INFORMATION AND KNOWLEDGE MANAGEMENT – A STRATEGY FOR PERFORMING MEDICAL SERVICES IN THE INFORMATIONAL ERA

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Abstract:
The unprecedented incertitude existing in the health system in Romania implies menaces for the system managers. The improvement of the performance of the medical system has never been more adequate, so that the health system needs specific managerial strategies. Romania needs a complete solution which could assure a performant management of the medical information in the system, and in their plans, the managers of the healthcare organizations must include investments for the application of the informational technologies, like the administration of medical information, of the health electronic file, the medical information exchange, so that the medical service be continuous and permanent from the birth until the death of any individual. But the piece of information is only valuable to the one who knows how to use it, where to search for it, how to choose it and finally how to use it, so that we can say the main instrument to which the manager from the health system may resort rapidly in order to find new solutions is information.

Keywords: information management, Information and Communication Technology, digital information, healthcare organization, patient electronic health file

The aging of the population, the reduced birth rate, transborder health, the menaces or diseases connected to unhealthy life styles determined new health politics, having as strategic objectives: a healthy population, which means productivity and economic prosperity.

Medical services represent one of the most important segments of modern society. Being a field of challenges and hopes, it has to experience a rapid increase and to represent a major part of public expenses.

The reasons for the accomplishment of this article are plenty, among which the fact that in Romania *a health system which should accomplish the needs of all those involved does not exist* (medical staff, patients, suppliers of medical services), a pretty large number of inaccuracies continues to exist, so that more than ever, management strategies are necessary and accurate.

The definition of the information in the health system

The information in the health system is any piece of information, verbal or registered in any form or in any environment, created or received by a supplier of health services (medical offices, hospitals, policlinics), by public health authorities (Ministry of Health, Department of Public Health), by medical staff (physicians, nurses, auxiliary staff), by institutions of health insurance (National House of Health Insurances), schools, universities or centers of medical assistance which are related to the past, the present or future of the health condition of any individual, with the supply of the medical service of

a person or with its past, present or future payment (Wager, Lee et al, 2009).

The Modern Solutions of the Information and Communication Technology (ITC), administration, transfer, stocking, processing the information and knowledge technologies are missing from the health system, making the performant management of the healthcare organization hard to accomplish.

It is extremely important for the manager of the healthcare organization an integrated, complete and collaborative informational solution be perceived as a long term investment and as a tool for the development of the organization, not as a momentarily expense for an immediate need.

There are few instruments to quantify the performance of the informational system of a healthcare organization from the perspective of a user, and the efficiency of the information management resides in the *utilization degree of information* that can be gathered, processed, stocked and transmitted.

The organizations with reduced investments in ITC infrastructure have very low performances in the information management comparing to those that invested a lot (Amarasingham, Lehmann et al, 2006)**.**

The Benefits of the Information and Communication Technology in the information management from the health system

Starting from the idea that *the technologies of the informational societies* accelerate the scientific progress, that its support is the information and communications technology (ITC), which allows the information processing and circulation in *Cyberspace*, in which the spinal column is the *Internet*, I can say that the modernization of the health system in Romania will not happen outside them.

The explosive increase of the "digital" information available by means of the products of the information and communications technology means *more efficient, more transparent and more rapid medical services*, closer to the individuals` needs and less expensive (Bălan, 2008)

The lack of information and knowledge management strategies from the system limits the development of the healthcare organization, and implicitly leads to the diminishing of the medical service quality. The need to approach the concept of information and knowledge management through the information technology in the healthcare organization resides in the following considerations:

- The managers and medical staff involved in the accomplishment of medical services feel that the process has gone too far, that there are too many performance indicators, targets, report forms and procedures, and the system loses too much time with them – without finality and without being found in the decisional process – lack of feed-back.
- **The lack of modern platforms of the system of medical services for integrated information management**, which should bring a contribution to the accomplishment of the objectives of the reform in the healthcare system, transforms the healthcare system from Romania in an unperformant, inaccessible, inefficient system.
- **The lack of an integrated unique informational system and of a modern data base with all the electronic health files of the patients (**administration system of the medical information and knowledge related to the patient) which should connect all suppliers of medical services, the Ministry of Health and the National House of Health Insurances makes the administration of the available funds to be lean.
- **The lack of management abilities and capacities -** this

management deficiency comes from the fact that the managers are still selected based on their professional capacity and not due to their managerial abilities and knowledge.

- **The management of the medical information is lean,** thus the need to develop an integrated informational system in the field of health services is imposed, which should administer the whole information assembly regarding the accumulation, the conservation the processing, the presentation and distribution of data, which, among other things, are useful in taking decisions.
- **The informational infrastructure of the health services is inadequate.** Data stocking and maximum use of information, conclusions and prognoses obtained, both in order to develop the medical services and the informational resources have no finality in the medical act.
- The medical system does not have an ***inter-relation integrated system*** of the professionals in the system, necessary to make the medical act efficient.

The use of information technology in the entire health system brings major benefits, like:

- The avoidance of redundancy and inaccuracy of medical information related to the patient;
- The identification and correlation of information that any participant in the health system needs in order to improve the medical services;
- The availability of relevant and actual information;
- The elimination of data inconsistency and the disappearance of *semantic and structural discontinuities* between informational systems.

And because the number of patients continues to grow, each of them needs a more active and more intense monitoring of the information connected to the disease, to the health state and the healthcare organizations, in order to preserve resources, need to have as target the use of electronic systems based on the medical registration of the patient. All the information will serve to the physician in order to choose a more adequate clinical approach and avoid certain therapeutic mistakes, like the administration of a drug unadvisable to the current medicine therapy of the patient, and by a single click, the physician has the possibility to add in a very rapid manner (but systematic), new data about anamnesis, therapy.

The capacity to deliver and assure the optimum availability of clinical information and knowledge is imperative for the success of the healthcare organization (Vision Solutions, 2009).

It is necessary that the automation of the software applications to administer the information in the health electronic file become more extended and more available.

Why do healthcare organizations need information availability?

The availability of the information connected to the medical electronic registration of the patient or of the health electronic file is necessary for quality medical services, for reducing errors and for improving the safety of the medical information.

Because the level of complexity of the information available for the suppliers of medical services, for payers and employees in the medical system evolved rapidly, the quality of the medical service depends on the availability degree of the clinical information connected to the patient, the management systems of medical information and knowledge using informational and communication technologies in health care are imperative to develop In order to fulfil the needs of the organizations.

New forms and formats of the information appear in order to predict what might happen with the clinical and

financial experiences of the population. If nowadays the medical piece of information is not completely available, with the new developed and refined informational technologies the relation between the past and present of the medical data of a patient can be used in order to evaluate the medical risk of a group of patients (Zelman, McCue et al, 2003).

The objectives of the information management through the lacks of the health system

If information (represents any element which can be expressed with the help of a code) is an external entity, put at our disposal arbitrarily, the knowledge on the other hand is an internal development, an enrichment of the practical existence, it is the product of our operative capacity.

Information and knowledge management is one of the essential conditions of the development of the society, in the context of the dimensions of the information, as a concept, and of the personalized knowledge, "*information presents*" "*what happens*" while personalized knowledge show *"what this thing" "means".*

Starting from the necessity of information management as part of the management system in the healthcare organization in Romania, a high degree of data breaking is noticed, with minimal communication, even non-existent inside and outside it. The decision makers of the health system go until the decision maker of the family medicine office; they hold exclusivity on their own data, a fact that makes them *unavailable* for the other actors of the system.

The soft (computing programs), the formats, the definitions, the standards and supports used differ both inside the system and outside it, they are not heterogeneous and they do not allow information exchange.

Data stocking and electronic processing is practically non-existent in some medical offices, the software applications are heterogeneous and incompatible, the electronic transmission is minimal, the data producers – hospitals, family physicians confront themselves with a double or triple reporting in incompatible formats and soft (WHO, 2004)**.**

Regarding the content, although the collected data refer to the health state and to certain "positive" aspects of it, like welfare, in the real world only data concerning the disease are analyzed, processed and transformed in information, and the information regarding the sickness causes, the history of the patient, treatments, diagnoses, hereditary-collateral antecedents are few and incomplete, especially those regarding chronic diseases.

The information offer is extremely limited and poor in graphic illustration, *old methods of data collecting* being maintained.

And because in data collection there is no purpose nor data feed-back, they have a poor quality, and the health system is based only on data produced by the primary suppliers of health services (Bălan, 2008b).

In order to prevent the discrepancy in reports, losses of data sources are necessary protocols for using common standards, *the projection of a common national soft which should be inter-operative, standardized, secured and the building of interfaces between data bases for bidirectional transmission*. The Health Informational System must be standardized, aligned to the strategy of the European and World Health Informational System, in order to accomplish *data, information and medical knowledge exchange* (Bălan, 2008a).

The organizations must adopt ***integrated and collaborative solutions*** using applications projected to work together, which should apportion the same information model and automates all the processes

existing at the level of the healthcare organization, including also *functionalities of decision support* – an automate system which allows to any participant in the system, usually a manager, to make better decisions based on the analysis of the information collected.

The way it is known, to the National House of Health Insurances three different reports are sent, fact that needs time from the physician, which could be used to detect symptomatologies, correct diagnosis and prescription of adequate doses. For instance, one day the physician had three patients at ten o'clock, then he stayed two hours with an empty office, the nurse mixed up the appointments, she made a mess of the program, so that it can be noticed that the use of computer can fix part of the problems through the benefits brought in terms of efficiency and profitableness (Bălan, 2008b).

The information management in healthcare organizations is an efficient instrument both for the administration of the medical information of the patient, (because we must not neglect the finality of the medical service, the satisfaction of the patient), and for the organization.

Many times the informational system of the healthcare organization only collects information for the administration of the personal data included in the health electronic file, like the name of the patient, the age, the marital status and the address, but for the work process (flux) for clinical purposes, *detailed information about the patient* is needed, very necessary in order to establish the complexity of the case and, subsequently, the potential risks. In the clinical context the interaction with various drugs is important, with psycho-social factors which can give results difficult to be anticipated. According to the variability of the patients, it means that this process can have various results and a need for various strategies may exist in order to improve the health results, for every patient (Bălan, 2008b).

This clinical information, although vital for the work process, *lack from the informational system of the healthcare organization*, and their collection would allow the automation of the risk evaluation process.

Because the physician needs information every day about the diagnosis, the prognostic, the treatment and prevention, the medical activity should be put down in order to be used in the future. Here comes up the role of informatics to stock raw data from the beginning, transformed in information and then by means of clinic doctors, physicians, specialists, transformed in knowledge. But in order to be used in the future, they have to be stocked, archived, transmitted, apportioned, secured. These aspects of knowledge resulted from facts, proves, evidences can be accomplished only through informational and communications technologies of the informational society.

Another issue not solved of the family physicians is the *non registration of the data in electronic format at patient level*. The quality of the data registration could be assured by the application of a set of rules for each registered component, that is by the creation of an *international standard* for an efficient data exchange, so that the content of the registrations refer to the *reasons of the presentation, the content of the examination, the prescribed investigations, the stage diagnosis, the episode to which it belongs, the treatment or prescribed procedures, sendings, the history of the patient, personal data* (Bălan, 2008a).

The promotion of the unique health electronic file of the patient to all the levels of the health system must be one of the compulsory requests with taking all the measures to secure its confidentiality. A national health informational strategy must be

developed, which should integrate the informatization of the medical information in a unique, standardized, coherent form.

The medical file, is one of the main instruments of the clinic doctor, so that for a physician the patient is not allowed to be a "spontaneous apparition", he has a history which contains previous and present diseases, malformations, hereditary – collateral data, professional, socio-economic data, medications administered and the answer to these medications, the dynamic of the results of the laboratory analyses made with the passing of years, etc. All these data, secret and belonging rightfully and exclusively to its patient or its tutor – according to case – have to be presented in need, to the competent medical staff, in a minimum time, "directly" (on-line), clear and complete. (Bălan, 2008b)

The dust covered files from the archives of a medical office or policlinic are of neglect able use on the spot and totally unuseful in the distance.

The Health Electronic File unified is the only instrument that can administer in a performant and efficient way the information useful to the physician, the one that contains data regarding the history of the patient and the past and future investigations, information stocked and processed by the *Health Electronic File of the Patient*. This will allow for such information to be transferable between health suppliers, between places of health care and between systems of health data administration, which will have as consequences: the increase of efficiency and efficacy of medical services in Europe and a support for health protection in general, for the medical-sanitary staff, and for patients, clients in the process of health care.

And because health protection has become a cooperative process (the specialist physician does not take care by himself of the patient), involving medical staff with various qualifications (physicians, nurses, pharmacists and other professionals who, among other different activities use health files, write chart abstracts, letters to the patient, etc, make tests and analyses, register the results in the file and sign, other execute specific treatments or are preoccupied with the mental and social state of the patient and introduce information related to him), the information technology will be the only one that will change the culture of the work environment, so that the patient's health electronic file must have a unitary, standardized structure (Bălan, 2008b).

The Health Electronic File is a data base with the complete medical files of the patients (medical chart, medical data, examinations, medication, etc), it can be accessed by physicians or other authorized persons, extremely useful in cases of emergency, and by a simple search, the medical staff can have at disposal the antecedents and medical data of a person. (IDG Romania, 2004)

"Working together to ensure that patient care delivery is timely and continuous from one provider to the next" (Gittel, Fairfield et al, 2000).

How can the information management in the healthcare organization be efficiently accomplished?

There are a few steps to follow in the efficient administration of information, and they are:

- **The establishment of the information the organization needs.** A considerable amount of information is obtained and used in order to take immediate or subsequent decisions, but only an efficient system of information management can use certain, adequate, efficient and accessible information necessary to take decisions in various moments.
- **Information collection and analysis.** Information can be obtained from various sources: staff reports,

sending notes, other justifying documents, medical registers, graphics.

- **Information stocking**. If the information is stocked in order to be used subsequently, it has to be easily found and accessed.
- **The use of information**. Information can be used to solve intra-organizational problems, to determine resources (their type and the necessary quantity), to establish future projects.
- **The diffusion or Information Flux**. In order to be used in an adequate way, the information must be exchanged between all the participants to the health system.

Information management is the process by which information are detected, collected, validated, analyzed, stocked and used through the efficient administration of the intra-organizational and inter-organizational communication channels, as well as of the supervision process (*Figure 1*).

For the existence of a performant information management *a coherent, robust informational infrastructure is needed in order to obtain, disseminate and use quality medical information, regarding the individual's health.*

Health organizations must see the integration as a necessity, so that the useful information collected by means of communications networks be available any time and any place for any professional in the system.

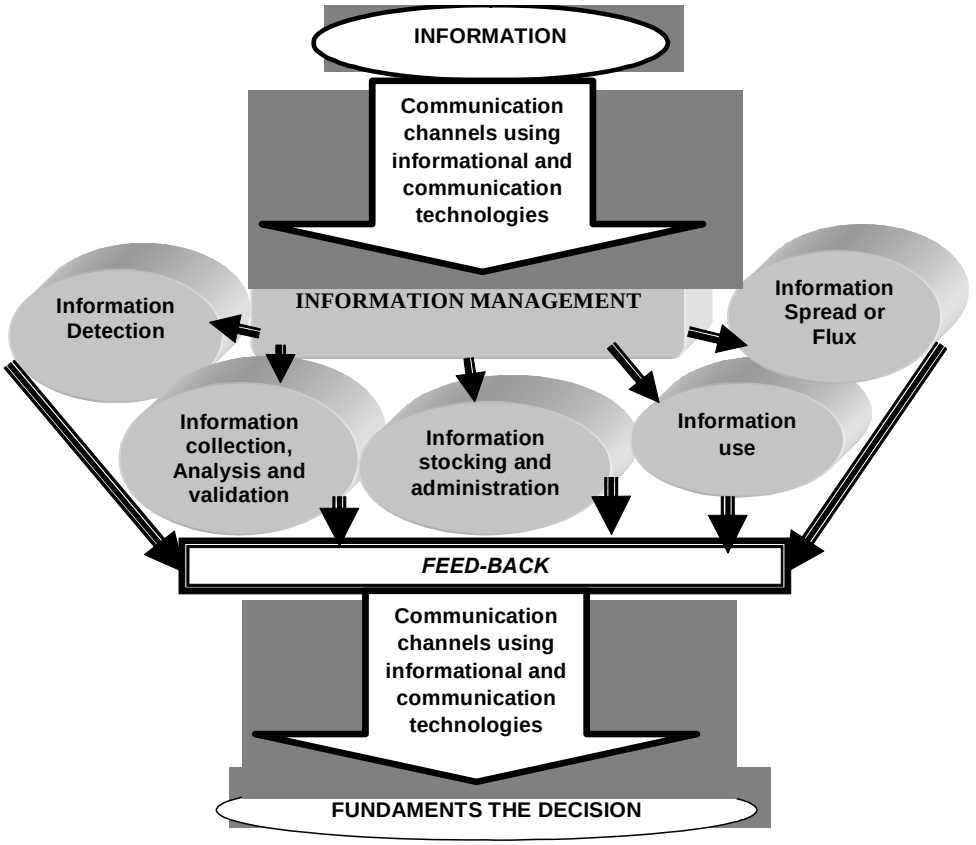

Figure 1. Performant Information Management interconnects the healthcare organization with the whole health system by digitizing the communication channel.

After the analysis made on the health system I can say that the medical informational system is very complex, and an integrated informational system in the health field would eliminate de information duplication.

As a starting point in accomplishing the software solutions, we must take into consideration the medical act from the level of a family medicine office, which is the medical act generating two types of information: *information regarding the state of the patient* (they have individual character) and *information regarding the diagnosis,* based on which the medical decision is taken, which concludes the elementary cycle of the medical information flux.

Information management from the perspective of the ITC solutions from the healthcare organization must have as finality:

- Conceiving an *electronic health file for patients (which contains personal data, information regarding clinical exams, anamnesis, imagistic, procedures, laboratory exams, the history of each patient of the medical office);*
- All the evidences, primary documents, typified documents, reports to be transformed from paper format in electronic format, with the transmission possibility to other health specialists;
- Solving a chronicisized phenomenon of health: *lack of information due to the lack of information exchange between specialists*
- Standardization of the health file
- Inter-operability of the electronic health file in other health systems

Management of medical information and communication in the healthcare organization

The medical information is the most important resource from the field of medical cares, it is essential to establish the health strategies, the treatments and medical decisions (Kreps, 1988).

Medical information are knowledge accumulated when examining the patient and after the laboratory tests, used to diagnose health problems.

They are precedents for the development of clinical and practical research used to determine the best treatment available strategies for the menace of the specific health.

The information that are stocked in the data bases are not useful to the organization, only those communicated are also useful, so that "*information must circulate smoothly through the communication channels of the organization*" because the great danger of an organization is the breaking between stocked information and communication (Solcan, 2005).

Communication is the process of symbolic information transmission between a transmitter and a receiver by means of specific channels.

The facility to communicate inside the organization is given by the informational and communicational technologies which have the ability to foreground opportune and efficient information to the specialists in the system.

Therefore different types of intra-organizational communications can be digitized using the new informational technologies:

- ***the formal communication*** (the one referring to normative acts, to operating code regulations) is used to transmit the information necessary to perform the activity within the organization
- ***informal communication*** (established spontaneously, between employees or between departments, generates unofficial information),
- ***vertical communication*** – concerning the direction of transmitting the information which is exemplary for the relation manager – subordinate (descendent and ascendant),
- ***horizontal communication*** – take places between departments on the same hierarchic level within the

same organization, in order to collaborate for solving certain complex situations,

- ***diagonal communication***, where the transmitter and the receiver have *different hierarchic positions* in *different departments within the organization*, being used to transmit certain methodological indications to perform the activity of other positions or departments (the manager of the pharmacy of the hospital communicates to a nurse from intensive therapy the adverse reactions of a certain medicine used in her department).

The communication between the organizations (takes place between persons and organizations which have interests over the organization in question, as the Doctors' College, nurses, and health insurance representatives), the communication is bidirectional (Chiriac, 2003).

The management of communication and traffic channels of information is the essential condition for an efficient management of information; therefore there are changes for this management strategy to succeed as long as we take into consideration the main concept from the management of communication: the existence of a source, as well as the existence of a receiver.

The efficiency of communication starts when the source of information is credible, the message is clear and there is feedback from the receiver. The release of information as understandable as possible, in a standard form and the adaptation of the communication strategy, depending on the public need to whom it is addresses to, represents real foundation stone to start an efficient communication on behalf of the decision institutions from the Romanian health system.

In order to make more efficient the communication of information, the healthcare organization has to:

- adopt a managerial philosophy which should encourage communication;
- reduce the number of hierarchic levels through which an information is communicated (Chiriac, 2003);
- use more communication channels and informational and communicational technologies.

Analyzing the health system I can say that it is compulsory to make changes of the environment in four of the major areas:

- within *the infrastructure which supports the distribution and application of the new clinical knowledge* and the technologies;
- *the infrastructure for the technology of information by* starting some governmental projects to develop the infrastructure;
- *payment policies*;
- *train the labor force within the health system*;

The doctor and the patient are the main actors of the system. In order to establish a coherent management strategy they must be correctly positioned within the system. Starting from *the position of the generalist within the health system*, there must be lined all the interactions of this entity with the system so that one can establish directions in the management of medical services for a family medicine clinic.

The shortcomings of this system starts from the collection of an oversized volume of data which fails to assure the need of information to the modern public health system because only a small part of data is used now in the process of taking any decision (Bălan, 2008b).

The medical personnel from the health system must make efforts to improve the quality and the opportunity of medical service granted to patients, therefore it is imposed the need to offer a complete and exact image of the medical information concerning the

patient observing the confidential regulations.

By using an efficient ITC infrastructure, the suppliers of medical services could *eliminate the use of information on paper*, improving the accuracy of medical and personal information concerning the patient, and finally to improve the quality of the medical service.

The internet had a major impact in *increasing the quantity of information* made available to specialists from the health system, but the problem of Romanian health system remained unsolved is the *medical personnel missing access* to this global network of information and knowledge, interconnected, in the context of globalizing the processes of informational era. The lack of access to the best practices, to the medicine based on statistics and proves will deepen the crisis in the health system; will hold back the development of the quality for the medical act.

The development of health systems supposes original *interconnection* of information between different organizations within the health system, in order to facilitate the exchange of information and cooperation between the specialists from the health system. Due to the separation of the medical data in whole safety and to the appropriate management instruments, *the technology of information is one of the main possibilities for this developing process*, therefore the information process of the whole healthcare system supposes *to think again the own information systems* and the insurance that they can be more and more *opened* [Bălan, 2008a].

A performing information management from the health system must have as scope the administration of patients' medical registration so that:

- The patient medical registration to be part of an electronic system of administrating the medical information.
- All information enclosed in the medical registration to be complete and characterized by accuracy (treatment procedures, diagnostics...)
- To exist ***communication*** between all the professionals within the system and the interaction between the patient and those meshed in the system to be permanent
- The patient medical registration to be one of the communication instruments between the medical services suppliers.

The knowledge management generates the change within the healthcare organization during the informational era

The economy based on knowledge or the New Economy is not only digital economy or Internet, it also supposes a *performing knowledge management* through which the organizations produce new knowledge, used by future generations where "*the intangible goods become more important than the palpable ones*" (Drăgănescu, 2002).

There is a global economy, namely it is accessible worldwide, being interconnected through a system of networks where territories are replaced by cyberspaces, the markets with networks, the ownership with the access right, and the Internet is a decentralized, transparent, atomic and fluid market where *knowledge is the central resource*, informational networks, data bases, informational technologies make up the infrastructure, so that there occur new opportunities for the modernization of medical assistance services, *new ways of communication between the state institutions and individuals*.

But, digital economy supposes a higher consumption of conception work, the existence of *certain flexible and interconnective standards* to easy the integration, the access to a plurality of services (e-health) and applications, placing *the individual user in the center of the society based on knowledge.*

The modern informational and communicational technologies (Internet, Intranet, browsers, data deposits, data mining techniques and intelligent agencies) will have to be used to ordinate, intensify and accelerate the management of intra and interorganizational knowledge (Alavi and Leidner, 1999).

The concept of coding, storage and transmission of knowledge is not something new, the training and specialization programs for employees, the organizational politics, the routines, the procedures, the reports and the manuals served it for several years (Alavi and Leidner, 2001).

Taking into consideration that the modern management is ***the main way of economic development*** and that the healthcare organizations during the informational era must be individual oriented, *the patient being the object and the subject of management in the family medicine*, I can say that the primary data source of the health system are the information and the knowledge concerning the patient. *The knowledge management (support, monitoring, capture) inside the organization is a eight stages process, being represented in figure no 2* (Beckman, 1997).

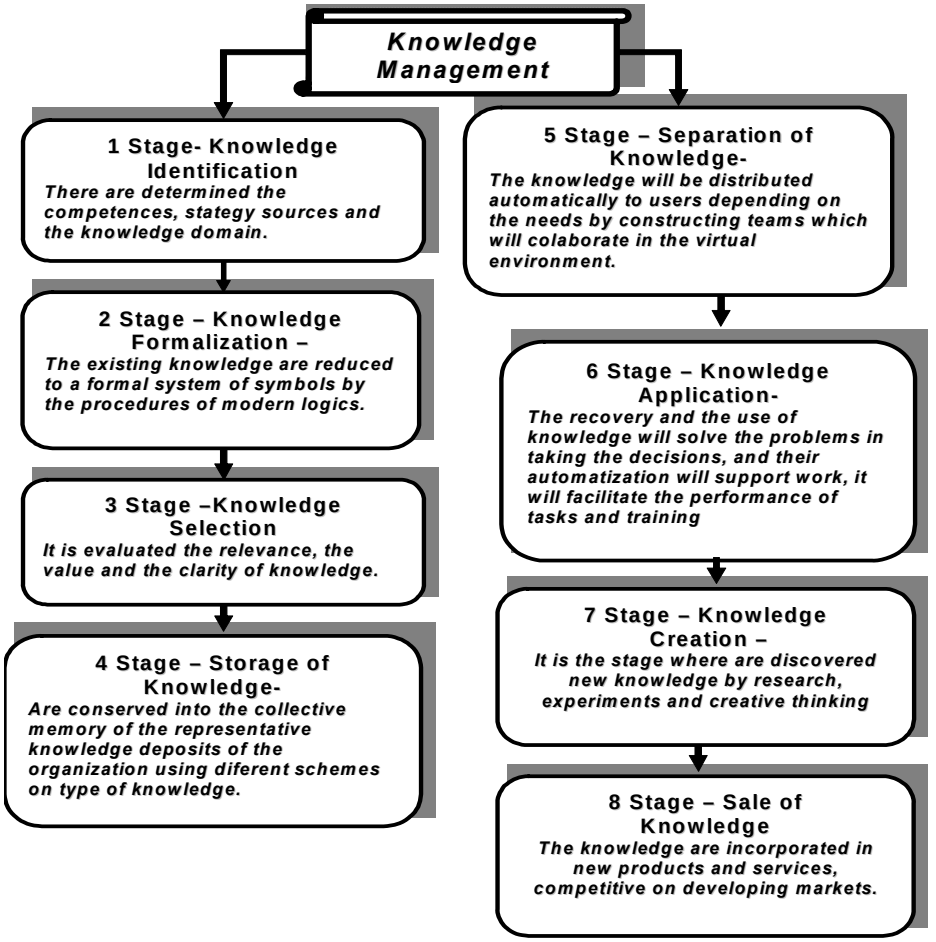

Figure 2. The stages of knowledge management

The change, as we all know is the dominant characteristic of this century, which modifies the entire individual existence and the management philosophy, so that the entire health system, and especially the deciders, must acknowledge the role of change in any conceptual construction, because the change generates a new approach, *the management based on knowledge*.

The medical knowledge and their impact on the patient and the healthcare organizations generate a new force into the world, the knowledge capital, which will amplify the change.

In order to be able to generate the change, we must identify the structural objectives, the base of the health system, of great actuality:

- The identification of the essential mutation generated by the effects of change during the informational era, especially the one with an impact on raising the individual health standard;
- The identification of informational components implicated in the management of medical services;
- The proposal of some modern solutions for the performance and efficiency of the medical services management using ITC in the entire health system;
- The performance of a documented scientific research using indispensable information and data for the approach of the information and knowledge management in the healthcare organizations.

The essential features and mutations of the informational era lay us, also in the domain of health management, in the perspective of a predictable future. We cannot talk about a good management in the medical system without the redesign of medical services management by ***using the information and communication technology in the entire health system.***

In the health system we need performance, transformation of medical health services by bringing the benefits of the medical science, the information and communication technology to all individuals in the society.

If the finality of the information management is the decision, ***the electronic registration of medical,*** financial and administrative ***information***, the electronic separation of such information between doctors, patients and those interested in a secure environment is compulsory if we wish to make the health care systems in XXI century.

The knowledge is information with meaning and information which acts, therefore the knowledge society is possible only if grafted on the informational society (Iancu, 2009) and cannot be separated by the later, and at the level of the "*information management*" the technologies of the informational societies have an integrating character, therefore the development will be more and more connected to ***knowledge***, to (human) capacity to assimilate and develop these technologies, to their use in new activity domains occurred (intelligent products and services: *telemedicine*, telelabour, telework..).

The knowledge management - KM, refers to ***the administration of organizational knowledge about the interior or exterior environment of healthcare organization***, having as scope the efficient use of the information necessary for the strategic decisions and for the knowledge storage in order to increase the performances.

The **knowledge management**, represent the achievement of the correct information in due time by all appropriate individuals, so that they could be able to take the best decisions" (Petrash, 1997).

Representing the most valuable asset of the healthcare organization, *the information* is both target, as well as weapon, and during the instable and

great changing periods, ***it is an intelligent mechanism which moves the organization management***, and constantly produces organizational knowledge, so that the healthcare organizations which will develop *collecting and integration systems for the patients' medical information* will be the ones which will survive and perform on long term, a performance which can be found in the patient satisfaction degree and implicitly in the quality of the medical act (Gheorghe, 2007).

The vision that the patient must be treated only when he is in the medical clinic is entirely wrong, he must be monitor during his entire life from his birth to his death, so that all the medical information to be collected, transmitted, processed, transformed into knowledge, used in the entire health system, separated in order to adopt the best decisions and for quality medical services.

The lack of access to medical services, the prolonged waiting to benefit of consultation, the excessive bureaucracy, lead to *the inefficiency of the medical service*, increasing the waiting time against offering a quality consult.

That is why the industry of medical health care services needs more than ever *intensive, updated and reliable information*, information about the patient (which should accompany him in the entire health system), essential for providing medical services, in order to be able to coordinate the organizations and persons implicated in every medical service.

This information is extremely complex, so that their intensity, complexity and quantity are considerable challenges in adopting the informational technology, an essential condition to increase the efficiency and to raise the quality of medical services.

The almost complete disconnection of primary assistance from other health services leads to serious *discontinuities in observing the evolution of the patients' health condition*, so that the lack of a functional informational system only outlines the shortcomings of the health system.

The informational application should allow the vertical integration of primary assistance services with the professional and hospital assistance, so that there could be facilitated the continuance of the medical service in observing the patient in the entire health system.

The primary medical assistance is essential, fundamental for the health condition, it is the most accessible, it is the cheapest one to a bearable price, *it is the first level of contact between individuals, family and community with the national health system.* And because the number of patients addressing to generalists is an indicator which measures the quality of the medical service, they must be able to approach many health problems. The medical service is efficient is *the generalist administrates all the information connected to the patient troubles from birth to death* by knowing the patient history, the hereditary-collateral conditions of his family, of the risk factors, of the illnesses, so that the primary assistance medical services must be brought to the center of the health system using the information and communication technology.

The evidence-based medicine – medical knowledge generation instrument during the informational era

Starting form the idea that the medicine must concentrate on objectivity, evidences, meta-analysis, on methodic, algorithmic use of all branches of medicine, taking into account the cost-efficiency ratio, under a permanent and rigorous quality control, *the doctor being the front factor of a larger group of professionals, that he interacts with*, unlike the "classic", deductive medicine, based on the amount of knowledge accumulated from

the studies and personal experience, on the traditional *ars medicae* (medical art), on the doctor's personal intuition, in the '70 appeared the concept of *evidence-based medicine* (EBM).

Due to the explosion of information, the erudite and thorough doctor, faithful to Hippocrates oath (encloses the doctors' moral duties) will give all his efforts to help the patient recover his health. In this respect he will use *all the instruments which the medical organization* has and offers to him, from the stethoscope up to the imagistic diagnose etc. He is forced by the conscience and law to be updated and well informed regarding the last publications referring to the case he examines.

The need of EBM come from the acknowledgement of many elements: the doctors daily needs information concerning the diagnose, the prognostication, the cure and the prevention (some noticed that they need up to five times more information for each hospitalized patient and twice more for each three patients consulted in the mobile medical clinic).

It was proved that the "*traditional sources for this information is not appropriate; some are exceeded (treaties), others frequently mistaken (experts), others are inefficient (continuous medical education) and other overwhelm by their volume and are not qualitatively equal to be used in clinical practice (medical magazines)* (Băicuş, 2004).

The disaccord between the diagnostic aptitudes and clinical judgment, improving with the experience, the "up to date" knowledge and the clinical report are in a continuous decline.

The difficulty to formulate a precise, centralized, clinical question can be a major impediment in EBM, so there must be selected *the most appropriate research resources* (for example, to avoid to order an infinite number of laboratory investigations hoping there will be a positive answer), there must be investigated and outlined the base of evidence (*proves, facts*), the appreciation of the clinical importance of facts and evidence, there must be registered the medical activity in order o use it in the future.

The role of informatics is very important in storing the raw data at the beginning, transformed in information and then transformed into knowledge by clinicians, doctors, professionals. But in order to use them later, they must be stored, filed, transmitted, separated and secured. These aspects of the medical knowledge resulted from facts, proves, statistics can be performed only trough the informational and communication technologies of informational society. Once the medical sheet become electronic, the hospital managers, by introducing the wireless networks, can make them available where doctors and nurses need them.

The internet introduces new ways for the individuals to communicate one with the other using the machines. Also in the medical assistance the Internet could offer unsuspected opportunities for the access to information, in order to improve the decisions and the communication between the participants to the health system. But the Internet offers without any limit information, available all the time and poorly organized. This information can be different and contradictory, which implies serious conflicts between the decision factors.

That is way the deciders within the system must use appropriate instruments for an efficient management of the medical knowledge. There must be acknowledged the fact that the medical decision based on evidences, on the best evidences available, a concept used in modern medicine, as well as in the medicine based on statistics must be supported by solutions and instruments specific to the information and communication technology, and the barriers between

the two of them must be reduced or eliminated.

If the Internet can foreground medical decisions based on concrete data, we can say that it can significantly contribute to the improvement of medical assistance. The knowledge and the information technology in medical decisions create opportunities, paradoxes, but also many lacks.

The healthcare organization must take care of the knowledge management in an efficient and responsible way, because the decision based on evidences is a process which implies to explicitly and judiciously take into consideration the best proves from the present care system.

„The ways to reach long-expected goals are implementing systems globally and individually for each patient and placing the patient at the heart of the information system, encouraging co-operation between healthcare professionals, measuring and managing activities being all essential enablers for modernization" (Bălan, 2008).

Conclusions

Now that the health is in a difficult moment, the health system should interconnect all the healthcare organizations, all the clinicians, patients, medical services suppliers, the deciders within the system must benefit of all the information which could be useful to them for taking the best decisions. The paradox is that we have instruments available, but we cannot communicate efficiently, we produce high amounts of information, but we do not have enough time to find them, to understand them or to use them. The efficient management of information and knowledge, their integration into the entire health system and the establishment of certain managerial strategies will confer the healthcare organization long term competitiveness.

Because of the separation of medical data in full safety and of the appropriate management instruments, *the information technology is one of the main possibilities of this evolutionary process*, therefore the informatization of the entire healthcare system supposes *to re-think own systems* and the insurance that they are more and more *open*.

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