

# Correlation between Knowledge, Attitude and Performance of the Employees with Quality Assurance System Implementation by the Employers

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## Abstract

**Background:** Quality assurance is implemented by the framework for the ISO 9001- 2000 " Quality Management System "and ISO 15189: 2003. QA system will be more efficient if every organization's employees are commitment to QA implementation. This survey aimed to correlate between knowledge, attitude and performance of the employees with QA system implementation and its indicators observation in Tehran University of Medical Sciences Hospitals' Clinical Laboratories in 2003-2005.

**Methods:** A Cross- sectional, descriptive analytical survey was accomplished with two types of questionnaires to collect Employees' demographic information and determine knowledge, attitude and performance of the employees about QA system and its indicators observation in TUMS Hospitals Laboratories. Also, a checklist including 685 questions published by WHO and ISO 15189: 2003 requirement series was made to monitor preanalytical, analytical, and postanalytical stage of fourteen TUMS Hospitals' Clinical Laboratories. The data was saved by spss software and analyzed by statistical method.

**Results:** The results showed that knowledge, attitude and performance of the employees for implementation and observation of QA system and its indicators are more increased and positive with increased level of their academic degrees.

**Conclusion:** QA programs and indicators would be programmed if all of the employees participated to implement QA programs in these laboratories.

**Keywords:** *Quality Assurance, Clinical laboratory, Hospital, Employees, Iran*

## Introduction

A quality issue is taken into consideration in the field of industry for the present time, but it seems that quality has much differentiation in the field of hospital services to improve patient care and patient satisfaction (1). There are several definitions for quality. Quality means to provide appropriate services for appropriate people of appropriate time with efficient practical and humanistic procedures according to average strength of society (2). International Standardization Organization (ISO) defines quality as a set of characteristics of a services or production which provide the customers requirement (3). Quality Control (QC), Quality Assurance (QA) and Total Quality Management (TQM) are three elements of quality (4).

QA is defined as philosophy and a set of quality principles that represent the foundation for

continuous organizational improvement. It is a management system that has customer satisfaction as a prime objective (5). QA is difficult, comprehensive and long term process. Leaders will need to maintain their commitment, keep the process visible, provide nursery support and maximize employees' involvement in design of the system (6). QA is planned and systematic process for monitoring and evaluating the quality and appropriateness of laboratory services. It is being supplemented gradually by Quality Improvement (QI) and other quality methods (7). Efficient QA system is the system that employees recognize their responsibilities and perform their duties with group participation and decision making. QA system will be more efficient if every organizations employees are commitment to QA implementation (8).

It is showed that some hospital employees have not realized how they are implementing QA programs, even though they report to be using the strategies for QA. On the other hand, some hospitals said that they were involved in QA programs, though not practically. These results suggest one major conclusion about the implementation of QA programs. Data indicate that QA programs may not be as effective as promised, due to a lack of understanding about QA by the people within the organization (9).

Orgam et al. (10) showed that implementation of QA programs in the clinical laboratories was dependant upon:

- 1) A clear focus on the most important aspects of the services;
- 2) A focus on the customers of our services;
- 3) New leadership philosophy;
- 4) Recognition of the importance of interdisciplinary and or multidisciplinary collaboration;
- 5) Taking advantage of staff development in the use of team tools;
- 6) Demonstrating perseverance and commitment to QA programs (10).

The ISO 9000 series is a collection of good management practice related to quality systems and composed of generic and specific standards. The ISO 9001- 2000 "Quality Management System Requirement" present requirement to the implementation of Quality Management and Quality Assurance (11). Recently, ISO 15189: 2003, Medical Laboratories- Particular requirement for quality and competence- provides a framework for the design and improvement of process- based Quality Management by Medical Laboratories (12). ISO 15189 requirements consist of two parts, one is management requirement and the other is technical requirement. The latter includes the requirements laboratory competence e.g. personal, facility, instrument and examination methods (13). Taking the essence of the College of American Pathologists (CAP) and the characteristics of the new international standard, ISO 15189, into considerations, it is important to choose the best suited accreditation and/or certification dependency of the purpose of clinical laboratory (14).

This survey aimed to correlate between knowledge, attitude, and performance of the employ-

ees with Quality Assurance System implementation and its indicators observation in Tehran University of Medical Sciences (TUMS) Hospitals' Clinical Laboratories in 2003- 2005.

## **Materials and Methods**

A cross- sectional, descriptive analytical survey was accomplished. Two types of questionnaires were used to collect data. First questionnaire was used to collect TUMS Hospitals' Clinical Laboratories' employees' demographic information and the second used to determine knowledge, attitude and performance of the employees about QA system implementation and QA indicators observation in these laboratories.

For measuring of the employees' knowledge, attitude and performance, a questionnaire comprising 50 multiple choices and one open questions, 20 questions related to knowledge, 20 questions related to attitude and 10 questions related to performance was made. Before beginning the main survey, a pilot study performed with 50 randomly respondents to check the reliability and validity of this questionnaire instrument. The reliability coefficient for this measure was relatively high (Cronbaach alpha= 0.92). A census technique was used to sample the clinical laboratories' employees. Therefore, the questionnaires were distributed to all (450) employees of fourteen TUMS Hospitals' Clinical Laboratories and 360 employees responded to these questionnaires. The response rate was 80%. In order to rating of the employees' knowledge, attitude and performance, three groups of questions related to correct and false answers were classified as follows:

Knowledge: Desired 18-20, Moderate 10-15, and Low below to 10.

Attitude: Desired 12-15, Moderate 8-11 and Negative below 8.

Performance: Desired 12-15, Moderate 8-11 and poor below 8.

Also a checklist including 685 questions within the framework of QA indicators published by WHO and ISO 15189: 2003 requirement series was made to monitor preanalytical, analytical, and post analytical stage just general aspects, equipment and instrumentation, reagents and culture media, procedures, facilities, staffs, edu-

cational programs, specimen collection and transportation, safety and occupational health, reporting and recording areas, and clinical Biochemistry, Immunology and Serology, blood bank, Hematology, Pathology, Bacteriology and Parasitology departments of TUMS fourteen Hospitals' Clinical Laboratories'.

QA indicators measure the quality of total hospitals clinical laboratories' performance and can reflect laboratory services outcome and the activities of technicians, technologists and administrators. It is a set of jointly agreed internal procedures to monitor and develop the quality of laboratory operations. All of the TUMS Clinical Laboratories were monitored by QA indicators in the next phase.

The data was analyzed by SPSS software. Collected data was quantified by zero score for false and 1 score for positive response for each question by SPSS software. Ultimately, observation rate of QA indicator was classified by bellow: Inappropriate: <50%, relatively appropriate: 50-75%, appropriate: >50%

## Results

Table 1 shows the distribution frequency of knowledge, attitude and performance of the clinical laboratories' employees by academic degree. Just as observed, 2/3 of the clinical laboratories' employees with MS and Doctorate degree are acquainted to QA systems and indicators, although, only 1/3 of the employees with high school diploma were acquainted to these systems. The results indicate that the employees'

positive attitude about implementation and observation of QA system and its indicators clearly increased with their academic degrees in these laboratories. However none of these employees with different academic degrees performed appropriately to implement QA system.

Additional comparisons were made across the groups of the characteristics of clinical laboratories' employees. Specially, differences in the level of knowledge, attitude and performance were examined by gender, position, age, marriage status and work experience. Although there were some differences between these groups, but they were not significant to individual items. Less than 50% of the clinical laboratories' employees were acquainted to QA system and 6.7% of them had positive attitude about this system. Also, all of them did not perform appropriately to implement QA system (Table 2).

Observation rate of QA indicators was not appropriate in most of the clinical laboratories. Furthermore, most of the indicators were observed at Sina, Shariati, Mirzakooshakkhan and Amiralalam Hospitals' Clinical Laboratories (Table 3). In most of the clinical laboratories that their employees were not acquainted to QA system, the implementation and observation rate of this system and indicators were not appropriate. In all of the clinical laboratories which their employees have not positive attitude and do not perform to implement QA system appropriately, the implementation and observation rate of QA system and indicators also are not appropriate (Table 4).

**Table 1:** Distribution frequency of knowledge, attitude and performance of TUMS Clinical Laboratories' Employees by academic degree

Academic Degree		Knowledge				Attitude				Performance			
		Desired	Moderate	Low	Total	Positive	Moderate	Negative	Total	Desired	Moderate	Poor	Total
MS and Doctrate	n	10	8	--	18	--	4	4	8	--	3	3	21
	%	22.7	17	--	16.2	--	12.9	12.9	11.4	--	14.2	14.2	15.6
BS	n	20	20	7	47	3	13	13	29	--	12	12	59
	%	45.4	42.5	35	42.3	37.5	41.9	41.9	41.4	--	57.1	57.1	43.7
Associate Degree	14	16	8	8	4	4	8	8	20	--	5	5	46
	%	31.9	34	40	34.2	50	25.9	25.9	28.5	--	23.8	23.8	34
High School Diploma and under Diploma	n	--	3	5	8	1	6	6	13	--	1	1	9
	%	--	6.5	25	7.2	12.5	19.3	19.3	18.7	--	4.7	4.7	6.7
Total	n	44	47	20	111	8	31	31	70	--	21	21	135
	%	39.6	42.3	18.1	100	11.4	44.3	44.3	100	--	15.5	15.5	100

$P<0.05$

$P<0.05$

$P<0.05$

**Table 2:** Distribution frequency of knowledge, attitude, and performance of the employees about implementation of QA programs in TUMS Hospitals' Clinical Laboratories

Row	Status		Knowledge	Attitude	Performance	Total
1	Desired	n	51	8	-	59
		%	42.5	6.7	-	16.39
2	Moderate	n	48	81	23	152
		%	40	67.5	19.2	42.22
3	Low/Negative/Poor	n	21	31	97	149
		%	17.5	25.8	80.8	41.39
4	Total	n	120	120	120	120
		%	100	100	100	100

**Table 3:** Distribution frequency of quality assurance indicators observation in TUMS Hospitals' Clinical Laboratories

Row	Hospital/ Laboratory	No		Yes		Total	
		n	%	n	%	n	%
1	Valiasr	170	28.2	433	71.81	603	100
2	Cancer Institute	192	32.71	395	67.29	587	100
3	Markaz Tebi	240	36.75	413	63.25	653	100
4	Shariati	167	25.41	490	74.59	657	100
5	Mirza Koochak khan	164	26.89	446	73.11	610	100
6	Sina	145	22.27	506	77.73	651	100
7	Baharloo	233	36.69	402	63.31	635	100
8	Amir Alam	174	26.65	479	73.35	653	100
9	Farabi	250	42.44	339	57.56	589	100
10	Roozbeh	165	31.55	358	68.45	523	100
11	Bahrami	203	35.55	368	64.45	571	100
12	Razi	242	38.91	380	61.09	622	100
13	Ziaian	213	33.76	418	66.24	631	100
14	Arash	250	39.87	377	60.13	627	100

**Table 4:** Distribution of the employees KAP according to QA indicators observation rate at TUMS Hospitals' clinical laboratories

Row	Hospital	Laboratories	Knowledge			Attitude		Performance		
			Desired	Moderate	Low	Positive	Moderate	Negative	Desired	Moderate
1	Farabi	A R I		×			×		×	
2	Arash	A R I		×			×			×
3	Amiralam	A R I	×				×			×
4	Bahrami	A R I	×				×			×
5	Baharlou	A R I		×			×			×

Table 4: Continued...

6	Markaztebbi	A					
		R	×		×		×
		I					
7	Roozbeh	A					
		R		×	×		×
		I					
8	Sina	A	×		×		×
		R					
		I					
9	Cancer institute	A					
		R	×		×		×
		I					
10	Valieasr	A					
		R		×	×		×
		I					
11	Shariati	A					
		R		×	×		×
		I					
12	Ziaian	A					
		R		×	×		×
		I					
13	Razi	A			×		×
		R	×				
		I					
		A = Appopriate	R = Relative appopriate			I = Inappopriate	

## Discussion

Clinical laboratories' employees put a high emphasis on maintaining and updating their technical skills and their own QA monitoring (15). It seems the employees' knowledge and attitude for implementing and observation of QA system and indicators are more increased and more positive with increased level of their educational degrees in TUMS Hospitals' Clinical Laboratories.

In response to the lack of reliable means to assess hospital laboratories systems effectiveness, there has been designated a survey tool to evaluate employees attitude about QA system (16). Clinical laboratories' employees are commitment to QA implementation if they recognize quality and have positive attitude to there regulations (17). There is relationship between employees' positive attitude to QA system and their commitment to organization goals. It is supposed that if employees work independently, they may be retained in organizations (18). Positive attitude of senior management and employees may cause implementation of QA system. It may be supported by employees' education and their participation in QA system.

A field study performed by "Stuart" and "Muel-ler" concluded that the important features of QA system include: A) quality concepts must be clearly communicated and completely integrated throughout all activities, B) employee commitment must be focused on continuous quality improvement, C) QA systems must be based on a comprehensive approach of collecting, analyzing, and acting on information with respect to customer satisfaction, and D) sup-pliers must be made partners in QA process (19). A more balanced set of beliefs regarding performance improvement will be introduced with a renewed emphasis on quality and productivity (20).

The laboratories employees' positive attitude to change, facilitate implementation of QA in these organizations. The employees believe QA if they are educated or participated in QA implementation (21).

We could monitor QA indicators using with WHO and ISO 15189: 2003 requirement series in TUMS Hospitals' Clinical Laboratories. The results of QA monitoring indicate that QA programs and indicators are not implemented and observed appropriately in TUMS Hospi-tals' Clinical Laboratories.

The final results of this survey showed that there was significant correlation between the employees' knowledge, attitude and performance with QA programs and indicators implementation and observation in these clinical laboratories.

There are several policies for management of clinical laboratory to raise the level of medical care and maintain it in hospitals. One of these policies is use of intelligence and arts of employees that have acquainted and have positive attitude through the practice of clinical laboratory, for example quality assurance, system making, objective analysis of data, high mobility and etc (22). Employees' positive attitude to QA implementation is accomplished with their organizational commitment. Employees are retrieved in organization if they involve in decision making independently. However, there is significant correlation between employees' positive attitude to QA with their organizational commitment (23).

The implementation of QA system based on ISO 9001-2000 requirements is a very good opportunity to improve the quality of internal process and achieve the expected results of clinical laboratories. The QA system can be considered one of the best ways to assure continual improvement and, as a bonus; it also makes it easier to evaluate management and performance. It suits perfectly the real world of our clinical labs, helping us to make the difficult liaison between the quality driven nature of our services and the current performance-driven reality in Health Care System. It is worth to try (11).

QA programs and indicators would be progressed if all of the employees participate to implement QA programs in TUMS Hospital Clinical Laboratories. If these clinical laboratories' senior management conduct employees' opinions and attitude in QA, though, they participate in implementation and improvement of QA programs in these clinical laboratories. The authors suggest several solutions to improve QA programs in TUMS Hospitals' Clinical Laboratories.

To establish and follow policies and procedures for a comprehensive QA programs (24).

Installing an elaborate QA system will not lead to employees' commitment to quality. Such efforts are based on the assumption that process and tasks that lead to the desired quality are already understood (25).

A program of QA should be in place to ensure quality throughout the total testing process from ordering the test to entering the result on the patient chart (26).

When QA system is successful, employees participate at every decision making affecting. The most common vehicle for employees' participation is a team. If participative work culture is encouraged, quality becomes everybody's responsibility (27).

Hospitals senior management should behave as a leader and constitute quality management committee for determining QA policies in the clinical laboratories.

To implement educational programs for employees to improve their knowledge about QA hospitals top management should demonstrate its commitment to the QA, establishing policies, objectives and plans and ensuring the achievement of customers and legal requirements (11).

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