



# Hospital Hygiene and Safety

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## Abstract

**Introduction:** Hospital hygiene and safety is a prerequisite to the reduction of occupational accidents and diseases; its favor's health promotion and workplace safety as well.

**Purpose:** The assessment of the impact of both hospital hygiene and safety on hospital workforce and hospitalized patients.

**Methodology:** The material of the study consists of bibliographic research and recent papers concerning the subject. The sources were mainly found via electronic databases - Medline, Google Scholar and the Hellenic Academic Libraries Link (HEAL-Link) in English and Greek using keywords regarding hygiene, safety and healthcare discipline. 38 reference sources were included.

**Results:** Over the last two decades, the European Union highlights an increasing interest in occupational hygiene and safety. Several actions strategies have been developed in that direction not only at EU level but also at national and global level. There seems to be some progress as regards occupational health and safety in harmony with the Community legislation, mainly regarding a legislative framework. In Greek hospitals, there seem to be individual efforts, not collective ones, to ensure workforce health and safety. Greek healthcare professionals require more comprehensive awareness and education as regards occupational health and safety issues.

**Conclusions:** It is essential concerted efforts and action of all stakeholders be adopted in order the desired outcome to be achieved.

**Keywords:** Hygiene; Safety; Hospital work; Hospital acquired disease; Illness; Healthcare Workforce

## Introduction

Hygiene and safety of both healthcare workforce and hospitalized patients involves a modern administration issue; at the same time, it is an apropos social issue. Hospitals used to have specific structure and organization since antiquity, such as the Asclepieia, to ensure the seamless care of the workforce to hospitalized patients of the time and restore their health [1,2].

This policy continued into the next centuries and especially during the Byzantine period, during which the organization and function of hospitals ensured the safe healthcare of hospitalized patients and their health restoration, while it consisted a standard for generations to come, even for recent generations [3,4]. The tradition continued during the Ottoman period in Greece; an exemplary example is Vostanio Hospital in Lesvos [5,6].

Nowadays, especially in developed societies, the State is responsible for the creation, organization and staffing hospitals so that they can ensure both patients' and healthcare workforce's health [7].

According to the Constitution, the responsibility for the hygiene and safety in the workplace along with the protection of healthcare

employees is the sole and exclusive responsibility of the employer. On the other hand, obedience of the law and rules for safety and hygiene is not only an employees' right but also a legal obligation of theirs [8].

The term "occupational hygiene and safety" is a broader concept that is in immediate connection with the existence of other individual concepts and entities. The presentation of the most important of them is attempted as this paper follows on.

In addition, the term "occupational hygiene and safety" refers to all those procedures to be applied in order [9]:

- I. A high level of physical, mental and social well-being of the workforce to be promoted and maintained, creating satisfying workplace environment.
- II. Appropriate preventive measures for prevention of occupational accidents and diseases to be taken to protect healthcare employees from occupational hazards.
- III. The workforce to receive suitable and proper education ensuring their occupational safety.

As regards the factors impacting on occupational hygiene and safety, they consist of work nature and conditions along with the employee's personal attitude towards hygiene and safety which may vary from intense interest to complete apathy [10].

The main objective of introducing a complete hygiene-security plan, is for the latter to be able to help the employee develop safety awareness and favorable attitudes towards safety and successful fulfillment of each working shift [11].

### Purpose

This review study aims at delving into the impacts of hygiene and safety in the hospital between healthcare workforce and hospitalized patients.

### Review Method and Material

Recent articles and scientific books on the subject have been found in Medline, and Google Scholar databases and the Hellenic Academic Libraries Link (HEAL-Link). They have been the material of the study, with the following keywords: hygiene, safety, hospital work, hospital-acquired disease, illness, healthcare workforce. The language of the books and articles was the criterion for exclusion except for Greek and English. Review articles and research ones, as well as books have been found in the above-mentioned electronic databases and libraries for the preparation of the specific bibliographic review. Furthermore, research through electronic database as well as finding information from scientific books have been performed. Finally, 38 reference sources were included.

### Safety Hazards in Hospital Environment

Safety hazards in hospital environment may lead to employees' physical injury as a result of their exposure to them. Hazards of this type are divided into [12]:

- I. Hazards due to shortages of building infrastructures.
- II. Hazards deriving from security deficiencies of machinery and equipment and facilities.
- III. Hazards because of lack of safety measures during the use and transportation of hazardous substances.
- IV. Hazards due to deficiencies in electrical installations.
- V. Hazards owing to fire explosions.
- VI. Hazards arising from deficiencies in awareness, information and training of healthcare workforce.

The correct assessment of the occupational hazards above in the workplace, as well as taking preventive measures at an organizational level plays a major role for those hazards to be mitigated, or even be eliminated [13].

### Health Hazards in Hospital Environments

Health hazards can distort employees' biological balance (disease), because of their exposure to the hospital working environment. These hazards can be as follows:

#### Natural hazards

Natural hazards are the risks related to natural factors of a working environment such as noise, low or high temperatures,

lighting, ionizing and ultraviolet radiation, vibration, ultrasound, laser, etc. [14,15,34,35].

The damage that natural factors may cause to the employees' organism depends on the concentration of "the exposure time to the X harmful factor"; it consists of the equivalent dose of employee's exposure to the harmful agent. For each of these factors there is a different way of measurement and evaluation as a professional risk. Their treatment is based on the removal or reduction of the intensity of these factors as well as their organizing prevention, which involves taking individual and other protective measures along with employees' medical surveillance [16-18].

#### Chemical hazards

The harmful agents of this type are classified into different categories such as particulate pollutants or aerosols (powders, fibers, fumes, clouds) and air pollutants (gases, vapors) [8].

In hospitals, in particular, chemical agents (potentially harmful) include anesthetics, radioisotopes, formaldehyde, glutaraldehyde, contrast mediums, antiseptics, ethylene oxide, chemotherapeutic - cytotoxic drugs, organic acids, aldehydes, ketones, inhalational anesthetics, etc. [19,20].

The introduction of chemical compounds into humans is by ingestion, skin contact and inhalation. These factors can cause problems to the respiratory, hematopoietic, and nervous system, and even lead to malignant lung cancer and gastrointestinal cancer [21,22,36,37].

It is necessary that an occupational risk assessment be held to quantify and qualify occupational hazards in the work environment due to the severity of the impacts on workers owing to their exposure to those factors, This could be achieved in two ways; in particular, the Analytical method (sampling and analysis of chemical pollutants sample) and the Direct measurement procedure (direct designation, qualitative and quantitative designation of the chemical agent) [23].

#### Biological hazards

Biological hazards are the risks deriving from the exposure to pathogens including genetically modified microorganisms, cell cultures (growth of cells derived from multicellular organisms) and human endoparasites (fungi, protozoa, mesozoa, viruses, rickets, bacteria, etc.) [9].

Exposure to biological agents may cause problems to human beings depending on the risk of each agent. The risk of a biological agent, among others, depends on its infectivity, its pathogenicity, its transmissibility, its inactivation-neutralization state and other characteristics. It may be dangerous not only for one employee, but also for all workers, and for the wider community as well [24].

The occupational risk assessment in the aforementioned case concerns [13,25]:

- I. The assessment of the exposure existence (identification of factors and their characteristics).
- II. The estimation of the exposure (surface contamination measurements, microorganism existence measurements).

Unfortunately, there are no exposure limit values concerning biological agents. About the protection against these harmful factors, a major role is played by:

- a) Personal and collective hygiene and protection measures.
- b) Employees' information and education.
- c) Adequate labeling for the presence of biological hazards.
- d) Keeping recorded data regarding workers' exposure.
- e) Medical follow-up of the workforce, vaccination.

III. Diseases that may arise from the hospital workforce exposure to biological agents such as Hepatitis A, B and C, AIDS, tuberculosis, meningococcal meningitis, rubella, salmonellosis, scabies, lice and others. [26].

### Ergonomic risk factors regarding health and safety

Ergonomic risk factors regarding health and safety are risks related to the organization of the production process itself and the employees' effort to adapt to work. These risks may be due to [27]:

- I. The organization of work (e.g. round-the-clock work, night shift, etc.)
- II. Psychological factors, emotional or mental distress (e.g. violence, aggression, emotional stress)
- III. Ergonomic factors (e.g. handling of loads, patients' moving and handling)
- IV. Adverse working conditions.

### Ensuring a Safe Hospital Environment

During the last two decades, regarding safety assessment of a workplace, there seem to be reckoned safety inspections, assessment of workers' both safe and risky behaviors, as well as the employees' general attitude towards security in accordance with new data on occupational health and safety management as well as the recognition of the importance of the security culture role [28].

This new approach intends to address occupational safety as a part of the overall administrative process. It aims at [29,30]:

- I. Collecting information in regard to the safety status of the work environment with the leading or proactive indicators that are comprised of circumstances, events or measures that precede an adverse event and can, to some extent, predict it.
- II. The evaluation of the applied policy utilizing lagging or reactive indicators usually related to accidents or illnesses.
- III. Making decisions for further actions. The best results are obtained by combining multiple indicators so as to gather as much information about a factor as possible through different approaches. This can be achieved either by measuring various characteristics through complementary approach or by measuring each and every factor using different methods known as supplementary approach [31,32].

In the European Community, occupational health check is based on a number of health indicators and effective indicators of health

care systems. These indicators reflect the consequences arising from working conditions; they should be divided into economic and professional indicators, so as the way in which illnesses are linked to work to be shown. The proposed index of indicators, as defined by the European Network for Workplace Health Promotion (ENWHP) and Healthy Workplaces Campaigns, will help to portray healthcare employees' health status at the workplace both at national and European level [9,33].

### Hygiene and Security Standards in Hospital Environments

The successful implementation of a hygiene-safety policy at the workplace requires coordinated efforts made by employers, employees and the State. Basic guidelines for this policy should be [34]:

- I. Administrative goal setting. The designation of specific targets and the emphasis given to a sanitary-security program, even the financial amount to be spent, are factors leading to success or failure of any program [11].
- II. A healthy working environment. Regular control of the work environment by sampling and measurement of adverse factors helps to ascertain the compliance with the premises and employees' safety limits regarding exposure to harmful agents and take corrective action [6].
- III. Mechanical equipment and mechanic safety procedures. It is vital safety procedures be redesigned in order to eliminate or reduce risks in the working environment. This requires the maintenance or replacement of machinery and the use of personal protective equipment (PPE) [8].
- IV. Delving into the causes of occupational accidents, diseases and recording statistics. The assessment of occupational accidents is mainly aimed at identifying the causes of an accident so that it is not repeated. Writing down statistics and classifying them (e.g. by injury type, part, cause, etc.) provides the opportunity to collect valuable information that may lead to the improvement of existing conditions and hence, reduce the likelihood of an accident or an illness to occur in the workplace [35].
- V. Staff education and training. Employees' training aims at identifying and understanding the risks involved, applying the appropriate safety technique, systematically using of individual protection measures and the proper use of technological equipment. Particular emphasis should be placed on informing pregnant women workers as well as informing them about infection control issues [36].
- VI. Implementation of protective measures-Monitoring of compliance (safety inspection). Safety inspection and the monitoring of the compliance with the safety measures by all the parties involved is of major importance as it enables the identification and subsequently the handling of various problems. Furthermore, information concerning security is collected to assess the risk of different jobs [34].

VII. Programming design patterns. These programs will address the reduction of risk sources, the maintenance of an ergonomic and safe working environment, the implementation of regular inspections in the workplace, the establishment of regular preventive medical controls for workers, and emergency preparedness.

VIII. Medical follow-up of the workforce. It is necessary medical follow-up regarding employees' health in hospitals be required by an occupational doctor and at regular intervals (Article 39 of the law number 3850). The medical check-up must include medical and occupational history, medical and laboratory tests, as well as the creation of medical records [8]. Regular employees' health check-up also helps to control the transmission of infections from the worker to other people, thereby ensuring both the safety of patients and visitors to the hospital [38].

## Conclusions

The approach to hygiene and safety in hospital environments requires action not only at an organizational level or at the level of the economic activity sector, but also at national and global level.

The social responsibility of the administration of a hospital is not limited to the prevention of its employees' safety and health, which, moreover, is a legally enforceable right. It should be extended to an overall effort to promote the physical, mental, social and intellectual safeguard of all its healthcare workforce.

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