

Computerization of Medical Laboratories Examinations in the Sudan : Reality and Expectations :Case Study Documentation and Information Center, National Center for Research- Sudan

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Keywords: *Computerization-Medical Laboratories – Medical information-Database- documentation center.*

Abstract- *Medical information services is one of the important pillars for researchers, but this information become worthless or benefit if they reach their devotees in a timely and appropriate.*

Medical information is the foundation upon which the medical research in different areas in the Sudan was therefore of interest to information and its role in various fields.

There are multiple institutions in Khartoum State for medical information to medical institutions from the University and hospital, the researcher noted that medical institutions suffer from a lack of human and technical resources, and low in information services provided by these institutions pushed all these and other reasons, a researcher of the Department of information systems of medical documentation and information centre. The study has followed the case study institutions information and has been used in a number of scientific curricula in both descriptive and analytical survey, while the study of data collection was used the following tools:-resolution as a key tool in data collection, interview and observation.

The questionnaire was distributed to researchers and graduate students and university students majoring in medical laboratory of global databases and local documentation and information centre of the National Research Center.

Search assumptions:

1- Systems and information technology in areas of current medical information.

Medical information is fundamental for healthy society. 2-

3- Medical analysis laboratories in the Sudan government to determine the effectiveness of information technology.

The purpose of the Research:-

A survey of sources and components of medical information systems in Sudan 1-

Identify the efficiency of current medical information systems in Sudan 2-

3- To raise awareness of the spirit of citizens and role of medical information systems

Research objectives:-

1-access through the study of the current status of medical information in Sudan.

Proposal of efficient systems suitable for medical information in Sudan. 2-

proposed work to automate medical analysis laboratories in Sudan. 3-

4-Reverse the current situation of the beneficiaries of the services of medical information.

Introduction:-

Interest is growing Palmalomyat health and medical , even become one of the key ingredients that are not indispensable national system of health care. Despite the different definitions of health and medical informatics, all definitions agree among themselves

on the use of computer applications in health and medical care.

The medical data can be taken in the field of computers and various forms according to the needs and views, but the most important thing is the quality and completeness of data, reliability and accuracy. And expanding the role of medical informatics in the work of doctors up to meet the needs and the needs of training and continuing education throughout life. Hence, it was necessary to provide medical informatics education as a long-term investment in the medical professions. The areas where it is applied medical informatics Interestingly, management, epidemiological surveillance, and medical records - based computers, and access to publications and information services, and knowledge-based services, and geographic information systems, and e-health and telemedicine

Definition of medical informatics:-

The field of study concerned with to medical information and biological weapons and their use, including medical computing (introduction of computer applications in medical practice), and the study of the nature of medical information itself.

Medical informatics is the science that is based on the acquisition and preservation, retrieval and application of knowledge and biomedical information in order to improve patient care, education, research and administration. And health informatics known as an umbrella term used to include specialization emerging quickly and of using methodologies and computing technology, networking and communications to support health-related fields such as medicine, nursing, pharmacy and dentistry. This definition covers a very wide range includes the exchange of messages and clinical management, and retrieval of information sources and references, and the operation and management of health services, save and retrieve patient information, health education and health promotion, epidemiological surveillance, and monitoring of health status, and clinical decision support, and analysis of radiographs and clinical signs (clinical) and provide models and telemedicine

Encoded data, the user can interpret the data first and then give it coded. It is worth mentioning that the coding may lead to mistakes during interpretation. Although the encoded data limits the way of self-expression, but it imposes subordination terms of the standards agreed to put it, which is very important if

I want to use the data by other people who are not collected, which applies to all health indicators data.

-:The use of medical informatics

-: *Management

Include administrative activities in the field of health care: the management of the activities (such as vaccination campaign or awareness); and management of a national program (such as disease control); and management of a health care institutions (such as a hospital or laboratory); also include the management of national health services in full.

It is intended "management" cyclical process to analyze problems, and planning, programming, budgeting, implementation, monitoring and evaluation and re-planning. It is thus not limited to the procurement of logistics and financial management and executive, but covered include, inter alia. While they include, for example, monitor the expenditure under assessed budgets, they must also include administrative necessity to link the resources (financial and human) to various aspects of health services and programs.

Epidemiological surveillance:-*

Includes disease surveillance data collection routine continuing to study the extent to which the spread of the disease, and to track trends, and to discover changes in the cases of occurrence. The epidemiological surveillance mainly study the distribution of disease patterns and trends and health care measures related distributed according to geographical regions and age groups, and communities, and others, for the purpose of setting priorities and the use of measures of care the best possible use through monitoring and evaluation. This requires the collection and analysis of large amounts of diverse data about the areas in which they occur diseases and other health problems, and which hosts including patients, particularly in hospitals and health centers in rural and urban areas.

***Computerized medical records:-**

Resulting in increased demand for available data and the good organization of patient, in addition to the developments in computer science to stir great interest in the development of electronic records for patients. The computer can facilitate the reading of the data and make it available, and improve the structure, but these things increase the need to gather

information. Featuring medical records computerized medical records on paper with a number of features made it is indispensable in health care . These features include:

Access to the contents of this record from several locations at the same time . It can doctors, and nurses who are in separate buildings or in remote areas (countries or cities) reached at the same time to record patients ; . Longer confidential patient information and ensure safety in the electronic medical records of the challenges facing medical informatics , health and legal communities . It must be taken into account when starting the design of electronic medical records that the secrecy of the key elements to ensure success in the future . It should be mutually supportive legal structure with the working environment of electronic access to electronic medical records high-quality and acceptable to both the medical community and the health and the general public.

***Provide services to reach Publications (documents and publications) and information services:-**

Topping many libraries in developing countries, a list of the victims of the economic problems and the problems of hard currency , forcing a lot of medical and university libraries to be squeezed curtailed tremendous acquisition for magazines and publications of foreign medical associations . If the disks use a chunky CD-ROMs, which are used in the development of lists of property libraries, dilute to a large extent of the research problem , the problem of acquisition unchanged.

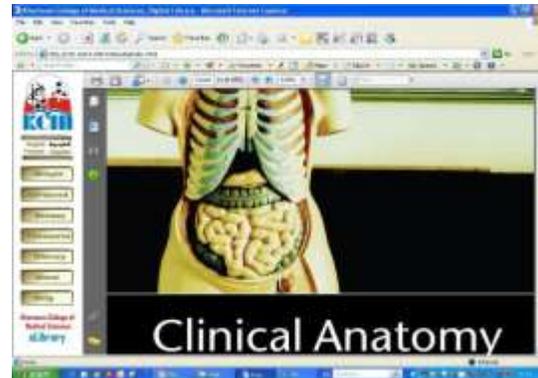
Publications are provided compositions and health , medical and biological in a number of electronic means , which provided for the health care community , and these include the following means:-

The importance of informatics for the basic roles of doctors:-

Based view of the need to be a medical informatics basic elements of the curriculum for undergraduate on the close relationship between information management and the five basic roles envisaged for future doctors. The statement could be related to the educational needs of medical Palmalomyat each of these five roles are as follows:

Learning needs related to informatics, "the role of a lifelong learner." To meet what is the responsibility of this role should be able to show the graduate know

what exists of information resources and tools, in order to support life-long learning. These include the knowledge to take the knowledge of these resources, and content, and these resources can respond to the needs of the information. And include the necessary skills for this role the ability to retrieve information and classified and evaluated, while the required positions include the development of appropriate information-related habits.



Internet :

A lot of health care organizations and publishers to use the Internet as a tool to spread their products on the Internet. Systems and e-mail discussion groups and news . One example is the use of the Internet by the health and medical community:-

- * Medical training and continuing education .
- * Provide access to information medical .
- * Patient care and support .
- * Diagnosis and consultation remotely .
- * Support during emergencies and epidemics .
- * Remote working for persons with disabilities .
- . Education in the field of preventive care and preventive health*
- *Electronic publication of the full texts of books and publications (documents and publications) health and biomedical.

***E-health and telemedicine**

Telemedicine is " the use of information technology to deliver services and medical information from one area to another or " provide remote service " , using electronic signals to transfer medical data (ie, optical

images with high resolution , and X-ray images , sounds, and patient records , and videoconferencing) from one location to another . has been defined telemedicine as " the delivery of medical care by using the means of contact data , audio and visual synergistic (interactive) , including the delivery of medical care and consultation , diagnosis , treatment, and education , and the transfer of medical data ." covers the term " education " both patient education and " continuing education " for health-care personnel.

Field study of the extent to which the beneficiaries of medical databases - available in medical laboratories Documentation and Information Centre - department of medical and vital information - National Research Center – Khartoum - Sudan

The Documentation and Information Center of the National Center for Research of the largest specialized centers in all different areas of knowledge in Sudan as it is interested in scientific research and development in Sudan. And documentation of research and studies Sudanese using the latest technology to save and retrieve and disseminate information, and is equipped with extended role of the ocean and all what he has . Not only was his role on the database, but Sudan has become a point of reference for many scientific centers and regional furnish him with CDs and online services and publications responsive inquiries researchers and students . Now the center is one of the most important centers of legal deposit of publications in Sudan.

Objectives:

* Dissemination of information on research and published studies and ongoing in Sudan in order to benefit from the results; includes books, magazines, periodicals and scientific studies *Providing information and publications related to scientific research

*Providing information to the researchers by collecting , organizing, classifying and extracting and providing information

*Contact information networks of regional and international , to provide information from various sources

*Contribute to the formation and development of national information and encourage cooperation between the various libraries around the country

*Work on the training of cadres and middleware research in the field of Information and Documentation Conducting studies and research in the relevant fields

Sections of the Documentation Center and information:-

Department of systems and information networks : boils down to his role in the establishment of information networks of the center and linked to networks of local, regional and international . The acquisition and construction of local rules and global and electronic libraries on different types and retrieval of the beneficiaries (CD-ROMs , Internet , etc ...) and the work of her statistics . Inventory and classification of beneficiaries and to identify their interests and provide them with the appropriate information.

Table (1) Decision maker from a sample of beneficiaries), hospital administrators and heads of units) shows a sample study answers whether the Internet is available to the beneficiaries in the possibility of their residence and their work:

Percentage	Repetition	Is the Internet is available in your workplace?
88	73	Yes
10	9	No
98.8	82	Total
1.2	1	No answer
100	83	Total final

The results of study in Table (1) (88%) of sample the internet available at their place of work, and this percentage is high, has attributed the reasons for the lack of the Internet for the rest of the study sample and the proportion (10.8%) of the nature of work in the field.

Table(2) shows the number of respondents who received cycle using the Internet:

Percentage	Repetition	Did you receive the session on the use of the Internet?
44.3	36	Yes

55.4	46	No
98.8	82	Total
1.2	1	No answer
100	83	Total final

In Table (2) (55.4%) of the of the study sample did not receive a course in the use of the Internet, and this percentage is high, indicating that they may be the cause of the weakness in the use of the Internet among workers in the study sample.

Table(4) shows the importance of Internet services to increase knowledge in the field of medical work and raise the efficiency and effectiveness of research:

Percentage	Repetition	Internet allows me to see all that is new in my field and raise the efficiency and effectiveness of the work degree
27.7	23	Very large
31.3	26	Great
16.9	14	Medium
6	5	A few
3.6	3	Very few
85.5	71	Total
14.5	12	No answer
100	83	Total final

Table (4) (31.3%) of the study sample reported that the Internet allows them to see all that is new in the field of medical work significantly, while (27.7%) reported that the Internet allows access to all that is New in the area of work very much, and when collecting percentages can say that 59% of the beneficiaries have convinced a large importance of the Internet in continuing education or in providing information and knowledge

in the field of work which leads to raise the efficiency and effectiveness of medical work, and this positive indicator and high.

Table (5) Degrees of study sample answers to local and international databases in access to medical information required

Percentage	Repetition	The efficiency of databases to access the required information achieved a degree?
16.9	14	Very large
21.7	18	Great
25.3	21	Medium
12	10	A few
8.4	7	Very few
84.3	70	Total
15.7	13	No answer
100	83	Total final

Study results in table (5) that (25.3%) Of the sample of the study stated that the efficiency and speed of access to the requested information is located at the middle class, while the reported (21.7%) Of the sample of the study that the efficiency of the Internet great,

(16.9%) When you score big, and collect a large and very large proportion of the total (38.6%) This is an indication that there is a problem in the use of the Internet if it has been dropped by who did not answer this question of forgotten (15.7%) And the reason may be product of the computers, and poor infrastructure for the Internet.

Proposal to automate medical analysis laboratories in Sudan:

At the end of our search, we will present the importance of information systems in medical analysis laboratories, and the reality of the application of these systems in the Sudan.

Information system analysis of medical laboratories:-

Is a software system automates the work of laboratory medical tests , starting from the reception of requests for tests to collect and process the results and then printed. The system handles this process of determining the necessary samples for analysis , and direct them to the various sections of the laboratory according to the jurisdiction . It can also process the requests are sent to the analysis devices and analysis involved the collection of results from them. So we can say that there are several levels of information system , according to the operations of the processed.

Benefits Information System Detective proposed:-

Vary the benefits of an information system Detective different level of the system and place of application. We will focus in this paper on the benefits of the laboratory information system serving a large hospital without going into the details of the many:

***Health information provided by :** Detective facilitates information system to get answers to the questions raised about the cost of conducting the analysis , and the terms of sampling , and the possibility of conducting tests in a laboratory.

-Increase the accuracy of processing samples : different types of blood tubes used in the analysis depending on the analysis to be performed . When a registration request analysis, the system specifying the types of containers and pipes needed to conduct a full analysis required for the patient . And this can not forget the organizers of the withdrawal of blood sampling or - as is the case in the manual system - any sample are necessary to complete the analysis required , and can not commit an error in determining the type of pipe needed for the analysis. The examples are many in fact for committing errors in determining the types of pipe needed to analyze what has come across one of the nurses in the department to establish one of the hospitals , continued to commit the error of ten years because of misinformation in to him, and did not discover it until after you start dealing with the Information System laboratories.

***Speed up the loading devices analysis applied analysis:** All tests required for patients taught devices tests in the laboratory and by jurisdiction, and is not a secret that the process of indoctrination or download analytical instruments applied analysis towards a programmatic and automated is much faster and without making a mistake , forgetting to one analysis or another switch and other analysis.

***Collect the results of the analysis of analytical instruments:** The system is automated , the results are printed by the same analysis devices connected to a printer . Then combine the results of the patient to each other and recognizes him without respect for common method for printing the results, at best printing results returned by a typewriter or computer system using the appropriate editing . In the automated system , which shall collect the results according to the protocols of analytical instruments , combining to automatically print a uniform manner , as well as the accuracy of the information

transmission speed and large in this process , and which have a significant impact in accelerating the work in the laboratory and improved.

. *** Monitor the results of analyzes of the Detective:** system ensures the passage of information on the results of laboratory monitoring to ensure the validity of these results scientifically and clinically..

***Potential and wide to conduct a study of the evolution of the case of a patient :** Do not stand detective work when issuing the results of analyzes of the patients , but also extends to become possible to provide the physician supervisor on the patient's schedule , it may be supported by drawings , shows the development of the result of analysis or multiple results to the patient over a period of time what . Of course, this gives a good idea about the patient's response to therapy practice, which will benefit large to determine the appropriate treatment for this patient>

***Vast potential for medical studies statistic:** The accumulation of massive amounts of test results to patients coming from different places , and slices of age and wide , it can only tempt scholars and researchers using these results to statistical studies , may indicate the spread of some diseases during the period of time that in some areas , or the spread of diseases between the sexes one without the other , or between age-specific . This will benefit large as information on the nation in general. They can avoid the spread of some diseases of obtaining this information through programs enlighten , or take other protective measures..

***Adjust accurate accounting:** When you talk about money , The field is very wide to talk about the benefits and all the actors : Accuracy , speed , providing information of financial several forms , the study of the evolution of the financial benefits gained positively or negatively , the statement of the results of certain policies on informant during a period of what , and other a lot of benefits that cannot be counted in this research. The benefits mentioned earlier to be the greatest, when linking information system Detective hospital information system (Hospital Information System - HIS) or at least expand the laboratory information system to include computer stations in the residence sections strapped to the Detective Information System.

***The possibility of knowledge available in the laboratory tests without trouble :** when the processor is available for a doctor in the department

to review the possibility of analysis available in the laboratory , can access a quick decision in determining the analysis made it possible for the patient.

***Prevent a repeat of the same request analysis of the patient during the day :** doctors may ask a group of laboratory tests without the knowledge of him that they had already asked . Prevents this information system, redundancy and increases the credibility of the hospital and keeps the money patients.

***Reducing the amount of paper products used to print the results :** You can review the results of analyzes of patients from the computers in the of residence without having to print them.

Reducing the amount of mutual communication between laboratory analysis and other sections of the hospital: The achievement of the link between information system detective with sections of residence, can avoid many of the questions that are being dumping detective by day, such as the question about the availability of the analysis, and on the readiness of the results of analyzes , and what kind of pipe needed to perform specific analysis.

The Reality of computerization of laboratories:

The first thing that comes to mind after reviewing the above benefits: Is the application of information systems in medical analysis laboratories that serve hospitals in Sudan?

-The answer is yes .. But Sometimes applied to laboratory information system without connecting sections of hospital stay. Which limits benefits of the information system, which we presented previously?

-Applied sometimes Information System laboratories , without linking

the office to accept patients , which is the beginning of a series of information in the hospital , where it is the introduction of information about the self of the patient and the reason for entry and date, and the name of the physician supervisor and others. Dissociating the admissions office calls to re-enter information on the self- patient in the laboratory after being introduced in the admissions office, this leads to a slow work in this system and to the possibility of the emergence of a mismatch between the data and the laboratory information system data admissions office.

Do not connect the analysis laboratories in the various hospitals to each other. The results of laboratory analysis do not belong to the analysis laboratory which conducted the analysis, but belong to the patient in the first place. And then if the patient entered the hospital last in the future , there is no easy way to know the results of previous tests conducted by this patient.

Conclusion and Recommendations:-

trend towards a digital society for the services of medical information is considered a movement sweeping is the sheer volume of medical information and technology flowing without dams on the level of the cosmic whole by the communications revolution that rely on advanced technologies and a growing and fast it is difficult for the human intellect absorbed, and is increasing in general with the breadth of activity scientific and technical .

The society of scientific Arab in general, will not rise to the level of importance globally will maintain the level of progress , but owning high value in front of developed societies with which it deals , and the key to this value is its ability to compete with all enzymes and harmonious , which lies primarily on the good benefit of keeping the content of the Arab Information scientific and technical flowing through modern media according to the plans and programs for the production of information , relying mainly on the efficiency of human resource. these capabilities

Recommendations

1- Preparation of master plans for the introduction of medical information in the health institutions and the implementation of these plans. Should cover these plans overall needs identified by users of the information, policies, and standards related to software development, and implementation phases, and the necessary resources, and management , and the necessary structural...

2- Allocation of financial and human resources at regional and national levels in order to provide support for the implementation of appropriate plans for private medical information...

3- Implementation of awareness-raising campaigns targeting health workers about the importance of medical information and the quality of their roles in the adjustment and adaptation.

4-Investment in human resource development in the field of medical information technology .

5 - To prepare a plan for the implementation of systematic and institutional framework for medical and health information in health care institutions.

6- Prepare a typical curriculum of medical information for medical colleges should be introduced this session in the early years of the curriculum

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