical, organizational, behavioral) and procedures "organized to generate information to improve health management decisions at all levels of the health system" and also for decision-making process in hospital. Engaging clinicians and other hospital personnel, including nurses, as well as providing strong institutional support, is critical to the successful implementation and operation of a HIMS in hospitals. These strategies have the potential to reduce significant resistance, reduce negative attitudes, and increase hospital staff acceptance of HIMS.<sup>6</sup>

Multiple studies have shown that using HIMS is difficult. This is due to the variety of computer interfaces and navigation options. It has been observed that some HIMS are not user friendly at all. This places an undue burden on hospital personnel who must learn the various HIMS operations. It is regarded as a barrier to HIMS acceptance.<sup>7</sup>

Initially, it is also resource intensive. This additional burden on hospital personnel fosters a negative attitude toward technology adoption. Although software behemoths like ORACLE, JAVA, and INFOSYS are gradually improving HIMS usability. In the future, the use of new technology such as voice recognition and voice assistants such as Google Assistant will drastically simplify HIS operations. Until now, designing user friendly software for HIMS has proven to be a significant challenge for IT professionals. As a result, it is critical to assess the level of HIMS acceptance among healthcare workers and investigate the determinants of HIMS that are impeding acceptance among all users.<sup>8</sup>

Every teaching institution has a critical role to play in the overall improvement of nursing officials' skills, attitudes, and knowledge of HIMS. Overall, little emphasis has been placed on research and development on this topic. Administrative research studies on this topic are still scarce.<sup>9</sup>

To the best of our knowledge, very few observational (in the technological domain) studies have been conducted with them worldwide. With this background, we intended to conduct this as an observational study to assess baseline acceptance of HIMS among healthcare workers (HCWs) working in a tertiary teaching hospital.

Hence, the present study was conducted to assess the acceptability level of HIS in decision making, as well as to improve quality of health care in teaching hospital of Visakhapatnam city.

## MATERIALS AND METHODS

### Study Design and Setting

An Institution-based mixed-method study using a mixed method *i.e.*, both quantitative and qualitative data collection methods was conducted at Dental Teaching Hospital of Visakhapatnam city for duration of 3 months.

### Study Participants, Sample Size, and Sampling Procedures

The source of population were the health care workers (HCWs) working in Dental Teaching Hospital, who were managing administrative hospital staff, heading sub-process departments, and nurses.

### Ethical considerations

This study was conducted as per the Declaration of Helsinki. Before data collection, we obtained an ethical clearance letter from the Institutional ethical committee [Ref No: ANIDS/IEC/2023001].

### Inclusion criteria

HCWs who had been working in different managerial positions in the hospital for at least six months preceding the survey period were included in the present study.

### Exclusion criteria

HCWs who were absent from their units/ departments, who did not give consent to participate, and who were seriously ill during the data collection period were excluded from the study.

The sample size for the present study was calculated using G power software.

### Sample Size Determination

Sample size estimation is calculated using G power software

$\chi^2$  tests - Goodness-of-fit tests: Contingency tables

Analysis	A priori:
	Compute required sample size
Input:	Effect size $w = 0.4$
$\alpha$ err prob	= 0.05
Power (1- $\beta$ err prob)	= 0.95
Df	= 1
Output:	Non centrality parameter $\lambda = 13.1200000$
Critical $\chi^2$	= 3.8414588
Total sample size	= 80
Actual power	= 0.9517627

The total sample for the present study was to 80

The total sample was arrived at 80 in which quantitative data was collected from 55 participants *i.e.*, questionnaire and remaining 25, qualitative data was used *i.e.*, face to face interview were conducted. Simple random sampling (SRS) method was used to select the samples in the hospital using the lottery method based on the list that was available in the human resource department of dental hospital for the qualitative and quantitative methods.

### Data collection methods, tools, and procedures

Data which is primary in nature was collected using mixed method. Quantitative Data was collected using a pre-structured self-administered questionnaire which contained a total of 19 questions altogether which was pre tested and self-administered to 55 study participants.

Qualitative data was collected using face to face in-depth personal interview with a Kuppa swamy education score of 5 and below. The principal investigator facilitated the interview process. These meetings lasted 15 to 30 minutes and the participants were asked open questions about four main issues of facilitating and encouraging factors, inhibiting factors, the optimal existing factors to meet the needs.

Firstly, the questionnaire was prepared in English and then translated to Telugu (the local language), then back to English by the language experts to look for consistency of the questions. The questionnaire was pretested on 5% of the sample among managers working in Teaching Hospital, two weeks before the actual data collection. The questionnaire was reviewed and reformatted based on the pretest results. They were excluded from the final study

### Data Processing and Analysis

Data was entered into Microsoft Excel and exported to SPSS version 26 for further analysis. Descriptive analyses like frequency distribution were computed for sociodemographic and other important variables were computed. A p-value < 0.05 with 95% confidence interval (CI) was used to see the strength of association between factors and the outcome variable. Finally, the results are presented using tables, charts and graph.

## RESULTS

### Quantitative data

Table 1 shows the demographic variables,

we found that most (38.40%) of our participants belonged to the age group of 25–35 years. Majority (45.60%) of them were females. Majority (69.70%) of them had bachelor's degree and 65% had work experience from 0- 5 years.

Table 2 shows the responses regarding acceptability of the questionnaire, regarding the accessibility of HIMS (69.09%) responded average, easy (14.54%), very difficult (9.09%).

Regarding the compatibility of HIMS, (63.5%) responded that HIMS was compatible and (9.09%) responded not compatible. Majority of the participants (52.72%) found HIMS system easy to use for everyone and (32.72%) found it not easy to use. A total of 52.72% of the participants found that the HIMS is average to work with. Most of our participants (47.27%) replied that they do not know about the error prevention mechanism. About (30.90%) of participants responded that there is an error prevention mechanism and (21.81%) replied that there is no error prevention mechanism. Most of our respondents answered that they were familiar with the HIMS. Nearly (34.54%) answered as average, (11.7%) answered as very familiar, and only (5.5%) of participants responded that they were not familiar with the system. A total of (63.63%) responded that the system was flexible.

Of the participants (27.27%) of the participants responded that the robustness of system was average, (70.09%) considered it to be just robust, while (1.81%) believed the system was not very robust. Of the participants, (9.09%) responded that this system never provides offline or online help. Among all participants, (69.09%) responded that HIMS always provide offline or online help/guidance. Majority (49.09%) of the participants agreed that sometimes this HIMS induces stress, while (32.72%) agreed that this HIMS never induces stress while working. Regarding error prevention, (23.63%) of the participants ranked this system average, (76.36%) responded that it was trustful, and none responded that it was not trustful in respect to error prevention. Majority (69.69%) of the participants encountered system failure once a month, 16.36% encountered system failure once a week. Majority (81.81%) of the participants responded their system has a mechanism to detect user responsibility, (18.8%) responded that their system does not have a mechanism to detect user responsibility, and majority (81.81%) responded that there is a mechanism to detect user responsibility.

Majority (78.18%) of the participants did not want to add any new feature to the existing HIMS

whereas (21.81) wanted to add new features.

**Table 1:** Demographic variables

Variables	Frequency (%)
<b>Age (years)</b>	
25-35	48 (38.40%)
36-45	28 (22.40%)
46-50	4 (3.20%)
<b>Gender</b>	
Male	23 (18.40%)
Female	57 (45.60%)
<b>Education status</b> <b>(According to modified Kuppaswamy scale 2023)</b>	
Professional degree (7)	0 (0.0%)
Graduate (6)	55 (68.75%)
Intermediate/ diploma (5)	16 (20%)
High school (4)	4 (5.0%)
Middle school (3)	4 (5.0%)
Primary school (2)	1 (1.25%)
Illiterate (1)	0 (0.0%)
<b>Working experience (in years)</b>	
0-5 years	52 (65%)
5-10 years	28 (35%)

**Table 2:** Acceptability of the questionnaire

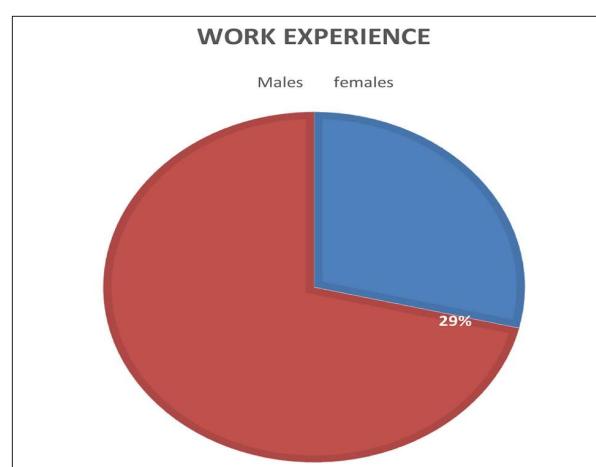
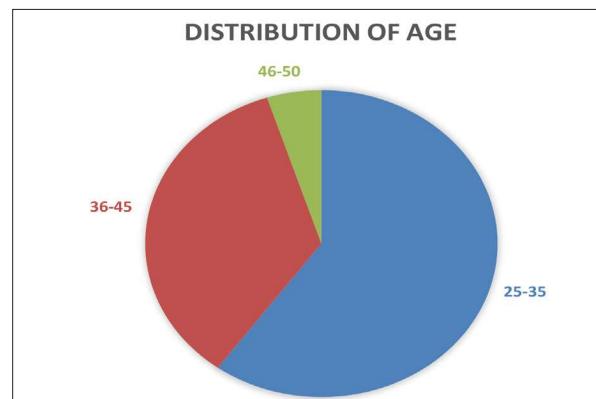
Questions	Responses	n=55, n (%)
Your HIMS system is easily accessible?	Very easy	0 (0.0%)
	Easy	8 (14.54%)
	Average	38 (69.09%)
	Difficult	4 (7.27%)
	Very difficult	5 (9.09%)
How much compatible is your HIMS system with the user's capability?	Very compatible	0 (0.0%)
	Compatible	35 (63.63%)
	Average	10 (18.8%)
	Least compatible	5 (9.09%)
	Not compatible	5 (9.09%)
Your system is easy to use for everyone?	Very easy	0 (0.0%)
	Easy	3 (5.45%)
	Average	29 (52.72%)
	Not easy	18 (32.72%)
	Don't know	5 (9.09%)
Does your system be efficient? (Quick and economical)	Very efficient	0 (0.0%)
	Efficient	28 (50.90%)
	Average	26 (47.27%)
	Not efficient	1 (1.81%)
	Worst	0 (0.0%)

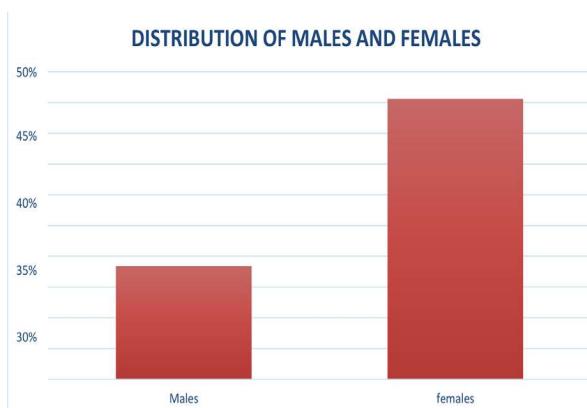
*Table Cont...*

In your system has any error prevention mechanism?	Yes	17 (30.90%)	Does your system have interlinking/ hyper linking facilities?	Yes	10 (18.8%)
	No	12 (21.81%)		No	5 (9.09%)
	Don't know	26 (47.27%)		Don't know	35 (63.63%)
How easy is error prevention in your system?	Very easy	0 (0.0%)	On a scale on 1-5, how much will you give to this system regarding acceptability?	5	0 (0.0%)
	Easy	35 (63.63%)		4	37 (67.273%)
	Average	10 (18.8%)		3	10 (18.8%)
	Not easy	5 (9.09%)		2	8 (14.54%)
	Worst	5 (9.09%)		1	0 (0.0%)
Did your system fulfil your expectations?	Very much	0 (0.0%)	Do you want to add any new features to this existing HIMS?	Yes	12 (21.81%)
	Fulfilled	25 (45.45%)		No	43 (78.18%)
	Average	19 (34.54%)			
	Not fulfilled	7 (12.72%)			
	Worst	4 (7.27%)			
Does your system is flexible i.e., you can adjust your system according to your needs?	Very flexible	0 (0.0%)			
	Flexible	35 (63.63%)			
	Average	19 (34.54%)			
	Not flexible	9 (16.36%)			
	Worst	2 (3.63%)			
Is your system robust?	Very robust	0 (0.0%)			
	Robust	39 (70.09%)			
	Average	15 (27.27%)			
	Not very robust	1 (1.81%)			
	Worst	0 (0.0%)			
Does your system provide online or offline help/guidance?	Always	0 (0.0%)			
	Sometimes	22 (40.00%)			
	Very frequent	16 (29.09%)			
	Not at all	5 (9.09%)			
	Worst	5 (9.09%)			
Reply of participants in regard to feeling stressed while working on HIMS system:	Can't say	0 (0.0%)			
	Not at all	18 (32.72%)			
	Very frequent	10 (18.8%)			
	Sometimes	27 (49.09%)			
How much you trust your system for preventing any error?	Always	0 (0.0%)			
	Very trustful	0 (0.0%)			
	Trustful	42 (76.36%)			
	Average	13 (23.63%)			
	Not at all	0 (0.0%)			
	Worst	0 (0.0%)			
How frequently encounter system failure?	Never	0 (0.0%)			
	Once in a year	8 (14.54%)			
	Once in a month	38 (69.09%)			
	Once in a week	9 (16.36%)			
	Once in a day	0 (0.0%)			
Is your system having a mechanism to detect user responsibility/ mistake?	Yes	45 (81.81%)			
	No	10 (18.8%)			
	Don't know	5 (9.09%)			

HIMS = Hospital Information Management System

Table 2 shows the responses regarding acceptability of the questionnaire, regarding the accessibility of HIMS (69.09%) responded average, easy (14.54%), very difficult (9.09%). Workload problems, training with manpower finally the management, time related issues, level of education and data related problems were interviewed for 60 minutes using face to face interviews and their comments are written.





### Qualitative data

The following were the main extracted axes of this study:

Workload problems, training with manpower finally the management, time related issues, level of education and data related problems. There were interviewee comments.

#### Q1. Work load

Do you believe that working with a computer is easier than entering data into a register?

One Participant responded that yes, it is easier to enter data into a computer as it was deemed easy thus decreasing the workload. Another participant responded that due to the

lack of number of the computers was less than the number of the users and lack of basic computer knowledge, so data was manually entered into the register. Computer was not used in all the departments and for all the matters.

#### Q2. Training

Do you believe that special training is required to work on a computer?

One Participant responded yes as due to their level of education, a special training was needed to reduce the work time. Another participant responded as the personnel were trained late, so the training time was not commensurate with the time of department's need and lack of monitoring the performance, special training wasn't required and decided to go with the manual entry.

#### Q3. Time related issues

Do you believe that entering data into software takes more time?

One Participant responded that yes due to low level of education and basic knowledge in the computer skills led them to respond in longer duration in data entry.

### Q4. Level of education

Do you believe your level of education will help you understand and make your job easier?

Only participant responded as due to the level of primary school to diploma and responded that if their level of education were high, they could have understood the system and responded better. Other participant stated that due to the lack of appropriate course on training, their level of understanding of the software is less and decided to go with manual data entry.

### Q5. Data related process

What is your opinion on data collection? Is it easy to extract data from software or data stored in a file system?

One Participant responded the data stored in software was easy as it was reliable and reduces workload also helps with longer duration but another participant responded that as they were habituated to the conventional data file system, manual data storage was more reliable as they can be stored for longer duration.

## DISCUSSION

This study was conducted to assess the level of decision making using HIMS among personals involved a teaching dental hospital. According to our findings, majority of all participants had access to the HIMS system. This could be due to a variety of factors such as their job profiles, the distribution of their working places, differences in their experiences, the average accessibility is due to the limited availability of computers in the hospitals because this hospital is not fully computerized. Our current study had a wider scope as we included additional qualitative method to identify the root causes of average or difficult accessibility to HIMS. This is in line with study conducted by Khalifa *et al.*<sup>10</sup> who found similar results (*i.e.*, lack of computer availability was the primary reason for suboptimal HIMS utilization).

In terms of human capability (knowledge and skills) and system compatibility, nearly half of those polled agreed that their system is compatible with their capability (knowledge and skills). It demonstrates that half of the participants were still unable (in terms of knowledge and skills) to operate the system. As a result, this is a major concern, so we must investigate the causes and resolve the issue. This is in line with a study conducted by Alipour and Zarei<sup>11</sup> in Iran which revealed that the level of computer knowledge and skills had more

dominant role in the acceptance of HIMS.

According to our findings, 50% of participants believe the HIMS system is moderately difficult to use. It is also a source of concern for us, as administrative staff and nurses are the backbone of any hospital and play an important role in HIMS. Accurate data entry is critical not only for patients but also to avoid future litigation. It is critical that the HIMS system be simple to use, as a complicated HIMS system can reduce the acceptance of HIMS system use. A similar finding was observed in an Iranian study, where it was discovered that image in using HIMS and perceived ease of use had a more positive impact.<sup>11</sup>

In terms of system efficiency, the majority of participants rated the existing HIMS system as average to efficient. In contrast to our findings, **Huryk *et al.***<sup>12</sup> discovered that the overall HIMS system was inefficient and caused user dissatisfaction in a systematic review.

Majority of the participants said they were aware of the HIMS error prevention mechanism. Almost one-third of the participants found it simple to correct the error. This is in line with a study done by **Huryk *et al.***<sup>12</sup>

The majority of the participants complained that every month they experienced system failure, which was upsets to them. In other studies, variables such as age, computer work experience, knowledge, and computer knowledge were found to be significantly related to user acceptance level.<sup>13</sup> However, only the education factor was found to be associated with user acceptance level in our study. As the graduates also had some difficulty using HIMS and participants who completed high school, diploma had difficulty in using HIMS. This could be because this is a dental hospital, attracting high-quality professionals can be challenging. Professionals who are highly educated and have a positive attitude and can effectively manage the HIMS system.

As for the qualitative part of the present study, research shows qualitative studies were dynamic, the obtained results went beyond training and included function's method, problems, and facilitating factors in using this progressing software system in the hospital. Because the goal of this system was to save data in a database at the same time, so that authorized users could access it when and where they needed it, with a structure tailored to the user's specific needs. The obtained results revealed that all of the major stages, namely saving, processing, and extracting information, had fundamental issues. In the present study,

qualitative method was used to the personals who had an educational level from primary school to diploma, they entered the data manually using OP registers. Also, seasonal training classes must be held to receive feedback from new and old users and introduced them with HIMS.

In a study done by **Chen *et al.***<sup>14</sup> the study showed that system quality and information quality were important factors influencing perceived ease of use of HIS, while information quality and service quality were important factors influencing perceived usefulness of HIMS. They discovered that perceived usefulness and perceived ease of use had a significant impact on HIMS acceptance.

**Wangenheim *et al.***<sup>15</sup> investigated user satisfaction in synchronous telemedicine and teleconsultation environments, and the collected data were quantified and statistically analyzed, revealing a clear perception of an improvement in service quality by both patients and healthcare professionals. The study's findings also revealed that both patients and healthcare professionals thought that introducing these new technologies was a positive step, even when they involved significant changes in the usual processes of primary care. This country does not meet the WHO's minimum workforce and bed density recommendations. A large proportion of the low-income population lacks access to quality healthcare. It is critical to use newer methods, such as m-Health, to make quality, affordable healthcare available to everyone. mHealth should be provided in tandem with other mServices such as mCare, mServices, mSurveillance, and mLearning. The success of mHealth will be determined by finding the right 'fit' between mHealth applications and healthcare needs; in other words, mHealth should be need-driven rather than technology-driven. HIMS proves to a digital revolution and efforts are made to do the same in various tertiary teaching hospitals.<sup>16</sup>

**Moradipour *et al.***<sup>17</sup> indicated that an automated HIS can be a powerful tool helping managers with the process of hospital management and decision-making, leading to significantly improved hospital performance. Therefore, continuous training courses are beneficial in enhancing information quality and modern technology usage, which in turn improve the quality of services offered to patients and clients and make them less time-consuming. The present study was in contrast with a study done by **Tomas *et al.***<sup>18</sup> where more than 50% have rarely or never used the health information system to support decision-making.

Most managers do not use hospital information systems to support management-related decision-making in Angola. **Zahra *et al.***<sup>19</sup> constructed an instrument for data collection was a self-administered structured questionnaire based on ISSM, covering seven dimensions, which includes system quality, information quality, service quality, system use, usefulness, satisfaction, and net benefits. This method was developed to determine the HIS success rate based on users' viewpoints. This method allows for the comparison of HIS success rates in various hospitals.

**Khalifa *et al.***<sup>20</sup> study done in a teaching hospital showed that HIS might frequently slow down the process of care delivery and increase the time spent by patients inside the hospital especially during slow performance and responsiveness phases. This is in contrast with the present study.

**Putu Wuri Handayan *et al.***<sup>21</sup> conducted a study in a teaching hospital and emphasized to prepare a plan to restructure their network with adequate infrastructure, create IT blue print and policy, IT organization restructuring, IT staff competency development and build integrated HIS. They are in line with a study done by **Sakineh Saghaeiannejad-Isfahani *et al.***<sup>22</sup> obtained for the satisfaction with different kinds of HISs in use in the hospitals were using Kowsar System (old version) and Pouya Samaneh Diva system and showed the level of users' satisfaction with the systems in question was relatively good. **Javek *et al.***<sup>23</sup> showed that the hospital information systems in content aspect is in a good condition, but in terms of time and structure, proper solutions are needed to improve the effectiveness.

The present study showed the need for training procedures for HIMS, and these training programs should be appropriate as study done by **Khalil Kimiafar**<sup>24</sup> who showed some problems concerning information quality of HIS in Mashhad training hospitals. These problems include inappropriate information quality of the system and incompatibility with user needs which leads to decreased satisfaction of users towards the system.

In study done by **Cruz-Correia *et al.***<sup>25</sup> quality of hospital information systems (HISs) was assessed and results showed that existing audit trails (AT) do not have enough quality to guarantee traceability or be used in HIS improvement. Evidence from documents at hospitals and health centers indicated that proper use of electronic software

is not available, and this could lead to reduced productivity of the system documents and

inefficient use of information in health records.<sup>26</sup>

Use of mobile hand held are also recommended by a study done by **Pandit *et al.***<sup>27</sup> for direct input of patient data into the HIMS.

### Strengths

- The present study used a mixed method as both quantitative and qualitative method of data collection were used.
- This was the first study to be conducted in Vishakhapatnam city in a Dental Teaching Hospital.

### Limitations

- Small sample size
- Since this study was conducted on one hospital, external validity would be limited in terms of generalizing the results and conclusions on other hospitals, especially if these were on a different healthcare level.

## CONCLUSION

The study concluded that overall acceptance of HIMS was adequate, though there is still room for improvement. India requires mHealth to provide care and compensate for the country's already inadequate healthcare workforce and infrastructure. HIMS can be more effective in enhancing clinical staff members' and the healthcare system's performance by establishing a suitable organizational culture and giving therapists adequate training as significant users of these systems, and taking into account their HIS work requirements. Since implementation, execution, and Support for these systems is very expensive, it's crucial to consider the significance a budget for this area and take the necessary steps to ensure full acceptance of these systems documents in the legal gatherings. Overall, the participation of the higher management and the dedication of the end users is what may bring about a positive change and increase the utilization of HIMS ultimately aiming toward paperless operations in a teaching hospital.

### Recommendations

- Training of the personals for HIMS may be conducted with the help of the IT department.
- User friendliness and new innovative methods for data entry, such as automated voice recognition, can improve the workload and enhance information quality.

- Increasing the availability of computers at the point of care.
- Equal opportunity for HIMS handling should be given to all personals on a rotation basis so that they become digitally empowered.
- HIMS system may be upgraded with modern facilities like hyperlinking, offline help like windows, software, hardware, etc.
- A  $24 \times 7$  call centre can be incorporated in the IT department that can coordinate with the dental hospital to fix any shutdown problem.
- Implementation of mobile handheld devices: These can be in the form of electronic tabs given to the doctors in the OPD for digital prescriptions and to the doctors in the respective departments for input of patient data directly into the HIMS with installation directly into the tabs.

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