Comparison between Retrieval Time of Manual and Electronic Medical Records –A Case Study

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ABSTRACT

Purpose: *A safe and effective healthcare service provides good quality medical records whether electronic or handwritten, which is essential for the continuity of patient care. In this context, a comparative study on the retrieval time of Manual and Electronic Medical Records is made to evaluate the advantages and limitations of both systems.*

Methodology: *The present study was conducted in two phases. In the first phase, the retrieval time taken by the Manual medical record and in the second phase the retrieval time taken for electronic medical records was collected. The study site was one of the departments in a multispecialty hospital. The study period was three months and a convenient sampling technique was used to collect the data. The sample was collected during the peak hours of the day. Hence 75 medical records which were documented manually and collected in the first phase and after the introduction of electronic method of documenting medical records, another 75 electronic medical record were collected to find the retrieval time.*

Finding/Result: *The study result revealed that standard turnaround time (TAT) as per the policy of the hospital for the retrieval of paper records exceeds whereas in electronic medical records most of the files receives within standard time and Electronic Medical Records to be implemented in various outpatient departments in order to reduce patient waiting time for the medical records during the revisit. These changes in the procedure will definitely improve the quality of healthcare and patient satisfaction.*

Originality/value: The result of the study will help to *know the retrieval time for manual and Electronic Medical Record, its advantages and disadvantages.*

Study Type: *Observational case study.*

Keywords: Manual Medical Records, Electronic Medical Records, Turn Around Time, Patient satisfaction, Fishbone analysis, SWOT analysis, ABCD analysis, PESTLE analysis.

1. INTRODUCTION :

Hippocrates, abided by the oath, made a sincere effort of keeping the information of the patient a secret in the process of providing care, since fourth century BC (Cortesi, 2011) [1]. Security of patient protection is a well-established issue in medical services. Documenting the patient information is very much required for the health care providers, to ensure quality care for the patients. It is also required for Insurers, managed care organizations, public health officials, researchers, and others. However, to provide privacy of the patients as their right, there is also a need to develop policies and practices for protecting the information they collect. 'People forget but records remember'- in fact medical records is very important which provide value of medical records to many groups, patients, hospital, physician,

and the researcher, and the health authorities (Mogli,2001) [2]. The medical records include a variety of types of "note"(manual record process) entered overtime by healthcare professionals, recording observations and administration of drugs and therapies, test result, X-rays, reports etc. the large scale use of these health care information demands the health care sectors to ensure that the policies, practices and procedures for handling in an appropriate way. The health care organization is responsible to collect, process, and store these health information and transmit these information between different entities, and also ensure adequate mechanism to protect the information. O'Toole MF, et al (2005) [3].

Administrating the clinical matters in the medical world is a challenging task. More confounding factor is the maintenance of administrative factors like records of admission, discharge, transfer, health documents, clinical investigation and management.

Traditionally, medical records were written on paper. The papers were kept in a file that is patient record file. Now manual medical records have many disadvantages because, it is a paper work, at times record is misplaced, stolen or lost, and it may lost forever. Paper records besides require an actual storage region and can once in a while bring about works on expecting to buy extra office space, which can be costly. Paper records also require a physical storage area and can sometimes result in practices needing to purchase additional office space, which can be expensive. Hence lot of disadvantages faced in manual medical record process in medical record department. Today the technological support helps to reduce the problems related in manual medical process, this lead to most of hospitals to use the electronic medical records process for providing patient history (Mogli, 2001) [2].

The development of the computerization in the field of medical records started in early 1960. By computerization it is possible to convert the handwritten medical record into paperless suitable standardization in order to achieve quick, efficient, and maintain comprehensive healthcare information to meet the needs of the community at large. Electronic medical records help in saving staff time and physician time [2]. The computer framework records should achieve an option that could be preferable over the manual clinical records and supportive to the doctors, nursing and other staff to work on their productivity in giving better clinical consideration to patient with sensibly minimal expense. Electronic Medical Record (EMR) will help to know the time taken by the retrieval of files and patient waiting time in Out Patient Department (OPD). This analysis will help to learn the efficiency of EMR. In OPD, EMR should easily and speedily able to retrieve by name, number or from a pick list. Move data field, entering of information with case by selecting pre-disposed data, prescribing medication ordering investigation, reading reports, accessing previous data and so on.

Electronic medical record process facilities in which this system are most advanced often printout medical record data for permanent storage and frequently printout parts of the medical record for physician or other use during patient care. After implementation of EMR we can analyse the efficiency and deficiency, and also it will help to conduct a comparative study on both EMR and Manual record process in a hospital.

Secure and reliable access to finish data gathered in the clinical record is fundamental to guarantee that medical services experts have the right data accessible when and where they need it. This maximizes the quality and productivity of the medicines they can give to their patients at the mark of care. An EMR replaces paper-based clinical records by electronically reporting the data pertinent to a patient's medical services.

As like the manual medical records, EMR system also comprises the clinical data which is involved by medical care providers for documentation, checking and the board. It likewise affirms the regulative necessities for clinical records. A very much planned and executed EMR framework will empower opportune admittance to patient data and the clinical proof base to provide benefits.

2. RELATED WORKS :

Table No.1: shows the various studies conducted with regard to EMR system.

Sl. No.	Contribution	Reference
1	They captured data addresses the need for EMR and critical diseases management data for decision support would be available continuously, resulting in improvements in health care without the need for additional resources. There is a need to standardize these data which could be the foundation to support quality-based reimbursement strategies and physician office-based, disease management strategies	O'Toole MF, et. al. (2005). [3]

2	A study conducted in Ethiopia, reported that health professionals, started to use the EMR system immediately after the implementation (76.1%). The logistic regression showed a strong correlation between system use and dissatisfaction (OR 7.99, 95% CI 5.62-9.10) and service quality and satisfaction (OR 8.23, 95% CI 3.23-17)	Binyam & Fluer (2015). [4]
3	A quantitative study to find the barriers and solution for the utilization of EMR, highlighted that the obstructions included high introductory expense, unsure monetary benefits, high beginning physician time cost to get familiar with the system, difficulties with innovation, including EMR ease of use; and troublesome integral changes and insufficient help from both IT support and EMR sellers. The review proposed strategy mediations to conquer these obstructions, including giving work/practice emotionally supportive networks, further developing electronic clinical information exchange, and giving monetary awards to quality improvement.	Miller R. H. & Sims I. (2004). [5]
4	A literature survey reviewed various literatures on common challenges and solutions for optimal utilisation of EHRs. The study, concluded that improper utilization, incorrect use of the software, faulty implementation, workflow burdens, financial considerations, and insufficient training were found to negatively affect the quality of the record.	David Tylor (2017). [6]
5	The exploratory study, revels that EMR resulted in the standardisation process with the ease and agility in the recovery over prescriptions, materials and procedure, better adherence to protocols and standards established by the hospital. The study also highlighted few disadvantages, dealing with technology like organization and formatting of the report.	Luize Cortesi (2011). [1]
6	This study conducted in one of the Hospitals in India, found that those lacking in computing skills, had a history of rejecting designing, however, the study found that implementation of EMR would be successful in hospitals of developed and developing countries.	Jeremiah Scholl, et al. (2011). [7]
7	The study was a prospective double cohort study, resulted that when compared with the paper record, EMR implementation had no significant effect on the provision of the 4 preventive services studies.	Michelle Greiver et al. (2011). [8]
8	The study found that it is difficult to predict the use of EHR as new technology will assist with giving global norms to interoperable applications that use health, economic, social, behavioral and environmental data to communicate, interpret, and act intelligently upon complex healthcare information to foster precision medicine and a learning health system.	Evans R. S. (2016). [9]

3. RESEARCH GAP :

Documentation of medical records are the legal requirements of healthcare which includes the documentation of patients health and treatments used during planning and management of patients in the hospital. Previous research shows that the time taken to retrieve paper based medical records and the problems related to manual medical records are enormous. Hence, as the technology improved the Electronic medical record implementation is underway in India, which improved the quality of service in the healthcare organization. This fact is seen in various research work that are published. However, the limitations are also observed while implementing the EMR, which figure out the barrier to implement EMR in the system. To the successful implementation of EMR it must be utilized by the clinicians and this remains the major challenge. This challenge is not studied in depth, and hence this gap is identified by the author of the present article, which will be addressed.

4. RESEARCH AGENDA :

Based on the research gaps the study has following agenda:
(1) What is the retrieval time for manual and electronic medical records?
(2) Why manual medical records are considered poor in the healthcare delivery system?
(3) How the electronic medical records does improves the quality of service?
(4) Which are the barriers to implement EMR system in the organization?

5. OBJECTIVE OF THE STUDY :

(1) To assess the time taken in retrieving patient medical record, in Out Patient Department (OPD) of a Multi-specialty hospital for both Manual and EMR systems.
(2) To analyze the advantages and limitations of Manual and EMR type of retrieving medical record system in the hospital with reference to the turnaround time of the medical records.
(3) To analyse the study using Fishbone analysis, SWOT Analysis, ABCD analysis, PESTLE Analysis.

The study is conducted in a tertiary care teaching hospital, which facilitates 450 beds situated in Dakshina Kannada district, Mangalore, Karnataka, India. The study tried to analyse the turnaround time, to retrieve the medical records of the patients attending the OPD of the hospital.

6. METHODOLOGY :

The study period is three months, where the data was collected in two phases. Observation method was used wherein time interval between revisit time and file receiving time is documented. The secondary data is collected through records, journals and other textbooks. The research site was urology department. Convenient sampling technique is used to select the records for the study. The first phase of data collected was before the implementation of EMR, where 75 medical records of the patients were randomly selected for the study.
In the second phase, when the electronic medical record system was introduced in the department, another set of 75 medical records which was processed by electronic software was selected. All these files were of the patients who revisited the department for the treatment. So the parameters for the Turn-Around Time (TAT) were the time of revisit requisition time and the time when files were received at the OPD. This period was calculated as Turnaround Time (TAT) and the analysis was conducted for the first objective. For the second objective, the investigator assessed the benefits and the limitations of the process of medical record retrieval, which was collected by the patients or the patient attendant who visited the hospital for treatment through the Interview method using a structured questionnaire.

7. RESULT :

The standard Turnaround Time (TAT), for retrieval of the medical records in the urology OPD, of the hospital was 20 minutes.

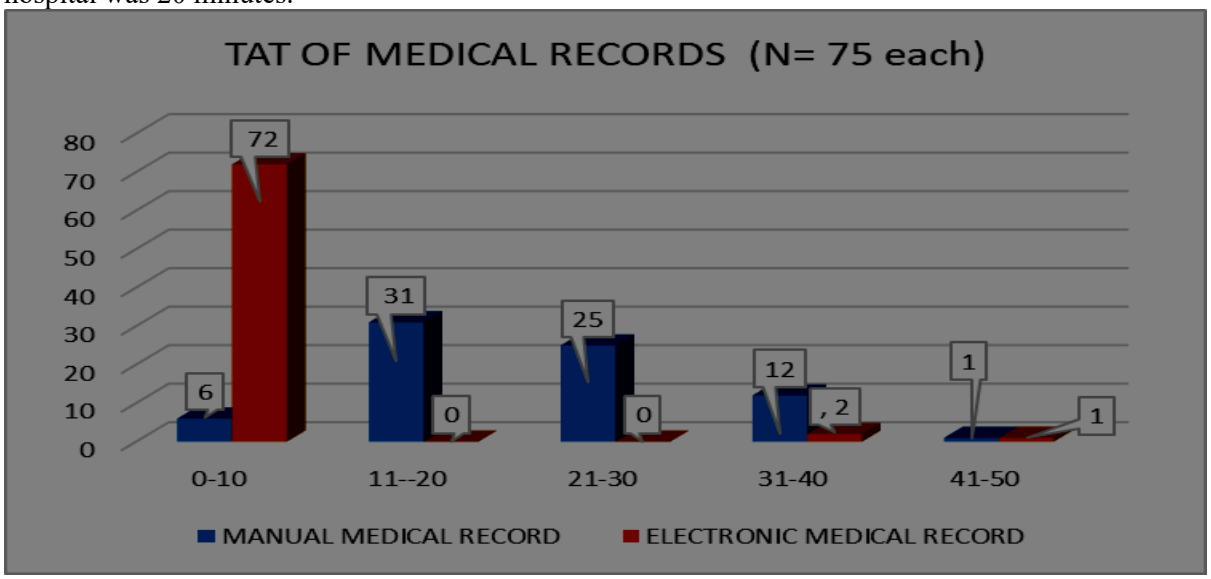

Fig. 1: TAT of Retrieval time for Manual and Electronic Medical Records, Source: Authors

The Figure 1 depicts the time taken for the retrieval of medical records when the patients revisit to the urology department. Keeping the standard TAT to get the medical records from the MRD of 20 minutes, we find the maximum time taken for manual medical record processing is 11-20 minutes were out of 75 records 31 are retrieved in this period. In the period of 21-30 minutes 25 records were retrieved. The standard time exceeded for 12 records when processed manually, which took 31-40 minutes and for 1 record, 41-50 minutes was taken. The result also points out that only 6 medical records were retrieved in first 10 minutes period after the entry of the patient to the department. Here we find 50.7% manually processed records took more than 20 minutes. Although various reasons like missing files, non-availability of file transferring system etc. , are given to justify the time taken to retrieve the medical records, we can understand the problems faced by the patients while waiting in OPD.

On the other hand 72 of the 75 files (96%) files which was electronically processed received within the standard TAT. Only 2 files were received in the time period of 31-40 minutes due to delay in scanning and only one file was not received in 41-50 minutes since it was totally missing. This led to preparation of new record of the patient.

Here attempt is made to understand the advantages and limitation faced by the Medical record department when processing the documents to the OPD during the patient revisit to the hospital. Manual Medical record was used since the emergence of the health care, and it was found very beneficial and easy to use. However, as we observed in the study, there are quite lot limitations especially, because there was ample delay during the process. The reasons for the delay are manageable, but are not practically done. This brought a technological improvement and Electronic Medical records took its place. During the present study, the author made an attempt to derive opinion regarding benefits and obstacles faced by the consultant in the OPD. Varied opinion was derived and it was found that there was improved diagnosis and treatment, and significantly the errors found in the electronic medical records were very few. It was found that the decision making responses speeded up, and helped to provide up-to-date and complete information about the patient care was available. It also enabled quick access to patient record which efficiently coordinated with other disciplines and experts. Electronic medical record enhanced privacy and security of patient data. There were several other benefits like, space saving, reduction in the usage of paper. All these advantages directed many other facilities like, increase in the number of patients, enhanced patient workflow and increased productivity. It also reduced operational costs like transcription services and overtime labour expenses and advance e-prescribing clinical documentation capabilities.

However, the study also brought out few limitations. Advances in technology don't always ensure acceptability. EMR can be expensive during implementation and usage. Investment will be in large scale with server support and other facilities. This also needs training at various level for the staff who operates the technology as well as the consultants. It was also noted that the Nurses were required to spend one-third of their service time dealing with documentation otherwise, there is the need of extra clerical staff which burdens the recruitment process of HRD. During the initial period, there was lot of technical malfunctions, which turned away the providers from EMR to manual medical records. The process also required, improved work flow process with appropriate training, which again was the burden of cost for the management with increased effort, time and resources. There was also the huge requirement of more computers in every department, which hindered the acceptability of EMR.

A Japanese quality control specialist, is credited with designing the fish bone outline to assist employees avoid solutions that merely address the symptoms of a much bigger issue. It is likewise called as cause - and-impact graph and Ishikawa chart [10]. A fishbone outline is a representation device for classifying the expected reasons for an issue [11]. This tool is used in order to identify a problem's root causes. In this study it helps to identify the various causes for the delay in manual medical records as well as Electronic Medical Records.

7.1 Fishbone Analysis:

A fishbone outline is an envisioning tool for classifying the potential causes and effects of a problem. This tool is utilized in finding out the root cause analysis [10]. A fishbone graph joins the act of conceptualizing with a kind of brain map model. The fishbone analysis is a tool for analyzing the organizational processes and its effectiveness. The study showed the problems of retrieval of Manual medical record and electronic medical record and the root cause of the delay or the problem.

The analysis showed that the causes for delay were due to factors related to the Facility Management, the manpower, the computer systems, the methods applied, the environment, and the materials.

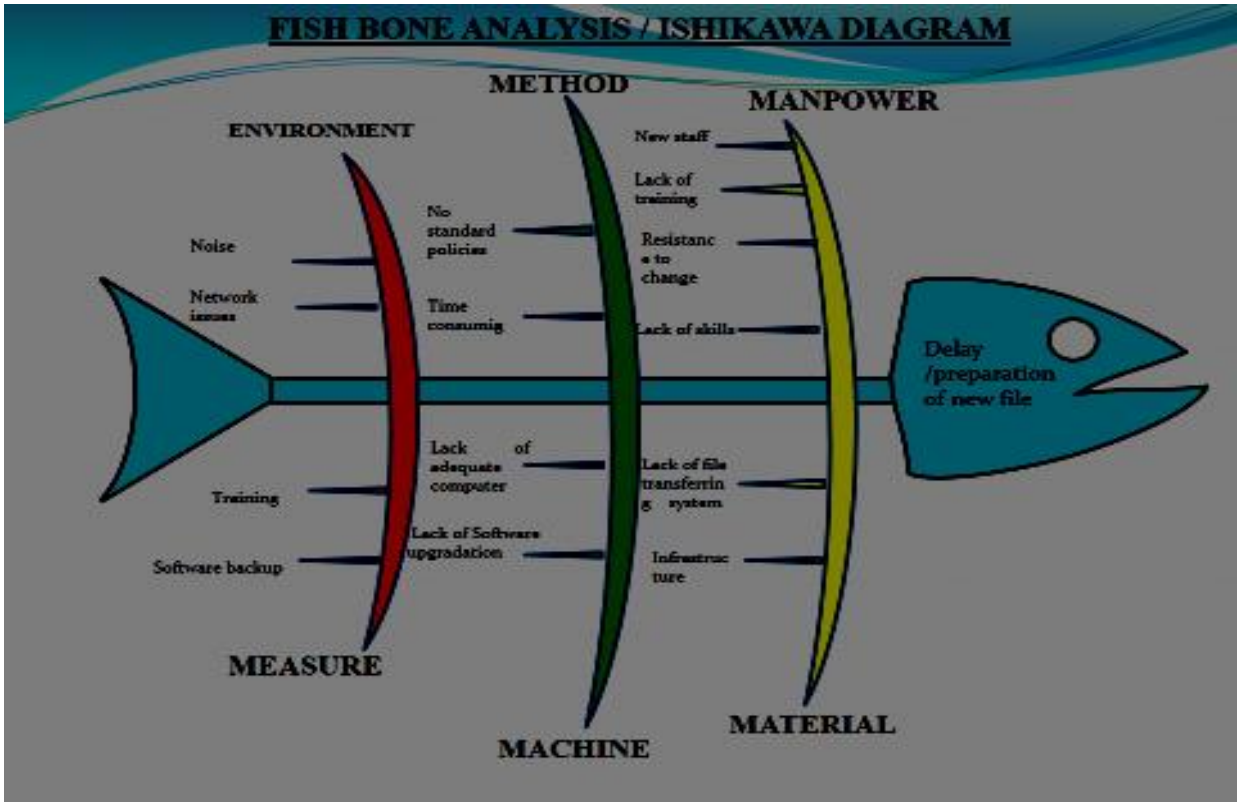

Fig. 2: Limitations of EMR by Fish Bone analysis on retrieving the Medical Records of the patient to the OPD

Ref: Coccia (2018). [10], [11]

7.2 Analysis of various aspects of Manual Medical Records and Electronic Medical Records Retrieval System:

The above figure No.2 clearly depicts the obstacles faced during the processing of the medical records when the patients revisit to the hospital for treatment. This enables the researcher to provide strategies to improve the services enabling the technological advancement and training to professionals to ensure quality care to the patients visiting the hospital.

Various analysis methods can be used to compare and conclude the benefit of Electronic Medical Records Retrieval System over the Manual Medical Records Retrieval System. They are illustrated and explained as follows:

7.3 SWOT analysis of the Manual Medical Record and the Electronic Medical Record:

SWOT analysis is a situational analysis or situational assessment. It is a strategic management technique to identify the strength, weakness, opportunity and threat of for any organization competition or project planning [12]. This tool helps the investigator to analyse the company's best operational areas and to plan a successful strategy for future. SWOT can also discover areas of the business which is holding you back, which is exploited by the competitors if the organization doesn't protect itself. Hence SWOT analysis examines the organizations internal and external factors, where in these factors may be within the control of the organization or few may not be.

Table 2: SWOT analysis of Manual Medical Records

I N T E	**Strengths**	**Weakness**
	• Reduced cost • Minimal Training • easy to use in a familiar Structure	• Lack of security [13] • Require Storage space [14] • Lack of back up [15]

RNAL	• All records sorted in one place • customization of formats is easy • flexible • portable	• Time consuming • Change in the format from one record to another • Temperature/pest controlled room • more man power[15]
EXTERNAL	**Opportunity** • Less capital expenditure • Simple • Reduced system related health issues • Patients benefits by better coordination • Introduction to technological advances [16] • cost reduction [16]	**Threat** • Errors related to legibility and Incomplete data [16] • loss of productivity if misfiled [16] • Reduced patient satisfaction • Quality of manual medical records [16] • Technological competitors

Table 3: SWOT Analysis of Electronic Medical Records

INTERNAL	**Strengths:** • Cloud Storage [17] • Files are secured & Strong back up [17] • Quick access [18] • Nil Errors related to legibility • Identical format • Viewable anywhere • Accurate data [18]	**Weakness:** • High cost [18] • Difficult in Training and errors in typing [18] • Different designed format • Customization requires software developer [17] • Lack of skills in documentation will slow down the work [18]
EXTERNAL	**Opportunity:** • Adoption to the new technology [19] • Strong competition • Improved image of the healthcare • Recognition • Enhance quality of service [19][20]	**Threat:** • Equipment breakdown [19] • Breach of information through internet hackers [20] • During conversation misplacing the data • Poorly designed forms [20] • Different systems [20] • Financial burden [21]

7.4 ABCD Analysis of the Manual Medical Record and the Electronic Medical Record:

ABCD is a tool used in business strategy to identify the list of a business advantages, benefits, constraints, and disadvantages in a systematic matrix. This system of analysis considers all determinants in key areas which discuss major issues by identifying the critical constraints [22][23][24].

Table 4: ABCD analysis for Manual and Electronic Medical Records

Type of records	Advantages	Benefits	Constraints	Disadvantages
Manual Medical Records	Easy to use in a familiar Structure	Reduced cost	Lack of backup [25]	Time consuming
	Customization of formats is easy	Minimal Training	Losing the file [25]	More man power
	Flexible	All records sorted in one place	More errors	More storage space
	Cloud Storage	Improved image of the healthcare	High cost	Different designed format

Electronic Medical Records	Files are secured & Strong back up	Recognition	Difficult in Training and errors in typing [25]	Lack of skills in documentation will slow down the work
	Quick access [25]	Enhance quality of service [25]	Customization requires Type equation here. software developer	Equipment Breakdown

7.5 PESTLE analysis of Manual medical record and Electronic medical record:

PEST Analysis comprises of political, economic, social and technological analysis by a management of an organization to assess the major external factors that influence its operation in the market more competitively [26]. This analysis looks into the "big picture" factors that might influence a decision, a market, or a potential new business, product line or product level. In this study, PEST analysis helps to find the various factors influencing the manual medical records and the factors affecting the adoption of new technology in the organization.

Table 5: PESTLE analysis of Manual medical record and Electronic medical record

Types of Record	Political	Economical	Social	Environmental	Legal	Technological
Electronic medical record	Nothing Significant	Fast and Accurate operation and Record Maintenance and retrieval enhances fast customer turn over and there by increases the patient handling capacity of the organization. This enhances Economic growth of the organization [27]	Electronic system usage ensure computerized recording, billing, payment and thus enhances the social status of stake holders and the organization. It also improves the Social status of Employees .Also Changing demographics, values, beliefs of the changing community / consumers [28]	Paper works are reduced in the Electronic methods. Less Paper usage means protection of Trees, Environment and Climate	Nothing Significant	Fast and Accurate operation and Record Maintenance and retrieval are enabled. Overall performance of the organization improves with the improved quality of services with new technology [29]

7.6 Comparison of Manual medical record system and Electronic medical record system:

Both the Manual medical record system and Electronic medical record system are analysed using three types of analysis tools, namely SWOT analysis, ABCD analysis, PESTLE analysis as indicated in above tables. The findings are compared below.

Table 6: Comparative of SWOT, ABCD and PESTLE analysis

S. No.	Manual Medical Record	Electronic Medical Record
SWOT Analysis	Manual record system is flexible to use with minimum training to the coordinators. It is also easy to use with customised formats and could be sorted in one place. Hence the cost is also reduced. However, it require high storage space, with increased security. It cannot be stored with back up. While filling the information, the format may change, and is time consuming. It was risk of pest and need more power. Manual	Electronic medical record is advantaged with high cloud storage, hence are secured with strong back up. They could be quickly accessed, with also is credited with nil errors. The format remains identical to each other, hence creating patients satisfaction. It could be accessible from anywhere through cloud. Since this system has to train the staff, and needs software, it incur high cost. However, it improves image of the health care and enhances quality service to the hospital, which increases patient

	medical record is simple and has less capital expenditure. Although it also is threatened with errors legibility and Incomplete data. With this error, it may reduce patient satisfaction.	satisfaction. It may enhance strong competition, to other health care organizations. The biggest threat for this system is Breach of information through internet hackers. It may also face poorly designed forms or equipment breakdown.
ABCD Analysis	The manual medical records is easy to use which has reduced cost. But it is time consuming and also lack back up. The benefit is that customization of formats is easier compared to electronic medical records. So minimal training is required for the staff using it. However, this system needs more manpower and the risk of losing the files are more. It was also seen that managing this system is more flexible. Although it could be sorted in one place, storage space is more. Errors could be more during the process in this system.	The main advantage of the electronic medical record is that, it could be stored through cloud, and the advanced technology improve the image of the health care. However, the cost for the designed format is more. However, this system shows the benefits of strong back up of the files, which ensures high security level. The main constraint of this type of process is that it ensures high skill in documentation, which may need vigor training and it may slow down the work [28][29]. However, it ensures quick access and enhance quality service and patient satisfaction.
PESTLE Analysis	Leads to increased man power and man hours to meet more workload, and thereby reduces the net growth of the organization in comparison to Electronic Record Maintenance system [27].	**POLITICL:** Nothing Significant **ENVIRONMENTAL:** Paper works are reduced in the Electronic methods. Less Paper usage means protection of Trees, Environment and Climate [29]. **SOCIAL:** Electronic system usage ensure computerized recording, billing, payment and thus enhances the social status of stake holders and the organization. It also improves the Social status of Employees. Also Changing demographics, values, beliefs of the changing community / consumers. **TECHNOLOGY:** Fast and Accurate operation and Record Maintenance and retrieval are enabled. Overall performance of the organization improves with the improved quality of services with new technology [30]. **LEGAL:** it's a legal document and, for the present and future care of the patient. Right to patient privacy must be regarded [31]. **ECONOMIC:** Fast and Accurate operation and Record Maintenance and retrieval enhances fast customer turn over and there by increases the patient handling capacity of the organization. This enhances Economic growth of the organization.

Source: Author

8. SUMMARY :

Patient satisfaction is one of the quality indicator in any of the health care sector. The present study interprets various analysis indicating the importance of updating the technology in order to provide quality service to the customers. The study interpreted the data with SWOT analysis, which depicted that Electronic medical record is advantageous with quick access to the customers in OPD, which decreased the waiting time. It also is accessed with cloud storage, hence, has less chances of losing the information. The ABCD analysis also interprets that although the manual medical records could be customized, electronic medical record is easier and can have back up. The PEST analysis clearly explains that electronic medical record procedure decreases the labour cost in the hospital, and standardizes the process which has an ability to increase the quality service. All these analysis also depicts the benefits received by the patients and patient attendants. The records is accessed easily and quickly by the attending doctors where follow up of the treatment, and prognosis becomes accurate. This factor increase patient satisfaction.

9. FINDINGS :

Hence from the result derived it is found that ,the time taken in retrieving patient medical record, in Out Patient Department of a Multispecialty hospital under study , using EMR system is much shorter than Manual system. There are many advantages in using the EMR type of retrieving medical record system in the Out Patient Department of a Multispecialty hospital under study with reference to the turnaround time of the medical records. The process decreased the waiting period of the patients in the OPD, increased the satisfaction level of the patients, increased critical disease management and decision making, quality indicator, improved safety and security of Medical Records, decreased the chances of loss of documents, and decreased the need of precious space requirements of storing bulk of documents. The result also depicted the number of patient handling capacity of the OPD has increased with the productivity of the hospital.

10. LIMITATIONS :

Though above are the findings, the limitations of the study are as follows

(1) The study is conducted only during peak hours of OPD timings 11am -1pm of the department under study
(2) Only 75 samples are taken for study as per convenient sample.
(3) The study is based on the available resources.
(4) The responses are based on the staff available during the study.
(5) The study is limited to only one healthcare.

11. SUGGESTIONS :

(1) Based on the study it is suggested that, the time taken in retrieving patient medical record, in Out Patient Department of the Multispecialty hospital under study, using EMR system can be improved by using electronic gadgets of state of art technology and by optimum synchronization of them.
(2) The time taken in retrieving patient medical record, the hospital under study, using EMR system can be improved by proper training of the staff and assigning right task.
(3) The advantages in using the EMR type of retrieving medical record system in the hospital under study can only been cashed only if all allied departments are trained in well-coordinated work
(4) The advantages in using the EMR type of retrieving medical record system in the hospital under study can only be uncashed only if all related medical and non-medical staff of related departments work in well-coordinated way.
(5) The advantages in using the EMR type of retrieving medical record system in the hospital under study can only be encashed, if all related departments have sufficient infrastructure and motivated staff
(6) The present study recommends that further research could be conducted at a large scale in bigger organizations. Study result concluded using the data of single organization [32].

12. CONCLUSION :

Documenting medical records of any patient is important for many reasons, be it for general use of legal purpose. In spite of the growth of computer technology in medicine most medical centres are still documenting on paper medical records [18]. Manually recording treatment process and the prognosis

is easy, but have few limitations like storing, disposing process, or even the time taken to retrieve the files during the revisits of the patients to the hospital. Hence with the technical development, electronic processing of medical records emerged which solved lots of limitations. The present study studied the process of manually medical records and electronic medical records in order to find the difference between the two. In the first phase when manual medical recording was in process, it was seen that only 50.3% of the patient's medical records could reach OPD within the set standard time of 20 minutes, which disadvantaged the patients with long waiting hours in OPD. This set a limitation to the appointment given to the patients in OPD hours. In the second phase of the study, when electronic medical records were introduced, 97% of the medical records were retrieved by the consultant within few seconds of the patient entry to the consultant room with the help of only Unique Identification number of the patient.

REFERENCES :

[1] Côrtes, P. L., & Côrtes, E. G. D. P. (2011). Hospital information systems: a study of electronic patient records. *JISTEM-Journal of Information Systems and Technology Management*, *8*(1), 131-154. Google Scholar↗

[2] Mogli, GD., (2001). *Medical record organization & management*, Jaypee brothers, Medical Publishers Pvt Ltd, New Delhi. 1-628. Google Scholar↗

[3] O'Toole, M. F., Kmetik, K. S., Bossley, H., Cahill, J. M., Kotsos, T. P., Schwamberger, P. A., & Bufalino, V. J. (2005). Electronic health record systems: the vehicle for implementing performance measures. *American Heart Hospital Journal*, *3(2)*, 88-93. Google Scholar↗

[4] Tilahun, B., & Fritz, F. (2015). Comprehensive evaluation of electronic medical record system use and user satisfaction at five low-resource setting hospitals in Ethiopia. *JMIR medical informatics*, *3(2),* 1-18. Google Scholar↗

[5] Miller, R. H., & Sim, I. (2004). Physicians' use of electronic medical records: barriers and solutions. *Health affairs, 23(2)*, 116-126. Google Scholar↗

[6] Taylor, D. N. (2017). A literature review of electronic health records in chiropractic practice: common challenges and solutions. *Journal of chiropractic humanities*, *24*(1), 31-40. Google Scholar↗

[7] Scholl, J., Syed-Abdul, S., & Ahmed, L. A. (2011). A case study of an EMR system at a large hospital in India: challenges and strategies for successful adoption. *Journal of biomedical informatics*, *44*(6), 958-967. Google Scholar↗

[8] Greiver, M., Barnsley, J., Glazier, R. H., Moineddin, R., & Harvey, B. J. (2011). Implementation of electronic medical records: effect on the provision of preventive services in a pay-for-performance environment. *Canadian Family Physician*, *57*(10), e381-e389. Google Scholar↗

[9] Evans, R. S., (2016). Electronic health records: then, now, and in the future. *Yearbook of medical informatics*, *25*(S 01), S48-S61. Google Scholar↗

[10] Coccia, M. (2018). The Fishbone diagram to identify, systematize and analyze the sources of general purpose Technologies. *Journal of Social and Administrative Sciences*, *4(4)*, 291-303. Google Scholar↗

[11] Joanna, P., Lorraine, S. (2013). Using fishbone analysis to investigate problems, *Nursing Times 109(15)*, 18-20. Google Scholar↗

[12] Weihrich, H. (1982). The TOWS matrix—A tool for situational analysis. *Long range planning*, *15*(2), 54-66. Google Scholar↗

[13] Newgard, C. D., Zive, D., Jui, J., Weathers, C., & Daya, M. (2012). Electronic versus manual data processing: evaluating the use of electronic health records in out-of-hospital clinical research. *Academic Emergency Medicine*, *19*(2), 217-227. Google Scholar↗

[14] Boonstra, A., & Broekhuis, M. (2010). Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions. *BMC health services research*, *10*(1), 1-17. Google Scholar↗

[15] McDonald, C. J. (1997). The barriers to electronic medical record systems and how to overcome them. *Journal of the American Medical Informatics Association*, *4*(3), 213-221. Google Scholar↗

[16] Newgard, C. D., Zive, D., Jui, J., Weathers, C., & Daya, M. (2012). Electronic versus manual data processing: evaluating the use of electronic health records in out-of-hospital clinical research. *Academic Emergency Medicine*, *19*(2), 217-227. Google Scholar↗

[17] Chen, Y., Ding, S., Xu, Z., Zheng, H., & Yang, S. (2019). Blockchain-based medical records secure storage and medical service framework. *Journal of medical systems*, *43*(1), 1-9. Google Scholar↗

[18] Gyamfi, A., Mensah, K. A., Oduro, G., Donkor, P., & Mock, C. N. (2017). Barriers and facilitators to electronic medical records usage in the emergency centre at Komfo Anokye Teaching Hospital, Kumasi-Ghana. *African Journal of emergency medicine*, *7*(4), 177-182. Google Scholar↗

[19] Kumar, S., & Aldrich, K. (2010). Overcoming barriers to electronic medical record (EMR) implementation in the US healthcare system: A comparative study. *Health informatics journal*, *16*(4), 306-318. Google Scholar↗

[20] Hersh, W. R. (1995). The electronic medical record: Promises and problems. *Journal of the American Society for Information Science*, *46*(10), 772-776. Google Scholar↗

[21] Choi, J. S., Lee, W. B., & Rhee, P. L. (2013). Cost-benefit analysis of electronic medical record system at a tertiary care hospital. *Healthcare informatics research*, *19*(3), 205-214. Google Scholar↗

[22] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2015). A new ABCD technique to analyze business models & concepts. *International Journal of Management, IT and Engineering*, *5*(4), 409-423. Google Scholar↗

[23] Aithal, P. S. (2016). Study on ABCD analysis technique for business models, business strategies, operating concepts & business systems. *International Journal in Management and Social Science*, *4*(1), 95-115. Google Scholar↗

[24] Dsouza, Prima Fredrick, Sujaya, H., & Salins, Meghana (2022).Quantitative ABCD Analysis of Online Shopping. *Internaltional Journal of Applied Engineering and Management Letters (IJAEML)*, 6(1), 313-329. Google Scholar↗

[25] Couralet, M., Leleu, H., Capuano, F., Marcotte, L., Nitenberg, G., Sicotte, C., & Minvielle, E. (2013). Method for developing national quality indicators based on manual data extraction from medical records. *BMJ quality & safety*, *22*(2), 155-162. Google Scholar↗

[26] Frederick, D. P., & Parappagoudar, S. K. (2021). A Descriptive Analysis on Sustainable Business Strategy of Online Food Service Industry. *International Research Journal of Modernization in Engineering Technology and Science, 3(3), 545-554.* Google Scholar↗

[27] Selvia, R., & Sulistiadi, W. (2019). Relative Effectiveness of Electronic Medical Record Compared to Physical Medical Record: A Systematic Review. In *6th International Conference on Public Health*, 495-506. Sebelas Maret University. Google Scholar↗

[28] Chen, C., Weider, M. K., Konopka, M. K., & Danis, M. (2014). Incorporation of socio-economic status indicators into policies for the meaningful use of electronic health records. *Journal of health care for the poor and underserved*, *25*(1), 1-16. Google Scholar↗

[29] Shortliffe, E. H. (1999). The evolution of electronic medical records. *Academic Medicine-Philadelphia*, *74*(1), 414-419. Google Scholar↗

[30] Steinkamp, J., Sharma, A., Bala, W., & Kantrowitz, J. J. (2021). A Fully Collaborative, Noteless Electronic Medical Record Designed to Minimize Information Chaos: Software Design and Feasibility Study. *JMIR formative research*, *5*(11), 237-289. Google Scholar↗

[31] Hajavi, A., Khoshgam, M., & Hatami, M. A. R. Y. A. M. (2008). A Comparative Study on regarding Rate of the Privacy Principles in legal Issues by WHO Manual at Teaching Hospitals of Iran, Tehran and Shahid Beheshti Medical Sciences Universities 2007. *Journal of Health Administration*, *11*(33), 7-16. Google Scholar↗

[32] Bhat, S., Gijo, E. V., & Jnanesh, N. A. (2016). Productivity and performance improvement in the medical records department of a hospital: an application of Lean Six Sigma. *International Journal of Productivity and Performance Management*. *65(1)*, 98-125. Google Scholar↗

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