Study on H.I.S. Systems of Developing Countries and Its Outlook on the Bases of HL7

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***Abstract*— In this paper the actual situation of hospital information systems in developing countries in different aspects has been discussed. Procedures and programs of 3rd world countries and developing countries in hardware, software, and management viewpoint were compared. Also, the current ideas for developing are discussed and finally, some ideas for optimization of these procedures are suggested.**

Keywords*— *hospital information systems, information technology, HL7

I. INTRODUCTION

Hospital Information Systems or Health Information Systems which is abbreviated as H.I.S is a computer based system which gathers, stores, processes and regains administrative and clinical information and vitals of patients in hospital are focused [1]. It is an integrated computer-assisted system design to store, manipulate and retrieve information concerned with the administrative and clinical aspects of provided services within the hospital. Most of countries moved toward automation of HIS since 1980s and this systems has experienced progress and development until now, has became an integrated system from nonintegrated and useless systems [2]. The aims of HIS can be explained as Clinical information systems, financial information systems, statistic of the patients, scheduling of hospital employees and etc. Figure 1 shows a typical HIS makeup.

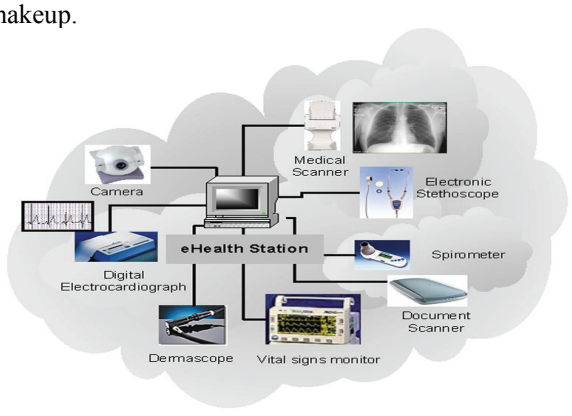

Figure 1. A sample HIS system architecture.

Enhancement of HIS system's software in industrialized countries causes some special results and capabilities like:

1. More time for patients from nurses
2. Easy and quick access to vital information
3. Improving documentation condition
4. Better communication between offices
5. Improving in human resource utilization
6. Decreasing in hospital costs
7. Increasing in job satisfaction
8. Decreasing in medication errors
9. Ability in tracing patients documents

In the second part, HIS conditions in recent time period of world has been studied and in third part the conditions of HIS in developing countries have been studied and at the end barriers and problems of HIS in the hospitals of developing countries have been discussed and some ways suggested.

II. RELATED WORKS

So much efforts have been done in order to enhance hospital Information Systems in the world, for instance we can have a look at services given by Sequel Systems Company which its products consist of these capabilities exchange of document, secure access to financial and medical documents, Internet access, finding out the wrong prescription of drug, lab input data, safe data transmission and etc that makes a really strong and powerful condition for safety and accessibility of information for people who use this HIS system [3].

Using the hardware along websites and software has been experienced brilliantly in different hospitals of industrialized countries, for instance Darthmouth-Hitchack Medical Center (DHMC) in the U.S. and INI [9] in Germany are samples of successful HIS systems which they use Wi-Fi and handy used devices for ordering goods and disposable tools by nurses or other staffs [4].

All of these works that have been done in industrialized companies are based on a global protocol named Health level 7 (HL7) but when we are considering protocols and standards related to this issue, it is obviously known that there is a gap between now a day systems and existing equipments that will be discussed further.

III. 3RD WORD COUNTRIES

Most of 3rd world countries are using the old equipments because of financial problems. On the other side, used soft ware can't cope with the needs of HIS. Nevertheless, these systems have been accepted by governments and some steps have been paced toward improving the existing systems [7]. Using the modern software and hardware together, the quantity and quality of equipments can be increased [5].

Being hurry in adopting with real requests, standards and protocols is completely necessary for these countries. In this way some other problems can be appeared like:

1. Financial problems.
2. Plurality in HIS companies.
3. Non existence of a comprehensive procedure [6].
4. Changing in insurance laws.
5. Not using of global protocols by companies.

IV. HEALTH LEVEL 7

So many works have been done for preparing a suitable standards and finally the HL7 became more acceptable. HL7 is an international community where all experts and information scientists collaborating to create standards for the exchange, management and integration of electronic healthcare information. HL7 promotes the use of such standards within and among healthcare organizations to increase the effectiveness and efficiency of healthcare information. It was founded in 1987 to produce a standard for hospital information systems. HL7 is a standards organization that was accredited in 1994 by the American National Standards Institute (ANSI). Health Level Seven's domain is clinical and administrative data. Hospitals and other healthcare provider organizations typically have many different computer systems used for everything from billing records to patient tracking. All of these systems should communicate with each other when they receive new information but this is not all the capabilities. HL7 specifies a number of flexible standards, guidelines, and methodologies by which, various healthcare systems can communicate with each other. Such guidelines or data standards are a set of rules that allow information to be shared and processed in a uniform and consistent manner. These data standards are meant to allow healthcare organizations to easily share clinical information. Theoretically, this ability to exchange information should help to minimize the tendency for medical care to be geographically isolated and highly variable.

It has also seven layer for implementation like:

- **Section 1: Primary Standards** - Primary standards are considered the most popular standards integral for system integrations, inter-operability and compliance. Our most frequently used and in-demand standards are in this category.
- **Section2: Foundational Standards** - Foundational standards define the fundamental tools and building blocks used to build the standards, and the technology infrastructure that implementers of HL7 standards must manage.
- **Section 3: Clinical and Administrative Domains** - Messaging and document standards for clinical specialties and groups are found in this section. These standards are usually implemented once primary standards for the organization are in place.
- **Section 4: EHR Profiles** - These standards provide functional models and profiles that enable the constructs for management of electronic health records.
- **Section 5: Implementation Guides** - This section is for implementation guides and/or support documents created to be used in conjunction with an existing standard. All documents in this section serve as supplemental material for a parent standard.
- **Section 6: Rules and References** - Technical specifications, programming structures and guidelines for software and standards development.
- **Section 7: Education & Awareness** - Find HL7's Draft Standards for Trial Use (DSTUs) and current projects here, as well as helpful resources and tools to further supplement understanding and adoption of HL7 standards [10].

V. DISCUSSION

By considering the countries situations in the world and world health organization programs, software and hardware of systems in hospitals should be integrated and can this can be achieved by appropriate measures. At the other side, new technologies can improve services from quantity and quality viewpoint [8][9].

All in all, there is a technical gap between ideal conditions and current condition in 3rd world countries that should be eliminated.

For solving this problem the following ideas may be considered:

1. Implementation of HIS projects on global standards basis.
2. Providing hardware and communication substructures.
3. Using the new technologies like Wi-Fi and RFID in order to do works easier and safe.
4. Hiring well qualified IT experts.
5. Achieving high level training courses for staffs.

Figure 2. Using RFIDs for medications.

Figure 3 Using RFID straps for patients.

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