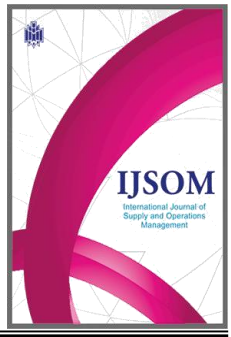
International Journal of Supply and Operations Management

IJSOM

February 2018, Volume 5, Issue 1, pp. 101-106
ISSN-Print: 2383-1359
ISSN-Online: 2383-2525
www.ijsom.com



Importance of Supply Chain Management in Healthcare of Third World Countries

Monika Arora [a, *] and Yogita Gigras [a]

[a] *The North Cap University, Gurugram, India*

Abstract
Healthcare Supply Chain Logistics is series of processes, workforce involved across different teams and movement of medicines, surgical equipment, and other products as needed by healthcare professionals to do their job. The aim of Supply Chain in Healthcare is to find the vulnerabilities among departments and propose measures to reduce them. It aims to identify weak areas to achieve targeted health outcome and increases investments in global health. The advantages of efficient Supply Chain in Healthcare is improved processes, efficient utilization of resources, satisfied employees, effective treatment and happy Patients. The significance of the research paper is to analyze possible loopholes in the healthcare and recommended controls which can be applied practically so as to bring improvement in the healthcare. In Hospitals Integrated Supply Chain should be implemented to meet the objectives. The Supply Chain ensures proper linkage of hospitals department, operations, and revenue cycle. The Supply Chain can be visualized as a backend program running which is necessary to integrate all the different processes together. The supply chain implemented ensures availability of medicine/product at right time, minimizing inventory wastage, maximizing patient care, coordination in all departments minimizing human error/medication errors. This can be accomplished by using possible measures i.e. integrating subsystems (Smith, Brian K, 2011), streamlining workflow and use of RFID technologies, standard product code, Global Identification number (GIN).

Keywords: Global Identification Number (GIN); Radio Frequency Identification Number (RFID); Supply Chain Management (SCM); Standard Product Code (SPC); In Patient Department (IPD); Out Patient Department (OPD).

1. Introduction

A pragmatic and holistic approach is used to cover all aspects of healthcare SCM as done today in different hospitals, including consultation of various research papers, market surveys done in past, and current trends in Hospitals.

Health care is the continuous maintenance of health through the prevention, diagnosis and treatment of diseases, physical and mental disabilities in human beings. The logistics in Healthcare constitute of Pharmaceutical products (Heinbuch, E. Susan, 2005), medical and surgical supplies, devices, and other products as required by Healthcare Professionals like Doctors, nurses, and admin staff. The On-Time action, Precision and Positive Results are of paramount importance in Healthcare. The SCM should optimize efficiency and effectiveness of the treatment provided. The sharp rise of driving costs with maintaining standards and regulation of hospitals is a tough task. As every subsystem work independently, aligning all subsystems together is a difficult task. At present hospitals are working on identifying weak areas in which work could be done to improve quality of service and patient care. SCM's foremost goal should be transparency in all processes. Information flows should be centralized and reviewed/corrected on time. Visibility and clarity of information should be maintained between manufacturer, distributor, insurance companies, providers and patients.

The Paper addresses techniques used in healthcare sector that result in efficient SCM practices. Integration and centralization helps in consolidation of all work flows in one set of standards processes using Standard product code (SPC) shared with all processes. The cycle of the supply chain starts with manufacturing of the medicines and medical equipment, avoiding contamination and faulty equipment.

Corresponding author email address: monika.arora406@gmail.com
(Document type: Technical note)

This paper is divided into two sections covering Stakeholders and Sub-Systems of a Healthcare unit.

2. Healthcare Stakeholders

A supply chain in healthcare can be defined as the sequence of physical and technical resources required in order to deliver a good service to patients with complete satisfaction in a cost-optimized manner. Based on the functions stakeholders in the healthcare supply chain can be divided into four groups: Manufacturers, Purchasers, Distributors, and Providers. Production (Figure 1). Logistics is involved in handling different operations: demand/supply management, Production control, Operation, Inventory management, Warehouse management, Distribution and Transportation management (Heidari-Fathian and Pasandideh, 2017). Logistics is responsible for two functions, first is of Managing resources i.e. Capacity management (Wheelchair, Stretcher, Ambulance), Warehouse management (Medical Equipment, Devices, Drugs), And Second is for Managing workflow i.e. Shipping, Routing (patient, wheelchair, stretcher, ambulance).

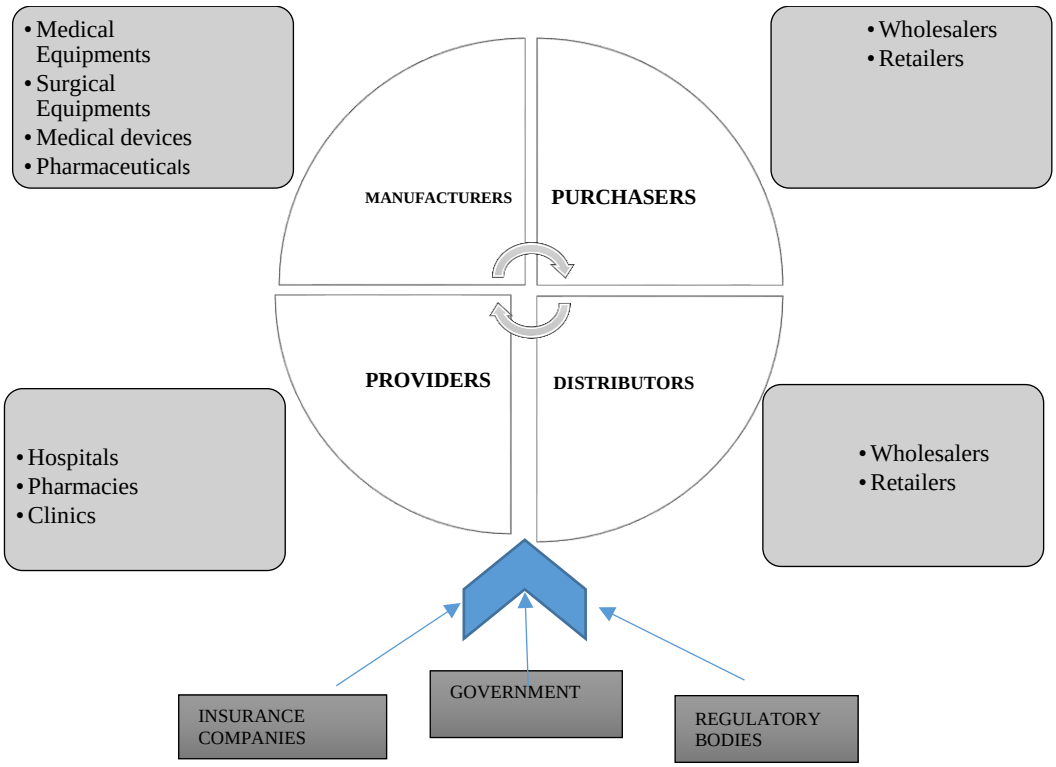


Figure 1. Stakeholders of Healthcare system

3. Healthcare Information System

Today every Healthcare is revolving around managing assets, optimizing cost without compromising with patient health. Different subsystems are involved in accomplishing the hospital functions. Most of the healthcare companies are converting Unit Processes to Supply Chains so as to optimize cost and assets (Bhutta, K. S. and Huq, F, 2002).

In this paper different aspects of hospital as Medical Strategies and Service Excellence, Patient reception & Admission, Diagnosis and Patient Treatment, Medical record Maintenance, Patient discharge and Rehabilitation services are considered for need of Supply Chain Management (Figure 2). Hospital management have been categorized in following categories as Check-in patients details (vital patient information), Inventory control, Billing and collection department, Medical records, Information System (Staff, patient), Patient Information Safety (Table 1)

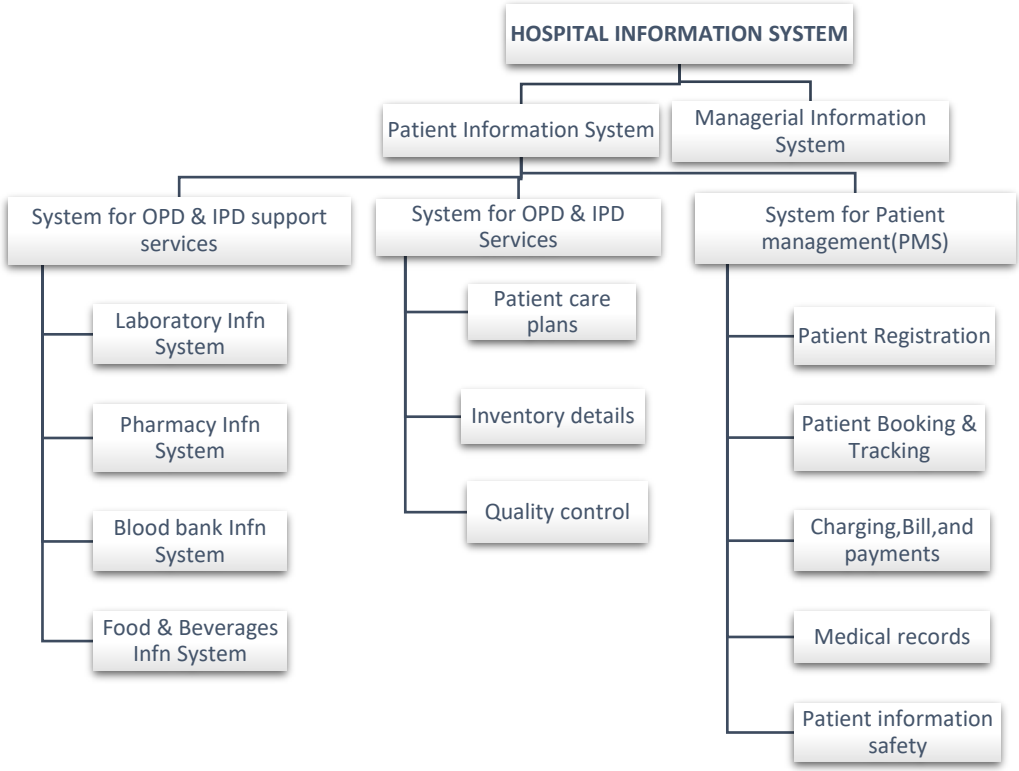


Figure 2. Hospital Information system

3.1. Pharmacy Supply Chain

The prime objective of Hospital is to provide adequate health care to Patients. It primarily needs adequate supply of high quality medicines in Pharmacy. Supply chain management plays an important role for Hospital Pharmacy to ensure timely availability of medicines at lowest possible purchasing cost. In supply chain, it needs different Suppliers (Narasimhan, R., Talluri, S., and Mendez, D, 2001), Vendor agreements, floating of tenders, rounds of negotiations, and freezing on processes of Product Delivery, as some medicines need to be transported at regulated temperatures only.

It is difficult to predict exact demand for medicines. Hence, it is important to capture accurate data on consumption of medicines, to get a trend of same. In today's hospitals, general Store keepers manage the Supply chain, but they are not well aware of Supply Chain management principles, and hence at times, it ends up in either High Demand, Low availability or Reverse as Low Demand but High Availability for some of the medicines, leading to increased shelf life, and hence risk of expiry of medicines in Pharmacy (Shah, N, 2004).

3.2. Blood Bank Supply Chain

The management of Blood supply is the critical issue for Healthcare. The goal of hospital is to dynamically manage the blood supply chain. As per study, the supply of Donor blood is irregular, so following points should be taken care: Locations selected for blood collections, Depending on the transfusion services commodity required should be stored, Number of regional blood bank, How supply and demand should be coordinated to meet the purpose, Transportation of blood on demand, Delivery system be closely connected to meet the run time requirement and Blood banks should be open 24*7 for any emergencies in hospital or near-by hospitals(Bhutta, K. S. and Huq, F, 2002).

3.3 Patient Safety Supply Chain

Research suggested that 440,000 patient's die annually just because of preventable medical errors, and poor safety cultures. The healthcare supply chain plays a crucial role in maintaining the valuable life and flow of business. Better supply chain in healthcare leads to better quality of care and supports patient safety.

As many hospitals have linked the patient safety and all other processes in proper format i.e. manage the expired medicines by automating the medicine/product tracking and identifying, accordingly taking actions so that staff and patient are confident about treatment done. Streamline all time consuming supply chain processes to reduce the medicines finding times, human errors, redundant processes. All the data sheet captured by doctor should be electronically captured using RFID technology eliminating redundancy and human errors. (Acharyulu, G, 2012) All the processes should follow supply chain transparency to gain patient satisfaction and considering human life the most important. In this section Drug Flow Supply Chain (Figure 3), Patient Safety Practices (Figure 4).

Drug Flow Supply Chain

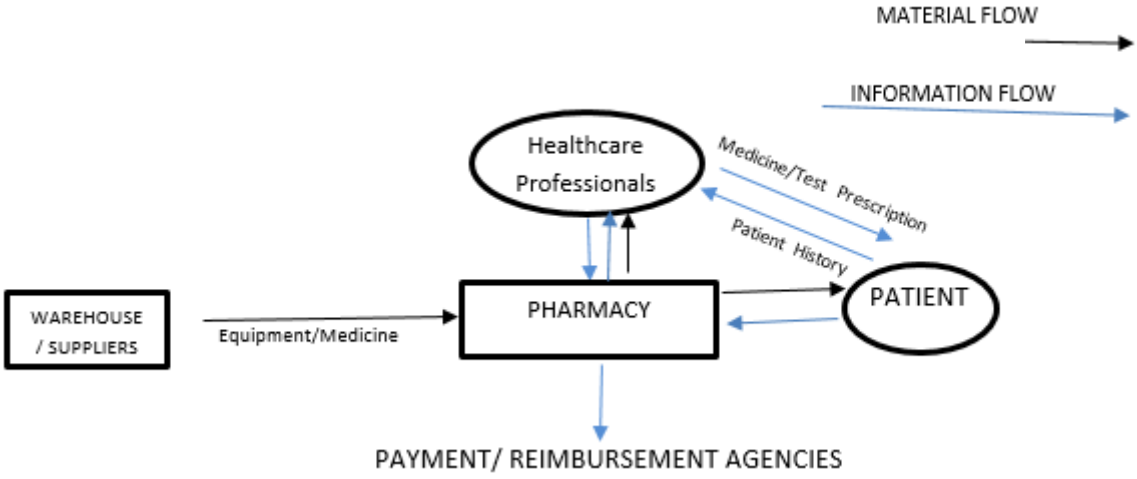


Figure 3. Drug Flow Supply Chain [2]

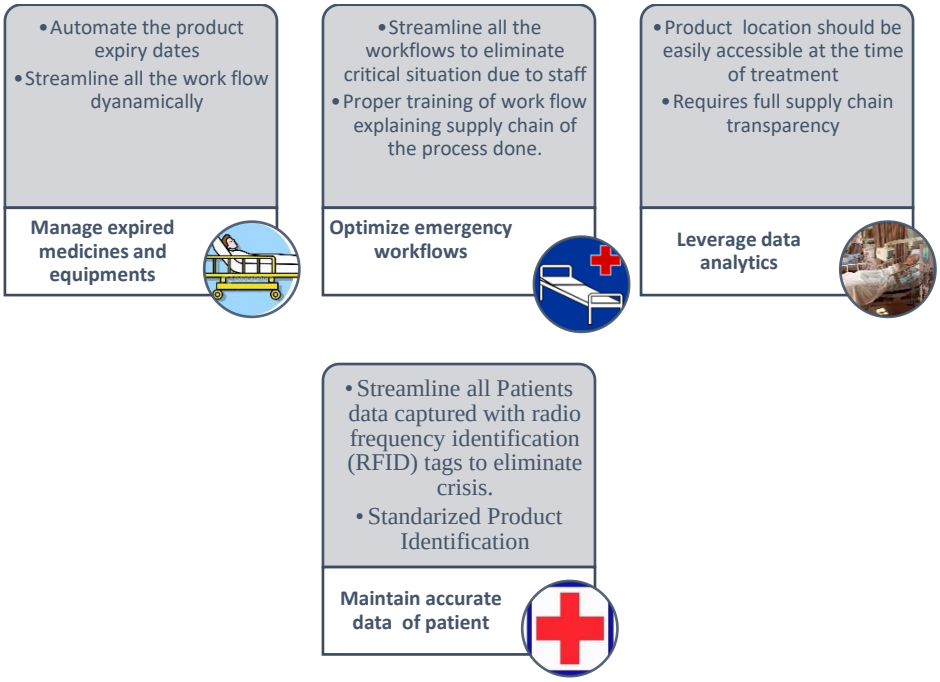


Figure 4. Patient Safety Practices Supply Functions

The Minimum Basic Functions of Healthcare Supply Chain is summarized in table 1.

4. Conclusion

This paper identifies some of the risks that may happen in normal functioning of Hospitals due to lack of proper Supply Chain, and where proper Supply chain management is necessary. As Hospital activities are directly related to life of a patient. Therefore proper dissemination of information to Staff/Doctors/Patients is highly critical, which is not happening currently due to lack of SCM.

Major benefits of SCM are as under:

1. Streamlined workflow across diff teams and people involved (Fouad Maliki, Mustapha Anwar Brahami, Mohammed Dahane, Zaki Sari, 2016)
2. Have tight inventory management, so as to be economically viable, and readily available in need.

3. Reduce failures and monetary loss due to Faulty equipment, expired medicines etc.
4. Optimize cost of equipment/medicine, by ordering in bulk or in parts as per consumption trend, and improve vendor management, by digitalizing all communication, tracking of consumption.

While it is important to identify and draft all SCM Process and guidelines, it is heavily dependent on Persons involved. Hence repeated efforts shall be done to improve on:

1. Establish Safety Culture.
2. Proper communication and team work via trainings etc.
3. Adequate supervision and trained staff.
4. Advanced Equipment and Suitable environment

It is an ongoing process. There shall be a provision to have Regular Internal Review as well as Third Party Audit of EMR (Electronic Medical Records) with proper IT Security and Access control Supply Chain Management is the SCM on timely basis, and take corrective actions as per operations need of a particular hospital.

Table 1. Minimum Basic Functions

Function	**Recommended Best Practices**
Pharmacy Information System	Expiry of medicines should be checked on regular basis in case of manual entries. Ensure adequate supply of medicines at all time.
Blood bank Information System	Set Alarm on Min/Max count of units for each blood type Blood should be evaluated before using to avoid crisis.
Laboratory Information System	Every sample should be properly barcoded with name and patient ID. Use of disposable syringes, sterilized & single use bottles.
Inventory Control (Narasimhan, R., Talluri, S., and Mendez, D, 2001)	Critical Equipment's for e.g. Cardiac monitoring system should be in working condition. Proper password authentication before accessing any database.
Billing and collection department	Before bill generation all the department dues should be cleared. In case dues are left it should be added in final patient bill Should sanction the insurance from insurance company.

References

Abdulsalam, Y., Gopalakrishnan, M., Maltz, A., and Schneller, E. (2015). Health care matters: Supply chains in and of the health sector. *Journal of Business Logistics*, Vol. 36(4), pp. 335-339.

Acharyulu, G. (2012). RFID in the Healthcare Supply Chain: Improving Performance through Greater Visibility, *Journal of Management*, Vol. 11, pp. 32-46.

Altricher, F., T. Caillet,(2004). SCM in a pharmaceutical company, Concepts, Models, Software and Case Studies. SpringerVerlag, NY, pp. 355-370.

Bhutta, K. S. and Huq, F. (2002). Supplier selection problem: a comparison of the total cost of ownership and analytic hierarchy process approach, *Supply Chain Management: An International Journal*, Vol. 7(3), pp. 126-135.

Hadiguna, R. A. (2012). Decision Support Framework for Risk Assessment of Sustainable Supply Chain. *International Journal of Logistics Economics and Globalisation*, Vol. 4 (1–2), pp. 35–54.

Hassini, E., C. Surti, and C. Searcy (2012). A Literature Review and a Case Study of Sustainable Supply Chains with a Focus on Metrics, *International Journal of Production Economics*, Vol. 140 (1), pp. 69–82.

Heidari-Fathian, Hassan, and Seyed Hamid Reza Pasandideh. (2017). Modeling and Solving a Blood Supply Chain Network: An Approach for Collection of Blood. *International Journal of Supply and Operations Management*, Vol. 4(2), pp. 158-166.

Heinbuch, E. Susan (2005). A Case Study of Successful Technology Transfer to Health Care: Total Quality Materials Management and Just-In-Time. *Journal of Management in Medicine*, Vol. 9(2), pp. 48-56.

Kazemi, Abolfazl, and Zohreh Saeed Mohammadi (2016). A Model for Cooperative Advertising and Pricing Decisions in Manufacturer-Retailer Supply Chain with Discount: A Game Theory Approach. *International Journal of Supply and Operations Management*, Vol. 2(4), pp. 1035-1063.

Kim, D. (2005). An integrated supply chain management system: a case study in healthcare sector, *Lecture Notes in Computer Science*, Vol. 3590, pp. 218-227.

Lo, W. (2009). A practical framework of industry-university for supply chain management of health care industry with using distance health-care ICT platform. *International Journal of Electronic Business*, Vol. 7(4), pp. 241-247.

Maliki Fouad, Anwar Brahami Mustapha; Dahane Mohammed; Sari Zaki (2016). A Supply Chain Design Problem, Integrated Facility Unavailability Management. *International journal of supply and operations management*, Vol. 3(2), pp. 1253-1266.

Narasimhan, R., Talluri, S., and Mendez, D (2001). Supplier evaluation and rationalization via data envelopment analysis: An empirical examination, *Journal of Supply Chain Management*, Vol. 37 (3), pp. 28–37.

Shah, N. (2004). Pharmaceutical supply chains: key issues and strategies for optimization, *Computers and Chemical Engineering*, Vol. 28, pp. 929-941.

Smith, Brian K., Heather Nachtmann, and Edward A. Pohl. (2011). Quality measurement in the healthcare supply chain, *Quality Management Journal*, Vol. 18(4), pp. 50-60.

Sohrabi Mohammad, Fattahi Parviz, Kheirkhah Amir, Esmaeilian Gholamreza (2016). Supplier Selection in Three Echelon Supply Chain and Vendor Managed Inventory Model under Price Dependent Demand Condition. *International Journal of Supply and Operations Management*, Vol. 2(4), pp. 1079-1101.

Stadtler, H., C. Kilger, eds (2004). Supply Chain Management and Advanced Planning", Concepts, Models, Software and Case Studies. SpringerVerlag, NY, pp. 355-370.