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Advancing the Direction of Health Information Management in Greek Public Hospitals: Theoretical Directions and Methodological Implications for Sharing Information in order to Obtain Decision-Making

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Abstract: Although consultants have long placed the use of research information at the centre of their activity, the extent that physicians use this information tends to vary widely. Despite this study and its recommendations, there is still a gap between the functions of a manager and the use of the associated information, while the decision-making procedures vary according to the organization in which they work. The cost of IT remains the largest barrier, while some current IT solutions are not user friendly and out-of-date, particularly for public hospitals in Greece. The knowledge management is concerned not only with the facts and figures of production, but also with the know-how of staff. The information needs protocol should not be referred only to those who comply with formal computer-based information systems, but also to those who take into account other informal information and its flow within the organization. In a field such as medicine, where out-of-date information may be positively dangerous, doctors make heavy use of journals and several texts from the web. The decision-making process is a complex approach, particularly in human diagnostic and therapeutic applications. Therefore, it is very important to set priorities in the sector of health information management and promote education and training on information and communication technology (ICT).

Keywords: information health management; quality information services; information economy; e-health coding; decision making; hospitals; integrated information systems; intelligence; Greece

1. Introduction

At the European Hospital Healthcare Congress in 2001, which was held on London, countries of EU, even if they use different strategies for improving hospital performance, decided to evolve in the field of public health. According to the proceedings of the EU Health congress, the main issue of EU policy in the health sector was to develop a national strategy for sharing information between primary, secondary, and tertiary care. The changes in the National Health System (NHS) around the world since 1990 have had a fundamental impact upon general practice than elsewhere in health care service. Most general practices use computers for their record keeping [1].This includes an increase in the use of IT, e-coding standards, and software development in order to face the increased demands of information management.

The Commission's assessment, in terms of expenditure, has identified priorities: the members of 2014 need to find ways to promote the investment in education, research, innovation, and climate

action. Open educational resources (OERs) and massive open online courses (MOOCs) have raised tremendous interest by higher medical education institutions worldwide. At the same time, during the "e-Health Forum 2014 n Athens [2], considerable attention was given on this matter and the Vice-President of the European Commission recognized that health budgets are strictly cut in relation to the increasing population demands. There is a widespread need to strengthen the efficiency of health care systems, giving emphasis to the quality of public expenditure and the modernization of administration by increasing the use of information and communication technology (ICT) at all levels of e-government services.

There is no doubt that many developing countries, and some developed ones, had continued to neglect their real health problems in favour of sporadic forays into the realm of high technology medicine. As the health care industry shifts from a billing efficiency culture to one focused on service efficiency and effectiveness, information strategies need to change to a new level. Integrated health care delivery systems are rapidly becoming the environment of the future. One of the most significant challenges in health care today is the ability to effectively manage information. Computers have done a great deal to automate and systematize the collection and transportation of data. This trend will make managing health care information even more challenging in comparison with previous decades. Equally, health programs were often based on "vertical" approaches to individual health problems, institutions, or particular groups of the population. Adding value can result in providing care, both hospital and primary, at lower cost, or providing better services to the patients and the families supporting the patient. As health enterprises, the community services present particular challenges in the collection, management, and use of information around the world. Considerable attention has been devoted to the role of the purchaser of health care.

2. Information Intelligence in Health Care

From 1974 to the present day the NHS of the UK has been in a continuous state of what some call "drivers for change". The District Health Authorities (DHA) project team in the UK at 1985 identified the categories of intelligence needed by purchasers of health care [3]. The word "intelligence" was used to denote both text and numeric information, because for many managers in the NHS the word "information" signified only "numeric data". Understanding how big data can support these challenges is central to having the right information available to the operational services when they need it to inform patient assessment and care. A useful starting point of the public health intelligence function is ensuring access to health intelligence, improving the quality of health data [4,5]. The Public Health Skills and Knowledge Framework defines 'public health intelligence' as involving the *'collection, generation, synthesis, appraisal, analysis, interpretation and communication of intelligence that assesses, measures and describes the health and wellbeing, risks, needs and health outcomes of defined populations'* [6].

A historical look-back on the formulation of health policy in all countries, the general targets of the development of the different aspects, defining classification, and terminology standards, were formulated slowly after the end of the Second World War by the WHO. Between 1960 and 1980, successful documentation organizations, like the American Medical Libraries Association (MLA) and the American National Centre for Biotechnology Information (NCBI), advanced science and health by providing access to biomedical and genomic information; the Cochrane Organization and the German Institute of Medical Documentation Information (DIMDI), built processes and systems which respond to the needs of decision-makers.

3. Managerial Operations

Drucker's list of five basic managerial operations, such as economy efficiency, excellence, enterprise, and effectiveness, has a special interest in information needed by managers [7]. A comprehensive work for key management issues for health managers was first reported by the Management Focus Group of the NHS/UK Information Management Group the 1989 [8]. Despite the

date of this adaption, it remains a valid list of information processes to convert basic data into information for general management. For decades, the information behaviour and the information needs of the related demand have triggered the interest of information scientists. Several studies focused on the examination of the outcomes objectively and on the real effects of information supplied to clinicians and health managers but, on the other hand, inadequate consideration was given to those who either did not use the system at all or had used it insufficiently, especially, the information problems of health care workers concerning the failures of clinicians to obtain scientific information from the several health portals, at the point of care [9].The high priority in health management areas are concerned with achieving cost-effective use of resources.

4. Health Expenditure in Relation to GDP, Innovation-ICT

In almost all the European Union members, the hospitals and the healthcare services are the major source of health expenditure. In Greece, which is a member of EU, the economic and financial crisis has been characterized by strong cost cutting in health expenditure. The cost of hospitalization has been increased and patients' contributions in some medical services have been reduced. From the latest available data of 2013, according to the Global Health Observatory [10], the total expenditure on health was $241.7 billion for a population of 11.3 million. During the last four years it was reduced by 0.7% of the GDP (10% of GDP in 2009 and 9.3% of GDP in 2013). From Hellenic NHS observation data [11], ESYnet 2013, which is available online the total admissions were 2,273,751 and the total out-patients were 11,883,536 (statistics provided by 134 hospitals). In the area of expenses, including medicines, salaries, etc., the cost was estimated about 1,421,437,261.

Governments in developed countries are transferring innovation and technology into their health organizations. Over the years there has been emphasis on health care technology, health services research, and on data created a coherent environmental in the NHS towards evidence-based management. This includes an increase in the use of IT, documentation of medical data using international taxonomies (e-Health coding, Medical Subject Headings—MeSH, DRGs), and integrated information management systems for in-/out-patient documentation, as a way of ensuring the value of information scientists and information services in patient care settings, the expert librarian's role in health services research and hospital administrative activities. In a current review study, responders were clinical and hospital managers of nine European countries, identifying the hospital managers' need for information in decision-making, as well as identifying that the economic focus of the hospital managers is quite narrow [12].

The data on Table 1 shows a comparison of the general government expenditure on health for a few countries, including Greece, UK, France, Germany, Sweden, USA, and Japan, compared with the gross domestic spending on research and development and Computed Technology (CT) value added.

From 2009 to 2013 the share of health expenditure increased in France, USA, and Japan, with a decline in Greece, UK, Germany, and Sweden. According to the economic outlook of the OECD 2016 reports [13], constant price estimated that the projected growth rate on the referred countries above is increasing: Greece, up 1.9%; UK, up 2.0%; France, up 1.5%; Germany, up 1.7%, Sweden, up 2.8%; USA, up 2.2%; and Japan, down 0.4%. Compared by hospital beds/1000 citizens: Greece, 4.2; UK, 2.7; France, 6.2; Germany, 8.2; Sweden, 2.5; USA, 2.9; and Japan, 13.2. Sweden has fewer hospital beds per 1000 citizens than most examined countries. By using data compiled for Organization for Economic Co-operation and Development (OECD) countries, the international trend is a particularly notable reduction in the number of beds/1000 citizens for in-patient hospital care.

In Greece, public hospitals are defined as short-term general or university hospitals, including academic medical centres or Armed Forces and rehabilitation hospitals. A report for Greece, which is available by the Ministry of Health, offers a clear picture of the recent Greek hospitals for 2013. According the current review of OECD 2016, health spending continued to shrink in Greece, the gross domestic spending on R & D is 0.8%, and on ICT in healthcare remained steady at 4.9%. For the other mentioned countries, the gross domestic spending on R and D and CT value added, is the difference

between the ICT sector gross output and intermediate consumption: UK, 1.7/7.4; France, 2.3/5.1; Germany, 2.9/5.1; Sweden, 3.2/6.8; USA, 2.7/7.1; and Japan, 3.6/8.1. It has been recognized that each country's government policy and mechanisms for adding value for encouraging innovation in ICT is the only way to reduce the total costs in health industries.

Assessing the medical literature for the benefits of health information management, expert hospital information systems, and quality research, also has definite focus in medical education and research, which are based on using ICT.

Table 1. Health expenditure as a total % of GDP for 2013 is the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, and emergency aid designated for health, but does not include provisions for water and sanitation/WHO–OECD.

Country	GDP (Current $)	Population Million	GDP% 2009	GDP% 2013	GDP% OECD 2016	Gross Domestic Spending on R & D/ICT OECD 2016	Hospital Beds/PER1000 People/OECD 2016
Greece	2.417 billion	11.3	10.0	9.3	1.9 up projected growth rate	0.8/4.9	4.2
UK	2.520 trillion	64.10	9.9	9.4	2.0 up	1.7/7.4	2.7
France	2.735 trillion	66.03	11.7	11.7	1.5 up	2.3/5.1	6.2
Germany	3.635 trillion	80.62	11.8	11.3	1.7 up	2.9/5.1	8.2
Sweden	5.579 billion	9.59	9.9	9.6	2.8 up	3.2/6.8	2.5
USA	16.80 trillion	316.1	17.7	17.9	2.2 up	2.7/7.1	2.9
Japan	4.902 trillion	127.3	9.5	10.1	0.4 down	3.6/8.1	13.2

5. Integrated Healthcare Getting Research into Practice

Sometimes "Integrated Healthcare", also called the continuum of care, is an effort to add value to the delivery of e-health care services. E-health is a concept that covers information technology and communication tools and services for the improvement of the continuity of health care. The typical user of health care is every human being, but user is also meant in the case of health information. Of special interest for the European region was a common goal of "health for all", but also "online health care information for all", enabling the well-informed patient on their health care [14,15]. Community health services are difficult to define, but they are very common for the patient. They provide types of care unique to this setting, as well as inter-linking to other forms of care provision. Getting research into practice is not a straightforward exercise and, as usual, in research a number of questions are raised: where does one find the "evidence" in MEDLINE bibliographic databases, Cochrane databases, DIMDI databases, InfoPoems, diseases topics and database searches? How do you get evidence into practice? The recent policy statement of the MLA takes the position that scientific evidence is the basis for improving the quality of Information sciences now and in the future. Developments, such as total quality of health management and continuous quality improvement, reinforce the centrality of research and its relationship to efficient and effective information practice.

Evidence-based practice (EBP) encourages health professionals to seek out, appraise, and apply the best evidence from the medical literature in order to improve the quality of clinical judgments [16,17]. The health information scientist interacts effectively by seeking the best information in order to assist in decision-making. It is time to change the way of seeking better evidence in order to solve patient problems [18].

Health economists, in coping with health information scientists, identify and evaluate published cost benefit analyses and cost effectiveness analyses within a variety of courses. These received detailed structured abstracts that describe the key aspects of the evaluation and indicate how far they have met a set of quality criteria expected of a well-contacted economic evaluation. The UK NHS Economic Evaluation Database (EED) is a structured database of abstracts of published economic evaluations and interventions of healthcare. The production of these structured abstracts is available through a public database and the Cochrane Library. This project is funded by the UK NHS program, for NHS

decision-makers. The first review of EED was undertaken between 1994 and 1999. A particular interest on evidence-based information offers a comprehensive drug database Lexicomp, a full-text access reference guide to point-of-care [19].

The health information manager (HIM) is generally responsible for managing health information systems, and plans and develops IS that meet the standards of accrediting and regulatory agencies, appropriate for various sizes and types of care facilities [20]. As an expert in processing, developing, analysing, and reporting vital information to the clinical and administrative staff, all of whom depend on health information to perform their jobs. The HIM's role in the transformation of health care delivery and overseeing the implementation of the National Health Information Management and Technology strategy, serves a bridging role, connecting clinical, operational, and administrative functions [21,22].

6. Conclusions

In the Hellenic public health sector, we have to focus on added value activities using technology. As health information scientists, having the expertise, we should be prepared for advanced clinical applications and be able to access outcomes of information use, since this is the only way to provide secure access to data for those with a "need to know". The decision process is a complex approach, especially in human diagnostic and therapeutic applications. Therefore, it is very important to set priorities in the sector of health information management into intelligence, bringing information, and promoting education and training into the organizations. We will also meet the joint actions planned for 2014 under the third EU Health programme 2014–2020, giving us the opportunity to set a proposal for actions under thematic priority three, contributing to innovative, efficient, and sustainable health systems, in a timely manner. Expert information professionals could help identifying opportunities in the Hellenic health community to show how important it is to have information on clinical praxis, cost analysis, quality care services, using accurate and actionable data to change all aspects of care delivery in and out of the hospital environmental. The current view should be optional rather than obligatory, until implementation is achieved and maintained.

7. Discussion

International changes in hospital provision in establishing ICT market information economies is needed. E-health and health services based on e-health applications are broadly recognized as an essential element to improved scientific co-ordination and resource sharing. Healthcare executives are often asked to think of better ways to upgrade services, finance healthcare, and respond to customer priorities. Changes in healthcare demand innovative approaches and timely action are needed more than ever before. With healthcare being treated more as a community and political affair, management decisions are increasingly more complicated and demanding. With healthcare costs to rise, technology to expand, and resources to become more limited, there is mounting pressure to optimize the outcome resource link. It is now well realized that in order to achieve international best practice in the primary healthcare sector, it is required to set the development methods on a fundamental integration of communications and information technologies with clinical practice. This will have reaching effects both on the pattern of medical practice and domiciliary care, as well as on patient outcomes. The primary care health sector represents the base of the healthcare pyramid, which plays a crucial role in the delivery of preventive health care and in the triaging of patients needing more expensive specialist or hospital services. The foundation for these structures is a systematic ongoing measurement of what data is important in supporting the critical services of each department and then using that information in order to improve the overall operations of the enterprise. Each country must determine its own detailed approach to primary health care; as such, systems cannot simply be transplanted from the different circumstances of other nations. The maintenance of a complete and comprehensive patient record will enable, in practice, the collection and storage of nearly all of the information necessary for it to function effectively.

General practice staff have to be guided and assisted for adopting written protocols for the creation and maintenance of clinical records. Additionally, required access is needed for systematic training programs to cover records management strategies and standards should specify the required search access which record systems must permit. Information technology can be used for denoting knowledge imparted and the process of informing as a by-product of care delivery, and documenting of all patient information needed to support coding, clinical trials, and evidence-based research. All of the patient data can be represented in a semantic manner, building and using a medical ontology for knowledge management and cooperative work in a health care network. Any NHS needs to share information extensively in order to meet its aspiration. The need to define the main national health problems is obvious, but it is not always easy to ensure that they are tackled in preference to other easier or more attractive alternatives. Patterns of health care in developed countries are usually the result of a process of evaluation.

There is need of a greater innovation in health and social care in order to provide better integrated-based information systems. Decision analysis has been increasing in recent years, and a taxonomy for decision models could be developed by keeping a record of any NHS needs, in order to share information extensively to ensure access to health intelligence.

Conflicts of Interest: The author declares no conflict of interest.

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