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Research Article

### THE STATUS OF INFORMATION SECURITY MANAGEMENT PERFORMANCE IN LIBRARIES OF STATE MEDICAL SCIENCES UNIVERSITIES IN TEHRAN BASED ON ISO/IEC 27002 STANDARDS

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#### Abstract:

##### Introduction

ISO/IEC 27002 standard is considered in the area of information security management. Its characteristics has made it applicable in various organizations and applied fields. In this study the status of information security management performance was examined in the Libraries of State Medical Sciences Universities in Tehran based on ISO/IEC 27002.

##### Methods:

In this study that is an applied research and its method is descriptive/ analytical, all of the senior and intermediate managers in the libraries of state medical sciences Universities in Tehran consist the research population. 50 managers participated in the current study. The data were collected with the questionnaire.

##### Results:

With regard to the 11 indexes for observing the ISO/IEC 27002, the results revealed the following mean values: security policy (2/54), organization of information security (2/58), asset management (1/97), human resources security (2/61), physical and environmental security (2/33), communications and operations management (2/51), access control (2/43), information systems acquisition, development and maintenance (2/64), information security incident management (2/68), business continuity management (2/66), compliance (2/49). According to the evaluation table, the mean values of all the indexes had a somehow optimal level and only one index "asset security management" was in non-optimal status.

##### Conclusion:

Considering the results, one might conclude that the studied libraries have a somehow optimal status of information security management. No study has yet been conducted regarding the information security management according to international standards in the libraries of medical sciences Universities in Iran.

**Keywords:** Information Security, Information Security Management, ISO/IEC27002 Standard.

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**INTRODUCTION:**

In contemporary world, information technology is growingly developing so that it provides both public and particular groups with numerous facilities. In such an era in which few professions are not influenced by technology, Library and Information Sciences also includes some representations of information and communication technology (1). With the advent of technologies in the libraries, paying attention to the available information and data in the libraries and their presentation to the clients is more highlighted and libraries as an organization for storing and retrieving the users' required information play a key role (2). Information systems in the libraries provided the inter-organization and intra-organization clients with the services and collections through web network. It is this accessibility through internet that has confronted these systems with security risks. Since information is the main commodity of a library, presented information in information systems requires coherent control in order to protect probable invasions. Libraries should keep the privacy of their information properties including the library financial information, the clients' information about their financial circulation, the password for accessing to the library information system, etc. The clients should also have confirmed access to the library computers, websites, databases and networks. Accordingly, since the information security plays a significant role in supporting the activities of the organizations, it is necessary to have a standard or criterion which organizes controlling the information security (3). In this regard, numerous organization and centers all over the world have presented a set of criteria and security levels in the form of various standards. One of these centers is the International Standard Organization (ISO) which has published various editions of ISO/IEC 27000 standard in order to support organizations in keeping their information assets. Among these versions editions, ISO/IEC27002 is related to "Code of practice for information security management" which is applicable for all the organizations, either public or private ones. Its guidelines were codified so that they had the least number of risks and the highest extent of security (4). This standard includes security controls in 11 very comprehensive domains. These 11 domains in the form of 39 components are the basis for evaluating the security risks and security development. They include the security policy (1 component), organization of information security (2 components), asset management (2 components), human resources security (3 components), physical and environmental security (2 components), communications and operations management (10 components), access control (7 components),

information systems acquisition, development and maintenance (6 components), information security incident management (2 components), business continuity management (1 components), and compliance (3 components) (5). A review of the related literature has shown that the average of information security management in the libraries of state Universities at Tehran is 4 and more than the average extent, i.e. at an optimal level with 95% of certainty based on ISO/IEC 27002 (2). In another study of ISO/IEC 27002 for examining the status of information security in Iran digital libraries, the results indicated that the average information security in Iran digital libraries was 0.79 (out of total mean 1) and libraries enjoyed a high extent of information security (6). The studies which have been conducted in other countries have shown that more than 90% of the public and specialist libraries in Malaysia had higher level of implementing information systems security. However, 54% of them lacked security policies, procedures and users' education (3). In another study, the library information system security was examined in light of the network environment and various issues were analyzed including external objective factors which might influence the library information security system, damaging the hardware tools, computer viruses invasions, weaknesses in the library information system procedures, operational weakness, illegal access and users' misuse. Moreover, the efficient tools for ensuring the library information system security e.g. computer viruses invasions, firewall, coding and deciphering the identities, installing the protective software, regular protection of databases, protecting the library applications, and efficiently managing the facilities controlling were elaborated (7). In seemingly the same line, the literature on developing the security and safety programs for the academic libraries was reviewed. In this study, a number of suggestions were posed for preparing the staff members of the library in order to control such situations. At the end, it was suggested that the best approach to avoid any crisis is being informed and prepared for taking timely action (8). A systematic review of the literature about managerial roles in the field of information security was conducted. It was found that multiple managerial activities specially development and implementation of information security policy, awareness, effective development of enterprise information architecture, compliance education, IT infrastructure management and etc have a major impact on the quality of information security management. Also in this study noted that information security issues should be considered as a managerial responsibility (9). A survey on information security in the Small and Medium-sized Enterprises (SMEs) in Bursa, Turkey

was conducted. Compare the results with the gathered data from other countries showed when communications and operations management, and security policy improve, other security parameters in companies such as organizational, personnel, physical and environmental securities improve also (10). To analyze common problems during the implementation of ISO standards in eight different public organizations in Turkey, a collaborative risk method in the field of information security management was used. The results showed that the use of this method has a systematic and structured approach to risk analysis. Also this method is collaborative and provides the possible of more effective participation such as discussions, decisions and etc in among the employees in the process of analyzing the information security risk (11). In another study, a new risk assessment method based on vulnerability trees that was completed with two new indexes to determine the risk resulting of cyber threats on a information system based on the computer have been used. It was found that this method can help information systems managers for the security current levels diagnosis and selection of the security mechanisms (12). In a case study, risk assessment of digital library information security was performed and ISO/IEC 27000 series standards were used. It was found that in this assessment many types of assets, threat, and vulnerability should be considered (13). Since huge expenses are spent on supplying and buying the sources and databases in academic libraries, keeping information is of utmost significance (14). In this regard, medical universities libraries which are considered as a part of the mainstream educational system, as a center for supplying and disseminating the specialist knowledge for the medical society, are of utmost significance. Considering the fact that keeping information in academic libraries like other organizations is very important and a lot of money is spent on owning and buying databases in medical libraries, conducting the current study in which the status of information security management in the libraries of state medical sciences Universities is examined seems to be required and its results would influence the information security management planning and policy-making. As a result, since no study has yet been conducted regarding the information security management according to international standards in the libraries of medical sciences Universities, the researcher tried to examine the status of the information security management performance in the libraries of state medical sciences Universities in Tehran based on 11 standard indexes of ISO/IEC 27002 standard.

#### **METHODOLOGY:**

This study is applied research and its method is descriptive/ analytical. The study was conducted in the libraries of state medical sciences Universities at Tehran in which the questionnaire, the instrument for collecting the required data, was administered. The statistical population consisted of all the senior and intermediate managers of the libraries of state medical sciences Universities at Tehran. The sample of the study included 50 senior and intermediate managers in the libraries under the study. Due to the limited statistical population, polling was used in order to elicit information from the respondents and sampling was not employed. These universities included Iran medical sciences University, Tehran, Shahed, Shahid Beheshti, Social Welfare and Rehabilitation Sciences, Army, and Baqiyatallah. The questionnaire used in the current study was previously used in Malekolkalami's study and its reliability and validity were also confirmed (15). The basis of the questionnaire was ISRI-ISO/IEC270021 pamphlet published by Institute of Standards and Industrial Research of Iran. First, based on the questionnaire pattern, the purpose of the study and ISRI-ISO/IEC27002 pamphlet, the final questionnaire was designed (5). Then, the required data were collected through referring to the libraries under the study and distributing the questionnaires to the senior and intermediate managers. The list of medical sciences universities in Tehran was prepared from the website of ministry of health and medical education. The data were analyzed through SPSS and descriptive statistics techniques.

#### **RESULTS:**

In this section, the performance of information security management in the libraries of medical sciences universities in Tehran is presented based on 11 standard indexes of ISO/IEC 27002.

The first index included one component: Security policy. The mean value for this index was 2/54 which indicated a somehow optimal level on the evaluation continuum (optimal, somehow optimal, non optimal). Among the libraries, the highest and the lowest mean value belonged to Tehran medical sciences University (3) and shahed University (1/5). The second index "organization of information security" included two components: internal organization and external parties. The mean value for this index was 2/58 which indicated a somehow optimal level on the evaluation continuum. Among the libraries, the highest and the lowest mean value belonged to Tehran medical sciences University (2/99) and Army

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(1/5). The third index was “asset management” with two secondary components, responsibility for assets and information classification. The mean value for this index was 1/97 which indicated a non optimal level on the evaluation continuum. Among the libraries, Shahed University (2/25) and Army medical sciences University (1) had the highest and the lowest mean value, respectively. The fourth index was “Human resources security” with three components including prior to employment, during employment, and termination or change of employment. The mean value for this index was 2/61 which indicated a somehow optimal level on the evaluation continuum. Among the libraries, the highest and the lowest mean values were for Tehran medical sciences University (2/87) and Army medical sciences University (1/33). The fifth index was “Physical and environmental security” with two components including secure areas, and equipment security. The mean value for this index was 2/33 indicating a somehow optimal level on the evaluation continuum. The highest and lowest mean values belonged to Baghiyatallah and Army medical sciences university's (2/5) and Social Welfare and Rehabilitation Sciences and Shahed University (2), respectively. Next index was “communication and operation management” including 10 components, operational procedures and responsibilities, third party service delivery management, system planning and acceptance, protection against malicious and mobile code, backup, network security management, media handling, exchange of information, electronic commerce services, and monitoring. The mean value was 2/51 indicting a somehow optimal level. The highest and the lowest mean values were for Iran medical sciences University (2/76) and Army medical sciences University (2/2). The seventh index was “access control” including 7 components, business requirement for access control, user access management, user responsibilities, network access

control, operating system access control, application and information access control, and mobile computing and teleworking. The mean value was 2/43 indicting a somehow optimal level. The highest and the lowest mean values were for Baqiyatallah medical sciences University (3/28) and Army medical sciences University (1/57).

The eighth index was “information systems acquisition, development and maintenance” including security requirements of information systems, correct processing in application systems, cryptographic controls, security of system files, security in development and support processes, and technical vulnerability management. The mean value was 2/64 indicating a somehow optimal level. The highest and the lowest mean values belonged to Iran medical sciences University (2/93) and Baqiyatallah medical sciences University (1/83). The index of “information security incident management” includes Reporting in information security events and weaknesses and management of information security incidents and improvements. The mean value was 2.68 indicating a somehow optimal level. Tehran medical sciences University (3/25) and Shahed University (2) had the highest and the lowest mean values. The tenth index “business continuity management” including 1 component, business continuity. The mean value for this index was 2/66 indicating a somehow optimal level. The highest and the lowest mean values belonged to Baqiyatallah medical sciences University (3) and Army medical sciences University (2). The index of “compliance” included compliance with legal requirements, compliance with security policies and standards, and technical compliance, and information systems audit considerations. The mean value for this index was 2.49 indicating a somehow optimal level. The highest and the lowest mean values belonged to Shahed University (3) and Baqiyatallah medical sciences University (1/33).

**Table1: The mean value for 11 standard indexes of ISO/IEC 27002 in the libraries of medical sciences universities in Tehran**

Iran medical sciences university	Shahed university	Tehran medical sciences university		Social Welfare and Rehabilitation Sciences university	Shahid Beheshti medical science university	Baqiyatallah medical sciences universiy	Army medical sciences universiy
security policy	1/5	3	2/78	2/66	2/25	2	2
organization of information security	2/25	2/99	2/56	2/91	2/4	2/5	1/5
asset management	2/25	2/24	2/19	2/16	1/71	1/5	1
human resources security	2/33	2/87	2/59	2/66	2/62	2/33	1/33
physical and environmental security	2	2/43	2/48	2	2/31	2/5	2/5
communication and operation management	2/3	2/72	2/76	2/6	2/34	2/3	2/2
Access control	1/92	2/42	2/62	2/52	2/31	3/28	1/57
Information systems acquisition, development and maintenance	2/58	2/70	2/93	2/38	2/53	1/83	2/33
Information security incident management	2	3/25	2/78	2/83	2/33	2/5	2/5
Business continuity management	2/5	2/87	2/92	2/5	2/38	3	2
Compliance	3	2/95	2/51	2/49	2/26	1/33	2

**DISCUSSION:**

Since no study has yet been conducted in this regard in Iran, the results of this study were compared to those of Malekolkalami as the only study available in this area. The results of this study were somehow similar to those of Malekolkalami's study in which the information security management of the libraries of state universities in Tehran was examined based on ISO/IEC standard. However, the current study demonstrated that all indices except for the asset management index which indicated a non-optimal level, all the indexes had a somehow optimal level on the evaluation continuum. The findings showed that among the standard indexes, the highest mean value belonged to the Information security incident management index (2/68) and the lowest mean value belonged to the asset management (1/97). In contrast, in Malekolkalami's study, the highest and the lowest mean values belonged to the asset management (4/38) and Business continuity management (3/46) indexes, respectively. Taking the results of the study into account, one might conclude that the libraries in state medical universities in Tehran enjoy a somehow

optimal level of information security management.

**CONCLUSION:**

Regarding the activities in the field of the measures of the information management security in the library, it is recommended to pay more attention to the following issues:

All the library properties must be clearly identified and a list of all the major properties of the library must be prepared and recorded. All the information resources and properties related to the information processing facilities must be maintained and controlled by one specific section of the library. There must be some documented regulations for using the information processing in the library.

The information must be classified based on their level of significance, legal requirements and level of sensitiveness. Finally, an appropriate set of procedures must be developed and implemented for the indexing/marketing and managing of the information as per the classification design used by

the organization.

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