

Organization Of Health Services In The Departments Of Nuclear Medicine

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Abstract

Introduction: The science and clinical practice of nuclear medicine involves the administration of small amounts of radioactive labelled compounds (radioisotope) used to provide diagnostic information in a wide range of diseases, as well as in the treatment of diseases.

Aim: The purpose of this review is to investigate the organization of the health services provided to the departments of nuclear medicine when performing diagnostic tests on patients.

Material & Methods: The study consists of a review of Greek and international bibliography. The study's material consists of articles related to the topic found in Greek and international databases such as Google Scholar, the Hellenic Academic Libraries Association (HEAL-Link). The exclusion criteria for the articles were the language, except for Greek and English. For the most part, only articles and studies accessible to authors were used.

Results: Health services are that part of the health system, which in any society that is specifically focused on the provision of health care services. A health system includes a complex set of structural relationships between populations and institutions that have an impact on health. Health services are delivered to a wide environment, the key components of which are healthcare professionals and staff, the various healthcare organizations where care is provided or coordinated, and the organizations or businesses that fund the provision of services.

Conclusion: There is currently a wide range of nuclear medicine health service providers, who deliver and coordinate health and care services. The differentiation of the organizational forms of healthcare providers has created new organizational forms and types.

Key words: Organization, health services, nuclear medicine, departments

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1. Introduction

The science and clinical practice of nuclear medicine involves the administration of small amounts of radioactive labelled compounds (radioisotope) used to provide diagnostic information in a wide range of diseases, as well as in the treatment of diseases. It is a functional imaging method that uses biologically active molecules or cells marked with radioactive isotopes as molecular detectors for taking in vivo images of physiopathological processes [1]

The importance of nuclear medicine lies in its ability to provide extremely sensitive measures of a wide range of biological processes that are taking place in the human body [2] Nuclear medicine is currently used for a large set of diagnostic tests. There are more than 100 different diagnostic imaging procedures in nuclear medicine, and these procedures use many different radiolabelled compounds, covering all the main organ systems of the body and providing many different measures of biological function. [3]

On a global basis, it is estimated that more than 30 million nuclear medicine imaging procedures and that there are more than 20,000 nuclear medicine cameras capable of displaying radioisotopes emitting gamma rays, installed in hospitals around the world. Even many small hospitals have their own department of nuclear medicine [4]

All of the above procedures require the delivery of a wide range of services that include the consultation and examination of the patient, the interpretation of diagnostic images, the correlation with other diagnostic methods, the determination of metabolic functions, the determination of the drugs and ingredients to be administered, and the provision of recommendations on the significance of the findings [5]

The purpose of this review is to investigate the organization of the health services provided to the departments of nuclear medicine when performing diagnostic tests on patients.

Methodology

The study consists of a review of Greek and international bibliography. The study's material consists of articles related to the topic found in Greek and international databases such as Google Scholar, the Hellenic Academic Libraries Association (HEAL-Link), and with the use of keywords such as organization, health services, nuclear medicine, departments. The exclusion criteria for the articles were the language, except for Greek and English. For the most part, only articles and studies accessible to authors were used.

The Concept of Health Services



Health services are that part of the health system, which in any society that is specifically focused on the provision of health care services. A health system includes a complex set of structural relationships between populations and institutions that have an impact on health [6]

Health services are delivered to a wide environment, the key components of which are healthcare professionals and staff, the various healthcare organizations where care is provided or coordinated, and the organizations or businesses that fund the provision of services. The aim of both health systems, healthcare organizations, and the delivery of health services is the universal provision of health care, the treatment of the patients, the preservation of the health of individuals and the protection of individuals and families from expensive medical care [7]

The successful delivery of health services is largely a function of the knowledge, skills, motivation and development of employees responsible for the organization and provision of health services [8] Health services are delivered to a wide environment, the main components of which are healthcare professionals and staff, the various healthcare organizations where care is provided or coordinated, and the organizations or enterprises that fund the provision of services [6]

Initially, health professionals and other workers have an essential role in the provision of health services. Human resources in the health sector include clinical staff, such as doctors, nurses and pharmacists, auxiliary staff as well as management and support staff, namely a set of people who do not provide health services directly, but are essential for the performance of health systems, such as managers, accountants, etc. The successful delivery of health services is largely a function of the knowledge, skills, motivation and development of employees responsible for the organization and provision of health services [9]

Therefore, health service providers must provide training and programmes for the development of these human resources, as well as certification and have regulatory mechanisms in place to guide their operation in the context of the provision of health services. [10]

Regarding health care organizations there is currently a wide range of providers who deliver and coordinate health and care services, and the number and type of these organizations developed especially during the 80s and 90s. The diversification of the organizational forms of healthcare providers has created new organizational forms and types, as for example hospitals have diversified by adding geriatric care components or have been vertically integrated into an integrated healthcare system, complemented by ambulatory clinics and long-term care units [11]

Service organizations can be either public or private, and if they belong to private entities, then they can be for-profit or non-profit. Despite the different models of ownership, contractual relations with financiers often allow for the full participation of organizations in an integrated system. The general framework of a system and the degree of government regulation are likely to determine the extent of integration and thus the overall effectiveness and responsiveness of health services [11]

Although healthcare workers, health service providers, and organizations and funding agencies are key determinants of the delivery of health services, there are also a set of external factors influencing health services. Medical products and technologies, for example, are part of the environment of providing health services [12] The ongoing expansion of diagnostic and therapeutic medical equipment and the discovery of new drugs have increased the cost of health services, as they have created new types of work and technical care professions within the healthcare delivery system, which in turn leads to greater demand for these technologies [13]

Organization of Departments of Nuclear Medicine

According to the IAEA (2006) the level of services of nuclear medicine is categorized according to three levels of need [14]:

- The first level is suitable when only one gamma camera is required for imaging purposes. Radiopharmaceutical supplies, physics and radiation protection services are set up outside the center. A single imaging room connected to a common reference area should be sufficient, and have staff consisting of at least one nuclear medicine physician and a nuclear medicine technologist. This level is suitable for private nuclear medicine practice.
- The second level is suitable for a general hospital where there are multiple imaging rooms in which in vitro and other non-imaging studies will be conducted, as well as radionuclide therapy.
- The third level is suitable for an academic institution where there is a need for an integrated clinical service of nuclear medicine and the conduct of research programs. Radionuclide therapy is provided at this level for inpatients and outpatients.

There are three main areas of service in nuclear medicine: in vitro diagnostic imaging, in vivo diagnostic imaging and isolated radionuclide therapy. In the first case, the patient does not come into direct contact with the radioactive material, but the sample (blood, urine, etc.) is taken and analyzed using a radioactive component. [15]

The term in vivo refers to the measurement or visualization of the distribution of a radiopharmaceutical product in a living organism. Radioactive isotopes are administered orally, by inhalation, intravenously or in selected cases by direct injection to obtain diagnostic evaluations of anatomical and / or physiological conditions. [16] And in the third case, if it is possible to administer beta- or alpha-radiopharmaceuticals to an organ or tissue that is to be disabled or destroyed, then this short-range radiation will affect only a few layers of cells or, when evenly distributed to one organ, will selectively irradiate the targeted organ. This process requires that radiopharmaceuticals accumulate specifically in the target organ, and preferably nowhere else in the body [17]

Nuclear medicine processes can be configured in different environments, such as outpatient centers, doctors' offices, mobile units and hospitals. The process of providing healthcare to the patients can be modified based on the provisioning



arrangement, however the basic level of quality of service must be maintained and continuous improvement must be sought. [5]

Some procedures of nuclear medicine require the conduct of a specific, standard procedure for preparing the patient. Therefore, nuclear medicine departments should have standardized patient preparation protocols with the programming source, such as nursing units, offices, or clinics.[18]

A reminder from nuclear medicine staff about the patient's preparation when planning can help avoid delays in performing the procedure. The programming source should also be aware of any conflicting tests, such as X-ray studies involving contrast substances, other nuclear medicine procedures, or interventional drugs. [19]

The management of radiopharmaceuticals is also important. Orders for radiopharmaceuticals should be placed regularly when storage is not possible. When ordering radiopharmaceuticals, the time from preparation to administration to the patient must be considered. Before the patient arrives, routine procedures should also take place, such as [20]:

- ✓ quality control measurements, which must be performed on all equipment (daily quality control on the dose calibrator and gamma camera),
- ✓ the staff must be trained in the technical aspects of the processes and in customer service,
- ✓ the necessary supplies must be assembled,
- ✓ radiopharmaceutical doses should be controlled in accordance with local regulations,
- ✓ radiopharmaceutical products must be ordered if they are not available, and
- ✓ emergency equipment and supplies must be available.

In addition, intrusive procedures, medications and disease conditions may require special precautions or result in the execution of an alternative protocol. Patients should be clarified what is expected of them during the examinations, how the procedure will be performed, any discomfort they may experience, the time required to complete the procedure and for the how and when they will receive their results [5]

On the other hand, the non-medical aspects of the health services provided, indirectly affect the health and well-being of patients and other health care users and include three sub-dimensions, which are the aesthetics of the space (servicescapes), accessibility and responsiveness. The aesthetics of the space refers in essence to the natural environment and basic amenities [21] Including accommodation, appearance of facilities, landscaping, staff apparel, signage, cleanliness and so on. Accessibility includes the location of the facility, the time it takes to get to it, as well as affordable care. Ease of admission, billing, discharge and other non-health related processes are also included in this dimension. [22]

Finally, the response is related to the expectations from the care received by the users of health services, including the dignity and autonomy of the patient, the

confidentiality of care, immediate attention, access to social support networks during care and the quality of basic benefits [23, 24]

Conclusion

There is currently a wide range of nuclear medicine health service providers, who deliver and coordinate health and care services. The differentiation of the organizational forms of healthcare providers has created new organizational forms and types.

Despite the different models of ownership, contractual relations with financiers often allow full participation of organizations in an integrated system. The general framework of a system and the degree of government regulation are likely to determine the extent of integration and thus the overall effectiveness and responsiveness of health services [11]

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