

# Qualitative Study on Healthcare Technology & Medical Devices Management

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*Abstract*— Healthcare Technology Management is a fundamental part of managing, maintaining, and designing medical devices. It also used in various healthcare settings from the home, the doctor's office, and the hospital. It includes the business processes used in interaction of the medical equipment involved in the diagnosis, treatment, and monitoring of patients. Its main purpose is to ensure that equipment and systems used in patient care are operational, safe, and properly configured to meet the mission of the healthcare; that the equipment is used in an effective way consistent with the highest standards of care by educating the healthcare provider, equipment user, and patient; that the equipment is designed to limit the potential for loss, harm, or damage to the patient, provider, visitor, and facilities through various means of analysis prior to and during acquisition, monitoring and foreseen problems during the lifecycle of the equipment, and collaborating with the parties who manufacturer, design, regulate, or recommend safe medical devices and systems.

**Key words:** Medical Devices, Qualitative Study

## I. INTRODUCTION

The maintenance of medical equipment is as important as its design and development. Usually, much more money is spent on maintaining a piece of equipment over its life span than on its procurement. Medical equipment is extensively (from 5,000 to more than 10,000 different type) used in all aspects of health services, ranging from prevention, screening, diagnosis, monitoring, and therapeutics to rehabilitation. Nowadays, it is virtually impossible to provide health services without them. As the sophistication and cost of medical equipment continue to escalate, the complexity and cost of its maintenance have also increases in the last few decades. Therefore, Hospitals and healthcare organizations must ensure that their medical devices are safe, accurate, reliable and operating at the required level of performance. Maintenance strategies and reliability engineering techniques have been significantly improved in the last two decades, and they have been successfully applied in many industries to improve the performance of equipment maintenance management. Healthcare management is the profession that provides leadership and direction to organizations that deliver personal health services and to divisions, departments, units or services within those organizations. Healthcare management provides significant rewards and personal satisfaction for those who want to make a difference in the lives of others. In addition, descriptions of supervisory level, mid-level and senior management positions within different organizations are provided.

## II. BACKGROUND

Medical devices used in home health care need to be appropriate for the people who use them and for the environments in which they are used. The people who use medical devices may be professional or lay caregivers or the care recipients themselves. As a group, these users have diverse physical, sensory, cognitive, and emotional characteristics. The environment of use may be the home, but may also be the workplace or another destination in the community or across the globe. Environments vary in the quality and accessibility of utilities, the amount of space available, light and noise levels, temperature and humidity levels, and occupants. All of these use factors must be considered in order to ensure that medical devices are safe and effective for people receiving health care.

## III. ISSUES AND CHALLENGES

### A. Caregiver Knowledge:

Although manufacturers have successfully made some medical devices less costly and more user-friendly. Many devices are still too complex for a layperson to use safely and effectively without proper training. In many cases, home care recipients may use devices that were designed for use by trained healthcare professionals in an acute care facility, not by lay caregivers in a non-clinical setting. In addition, lay caregivers may lack awareness of how to respond in the event of a device malfunction or failure.

### B. Device Usability:

Many individuals who receive or provide care in the home use older medical devices, which often come with minimal or no labelling or instructions for use. In such cases, the home healthcare provider must develop his or her own basic instructions for use, maintenance, and cleaning, to share with the care recipient. Even when the device comes with a user manual, instructions are not typically written for a lay audience, and, as a result, the lay caregiver may not be able to use the device safely and effectively. Device labelling may include complex or difficult-to-comprehend warnings, precautions, and contraindications that confuse lay readers.

### C. Environmental Unpredictability:

Unlike the clinical setting, the home is an uncontrolled environment. Home use medical devices may be exposed to environmental risks that may adversely affect performance. These risks include space limitations, the presence of children or pets, electromagnetic interference, sanitation issues such as dirty household items, and safety hazards such as clutter or neighbourhood crime. In addition, the location of the home, noise levels inside and outside of the home, air quality, temperature, and humidity may affect device performance.

#### IV. MANAGEMENT

Healthcare organizations are complex and dynamic. The nature of organizations requires that managers provide leadership, as well as the supervision and coordination of employees. Organizations were created to achieve goals that were beyond the capacity of any single individual. Healthcare managers are appointed to position of authority where they shape the organization by making important decisions. Decision made by healthcare manager not only focus on ensuring that the patient devices receive the most appropriate, timely and effective services possible, but also address achievement of performance targets that are desired by the manager. Managers implement six management functions as they carry out the process of management.

##### A. Planning:

This function requires the manager to set a direction and determine what needs to be accomplished. It means setting priorities and determining performance targets.

##### B. Organizing:

This management function refers to the overall design of organization or the specific division, unit or service for which the manager is responsible. Determining positions, teamwork assignments and distribution of authority and responsibility and critical components of this function.

##### C. Staffing:

This function refers to the acquiring and retaining human resources. It also refers to developing and maintaining the workforce through various strategies.

##### D. Controlling

This function refers to monitoring staff activities and performance and taking the appropriate actions for corrective action to increase performance.

Directing: The focus in this function is on initiating action in the organization through effective leadership and motivation of and communication with subordinates.

##### E. Decision making:

This function is critical to all aforementioned management function and means making effective decisions based on consideration of benefits and the drawbacks of alternative.

#### V. Decision making process in Healthcare

Making and implementing decisions is a central function of management, and it is where health care managers concentrate their efforts. To facilitate making decisions, health care managers need to rely on the statistical and mathematical tools of management science. To implement decisions, leadership and other important behavioural skills come into play. Success depends on whether or not enough right decisions are made and implemented. Although decisions don't always turn out as planned, a plan of action that improves the chances of a successful decision will include the following steps:

- 1) Identify the problem and its nature
- 2) Specify objectives and decision criteria
- 3) Develop alternatives
- 4) Analyse and compare the alternatives
- 5) Select the best alternative
- 6) Implement the selected alternative

#### 7) Control and monitor the results.

Effective decision making requires monitoring the results of the decision to make sure that they occur as desired. If they have not, the health care manager may choose to repeat the entire process. On the other hand, investigation may uncover an error in the implementation or the calculations, or perhaps a false assumption that affected the entire process. Decisions are not always made in a concise and sequential way. A health care manager will often have to backtrack to uncover errors, as well as to solicit feedback from other managers and employees, in terms of developing and analysing alternatives. To ensure that the organization benefits from the best solution, it is essential to involve the persons who will be affected by the decisions a manager makes.

#### VI. HEALTHCARE SUPPLY CHAIN

In healthcare organizations, supply chain is a new way of conceptualizing medical supply management. A supply chain is defined as "a virtual network that facilitates the movement of product from its production, distribution and consumption". In considering supply chains, health care managers are not only concerned with how much of each type of supply and when they need to purchase and carry in their stockrooms to effectively serve their patients, they also concerned with their relationship with the companies at the upstream source of the products to minimize their overall costs in supply management.

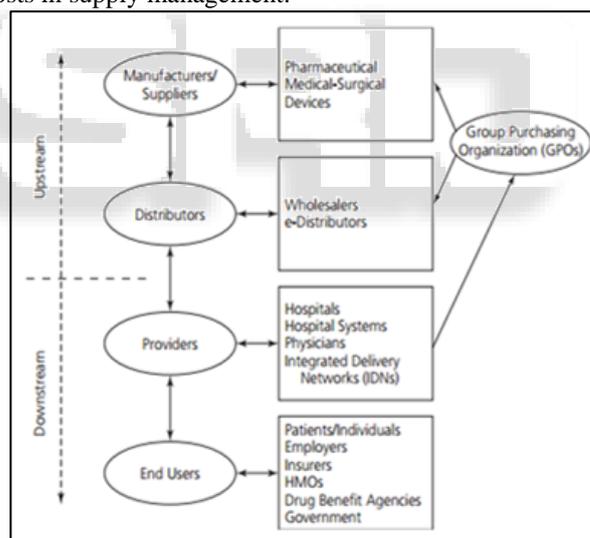


Fig. 1: healthcare Supply Chain

Figure 1 depicts the conceptualization of a health care supply chain identifying the upstream and downstream links with respect to providers. Upstream in the next place on the chain are distributors who purchase the medical and surgical devices from the manufacturer and who comprise wholesalers, group purchasing organizations and e-distributors. Downstream are the end users of the product. Providers are those who decide what to use and whom to use among all these products and secure their availability and end distribution.

#### VII. QUALITY IN HEALTHCARE

Quality in general terms means meeting and exceeding customer expectations. In healthcare, the definition of customer and the criteria for quality are complicated matters

in comparison to the meaning of those terms in industry. "Quality is the extent to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge." Healthcare organizations have developed many valid technical measures to evaluate diagnostic and therapeutic clinical processes.

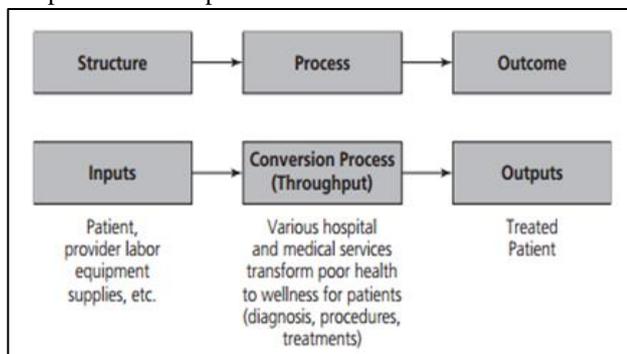


Fig. 2: Quality Management

Figure illustrate structure – process – outcome conceptualization extended to health services. The input – throughput – output sequence facilitates conceptualizing measurements that can be taken at various stage of providing healthcare services production. At the next stage, the conversion process encompasses diagnostic and therapeutic procedures. At the third stage, output patient exit the system, at which point we access their conditions as either treated successfully.

## VIII. CONCLUSION

The profession of healthcare management is challenging and requires that person in managerial positions at all levels of the organization possess sound conceptual, technical and interpersonal skills in order to carry out the required managerial functions of planning, organizing, staffing, directing, controlling and decision making. In addition, managers must maintain a dual perspective where they understand the external and internal domains of their organization and the need for development at the self, unit and organization level. The role of manager is critical to ensuring a high level of organizational performance and managers are also instrumental in talent recruitment and retention as well as succession planning.

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