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Quality improvement in the surgery-related processes: Managerial challenges and solutions from hospitals of Iran

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Abstract:

BACKGROUND: There is a growing global movement toward quality and safety in healthcare and quality improvement (QI) in general surgery. The first step in any QI initiative is identifying the challenges and barriers to achieve such goals and then to define appropriate actions. This study aims to provide an overview of the QI challenges in Iranian hospitals' surgery-related processes and suggest applied solutions accordingly.

METHODS: This is a sequential (qual-quant) mixed-method study from November 2019 to January 2020, involving 21 face-to-face interviews with hospital managers, quality officers, and surgery-related clinicians and staff, followed by a Delphi consensus-seeking stage to finalize solutions. MAXQDA software was applied for organizing the concepts, and thematic content analysis was used for analyzing the data as an inductive approach to extract the emerging themes and sub-themes.

RESULTS: The managerial problems were classified into four groups of (I) defects and delays in completing patient medical records, (II) irregularity and the lack of transparency in the direction of processes in the hospital, (III) inappropriate and unrealistic operating scheduling, and (IV) poor safety considerations. The proposed solutions included imposing stricter regulations for competing for medical records, such as reduction of payments, development of guiding brochures or protocols for patients on their arrival, assigning a certain number of experienced nurses and surgeons for schedule management, rewarding the report of medical and surgical error cases, and developing a regular monitoring program for the proper implementation of surgical safety guidelines.

CONCLUSION: There are various managerial barriers that hamper QI in hospitals' surgery-related processes. Implementing simple but agreed solutions can lead to saving patients' lives, reduction of the unnecessary use of resources, and enhance of patient and staff satisfaction.

Keywords:

Barriers and solutions, general surgery, hospital, operating rooms, operation room, quality improvement, surgical procedures

Introduction

Quality in healthcare is described as a common basis that directly addresses the needs of different levels and stakeholders, such as patients, healthcare providers and financial partners.^[1] The World Health Organization (WHO) has highlighted quality of health care as a key

element in improving the health-centered outcomes, and also as a framework for strengthening health systems, especially in resource-poor countries.^[2] Nevertheless, little emphasis has been given to improving the quality of surgical care in low- and middle-income countries.^[3] There are many different reasons for why it is important to improve quality of healthcare, such as the enhancement of clinician accountability,

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efficient use of resources, alignment of needed care in a patient-centered manner, and the minimization of errors while maximizing effectiveness of care.^[4]

Quality improvement (QI) seeks to upgrade the functions of healthcare organizations by making systematic advancements to healthcare systems and processes.^[5,6] In general, if healthcare does not follow quality standards, as well as demands and expectations of patients, huge losses will be imposed to the health system. The concern for quality of care is well established among health care professionals and policy makers and many efforts have been made to improve quality of care. However, this has not been realized as it should be.^[7]

Within health systems, due to their role, hospitals should be managed toward the fulfilment of quality standards.^[8] These organizations comprise the largest proportion of healthcare expenditures and among all sections of hospitals, the operating rooms tend to be the most critical in terms of QI initiatives.^[9,10] There are various challenges in the hospital that hinder the QI of the healthcare and could be avoidable.^[11] Hence, the first step in the QI initiatives is to identify the challenges and barriers that hinder effective improvements. Hence, the current situation should be identified, then the solutions and strategies will be explore to fill the gaps.^[12]

The growing focus on quality of healthcare in the past two decades has led to much debate about how quality is defined and about whether and how health systems can be organized so that quality is an integral component of care.^[13] Despite these on-going debates, recognition of the actual and potential deficits and challenges in quality in healthcare has prompted the introduction of a wide range of diverse initiatives and programs which aim to address these challenges.^[6] There is also an increasing interest in explaining why QI efforts fail to achieve their goals in hospitals and in particular, in identifying the barriers and enablers to improvement.^[14-16]

Despite continuing evidence of problems in QI and gaps between the care patients receive and the evidence about what they should receive, efforts to improve quality in healthcare show mostly inconsistent and patchy results.^[17] On the other hand, a few researches have been carried out so far on the barriers of QI initiatives across surgical procedures in Iranian hospitals, the study is aimed to identify the managerial challenges and strategies for QI in surgical processes in hospitals affiliated with Iran University of Medical Sciences (IUMS). The findings of this study can be a fundamental step toward improving the quality of surgery-related procedures in hospitals, especially by defining agreed solutions which can fit well the developing countries' health systems.

Methods

This study was a sequential (qual-quant) mixed method research conducted from November 2019 to January 2020. In the qualitative phase, using a critical realistic framework,^[18] data were collected through semi-structured interviews. In this study, a purposive sampling was used to select individuals with significant work experience in the field of hospitals surgery procedures, so that they could share their experiences and perspectives on the challenges and barriers of QI in surgery-related processes in their hospital.^[19] Our inclusion criteria for interviews were experience of working in surgery related department and the operation room for at least 5 years, and involvement in QI activities such as attending at the session of hospital committees such as QI, human error, infection control, and mortality. Hence, the study participants included hospital managers ($n = 3$), hospital QI officers ($n = 6$), nurses of operating rooms and surgical wards ($n = 5$), surgeons ($n = 1$), operating room technicians ($n = 5$), and anaesthesiologists ($n = 1$) across four hospitals affiliated with one of medical universities in Tehran, Iran. Hospitals were selected for their general specialties, i.e., having at least four wards of internal medicine, surgery, gynaecology, and pediatrics, as well as their teaching activity, because teaching hospitals are involved with larger population of patients, and so sharper experience on QI challenges.

Overall, 21 semi-structured interviews were conducted, each varied 30–45 min. Each interview started with briefing the potential participants with the objectives of the study as well as explaining the privacy consideration taken by the research team and the voluntary nature of the study. The study was approved by the University Research Ethics Committee and a written consent form was obtained from the participants if they agreed to attend the study. A flexible topic guide was used for interviews with questions focused on the current status and major managerial problems and challenges of surgical procedures and their root causes. The interviews continued with questions about the optimal strategies and solutions to eliminate the identified challenges and barriers. At the end of each interview, the key points of interview were summarized for the interviewee for trustworthiness and member checking.^[20] Interviews were continued until reaching saturation at the 19th interview, but two more interviews were conducted for possible emerging meanings. All interviews were recorded by a digital voice recorder and were transcribed verbatim after each interview.

Data analysis was conducted after each interview day, by extracting meaning units and coding them based on the challenges, barriers, or solutions and

suggestions addressed. Hence, thematic content analysis was used as an inductive approach to extract the emerging sub-themes and themes. The interviews were coded by the leading author, while the codes of first three interviews were checked and agreed by the corresponding author. Finally, all emerged themes were finalized among all team members. MAXQDA software version 11 (VERBI GmbH, Berlin, Germany), was used to facilitate coding and categorizing the data.

In the quantitative phase of the study, the identified solutions developed in the first phase were provided to the study participant in order to reach a consensus of improvement package through a two-round Delphi method. Hence, a 14-item questionnaire with a 5-point Likert scale was developed. At the end of the questionnaire, an open-ended question was designed to receive possible comments and suggestions. Decision on each solution item was made based on the median of answers, so that if the median was either "completely agree" or "agree," the item was agreed, if the median was "completely disagree" or "disagree," the solution was omitted, and finally if the median was "no view," the second round would decide about the item.

Results

The managerial challenges and barriers to improve quality of surgery procedures were categorized in four themes, while 14 solutions were recognized for them [Table 1]. Furthermore, after the quantitative phase, all the 14 identified solutions were approved by participants.

Managerial challenges and their root causes (qualitative findings)

Defect and delay in completing patient medical records
Accurate completion of patient medical records plays a key role in the patient care and follow-up. Patient medical records are significant evidence to justify medical diagnosis, patient status, and all surgical procedures. Despite the great importance of medical records and documentation, it is frequently observed that important record forms such as summary of medical reports, medical history, and course of illness, diagnostic and imaging test results, and preoperative consultation results are incomplete. Defect and delay in completing patient medical records cause various problems such as medical errors, patient complaint, deductions on payers' bills, delayed discharge of patients and consequently patient dissatisfaction. This challenge may have different causes, such as negligence or forgetfulness in completing the records, high hospital workload and lack of time to register medical records, lack of strict rules on incomplete patient medical records, and lack of coordination with imaging-diagnostic

departments. Most interviewees mentioned this issue in their interviews:

"Sometimes the patient gets ready for surgery and comes to the operating room, when we realize that the necessary tests were not been performed. So, we have to wait and delay the operation or cancel it." (P4).

"Where the patient turnover is high, we don't even have time to complete or even check the medical records. This is exactly where the error occurs. Then the records have to get completed with delay, and consequently the patient has to be discharged with delay, which makes him/her prone to other problems such as nosocomial infections." (P15).

Irregularity and ambiguity in the direction of procedures in hospital

Vagueness of hospital processes and unclear and undefined steps from admission through discharge (admission, hospitalization, and discharge) are important issues that can lead to the patient confusion in hospitals. This challenge may arise from several reasons; including the ambiguity of hospital procedures, even for the staff themselves, the continuous change of procedures and processes, undocumented processes and lack of inaccessibility to them when they are required. Some of the examples mentioned by the interviewees are as follows:

"Sometimes, the patient gets lost in the hospital system, because the systematic format for providing services isn't well defined, as a result it makes the patient dissatisfied." (P8).

Inappropriate and unrealistic operating schedules

Hospitals consume valuable and expensive resources in operating rooms to perform surgical procedures as planned. After the coordination with departments, surgeons and the operating room, a list of surgeries will be scheduled. However, they are not always according to the schedule, and problems may occur that lead to the cancellation of operation, and consequently, patient dissatisfaction and potential decline of quality of surgical care. There are a number of reasons for the underlying challenges, including absence of the main surgeon, lack of anaesthesiologist's approval, lack of necessary equipment and supplies to perform the operation, patients' late arrival or leave, changes in the patient's clinical condition, prolongation of previous surgeries, lack of preoperative test results, or lack of consultation records and signed consent forms. Here are some examples:

"Operations' scheduling isn't right. Sometimes a patient is scheduled for a major surgery but we do not have the

Table 1: The most managerial challenges and solutions to quality improvement in hospitals' surgery-related processes

Challenges	Solutions
Defects and delays in completing patient medical records	Appointing one person to confirm that the patient's medical records is completed before surgery Developing stricter laws and executive regulations in order to eliminating medical record defects, such as: fee for service reduction
Irregularity and the lack of transparency in direction of processes in the hospital	Clarifying the process path of admission to discharge after surgery for patients with preparation the tools such as brochures or protocols upon arrival the patient
Inappropriate and unrealistic operating scheduling	Precis clinical pre-evaluation and patient preparation 4 days before surgery to prevent cancellation or unexpected delays in surgery Creating a scoring system in order to record canceling or delaying surgical procedures and connecting it to the hospital payment system Assigning scheduling surgery responsibility to a group of nurses and surgeons with managerial experience
Poor safety management	Appointing one person as responsible for equipment and supplies continues evaluation before any surgery Assigning financial incentives to medical or surgical error reporting cases Assigning one person as responsible for precise examining patient's medical record before surgery and matching its documentation with the patient Conducting continues training programs in order to surgical error prevent and coping with them Conducting periodic and continues brainstorming sessions in order to anticipate unexpected and adverse events and identify how to encounter with them Developing a regular monitoring program for proper implementation of surgical safety guidelines and checklists Training the ways to strengthen team work and professional communication in order to improve surgical safety Simplifying and standardizing processes and specifying the surgical team responsibilities

condition to operate this patient that day. Maybe the anaesthesiologist and the surgeon were not coordinated, the supplies and equipment weren't ready, or the surgeon didn't coordinate with the operating room. Patient has to stay in the ward for extra 2–3 days, because of such mismanagement." (P19).

Poor safety management

Safety initiatives in surgery include improving patient and team safety, medical error management, and infection control in surgery. Poor safety in surgery can lead to injury and ultimately affect the quality of provided surgical care. Various factors can affect safety in surgery, the most important of which are diagnostic errors, errors in prescribing medications and therapies, errors in surgical procedures, errors in the use of technology and equipment and defects in their safety, errors in diagnostic tests interpretation, patient falls, poor anaesthesia safety and hand hygiene. The most important root causes of such problems often include technical and nontechnical skills impairments, poor communication and teamwork, distractions, unsafe actions, unsafe tools and technology, and poor safety culture. Most of the interviewees mentioned this challenge in their interviews:

"Sometimes the patient's left and right hand surgery are displaced. If a nurse was in charge of checking this, it would not happen. The routine is done often and details are not considered." (P10).

Solutions in order to solve the identified challenges (qualitative findings)

Various strategies and suggested solutions are presented in order to solve the raised managerial barriers that obstacle QI in the hospitals' surgery-related processes. The solutions are based on the interviewees' findings, followed by two round Delphi technique to reach a consensus on the suggested solutions [Table 1].

Solving the incomplete patient medical records

The first solution to address this challenge is appointment of a person to confirm that the patient's medical records are completed before any operation. This person will make sure that all records are correct and complete before initiating any surgery procedure. Another solution is to develop stricter rules and regulations against wards, or surgery teams that their patient medical records are incomplete, such as reducing the payments and bonuses to the teams that have incomplete medical records.

Solving the irregular and ambiguous hospital procedures

The solution presented to solve this challenge is to clarify all procedures from patient admission to discharge via preparation of some tools such as brochures or agreed protocols, delivered to patients and their relatives on their arrival. Such brochures or pamphlets may contain information on the location of wards that patient should visit, and any necessary documents that should delivered by patients or their family in each ward. The content and

information may vary depending on the circumstances of the hospital.

Solving inappropriate and unrealistic operation schedules

The first solution to resolve this challenge is setting precise clinical pre-evaluation and patient preparation 4 days before a surgery to prevent cancellation or delays in surgeries. Preclinical evaluation can include preoperative diagnostic tests and consultations and patient preparation and hospitalization a few days before surgery. Therefore, delay or cancellation of surgery can be prevented. The second solution to address this challenge is creating a scoring system in order to record cancellations or delayed surgical procedures and linking it to the hospital payment system. Delay or cancellation of operations may be due to the shortage of the surgeons, anaesthesiologists, nurses, or operating room surgical procedures decreases over the time.

The next solution to solve this challenge is assigning scheduling surgery responsibility to a group of nurses and surgeons with managerial experience. One of the main causes of delays or cancellations in surgery is inexperienced surgical planning teams. If the responsibility of scheduling surgeries is assigned to a group of nurses and surgeons with managerial experiences and skills, this challenge can be eliminated. Another solution to resolve this challenge is appointing a person for the continuous evaluation of equipment and supplies before any surgery that can reduce the possibility of surgery cancellation or delaying due to any malfunction of equipment or shortage of supplies.

Solving poor safety management

The first solutions to solve poor safety management are assigning financial incentives to medical and surgical error reporting cases. Financial incentives can always act as a strong incentives for staff, especially in cases that most staff are hiding something, such as reporting an error or the main culprit of it. Therefore, the allocation of such incentives is further recommended in the form of encouragement with financial rewards. The second solution is assigning one person in charge of examining patient's medical record before surgery and cross-checking the documents with the patient. Indeed all documents should be checked with patients before he/she enters the operating room and the important information should be reviewed and read aloud to the surgical team. As a result, the probability of wrong patient surgery, wrong surgical site, wrong procedure and other possible surgical error will be reduced. Another solution for the challenge is conducting continuous training programs to prevent surgical errors. It is necessary that hospitals should conduct regular and periodic training programs about different types of possible surgical errors

and how to prevent and deal with them in the forms of classes or workshops.

The next solution is conducting periodic and continuous brainstorming sessions in order to anticipate unexpected and adverse events and identify how to deal with them. Such sessions and meetings should be held monthly or in regular intervals. Another solution is to develop a regular monitoring program for proper implementation of surgical safety guidelines and checklists. Checklists and guidelines for the safety and infection control in surgical departments are regularly developed by the Ministry of Health, university, or WHO, and hospitals are required to perform them. In order to ensure their proper implementation, a regular monitoring is necessary to assure their proper performance. As a result, this action improves safety and infection control in surgery.

Another offered solution is to strengthen teamwork and professional communication in order to improve surgical safety. Teamwork is a mechanism for enhancing the quality of surgical care. The last solution was to simplify and standardize the surgical procedures and specify the surgical team members' responsibilities. Teamwork in the surgery procedures will succeed if each team member is aware of his/her responsibilities and the responsibilities are defined properly.

Discussion

Hospitals should build up QI mechanisms in order to achieve their ultimate goal of delivering the best services to patients.^[21] Emphasized by the WHO for conducting QI plans, the surgical wards and operating rooms are the heart of hospitals.^[2,22] The first step in any QI initiative is to identify and resolve the challenges and problems to achieve the goals. Hence, the existing barriers should be identified, and then, the solutions and strategies can be explored to fill the gaps.^[12] Purpose of this study was to provide an overview of Iranian hospitals' existing managerial obstacles that hinder QI in surgeries and agreed solutions for them.

The results show that there are several solutions and strategies to solve the identified managerial challenges in the surgical QI. The quality of health care is directly related to the accuracy of patient medical records.^[23] The results of the studies showed that the medical records' documentation process were performed incomplete that lead to data losing that can affect the quality of provided care. Therefore, providing enough training about complete and correct documentation of medical records for care providers is advisable. In addition, it is preferable that quantitative review of medical records be performed by staff of the medical record departments immediately after the care/event, which is called the concurrent review.^[24] It has also been suggested

in the Balestra's study that formulating supervisory and executive policies in the form of guidelines or instructions, based on the conditions of each hospital, can be helpful in resolving the defects in medical records.^[25] These results are consistent with the results of our study.

Parsaemehr *et al.* reported that improper direction of processes in hospital would affect the patient satisfaction and the quality of care.^[26] With regarding that patients are not in good mental and physical situation and on the other hand, time plays an important role in the hospital, so clarifying the process path of admission to discharge for patients through preparation of some tools such as brochures or protocols upon patients' arrival will improve the quality of surgical care.

According to the results of many studies, cancellation of operations can cause waste of resources, operating room inefficiency, and ineffective hospital beds occupation.^[27,28] It also causes lots of stress and anxiety for patients and their families.^[29] The results of a study showed that before scheduling the operations list the following considerations should be assured: The anaesthesiologist's and surgeon's approval, patient preparedness for surgery, patient presence in hospital, and operating room readiness in terms of personnel, equipment, and capacity.^[30]

It should be noted that the majority of cancellations or delays in surgeries are avoidable and are often due to malfunction of hospitals' internal processes. It was suggested that close collaboration between experienced members of the surgical team in planning the operations as well as monitoring the pre-surgical situation of patients can reduce cancellations and delays of surgeries.^[31] Other interventions suggested for this challenge include establishing an outpatient anaesthesia clinic for preoperative preparation, improving preclinical evaluation, setting up new electronic system that improves operations scheduling, and participation of patients in scheduling of operations to facilitate communication and prevent cancellations.^[32,33]

The most common place for the occurrence of adverse events is operating rooms and surgical sections. Evidence shows that about half of such events are preventable.^[34] The results of a study show that actions such as checking the performance of the equipment, preparing supplies and medications, ensuring and double-checking marking of the surgical site, and checking consent form should be performed properly before any surgery processes.^[35] Studies also reflect that the most cause of adverse events in surgery is weakness in nontechnical skills such as communication and teamwork.^[36] Successful surgeries are dependent on teamwork and evidence suggests that adverse events in surgeries are often due to a failure in teamwork.^[37] Thus,

nontechnical skills should be developed and trained as an implicit and integrated part of the hospital educational curriculum, to reduce surgical errors and improve these skills.^[38] Baker concluded in a study that teamwork is important in ensuring safety and preventing medical errors.^[39] Other strategies to improve safety in surgical care include automating and simplifying the processes, standardizing them to reduce unplanned changes, using algorithms, protocols, and checklists to manage care and improve information systems.^[40]

Involving different professional groups in the QI process is one of the requirements for success in improving the quality of health care, which ensures that all relevant stakeholders in the clinical process are involved in QI and must exchange information one another. Hence, we cannot consider a sole key player in QI. Again this indicates that interdisciplinary communication plays a crucial role in QI. Furthermore, there should be a formal commitment for QI programs, and the fundamentals of QI and how they are applied must be understood in hospitals. Therefore, paying attention to the importance of collaboration, teamwork and communication skills in improving quality is essential, and substantial investments in health system infrastructures, which requires time and human resources.

Despite the effective steps taken to support QI activities in surgeries, there is still a significant need for research and work in this area. Although the proposed strategies may not lead to a sustained and continuous improvement in the quality of surgical care, but it can help to better understanding and solving the existing problems to improving the quality of surgical care. It should be noted that Iranian hospitals need to implement more aggressive QI policies to maintain themselves in the current economic situation.

Conclusion

Hospitals comprise a large proportion of expenditures in health system and operation room activities have the largest share in hospital expenditures. There is a growing global movement toward quality and safety in healthcare and QI initiatives in surgery. Recently, more emphasis has been given to improving the quality of surgical care in low- and middle-income countries. Reducing inefficiencies in the surgery-related processes and improving the quality of surgical care, especially in the current economic crisis, is one of the requirements of budgetary and resource-poor health systems. The first step in any QI initiative is identifying the challenges and problems to achieve the goals. Implementing the identified solution to resolve managerial challenges leads to reducing the unnecessary use of resources,

enhancing the satisfaction of patients and their families with healthcare and improving the efficiency, safety, and quality of healthcare in the surgical departments.

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Conflicts of interest

There are no conflicts of interest.

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