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HEALTHCARE PROVIDERS ATTITUDE REGARDING EFFECTIVENES OF HEALTHCARE TEAM IN OPERATING ROOM

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ABSTRACT

Introduction: Effective healthcare team among healthcare providers is important to improve the quality of services and to provide safe and effective care Objective: The purpose of this study was to evaluate the attitude of healthcare providers regarding the effectiveness of teamwork and some related factors in operating room. Materials and Methods: the current study is a descriptive-analytic study and the study population consisted of 217 healthcare providers who work in operating rooms of nine educational hospitals in Isfahan, Iran. For gathering data in this study, two assessment tools a researcher designed questionnaire and a Team stepps-Team Assessment Questionnaire (TAQ) had been used. Finally, healthcare providers were divided into five groups according to the scoring system. Results: From 217 samples, 132 were female and 85 were male. The mean of age were 34.9 respectively. The mean score of attitude toward the effectiveness of teamwork in this study was 194.67 ± 2.05; which according to the scoring system of attitude assessment questionnaire it was considered strong for this study. Discussion: In this study, the healthcare providers in the operating rooms mostly had a strong and relatively strong attitude regarding the effectiveness of teamwork. But the difference in the points of the various groups together represents the difference in perceptions of individuals about the behavior associated with teamwork. The results of this study also indicated that the advancement of technology, teaching and learning new methods and rewards system are factors influencing the effectiveness of teamwork in the operating room.

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Introduction

A team is a small group of people with complementary skills who work together to achieve a common goal, and it has an important role as one of the essential tools for increasing hospital functionality [1].

Effective teamwork can provide more adaptability, productivity and creativity than individual people can, and it can improve quality of work. In fact, teamwork is not just the regular placement of people in one place. Teamwork requires the ability to anticipate the needs of others, adapt to each other's actions, change the environment, and have a common understanding of how to perform activities to obtain best results [2].

An effective teamwork requires a clear understanding of the concepts, features, and factors affecting it [3].

Roosmalen (2012) using Burke and Sim's model (2005) described a number of features for effective teamwork titled Teamwork Five. For an effective team work, the five components of this model are needed in varying degrees: 1. Team leadership. Team leadership is actually a social interaction process in which the leader tries to achieve team goals and have an

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impact on the behavior and performance of subordinates. By creating team participation, team leader monitors internal and external team environments, observes team progresses towards goals, expresses behavioral and functional expectations from team members which enhance their skills, and in turn can cause an effective teamwork. 2. Mutual monitoring. Mutual monitoring means the ability to monitor the work of team members at the same time as performing one's work to ensure that everything goes as planned and to ensure that others are performing their job properly. 3. Supportive behavior. Supportive behavior is the availability of additional resources when help is needed in cases when there is a problem with the work load in the team. When work load seems high, the supportive behavior is characterized by three behaviors: providing constructive feedback to improve performance, helping team members accomplish their tasks, and completing team members' responsibilities. The supportive behavior is directly influential for the effectiveness of team as it provides efficient assistance to team members and makes them more efficient, adaptive, and flexible. 4. Adaptability. Adaptability means the ability to detect deviations from expected performance and reset actions with an adaptive behavior. To achieve this, members must monitor their environment and, when the degree of complexity changes in the workplace, they should be flexible and have an adaptive behavior. Therefore, adaptability does not mean submission to the complexity of the environment. It is a prerequisite for an effective team. 5. Team orientation. Team orientation means willing to work through the collaboration and benefiting from other workforces while performing group tasks [4]. Therefore, the effectiveness of teamwork is defined as a type of assessment that evaluated the results of the team's work process in accordance with a set of criteria [5].

Effective teamwork among healthcare providers is a dynamic process that includes two or more professional members with skills who share common health goals and exercise coordinated physical and mental activities; it examines, plans, or evaluates caregivers which the outcome effects the patient [2].

Patient safety is an essential part of the quality of care in the operating room; therefore, to create such safety, it is essential to establish appropriate communication among healthcare providers in the operating room [6]. In fact, the team's effective performance can provide patient safety. On the other hand, poor communication and lack of effective teamwork among healthcare providers creates issues regarding patient care quality and safety at different levels [7].

The importance of teamwork and factors influencing it have been considered in many studies in many parts of the world; so that, a study by Plaza (2015) showed that about 50% of hospital errors that occur in operating rooms and Intensive Care Units are due to the lack of communication [8]. Also, the study of Pronovost (2006) showed that 32% of hospital errors were due to lack of teamwork [9]

In the operating room as a unit that coordination, speed of operation and quality of service are very important, teamwork should receive special attention [10]. Failure in communication and lack of teamwork in operating rooms can lead to problems which in turn can lead to endangerment of patient's life, interruption in the routine work and increase of stress [11]. Mistakes such as gauze stagnation, damages to organs or inadequate blood injections are usually the result of poor communication and lack of coordination among the team [12] and it is not possible to prevent these irreparable mistakes alone and without the help of others. Because of patient's conditions and the complexity of technologies in operating rooms, the number of tasks has increased and therefore, the need for manpower also has increased [13]. For this reason, most organizations seek to strengthen teamwork and believe that teamwork is more successful than individual work [14].

Today's world is a world of continuous changes and transformations, and it is essential to adapt to these changes in order to survive and to continue life. The healthcare system is not an exception and without changing and applying modern technologies, healthcare system will not be able to transform health centers according to the goals and policies that the system requires [15].

In the operating rooms, science and technology have created great changes. Considering the willingness of medical centers for reducing costs while providing the best facilities for surgeons and other personnel in operating rooms in accordance with advanced technologies of the day, the world has moved forward to change the layout and management of operating rooms. This change requires trained personnel to make the best use of space, equipment and forces in operating rooms. It seems that the presence of these people have changed teamwork in operating rooms as well; moreover, the educational needs have affected healthcare providers by the advancement of technology.

The advancement of technology on the other hand can affect the reward system. The reward system compensates for the work that a person is likely to put in workplace and it is given to the individual in return for the time and effort he/she puts for organization goals and in retaliation for creativity and initiative to find and apply newer working procedures and practices to improve the organization. Since rewards can be determined based on the specialty, education, information, skills, and talents of the staff, it can also affect teamwork.

The study of attitude, as the most important concept of social psychology, has a special place in descriptive researches [16]. There are different attitudes regarding teamwork in operating rooms and the reasons for this have not been identified yet.

Meanwhile, studying the attitude of individuals towards the effectiveness of teamwork in operating rooms will show us how far the teamwork has gone from its original nature and became merely a team effort. Studying the attitudes of individuals towards the effectiveness of teamwork plays an important role in recognizing and paying attention to one another's capabilities and improving the quality of services provided in the operating room. Due to the lack of evidence published about the key factors affecting the effectiveness of teamwork and due to the importance of this topic among healthcare providers in operating

rooms, we aimed to investigate the attitude of healthcare providers about the effectiveness of healthcare team and its related factors in operating rooms of Isfahan teaching hospitals in Iran.

Materials and Methods:

The present study is a descriptive-analytic study. The study population consisted of healthcare providers in operating rooms included surgeons, surgery residents, anesthesiologists, operating room personnel (both associate's and bachelor's degree) and anesthetist technician and nurses. Inclusion criterion was that individuals should have at least one-year work experience in operating rooms from the starting point of their work in any health center. Also, exclusion criteria included transferring from operating rooms to other departments, unwilling to cooperate of health providers and incomplete questionnaires.
Initially, with the use of quota sampling method, the number of samples was determined for each hospital. Thus, 217 samples had been obtained from 9 medical centers affiliated with the Isfahan University of Medical Sciences. One of the health centers had 3 separate operating rooms (with a total of 26 operating rooms), two centers had 2 separated operating rooms (one with a total of 13 rooms, and the other with a total of 6 rooms), and other centers had one operating center (with 30 operating rooms). Then, with the use of stratified sampling, the number of individuals in each hospital who should complete the questionnaire according to their role in the team was determined. For gathering data in the current study, Team Stepps Assessment Questionnaire (TAQ) was used. This questionnaire is Team Stepps Company's scale. The word Team Stepps is an abbreviation for Team Strategies and Tools to Enhance Performance and Patient Safety; it assesses team performance with the effectiveness of teamwork approach. Also, a researcher-designed questionnaire was used which included demographic information and several questions regarding the factors related to the effectiveness of teamwork, including attitudes towards reward system, technological advancements, and teaching and learning new technologies in operating rooms. Both questionnaires had a 5-point Likert scale system.
The TAQ questionnaire contains 7 items and 55 options. These 7 items include team structure (12 questions), team ability (6 questions), team performance (4 questions), team skills (6 questions), team leadership (8 questions), team situation (10 questions) and team identity (9 questions). Individuals had been categorized based on their obtained scores into five groups of strong (177 to 220), relatively strong (133 to 176), moderate (89 to 132), relatively weak (45 to 88), and weak (score less than 45).
Content validation method was used to validate the content of the questionnaire. This means that the initial questionnaire was translated and prepared, and then it was distributed among ten faculty members of the Nursing and Midwifery department of Medical Science at the University on Isfahan; and they were asked to submit their corrective comments and suggestions in an expanded manner after careful study of the instrument. Then the questionnaire was corrected and approved.
The reliability of the questionnaire was confirmed based on Test Retest method with two replicates of the questionnaire on samples of 20, so that the correlation coefficient between the attitude scores and the effectiveness of teamwork was equal to 0.995 for both groups. Then Cronbach's alpha was used to assess the internal reliability of each question and the reliability of the questionnaire was 0.934. Since the researcher could not access Persian version of this questionnaire, and she, herself translated it to Farsi, the questionnaire once more had been translated back to English and gain to Persian to ensure the reliability of its Persian version. The reliability for the both versions of Persian was 0.893.
The entire period of sampling lasted three months. During this period, the researcher visited 9 hospitals, and after describing the research objectives and obtaining sample's consent for participation in the research, the researcher distributed the questionnaires following ethical standards. The time required to respond was given to the participants and they were ensured that their personal information collected from the questionnaire would be confidential.
Then, the questionnaire was entered into SPSS version 16 and statistical tests such as one-way ANOVA, Kruskal-Wallis test, correlation analysis, independent t-test, multiple regression model and descriptive statistics were used.

Results:

From 217 samples, 132 were female and 85 were male. The mean and standard deviation of age were 34.9 and 0.61, respectively. From this total number of samples, 23 were surgeons, 27 were surgery residents, 22 were anesthesiologists, 92 were operating room technicians (associate's and bachelor's degree), and 53 were anesthetist technician or nurses who had completed the questionnaire.
The mean score of attitude toward the effectiveness of teamwork in this study was 194.67 ± 2.05; which according to the scoring system of attitude assessment questionnaire it was considered strong for this study.
The results of chi-square test showed that there was no significant difference between the demographic characteristics of healthcare providers and their attitude towards the effectiveness of teamwork. (Attitude towards the effectiveness of teamwork among female healthcare providers was 195.23 and among male healthcare providers were 193.80) (P-value = 0.735> 0.05).
Pearson correlation test also showed that there was no significant correlation between the age of healthcare providers and their attitude towards the effectiveness of teamwork (correlation coefficient equals to 0.022) (P value = 0.750> 0.05).

In this study, 87% of surgeons and 81.8% of anesthesiologists had a strong attitude towards the effectiveness of teamwork (mean score for surgeons was 206.91 and the mean score for anesthesiologists was 205.00); Also, strong score had been obtained for attitude towards the effectiveness of teamwork among the operating room technicians (both associate's and bachelor's degree) with an average score of 191.94, and anesthetist nurses and technicians with an average score of 194.62 but the mean scores for these two groups were lower than the mean scores for surgeons and anesthesiologists. This situation was not very different among surgery residents and the average score for attitude was 188.69. Also, the average number of people with a strong and relatively strong attitude was similar (48.1%). It is noteworthy that poor attitude towards teamwork was observed only in 1.9% of anesthetic assistant or technicians.

The results of the frequency distribution score for healthcare providers in operating rooms regarding the attitude towards the effectiveness of teamwork divided by operating room environment showed that the highest average score for strong attitude toward the effectiveness of teamwork was associated with single-specialized treatment centers. In other health centers, the average score of attitude was relatively strong. So that, most of relatively strong mean score for attitude was associated with pediatric single-specialized health centers; the double-specialized health centers were at frequency percentage borderline between strong and relatively strong for attitude towards the effectiveness of teamwork. It is noteworthy that the only case for weak attitude towards the effectiveness of teamwork was associated with single-specialized heart center.

In general, the attitude score of healthcare providers in operating rooms of the specialized hospitals was 196.24, in operating rooms of specialized hospitals with two specializations were 192.23 and in operating rooms of multi-specialized hospitals were 194.67, which they did not show a significant difference. (P-value = 0.424> 0.05)

Spearman correlation test showed that there was a significant relationship between the attitudes of healthcare providers towards the effectiveness of teamwork in operating rooms with their attitude toward the reward system, technological advancements, education and learning of modern technologies of the operating room. (*P-value = 0.001 <0.05). This means that with the improvement of the reward system, advancement of technology, and teaching and learning of modern technologies in the operating room, the attitude towards the effectiveness of the teamwork also becomes stronger. (Table 1)

Table 1. Estimation of Multiple Regression Model Parameters

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	132.794	6.825		19.457	0.000
Attitude towards learning new technologies	9.595	1.835	0.339	5.230	0.000*
Attitude towards reward systems	3.080	1.687	0.113	1.826	.069
Attitude towards Technological advancements	7.313	2.063	0.236	3.544	0.000*

Scores of different dimensions of the questionnaire showed that the mean score as it follows: 42.80 out of 60 for team structure, 32.89 out of 45 for team identity, 32.52 out of 50 for team situation, 28.28 out of 40 for team leadership, 22.32 out of 30 for team ability, 22.09 out of the 30 for team skills, 14.23 out of 29 for team performance.

Also, the mean scores for the dimensions of the questionnaire were significantly different (P-value = 0.001 <0.05); the results of the post hoc test showed no significant difference only between the mean scores of team ability with the team skill, as well as the mean scores of team situation with team identity. (** P-value> 0.05) and there was a significant difference between the other dimensions. (Table 2)

Table 2. Determining the Frequency Distribution and mean Score of attitude towards the Effectiveness of teamwork for Each Dimension of the TAQ

	Team structure	Team Ability	Team Performance	Team Skills	Team Leadership	Team Situation	Team Identity
Mean	42.80	22.32	14.23	22.09	28.28	32.52	32.89
Std. Error of Mean	0.520	0.263	0.185	0.303	0.410	0.491	0.398
P-value	0.001*						

I	J	Mean Difference (I-J)	Std. Error	Sig.
Team Structure	Team Ability	20.474	0.583	0.000
	Team Performance	28.570	0.552	0.000
	Team Skills	20.709	0.601	0.000
	Team Leadership	14.513	0.662	0.000
	Team Situation	10.280	0.715	0.000
	Team Identity	9.902	0.655	0.000
Team Ability	Team Performance	8.097	0.322	0.000
	Team Skills	.235	0.401	**1.00
	Team Leadership	-5.961	0.487	0.000
	Team Situation	-10.194	0.557	0.000
	Team Identity	-10.571	0.477	0.000
Team Performance	Team Skills	-7.862	0.355	0.000
	Team Leadership	-14.058	0.450	0.000
	Team Situation	-18.290	0.524	0.000
	Team Identity	-18.668	0.439	0.000

Team Skills	Team Leadership	-6.196	0.510	0.000
	Team Situation	-10.429	0.577	0.000
	Team Identity	-10.806	0.500	0.000
Team Leadership	Team Situation	-4.232	0.640	0.000
	Team Identity	-4.610	0.572	0.000
Team Situation	Team Identity	-.378	0.632	**1.00

Discussion:

The results of the current study indicate that healthcare providers in operating rooms have strong attitudes towards the effectiveness of teamwork. A research conducted by Hekmat (2015) also showed that the average of total score for attitude towards teamwork in the clinical teams of four educational hospitals in Kerman was 3.9 out of 5 which was above the average [14].

In this study, surgeons and anesthesiologists had a stronger attitude comparing to other members. According to Makary et al. (2006), there was a significant difference between the attitude scores of healthcare providers in operating rooms towards teamwork. So, the perspective of samples regarding teamwork is as it follows: 85.2% by surgeons, 84% by anesthesiologists, 87% by operating room nurses and 97.2% by anesthetic personnel [12].

But a study by Undre et al. (2007) also obtained results that are consistent with the results of the present study. The mean score of attitude among surgeons and anesthesiologists was higher than the mean score in other groups [17].

Therefore, it can be said that since the main and primary individuals who are responsible for patient safety in operating rooms are surgeons and then anesthesiologists, and since each surgery is followed by the names of surgeon and then anesthesiologists, these two groups will acquired the most benefits from a team in the operating room. On the other hand; these two groups have grasped the importance of teamwork more than others, which is why they have a stronger attitude towards teamwork.

In the current study, single specialized operating rooms such as urology and gynecology had higher scores for attitude, but it seems this high score is due to low numbers of operating rooms, and therefore, smaller sample size in these centers (11 samples from each hospital). The mean scores for attitude reported by single specialized operating rooms such pediatrics and open heart which also had higher numbers of samples (17 Samples) comparing to urology and gynecology was not very different in comparison with two or multi specialized operating rooms. On the other hand, a multi-specialized operation room in Al-Zahra health center which has a total of 20 operating rooms for different specialties and meanwhile has the highest number of samples among all health centers, received a considerable mean score for the attitude and gained the third place.

According to a study by Mills et al. (2007), the average score for teamwork among the urology operating rooms as single specialized operating rooms was 5.31 out of 6 [18]. But in the study of Kalantari et al. (2015), the average score for teamwork among the orthopedic operating rooms as single specialized operating room was 3.6 of 6 which showed that teamwork was above the average [1].

In the current study, there was a direct correlation between the mean score of attitude towards teamwork and reward system. The results of a study conducted by Khalil-Nejad (1997) also showed that individual incentive payments have affected individual performance and, consequently, performance of the organization about 30 percent and group incentive payments have affected individual performance and, consequently, performance of the organization about 15 to 20 percent. These results indicate that designing an effective reward system will increase the motivation of teams to achieve success and the goals set by the organization [19].

Also, the mean score for attitude towards technological advancements and the mean score for attitude towards teaching and learning new technologies of operating rooms had direct correlation with the mean score of attitude towards the effectiveness of teamwork. A research by Anna Rosiek et al in 2016 on robotic surgery as a new technology in operating room also indicated that the use of this technology has been correlated with the improvement of teamwork effectiveness, increase of job satisfaction and decrease of stress [20]

For determining variables' degree of impact on the mean score of attitude towards the effectiveness of teamwork based on the significant relationship between the mean score of attitude towards the effectiveness of teamwork and the mean score of attitude towards the reward system, technological advancement and learning modern technologies in the operating room, a multiple regression model was used. In the presence of all three variables, the presence of the attitude variable in relation to reward system had no significant effect in predicting the mean score of attitude towards the effectiveness of teamwork (P-value = 0.069> 0.05). While the other two variables were significant (P-value = 0.001 <0.05); so that when the score for attitude towards the technological advancements remained constant, the mean score for the effectiveness of teamwork was 10.03 fold higher per unit increase in attitude scores towards teaching and learning new technologies; also, when attitude scores towards teaching and learning new technologies remained constant, the mean score for the effectiveness of teamwork was 8.33 fold higher per unit increase of attitude scores towards progress of technologies.

This means that despite the positive relationship between the scores of attitude towards the reward system with the attitude score towards the effectiveness of teamwork, the attitude score in the presence of two other variables cannot be predicted by strengthening the reward system. Also, due to the lack of significance of attitude score towards the reward system in the presence of two other variables, and due to the significant relation between attitude towards teaching and learning new

technologies and the attitude toward the effectiveness of teamwork (9.59 out of 15), it seems that teamwork and its related factors as a need are in accordance with the Maslow Pyramid; therefore, teamwork are classified as third level needs, namely, belonging to others, or in higher levels and can be classified at the forth and even the fifth levels, namely, self-actualization and excellence levels of need.

In this regard, a possible reason for high score of attitude towards the effectiveness of teamwork in the present study is the introduction of advanced surgical techniques into our operating rooms. In recent years, the arrival of minimally-invasive and introscopic surgeries in Iran and the presence of medical equipment engineers and technicians in operating rooms have led to an increase in the complexity of relationships in operating rooms; and it has created a new level of collaboration and teamwork. On the other hand, the presence of advanced technologies in operating rooms has changed the tasks of healthcare providers, which can affect their attitude towards the effectiveness of teamwork. The result of the current study shows the necessity for updating the operating rooms with the advancement of technologies to strengthen teamwork and ensure patient safety.

In the current study, the highest score of attitude from different dimensions of TAQ was obtained for the "level of team support" and "team identity", and the lowest score of attitude was related to "team performance" and "team skills". In the dimension of "team leadership", the average score was obtained. (Table 2)

In a research by Hekmat (2015), "leadership" dimension had obtained the highest score [14]. The reason for this difference is due to the use of different tools in these two studies as well as the relatively different contents of the items of these two tools. The items used in the current study examined the attitude toward the effectiveness of teamwork and the scale used in Hekmat's research examined merely the attitude towards teamwork.

Also, in a research by Geraghty et al. (2014), items such as "information exchange during and after surgery" (89 to 100 percent) and the "appropriate feedback from colleagues during teamwork" (82 to 96 percent) received highest scores, respectively [21].

In examining the relationship between the mean scores for different dimensions of TAQ with the total score of the questionnaire, only in two cases there was no significant relationship: between the mean score of "team ability" with "team skill", and between the mean score of "team identity" with "team situation". The relationship among other dimensions was significant. The reason for this can be related to the items of these four dimensions in comparison with each other; so that in the dimension of "team ability", items such as “timely participation of team members” and “their acceptable participation”, and in "team skills” dimension, items such as “familiarity with each other's occupational responsibilities” and “giving constructive criticisms and suggestions to each other” are presented that have less conceptual fit. While items of dimensions that had significant relationship with each other had more conceptual relationship, such as “receiving sufficient training to have effective performance” and “having a clear and necessary role”, in "team structure" dimension and items such as “being committed to obvious values” and “diligence of all team members in creating patient safety” for in "team identity" dimension.

Based on the role and importance of teamwork in patient safety and preventing human error, it is important to study and determine attitudes toward strengths and weaknesses of teamwork. The results of the current study showed that the attitude of healthcare providers in operating rooms is strong towards to the effectiveness of teamwork. However, the differences in the scores of varying healthcare groups indicate the differences between perceptions of teamwork behaviors. The results of this research also showed that single specialized or multi-specialized operating rooms is not related to the effectiveness of teamwork, but the advancement of technology, teaching and learning new methods, as well as the reward system, are factors influencing the effectiveness of teamwork in operating rooms.

Moral considerations

This research has been approved by 395941 Code of Ethics from Isfahan University of Medical Sciences. Also, all individuals in the samples were free to participate in the study and a written consent had been obtained for their participation

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