APPLICABILITY OF ELECTRONIC MEDICAL RECORDS IN HEALTH SECTOR: AN INTEGRATIVE REVIEW

APLICABILIDADE DO PRONTUÁRIO ELETRÔNICO NA ÁREA DA SAÚDE: REVISÃO INTEGRATIVA

LA APLICABILIDAD DE LOS REGISTROS MÉDICOS ELECTRÓNICOS EN LA AREA DE LA SALUD: UNA REVISIÓN INTEGRADORA

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ABSTRACT

Objective: identifying the main contributions of the electronic record for patient care. Method: an integrative review guided by the question << What is the contribution of the electronic record for patient care? >> held in database LILACS and SciELO Virtual Library in the period June-December 2013. The studies were analyzed and presented descriptively and in tables. Results: ten studies were the sample. It was observed that the technological resource through the use of electronic medical records helps in improving patient care and organization of the health service. Some limitations of professional order, the structure of the service and technical constraints were also highlighted. Conclusion: the electronic patient record corresponds to an essential technological resource to health services, as it allows benefits to the organization and to the patient. Descriptors: Electronic Record; Information Technology; Health.

RESUMO


RESUMEN

Objetivo: identificar las principales aportaciones del registro electrónico para la atención al paciente. Método: revisión integradora guiada por la pregunta << ¿Cuál es la contribución del registro electrónico para la atención al paciente? >> celebrada en la base de datos LILACS y Biblioteca Virtual SciELO en el período junio-diciembre de 2013. Los estudios fueron analizados y presentados de forma descriptiva y en tablas. Resultados: diez estudios formaron la muestra. Se observó que el recurso tecnológico a través del uso de registros médicos electrónicos ayuda a mejorar el cuidado y la organización del servicio de salud de los pacientes. Algunas limitaciones de orden profesional, de la estructura del servicio e limitaciones técnicas también se pusieron de relieve, de las restricciones y. Conclusión: el prontuário eletrônicos del paciente corresponde a una característica tecnológica esencial a los servicios de salud, ya que permite los beneficios a la organización y al paciente. Descriptores: Registro Electrónico; Tecnologías de la Información; Salud.

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INTRODUCTION

Technological advances have made knowledge in health care more affordable, with the possibility of widespread use and sharing of information, highlighting the ubiquitous computing that aims to bring computing devices for day-to-day man. In this sense, concern for the welfare of our client, the increasing speed at which advances scientific knowledge and the consequent need for a process of optimal decision, put health in different position in relation to other fields dependent on the handling of information.1

The use of information technology in health care includes a variety of applications, from typical systems of management information to systems of automation and support of diagnostic tasks. A typical application and relatively widespread information management is the Electronic Health Record (EHR), which, in principle, helps in bureaucratic tasks and information retrieval of patients, a process that incorporates a user logs into a computer system, in order to generate information for diagnosis and treatment, documenting the monitoring and facilitating planning assistance.2

The PEP can be defined as a set of information regarding the patient, stored digitally, whose main objective is to enable the quality of service, accuracy of information and health care in places and different scenarios.3 The PEP is one of the innovations that have been adopted in health services as part of this movement for the introduction of Information and Communication Technology (ICT), in order to achieve gains in efficiency and effectiveness in the management of these organizations.4

There are numerous advantages and possibilities arising from the use of PEP, such as faster access to health history and interventions; simultaneous use of several services and health professionals; absolute clarity of the information; elimination of redundant data and requests for additional tests; integration with other information systems; continuous processing of data, making them immediately available to all actors involved in patient care and organized information more systematic.5 Besides these advantages, the PEP provides access to knowledge updated with consequent improvement of the decision-making process and effectiveness of care.6,7

Its vast body of information is capable of generating knowledge and can be understood as its main database, from which all systems are built of information, whether managerial, decision support, teaching support, and statistical for research. Thus, the PEP enables the distributed data access and information, promotes knowledge of all health care activities and allows a better performance of the activities, creating a new way of working for health services and changes in management because it allows access to distance information.8

PEP may represent a new treatment concept in health information and serves as a tool to assisting in the diagnosis and treatment of health of a person; however, one realizes that the studies on this topic leave gaps relating to the contributions that use of this instrument brings to patient care.

OBJECTIVE

- Identifying the main contributions of the electronic record for patient care.

METHODOLOGY

This is a study using the integrative review method for allowance of the synthesis of multiple published studies and general conclusions about a particular area of study. To this end, we traveled six stages: identifying the topic, literature search, categorization of studies, assessment of the studies included in the integrative review, interpretation of results and synthesis of knowledge evidenced in the analyzed articles or presentation of the integrative review.

The guiding question of this integrative review is in << What is the contribution of the electronic record for patient care? >>

The selection of articles was conducted in the period from June to December 2013, the database of the Latin American and Caribbean Literature on Health Sciences (LILACS) and Virtual Library Literature Scientific Electronic Library Online (SciELO), using the following descriptors: “electronic patient record”, “application area”, “field” and “contributions in aid.”

The following criteria for inclusion of articles were defined: to be published in Portuguese, contain the descriptor “electronic patient record” associated with one of the other descriptors in your title or in your resume, have been published in the last ten years and is available in full. Articles were excluded duplicates and those that did not contain summaries.

Initially, it was delimited descriptors as “electronic patient record” and “application area”, from this search 12 listings were found in the database and the virtual library, six in six in LILACS and SciELO, four of which obeyed...
the inclusion criteria and were selected for the study.

The second search included the keywords "electronic patient record" and "field", this quest ten references were found in the database and the virtual library searched. In six references were found LILACS and SciELO met four references, of these, six were repeated, only four were selected for the study.

The third and final search descriptors considered "electronic patient record" and “contributions on tour” from this search 13 references were found, eight in LILACS and SciELO in five, ten of which were repeated, only two were selected for the study.

35 selected references. After reading and applying the established inclusion criteria resulted in a sample of ten articles.

**RESULTS**

In the present study ten articles that met the inclusion criteria established, as shown in Table 1 were analyzed.

<table>
<thead>
<tr>
<th>Title</th>
<th>Year</th>
<th>Journal</th>
<th>Database/Virtual Library</th>
<th>Researcher’s skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic health record of patients: integrating clinical information and medical imaging</td>
<td>2003</td>
<td>Biomedical Engineering Magazine</td>
<td>LILACS</td>
<td>Medicine</td>
</tr>
<tr>
<td>Electronic health record as a management tool in the Dental Office</td>
<td>2010</td>
<td>Brazilian Dentistry Magazine</td>
<td>LILACS</td>
<td>Dentistry</td>
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<td>Electronic patient record: some footprints into the future</td>
<td>2010</td>
<td>Diagnosis and Treatment Magazine</td>
<td>LILACS</td>
<td>Medicine</td>
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<tr>
<td>Adoption of electronic patient record in university hospitals of Brazil and Spain: the perception of professionals</td>
<td>2010</td>
<td>Public Management Magazine</td>
<td>SCIELO</td>
<td>Statistics Sociology Administration</td>
</tr>
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<td>Determinants of adoption of information systems in the health area: a study on the electronic medical record</td>
<td>2010</td>
<td>Mackenzie Administration Magazine</td>
<td>SCIELO</td>
<td>Administration</td>
</tr>
<tr>
<td>The electronic patient record in the Brazilian health system: a reality for the doctors?</td>
<td>2011</td>
<td>Scientia Medica</td>
<td>LILACS</td>
<td>Medicine Dentistry Informatics</td>
</tr>
<tr>
<td>Indicators of use of the electronic patient record.</td>
<td>2011</td>
<td>Journal Of Health Informatics</td>
<td>LILACS</td>
<td>Informatics Medicine</td>
</tr>
<tr>
<td>Literature review: deployment of electronic patient record</td>
<td>2012</td>
<td>Journal Of Health Informatics</td>
<td>LILACS</td>
<td>Nursing</td>
</tr>
<tr>
<td>Validation of the electronic patient record in an institution of higher learning in health: report of the experience in module anamnesis.</td>
<td>2013</td>
<td>Journal of Health Informatics</td>
<td>LILACS</td>
<td>Medicine Dentistry Informatics</td>
</tr>
<tr>
<td>Electronic health record: a tool that can contribute to the integration of networks for health care.</td>
<td>2013</td>
<td>In Health Debate</td>
<td>SCIELO</td>
<td>Medicine Nursing</td>
</tr>
</tbody>
</table>

Figure 1. Distribution of articles surveyed according to the title, year of publication, name of the journal, and database training of researchers.

Through the results it is noted that several studies have been developed in order to verify the use of technological resources in health. As shown by the titles of the articles analyzed, this issue is being increasingly studied and when talking on the applicability of technology in health care, the vast majority of studies are focused on analysis of the Patient Electronic Medical Records. With regard to the journals that publish on the subject stands out first the Journal of Health Informatics has published three articles, 30% of the articles analyzed. Regarding the database and library that the articles are published, 70% were published in the Lilacs database and 30% in Scielo library.

Regarding the training of researchers, 80% of the analyzed articles were published by researchers in the field of health and the remainders were researchers in management and information technology. The fact that most researchers belong to healthcare is justified by the fact that the theme of the articles analyzed contemplate the applicability of the technology in this area.

As for areas of application and contribution of PEP, the study showed that the electronic medical record as well as being used in healthcare, with nine publications, is also used in the administrative area, although restricted to a publication. However, the greater emphasis is on health, especially in the areas of medicine and nursing with seven publications.

Regarding areas of contribution of PEP, the study showed that the electronic records to
aid in the treatment and diagnosis, as well as in disease prevention, and its greatest support in the treatment, represented in this study by five of the articles analyzed. Therefore, its use can bring contributions both in patient care as well as in the organization of the service, as shown in Table 2.

<table>
<thead>
<tr>
<th>CONTRIBUTIONS ARISING FROM USE OF PEP</th>
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<tr>
<td>In patient care</td>
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<tr>
<td>- Improves the Organization of data on the patient's clinical life assisting diagnosis and treatment;</td>
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<td>- Have significant impact on the quality of patient care;</td>
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<tr>
<td>- Identifies the patient making errors due to hard-to-read handwriting;</td>
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<td>- Offers better conditions of service to patients on the basis of the Organization of services and work processes;</td>
</tr>
<tr>
<td>- Enables faster access to information, simultaneous use of the information, readability, elimination of data redundancy and requests of scans, eliminating retyping of information, more systematic organization of customer data, improving the effectiveness of care and treatment;</td>
</tr>
<tr>
<td>- Improves the patient's adherence to the proposed treatment due to the overview that the team has of their clinical evolution and of their behavior as a user assistance network.</td>
</tr>
<tr>
<td>In the Organization of the service</td>
</tr>
<tr>
<td>- Facilitates communication and sharing of information in a country with continental dimensions and immense cultural diversity by supporting the management of services and providing more quality customer service and public administration;</td>
</tr>
<tr>
<td>- Provides better control of patients, medication use and costs, gain more accuracy and correctness, since the information of patients are recorded in an information system that integrates the healthcare and administrative areas, with the possibility to generate key performance indicators for these areas.</td>
</tr>
</tbody>
</table>

Figure 2. Distribution of articles surveyed according to the contributions arising from the use of PEP.

It is possible, observing in the analysis of the articles that the use of PEP contributes significantly in patient care assisting in the diagnosis and treatment due to the more systematic organization of data, which has shown to improve the effectiveness of care, as well as treatment raising the quality of care provided to patients.

In addition to the contributions in patient care, the analysis of the articles revealed advantages in the organization of health services, for example, facilitates communication and sharing of information between services, provides better control of patients, medication use and costs, generating indicators for planning assistance and administrative activities.

The articles analyzed also showed the progress achieved through the use of the PEP, as shown in Table 3.

<table>
<thead>
<tr>
<th>ADVANCES OBTAINED WITH THE USE OF PEP</th>
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<tbody>
<tr>
<td>- Digital Certification</td>
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<td>- Dissemination of the implementation of the PEP in health services</td>
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<td>- Dissemination of research and studies that analyze the PEP</td>
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<td>- Reduction of paper usage</td>
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<td>- Reduction of bureaucratic activities</td>
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<tr>
<td>- Improvement in health and information management</td>
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<tr>
<td>- Possibility of recovery and information sharing</td>
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<tr>
<td>- Cost reduction</td>
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<tr>
<td>- Improvement in the quality of patient care</td>
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</tbody>
</table>

Figure 3. Distribution of articles surveyed according to the progress observed through the use of PEP.

Observed in studies that comprised the sample, several advancements associated with the use of PEP, including: digital certification, dissemination of research addressing the issue, reduction of bureaucratic activities under the responsibility of health professionals, improving the management of customer information, reduction of costs and, as a final result of its use, improved patient care.

Despite the many advantages presented by studies on the use of PEP, the technology has some limitations, as shown in Table 4.
LIMITATIONS OBSERVED WITH THE USE OF PEP

| Professionals | -Difficulty of handling technology  
| -Need for realization of trainings  
| -Elaboration of programs of continuing education in the area  
| -Resistance to use of the system  
| -Conflict of opinions among professionals about the benefits of PEP  
| -Dehumanization of assistance  
| Structural | -Lack of financial resources for implementation of PEP  
| -High costs for system maintenance  
| -Dubious investment rate of return  
| -Complexity of the technological resources necessary for the implementation of the PEP  
| -Difficulties of integration of health information  
| Techniques | -Time of permanence of the data in the system  
| -User’s access to information  
| -Team of information technology (IT) not prepared  
| -System slowdowns  
| -Long road for access to a specific file  
| -Absence of important information about the patient  
| -Applicability of PEP in certain health services  
| -Occurrence of possible system failures that prevent its handling  
| -Difficulties of deploying an online system

Figure 4. Distribution of articles surveyed in accordance with the limitations observed with the use of PEP.

It is noticed that the limitations caused by the use of PEP can be categorized into related to professional limitations, structural limitations of technology, or health problems associated with the system may have limitations services.

With regard to human resource constraints, it is observed that the adhesion strength of a new technology in the labor process in health is one of the main problems revealed by the studies. With respect to structural limitations, we realize that the problems are related to the financial sector required by the high costs of technological systems. Lastly, the technical limitations related to the operation of the system.

DISCUSSION

Importantly, the PEP constitutes a database on the patient's clinical history. Its purpose is to allow the storage and retrieval of clinical events of an individual, so that all health professionals can access, thus enabling better care to the individual. It also offers the possibility of using this information to conduct studies, compare results and create new knowledge. Therefore, the PEP may represent a new treatment concept of health information and serve as a tool to assist in the diagnosis and treatment of health of a person, wherever it is, and anyone who are under their care.9

The joint use, both in health and in the administrative area of the medical records should be able to provide disaggregated or aggregated information about people served, the treatments that were performed, therapeutic ways that have yielded positive results, as patients and responded how much it cost each form of treatment or procedure cumulatively for all procedures a patient, group of patients or an entire population. This aggregated and systematized information is needed to characterize the level of population health and enable the construction of models and policies for the treatment and management of health care organizations.10

Regarding aid in treatment, studies show that it organizes the data records of patients, lists the laboratory tests and diagnostic services, prescription medications and dosages with their diagnosis, according to the International Classification of Diseases (ICD) that allows the doctor select the options you want, speeding up service. The electronic record also provides the use of protocols. Offer the option of selecting certain protocols to guide medical management, such as observed in the field: women, children, adults, hypertension/cardiovascular risk, diabetes, asthma, elderly, dengue, immunization, oral health. These protocols indicate procedures, tests and medications related to the diagnosis or treatment of diseases.11

In primary care PEP supports the actions of health promotion and disease prevention. The information contained in records that are the basis for the analysis of health status of the enrolled population, as well as the programming of activities, control and evaluation, and is the power source of all information systems of the Ministry of health.12

We cannot forget that the PEP was developed with the purpose of making the promotion of health, prevention of diseases and risks, providing health team the complete

English/Portuguese

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that offers alternatives to the limitations of medical records used.17

The use of PEP can achieve numerous benefits, eg, information always legible; offering support to the diagnosis and decision making; possibility of variation in the way of visualizing the data; greater certainty as to the possibility of data loss due to the possibility of backups; greater possibility of certainty as to the confidentiality of information due to the possibility of electronic access controls; the system may not allow procedures not included in the protocols involved and; facility audits.18

Despite all these benefits, the implementation of the PEP needs to be inserted into an institutional policy, since, in addition to patient care, involves the administrative sector and the audit of the health service.

PEP permits improving the quality of patient care while also enabling increased productivity of health professionals, ease of access to services and reducing administrative costs. As hospitals deploy electronic medical records, the institution as a whole is benefited.19

Information technology can become more efficient provision of quality health care by providing better documentation of procedures, test results in less time, processing and storage of information and better management of chronic diseases.20

In spite of all anticipated benefits across studies, there are some limitations on the use of PEP. How many limitations related to human resources, it is noticed that many health professionals recognize that, in the long term, the computerized records can improve quality of care, but most are reluctant to invest time and energy into learning a new system working22. Accordingly, to reach the expected benefits of its use is necessary to restructure the way health professionals of different categories and specialties use the information and how these interact. Therefore, the degree of success of the new tool will depend on how much these professionals will be willing to invest resources to redesign their practice, and how much are aware that investment returns them.21

Regarding technical failures, study in a Municipal Hospital in the city of Volta Redonda - RJ, found that the occurrence of faults in the PEP system was the main drawback pointed out by doctors interviewed (78%). This fact should be worked out by the institutions that want to deploy the technology, since the confidence of
professionals who use the system is essential.17

One realizes that literature expresses several advantages over the use of PEP. However, some authors consider and report as limitations of its use: the dependence on software, hardware and infrastructure grid, maintenance; investments in hardware, software and training of users of different records are not trivial; the electronic medical record needs constant maintenance, updating and maintenance of data integrity, which requires different organizational approaches and investments; the use of electronic medical records training requires both the use of computational tools as the software itself. This training is often the cornerstone for the acceptance and use PEP; must maintain the privacy of data by electronic means; thus, investment in security should be considered; the difficulties of health professionals who have not undergone prior training in typing process, maintaining the doctor-patient relationship in front of a computer and spent time with the query on a computer should be observed.22

Even in the world of information technology, it is known that it is impossible to automating processes that are not well defined; it is not the presence of a network of computers that will solve conceptual and organizational problems previously unsolved. If there are no defined processes, there is no way to computerize. The computer is only a facilitating tool, not a solution to all the problems presented by the health services.21

Given all this contextualization observe how important the electronic medical record as an innovative and effective tool when it concerns the holistic care of the patient. It is known that, if you still have many obstacles to be faced and routes to be followed in order that the insecurity about the new, to change, has made the implementation of this tool is postponed.22

CONCLUSION

The study showed that national concerning the applicability of information technology in healthcare through the use of electronic medical publications are well advanced. The papers published in this area, mostly, are the result of original research with quantitative approach carried out by health professionals and office workers, showing great interest of researchers in check, in reality, as this phenomenon is occurring.

It can be concluded that in relation to the areas of application of PEP, besides being used in healthcare, it is also used in the

administrative area, with greater emphasis on health, especially in medicine and nursing, giving subsidies in the treatment, the diagnosis, but also in disease prevention. However, the use of this model record in health care is essential since it provides higher quality at the service and public management.

Another important point highlighted in the research is that in addition to contributions in patient care, the analysis of the articles also revealed that the PEP provides advantages in the organization of health services. Therefore, its implementation can be a big step toward improving the quality of care provided to patients by generating facility, agility and safety for health professionals. Thus, the Brazilian health services would become more complete and accurate in their care.

It can be concluded that the electronic medical record is a proposal to meet the demands of new models of care and management of health services, it is clear that improvements in the way in which records are produced, processed and stored can contribute to it and can considerably reduce problems with readability, organization, access and use of these documents. Despite the advantages, its implementation has some limitations, for example, depends on the existence of software, hardware, infrastructure networks and training of users of different records. However, it is hoped that this, is not an obstacle to its implementation, since it has been shown that computerized information allows the recording of patient care throughout the health care team with more speed and accessibility, so that all are able to contextualize the assistance of integral and holistic way.

It is hoped that this study can contribute to the knowledge of the importance of electronic medical record development work of health professionals in hospitals and in primary care, improving the quality of work and reducing complications such form and providing agility and quickness in action.

REFERENCES

Applicability of electronic medical records...


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