Electronic Medical Records (EMR) over manual documentation of in-patient records: a scientific insight

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Abstract: Background: Patient Medical Records are crucial for the track of healthcare rendered and appropriateness of the treatment provided to the patient. With the increased adoption of NABH and JCI standards in hospitals, documentation of medical records has become a mandatory process. The study focuses on the efficiency of the manual documentation system.

Methods: The complete list of documents (forms & formats) filed under patient medical records were identified through observational research in the medical records department. The study involved a sample survey method with the help of a questionnaire that includes probability random sampling of size 261. The statistical tools used were chi-square analysis, ANOVA, and correlation.

Results: The chi-square analysis describes the reliability of the documentation system affected by legibility and completeness of the medical records. The ANOVA test inferred that the overall opinion of employees on the documentation system varies depending on their designation. The analysis for correlation describes that an increase in medication errors increases the time taken for processing of medication to the patient. The Pareto analysis for the problems due to manual documentation describes 80% of the problem is raised by 20% of the causes, namely "time-consuming process" and "legibility of the patient records." Common suggestions from the employees were the implementation of electronic medical records.

Conclusion: The study results suggest that it was to either implement integrated electronic medical records or partially automate the supportive documents apart from the point of care records.

Keywords: Efficiency, Electronic Medical Record (EMR), manual documentation, in-patient

1. Background

A hospital is a health care institution providing patient treatment with specialized medical and nursing staff and medical equipment. Some patients go to a hospital just for diagnosis, cure, or therapy and then leave ("outpatients") without staying overnight. At the same time, others are "admitted" and stay overnight or for several days or weeks or months ("in-patients"). The primary responsibility of the in-patient and outpatient department is the maintenance of medical records.

Health professionals communicate with each other about medication information using different forms of documentation. Traditionally manual documentation systems were practiced in Hospitals to record patient data. The documentation system is used to track, manage, and store documents. Most are capable of keeping a record of the various versions created and modified by different users. Hospitals, clinics, and private practices must manage an abundance of medical records and billing information each day. Physicians are required to retain patient medical records and recordings, including deceased patients, for a minimum of 10 years from the date of the patient's last visit. Hospitals and clinics abide by their policies to store the information. Over time, this amounts to a lot of records and paper. Paper documents that are generated or come into the hospital are scanned. Each scanned copy is indexed and attached to either an existing electronic patient record or a new one can be created.

Mistakes are unavoidable when dealing with a large amount of paper. If files or documents are misplaced, physicians are not able to know what medications a patient may have adverse effects on. Paper records are physical documents that must be hand-carried from archives to the appropriate department. It's not unusual for some record requests to take hours- even days. The less time and money spent on administrative paperwork, the more resources your staff can devote to services that genuinely add value- namely providing superior health care. Storing paper documents and patient medical records on-site can be a risky business. Documents can be destroy yed during any natural calamity like floods, fire, etc.

Health care environments are increasingly dependent on information, and the volume of the data collected, stored, and used has dramatically increased, while computer dependence has also increased. The most critical issue in this field is the use of high-quality information to improve patient care. Thus, health information can be most effective when the data is high in quality.

Improving the documentation system of the hospital will help in efficient healthcare delivery and increased patient satisfaction. Also, it helps in operational control over the functioning of the hospital. Operational

efficiency will provide smooth functioning of the hospital without disputes. Moreover, decisions made in a hospital requires numerical evidence to obtain the acceptance of all the employees in a significant decision. This study deals with getting the opinion of the employees on the existing documentation system. This will provide evidence for the hospital management to understand the importance of an effective documentation system.

Also, this study helps to understand the difference between electronic records and manual records. Manual descriptions are believed to be prone to errors and lack of legibility. At the same time, electronic records rectify these problems. This study aims to observe the process of documentation of patient records existing in the wards, to analyze the effectiveness, efficiency and issues in the existing documentation system, and finally to study the opinion of employees on the existing E-prescription process and to find the areas to be improved in the manual documentation system.

2. Methods

The study is confined to Sri Ramachandra Medical Centre and Research Institute, Chennai. The study is descriptive research followed by analytical research. All the preliminary data of the survey will be collected through a questionnaire. The questionnaire is designed based on the objectives of the study. Secondary data will be collected from journals, Articles, E-books, and websites. The duration of the study is for three months. Probability Random Sampling Method will be used for sample collection. The sample size for inpatient ward staff is 83 including Medical officers, ward secretary, Billing supervisor, Administrators, Social worker, Dietician, and executives of the medical records department. The sample size for nurses is 178 (at 90% confidence level). Therefore the overall sample size for the study is 261.

3. Statistical analysis:

Statistical analysis is performed using SPSS version 23.0. Pareto analysis is a formal technique useful where 20% of causes determine 80% of problems. Percentage analysis is done for easy comparisons and interpretations. The Chi-Square method is used to test the hypothesis and aims at determining whether a significant difference exists among groups of data or whether differences are due to sampling. ANOVA to analyze the differences among group means. Correlation analysis to find out a statistical relationship between two variables. P-value <0.05 is significant.

The following were the hypothesis framed for the study

Hypothesis 1:

H0: There is no significant association between difficulty in understanding the information in patient records and the dependency of employees on the existing manual documentation system.

H1: There is a significant association between difficulty in understanding the information in patient records and the dependency of employees on the existing manual documentation system.

Hypothesis 2:

H0: There is no significant association between incomplete information in the patient records and dependency of employees on the existing manual documentation system.

H1: There is a significant association between incomplete information in the patient records and dependency of employees on the existing manual documentation system.

Hypothesis 3:

H0: There is no significant difference between all the details on patient care that are included in the patient records and the designation of the respondent for documentation of patient records.

H1: There is a significant difference between all the details on patient care that are included in the patient records and the designation of the respondent for documentation of patient records.

Hypothesis 4:

H0: There is no significant difference between the time taken for documentation of patient records and the designation of the respondent.

H1: There is a significant difference between the time taken for documentation of patient records and the designation of the respondent.

Hypothesis 5:

H0: There is no significant difference between the usage of stationaries for documentation of patient records and the designation of the respondent.

H1: There is a significant difference between the usage of stationaries for documentation of patient records and the designation of the respondent.

Hypothesis 6:

H0: There is no significant relationship between E-prescription reduces medication errors, and E-prescription reduces time in the processing of prescribed drugs.

H1: There is a significant relationship between E-prescription reduces medication errors, and E-prescription reduces time in the processing of prescribed drugs.

Pilot Test

Initially, a pilot study was done to assess the reliability of the framed questionnaire using 20 respondents as sample size. The calculated values of 28 items Cronbach's Alpha result were 0.723, which indicated good consistency among the test items.

4. Results:

Table 1: Percentage analysis of the respondents

Demographics of Respondents	% of Respondents (n=261)
Gender	
Male	11
Female	89
Age group	
20-30	77
31-40	14
41-50	7
Above 50	2
Education	
UG	55
PG	15
Diploma	28
Others	3
Departments	
Wards	86
Nutrition	4
Medical Records	5
Pharmacy	3
Physiotherapy	2
Opinion On Documentation Of Patient Records For Future Reference	
Very Important	82
Important	16
Moderately Important	2

Source: Primary

Table 1 shows the percentage analysis of the respondents. Female predominance was seen among the respondents (89%). Most of the respondents (77%) were in the the age group of 20-30 years. Among the respondents, only 15% of them have completed their post graduation. Only 3% of the respondents were experienced above 20 years. Majority of the respondents for the study were Nurses and ward secretaries from the various Wards of the hospital. The respondents felt (82%) that the documentation of patient records is very important for future reference.

Effectiveness of the documentation system

About 52% of the respondents agree that there are enough record formats are available for recording patient information. Most of the respondents (47%) agree that they have standardized formats for patient records. About 47% of the respondents agree that all the details are available in patient records for their reference. Majority of the respondents (46%) agree that they can identify who recorded the data in the patient records. Almost 51% of the respondents strongly agree that date and time of recording patient information is present in the medical records.

About 47% of the respondents strongly agree that patient records are up-to-date. Majority of the respondents (50%) agree that policies are available on sharing of patient information. About 43% of the respondents agree that they have enough space to store patient records. Majority of the respondents (47%) agree that they are aware of the policies on duration of storage of patient records. Equal percentage of the respondents (43%) either strongly agrees or agrees that they have access to old patient records. Majority of the respondents (52%) strongly agree that they are aware of their responsibilities in handling of patient records. About 46% of the respondents strongly agree that procedures are available to refer old patient records in MRD whenever needed. Majority of the respondents (45%) strongly agree that disclosure of patient information is done only after patient authorization. About 48% of the respondents strongly agree that patient records are protected from physical damage (Table 2).

Table 2: Effectiveness of Manual Documentation of Patient Records

S.No.	Effectiveness of Manual Documentation of Patient Records	Response in %				
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	The existing patient records system has enough records for its activities.	39	52	5	0	0
2.	The patient records are present in a standardized format.	45	47	4	0	1
3.	All the details on patient care are included in the patient records.	45	47	5	0	1
4.	You are able to identify who recorded any specific patient information.	40	46	9	2	0
5.	All the patient records are signed with date and time.	51	36	7	2	1
6.	All the information in the patient records are up-to-date.	47	41	7	2	1
7.	Policies are available to decide on which patient information needs to be shared.	39	50	6	2	1
8.	There is enough space to store patient records.	42	43	10	3	0
9.	The existing documentation system has policies to store patient records for longer time depending upon the standards.	42	47	7	1	0
10.	You are able to access old patient records whenever necessary.	43	43	9	2	0
11.	You are aware of your responsibilities in handling patient records.	52	41	2	2	0
12.	You have standard procedures to refer old patient records in the Medical Records Department.	46	44	6	1	0
13.	Disclosure of patient information to external people is done only after patient's authorization.	45	43	7	1	2
14.	The patient records are protected from physical damage.	48	41	8	1	0

Source: Primary

Efficiency of the employees on documentation system:

Among the respondents, 62% strongly agree that they are able to gather patient information using their Unique Hospital Identification (UHID). About 55% strongly agree that patient records help to communicate patient information between staff. Almost half of them (43% and 46%) strongly agree that patient records are efficient in making decisions and can be efficiently audited during any inspection. The respondents (25%) feel time taken for documentation of patient records was too long and 47% rated all the details are accessible by them (Table 3). Only 31% rated very frequently the patient records are checked for correctness.

Table 3: Efficiency of the employees on Documentation

S.No.	Efficiency of the employees on Documentation	Response in %				
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	You are able to gather patient	62	27	7	2	0

	information using the UHID of the patient.					
2.	The documentation of patient records helps to communicate the patient information between staff.	55	33	8	1	0
3.	You are able to make decisions on patient care using available patient records.	43	41	10	3	0
4.	Manual patient records are easy to audit during any inspection.	46	40	11	1	0
		Too long	**Long**	**Optimum**	**Short**	**Very short**
5.	Time taken for documentation of patient records	25	33	30	10	0
		All the Details	**Most of the Details**	**Some of the Details**	**Very Few Details**	**None**
6.	How far you are allowed access to patient information?	47	32	14	3	1
		Very Frequently	**Frequently**	**Occasionally**	**Rarely**	**Never**
7.	The patient records are checked for correctness	31	56	7	3	1

Source: Primary

Table 4 shows problems in existing documentation system provide information on the problems existing in documentation. Only 18% rated that there is always difficulty in understanding the patient information in patient records. Among respondents, 16% of them felt that there is always incomplete information in patient records. The respondents (20% and 22%) felt that there is always difficulty in using computer when needed and in filing manually written case sheets respectively. Among the respondents, 11% and 14% of them informed that very frequently they find errors in patient records and repetition of information in patient records respectively.

Table 4: Problems in Existing Documentation System

S.No.	Questionnaire	Response in %				
		Always	**Mostly**	**Sometimes**	**Rarely**	**Never**
1.	Do you find difficulty in understanding the information in the patient records?	18	11	39	20	9
2.	You find incomplete information in the patient records.	16	19	25	26	11
3.	Do you find difficulty in using computer whenever you need?	20	15	26	22	14
4.	Do you find difficulty in filing manually written case sheets?	22	16	27	19	13
		Very Frequently	**Frequently**	**Occasionally**	**Rarely**	**Never**
5.	You identify any errors in the patient records	11	23	27	29	7
6.	How often do you find the information in the patient records are repetitive?	14	32	23	21	8
7.	Usage of stationeries like papers, files, etc., for documentation of patient records is,	20	39	31	5	2
8.	You will depend on existing manual documentation system.	19	33	39	3	3
9.	Do you find any difficulty in maintaining patient records without damage?	15	20	39	8	15

Source: Primary

Table 5 gives information on employees' opinion on existing E-prescription process. More than 80% of them either strongly agree or agree that they are able to read and understand handwritten prescriptions and the order of information in E-prescription screen agree with their needs. Among the respondents, 52% strongly agree that medication errors are reduced by E-prescription and 44% strongly agree that E-prescription reduces paper work. More than 40% of the respondents strongly agree that E-prescription reduces time in processing of drug administration and 45% informed that they can track the status of prescribed drugs in E-prescription.

More than 90% of them either strongly agree or agree that they are able to monitor high alert medications using E-prescription. The respondents (67%) agreed they are confident in using a computer.

Table 5: Employees Opinion on Existing E- Prescription Process

| S.No.	Questionnaire	Response				
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	You are able to read and understand the handwritten prescriptions.	38	43	11	7	1
2.	Does the order of information presented on the E-prescription screen agree with your needs?	42	45	9	4	0
3.	E-prescription reduces medication errors.	52	44	4	1	0
4.	E-prescription reduces paper work.	44	48	6	2	0
5.	E-prescription reduces time in processing of drug administration.	47	46	5	1	2
6.	You are able to track the status of prescribed drugs in E-prescription.	45	47	8	1	0
7.	You are able to monitor high alert medications.	52	42	4	2	0
8.	E-prescription reduces call backs to physicians regarding clarification on drug orders.	42	48	8	2	0
9.	Overall rating about quality of existing manual records	28	61	10	1	0
10.	How much you are confident in using a computer?	28	67	5	0	0

Source: Primary

The weighted average shows the of effectiveness of manual documentation, efficiency of employees on documentation and problems in existing documentation system. The major factor affecting the effectiveness of the documentation system is the awareness of the employee's responsibilities in handling the patient records. Also, UHID for each patient helps easy accessibility of However, steps need to be taken to reduce errors in the documentation system and by effectively using E prescription in the existing documentation system.

Pareto analysis

Based on the observation during the study following seven problems were found to be more frequent and directly affecting the efficiency of the documentation system.

The Pareto analysis was done for the seven problems as shown in Fig. 1. From the figure we understand that efficiency of the documentation system is affected highly by time consuming process of recording patient information. Followed by legibility of the patient records is the second important cause to decrease the efficiency of the documentation system. Hence vital few causes have maximum effect on the manual documentation system.

Fig. 1. Pareto analysis for problems in manual documentation system

PARETO CHART

Problems in manual documentation system
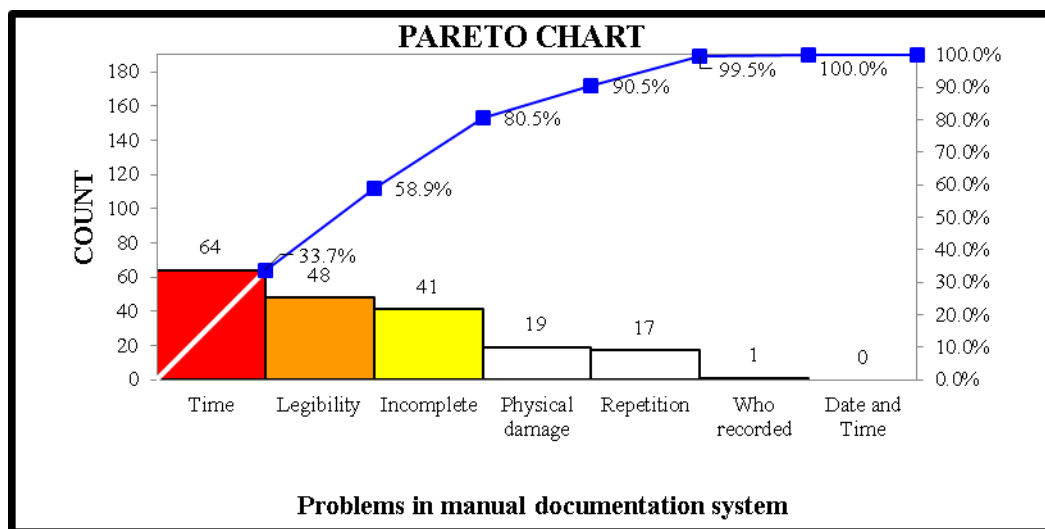
Source: Primary

Hypothesis results

Hypothesis 1:

H0 (Null Hypothesis): There is no significant association between difficulty in understanding the information in patient records and dependency of employees on the existing manual documentation system. The chi-Square analysis shows P-value <0.001. Hence H0 is not accepted. There is a significant association between difficulty in understanding the information in patient records and the dependency of employees on the existing manual documentation system.

Hypothesis 2:

H0 (Null Hypothesis): There is no significant association between incomplete information in the patient records and dependency of employees on the existing manual documentation system. The chi-Square analysis shows P-Value <0.001. H0 is not accepted. There is a significant association between incomplete information in the patient records and dependency of employees on the existing manual documentation system.

Hypothesis 3:

H0 (Null Hypothesis): There is no significant difference between all the details on patient care is included in the patient records and the designation of the respondent. ANOVA shows P-Value <0.001. H0 is not accepted. Hence, there is a significant difference between all the details on patient care that are included in the patient records and the designation of the respondent.

Hypothesis 4:

H0 (Null Hypothesis): There is no significant difference between the time taken for documentation of patient records and the designation of the respondent. ANOVA shows P-Value <0.001. H0 is not accepted. Hence, there is a significant difference between the time taken for documentation of patient records and the designation of the respondent.

Hypothesis 5:

H0 (Null Hypothesis): There is no significant difference between the usage of stationaries for documentation of patient records and the designation of the respondent. ANOVA shows P-Value <0.001. H0 is not accepted. Hence, there is a significant difference between the usage of stationeries for documentation of patient records and the designation of the respondent.

Hypothesis 6:

H0 (Null Hypothesis): There is no significant relationship between E-prescription reduces medication errors, and E-prescription reduces time in the processing of prescribed drugs.Correlation value is 0.967. H1 is accepted. Thus as far as the medication errors are reduced, the time taken for processing of prescribed drugs is also reduced.

5. Discussion

The survey results of the respondents who were mainly of ward nurses and secretaries showed that the documentation of patient records is very important for future reference. Also the existing system is effective and

efficient but errors due to manual documentation reduce reliability of the system which can be rectified by digitalizing the patient records. Hence, the major purpose of the study is to inform the management about the problems in manual documentation and gain support from them in implementing the Electronic Medical Records and an integrated HIS to consolidate all patient information to one database. Bhoomadevi et al (2019) also observed that the the healthcare providers can spend some time to understand the patient's needs and develop a model that all the employees can adopt it to reduce the indifference shown in the patient-centered care aspects.

From the overall observation made during the study, around 30-40 different formats of patient records were observed to be recorded manually for any case diagnosed in Inpatient department. All the formats are manually documented during the patient stay and Medical Records Department indicated the difficulty in handling patient records and filing of 3000 to 4000 medical records every month. Based on this observation, Pareto analysis identified vital few problems as the time taken for manual documentation and lack of legibility of the medical records. These two problems contribute to 80% of the effects on the manual documentation system. Therefore the existing manual documentation system is difficult for employees to handle since it is tedious and time consuming. Similarly to our study, Asabe SA et al (2013) also observed that manual documentation like filing pieces of paper, missing pieces of information, retrieval of data, security of data and privacy of patient information was time consuming and suggests electronic records eliminate missing files and enhance speedy retrieval of patient's record.

In our study, the employees opinion on the documentation system highly depends on their designation which includes the type of task they perform in patient care. The existing documentation system is highly effective and efficient in recording patient information for future reference and majority of the employees (40 – 50%) are aware of their roles and responsibilities in handling patient information and lacks reduction of time. The employees feel that existing e-prescription system is effective enough to facilitate drug distribution to patients in time without errors. Hence the employees are confident enough to take up electronic medical records (EMR) since majority (67%) of them are confident enough to access computers. They also believe that electronic documents reduce time and errors.

A study done by Pedro LuizCôrtes and Eliana Golfette de Paula Côrtes, (2011) in the city of Sao Paulo, Brazil revealed that the electronic records benefit the hospitals by standardization of processes; the ease and agility in the recovery of information; better control over prescriptions, materials, and procedures; and better adherence to protocols and standards established by the hospital. Despite these benefits, certain problems were found, such as the difficulty in organizing the information on the screens of the system, interruption of the system, and the difficulty in the formatting and adequacy of the reports. Although problems can be identified during the process of using electronic record systems, the benefits outweigh the difficulties.

Further analysis in our survey suggests that there is a significant association between difficulty in understanding the information in patient records, incomplete information in the patient records and the dependency of employees on the existing manual documentation system. There is a significant difference between the designation of the respondent and all the details on patient care that are included in the patient records, the time taken for documentation of patient records and the usage of stationeries for documentation of patient records.

Electronic data will reduce usage of stationeries, missing of case sheets, filing of case sheets every time, damaged case sheets, time consuming recording process, increase legibility of data thereby reducing errors and increase patient satisfaction on the treatment provided. Moreover the employees will gain more time to focus on patient care instead of documenting the records.

Therefore, the major purpose of the study is to inform the management about the problems in manual documentation and gain support from them in implementing the EMR. More of advanced technologies are readily available to implement EMR in an organization based on the requirements of the technical professionals. The technology should be well understood by a technical professional and training for employees should be given. A study by Noraziani.K, et. al., (2013) suggests that some of technical and non-technical issues also must be resolved before powerful EMR systems can become realities in our healthcare system.

A descriptive study of 100 nursing personnel at a large Magnet hospital in Southwest Florida revealed that 75% of nurses thought EHRs had improved the quality of documentation and 76% believed electronic charting would lead to improved safety and patient care. Nurses with expertise in computer use, 80%, had a more favourable attitude toward EHRs than those with less expertise (Linda E. Moody, et. al., 2004).

A review by Digvijay H. Gadhari, et. al., (2016) in an Indian set up suggests a Software Development Life Cycle (SDLC) to gather requirements from the users of health records to design a user friendly Health Information Technology for real time capturing and analysis of data. Instead of transferring entire system to electronic system, the automation can be done partially. The point of care records (Category I) can be continued in manual formats while supportive records (Category II) can be converted to electronic format with minimum investment. Category

I documents should be recorded at patient bed side hence it is not possible for online documentation since there are no systems available at the patient bed side.

Limitations: In light of the above discussion, it is believed that the obtained results are representative only of the surveyed population. The study is confined to the employees of Inpatient Department of the hospital and only employees involved in documentation in wards were considered for the study.

Recommendations to implement EMR in a hospital

o   An integrated HIS to consolidate all patient information to one database. This will reduce repetition of patient information in the records.

o   The system should have status tracking ability to identify the position of the healthcare process for individual patient.

o   Point of care delivery of patient information should be facilitated by mobile computing systems like tablets, M-Health, etc.,

o   To handle huge patient flow the system should be highly automated to reduce time in documenting.

o   For highly important information mandatory fields should be set to indicate incomplete information.

o   Access to the records should be restricted to respective professionals to ensure security and confidentiality of the data.

o   Doctor's and Nurse's notes can be entered into EMR by voice texts like Natural Language Processing (NLP).

o   E- Consent forms can be used to get consents form patients thereby completely reducing paper work.

Automation of medical records also helps in clinical decision support. The EMR can be used to predict clinical outcomes with AI (Artificial Intelligence). Electronic records are also used for research activities in community health management. Data analytics can be applied for measuring quality indicators. Also automation of patient records helps in hospital workflow management like reducing TAT for discharges, handling patient diet services, etc.

Alternative recommendation

o   Instead of transferring entire system to electronic system, the automation can be done partially. The available formats for patient records can be categorized into two,

o   Category I – Point of care records which can be continued in manual formats due to lack of mobile computing systems

o   Category II – Supportive records which can be converted to electronic format with minimum investment.

Category I

- History and Physical examination
- Procedure or surgical record
- Doctor's daily notes
- Medication Chart
- Nursing assessment and clinical chart
- Nurse's notes
- Physiotherapy record
- ICU daily record
- Consent sheets
- ER- triage Assessment
- ER- Initial Assessment
- ER- Consultation record
- Medical record for patient invasive procedure

Category II

- Admission record
- Admission order
- Patient sociological form
- Admission check list
- Discharge summary
- Investigation results
- Investigations log
- UTI/CRBSI/VAP form
- UTI/CRBSI/VAP Bundle

- Transfer sheet
- Investigation request
- Crossmatch request
- Check list for patient transfer from ICU to ward
- Approval for corporate
- Insurance records
- Critical values

6. Conclusion

With growing healthcare facilities patient approach hospitals frequently to get rid of their ailments at the earliest. Hence patient flow to hospitals is increasing now-a-days with advanced treatment procedures. But sensitivity of healthcare is very high when any minor error occurs in patient care. In this context documenting patient care becomes essential for healthcare providers. When this documentation is effectively automated it reduces the time taken in recording than the time taken for patient care. This is possible only with Electronic Medical Records (EMR) which ensures accuracy, accessibility, security, confidentiality and timely availability of data. But implementation of EMR does not happen without organization support. This study will help the management to make decision on whether to implement EMR or not.

Even if the management feels this as a major decision to be taken, alternative methods have been suggested to use the existing infrastructure effectively to improve the documentation system. In the competitive healthcare industry all the players are focusing on accurate and timely delivery of healthcare. So automating the patient care process will ensure quality and safety of patient care.

List of abbreviations:

AI – Artificial Intelligence

ANOVA – Analysis of Variance

CRBSI – Catheter-related bloodstream infection

EMR – Electronic Medical Records

E prescription – Electronic prescription

ER – Emergency

HIS - Hospital Information System

ICU – Intensive Care Unit

JCI – Joint Commission International

M Health – Mobile Health

NABH – National Accreditation Board for Hospitals & Healthcare Providers

NLP – Natural Language Processing

SDLC – Software Development Life Cycle

TAT – Turn Around Time

UHID – Unique Hospital Identification

UTI – Urinary Tract Infection

VAP – Ventilator-associated pneumonia

Declarations:

Ethics approval and consent to participate: Institution Ethics approval and informed consent was obtained.

Consent for publication: Yes

Availability of data and materials: Yes

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Authors' information (optional).

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