

Critical Review and Analysis of Just in Time Elements in Health Care Sector: A Case Study

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ABSTRACT

Cost, quality, patient satisfaction etc. are some important issues facing healthcare industry. Hospitals are searching continuously for innovative ways to contain costs without sacrificing quality and meet the patients' needs. One successful solution has been the adoption of JIT manufacturing systems which involve many functional areas of a company such as manufacturing, engineering, marketing, and purchasing. JIT concepts have successfully been implemented in manufacturing organizations. There is a reasonable consensus among researchers that JIT is a useful approach for reducing costs and improving quality and can be applied to service environments also. This paper reviews the relevant literature and explores the integration of JIT techniques and practices into health care services. Based on this, some research directions are identified.

Keywords---- JIT, Community network, Quality circle

I. INTRODUCTION

Hospital operators are searching continuously for innovative ways to contain costs without sacrificing the quality. Many hospitals have focused cost containment efforts on lowering the acquisition price of supply instead of lowering their total delivered cost by adopting the elements of JIT system. In India, there is a lack of healthcare facilities, so long waiting queue of the patients in the hospital is all pervasive, therefore doctors and other supporting staff need to spend more time with patient if they lose their valuable time with other non-value added activities then it will result into losses to both hospital and patients. JIT provides an attractive alternative which reduces the various non-value added activities called as the hospital's waste. Hospitals spend large amount of money on supplies, unfortunately poor inventory can lead to significant losses for hospitals. Therefore we need to manage inventory. In fact the money hospitals spend on inventory associated work often equals the original purchase price. Poor inventory management will not only increase the costs, but in turn negatively affect the quality of patient care.

JIT came into existence in hospital in 1985. JIT is a flexible system that can be adapted to a wide range of health care settings. Due to smaller orders and high frequency of delivery, hospitals can respond to reduce price fluctuation rapidly and switch to less expensive products. The JIT system can provide many long term benefits including cost reduction, waste reduction, reduction in length of hospital stay, improved process flow, reducing cycle time, higher patient satisfaction etc but requires a lot of prior planning and initial work to make the system functional. Education and training of the hospital staff on the JIT system is crucial to the success of JIT in hospital.

II. LITERATURE REVIEW

Hospital administrators have understandably resisted the notion of JIT for more core supplies and services out of a genuine concern for remaining ready to meet all patient needs at all times. While some administrators admit that their concerns may be a bit exaggerated, there are the realities of allocating time and resources, and they often do not have the trained personnel who can fully understand how JIT can be extended to other less basic, often uniquely health care related materials. These administrators want to avoid letting the past be the way forward, but they are drowning in red ink. With so many issues to consider, JIT is often not the first thing that comes to mind. Despite the above concerns, some administrators have, and continue to experiment with, JIT for their more essential health care supplies.

During the literature review, sixty research papers pertaining to JIT have been reviewed. They published since S.Chapman (1986) to include the applicability of JIT in the health care services, the framework of JIT in hospitals in order to find out the elements of JIT that are feasible to health care sector. Researchers have made various suggestions pertaining to inventory management in health care, primary vendor, communication role in health care, role of advance technologies to reduce the time lapses of the hospital

personnel. JIT if implemented carefully with pre implementation planning then it will benefit every partner of the supply chain both in upstream and downstream directions.

AREAS OF JIT APPLICATIONS IN HOSPITALS

The areas where JIT can be applied in health care include central supply, materials management and pharmacy, nursing, swing beds, relationships between nursing units and supplying departments, and physician practices.

Central Supply

Under JIT the central supply function is minimized because the need to store goods between supplier delivery and internal delivery to units or department is decreased by adopting a JIT method where an individual unit directly receives items from the supplier.

Material Management and Pharmacy

Materials management and pharmacy are the most obvious opportunities to apply JIT systems in the healthcare industry, because they both deal with tangible goods, suppliers, and inventories. To reduce costs, hospitals need to reduce the number of suppliers, choose suppliers which are geographically closer, and improve relationships with suppliers. At the same time, hospitals should develop a community network with other hospitals or pharmacies to ensure backup systems for life-critical supplies. This is important because it allows hospitals to have low inventory costs without putting patient safety at risk.

Nursing

Third, a flexible work force, a crucial JIT element, can be applied to nurses with multiple skills who provide numerous nursing, diagnostic, and care-giving functions for patients in hospitals. These nurses form a pool of floaters who go to work at the units which need extra staff. The unit of inventory in this case is the multi-skilled nurse. The flexible work assignments avoid excess "inventories" on departments with small workloads in the hospital. This system also provides greater flexibility for scheduling.

Moreover, nurses with multiple skills can provide better patient-focused care because patients do not need to interact with a new nurse for every activity or service throughout the day. This resembles the use of work cells in manufacturing companies using a JIT system, where a small group of multi-skilled workers handles the entire manufacturing process. In addition, the careful arrangement of space and schedules can also provide better patient-focused care as the transportation of patients and waiting times for services are diminished. This elimination of non value-added time is a key element of the JIT system.

Swing Beds

Another area making use of JIT principles is the use of swing beds for patients who are between acute status and skill care (nursing home) status. Instead of being transferring to a nursing home, patients can stay in the hospital where staff members are familiar with their

cases while recovering. This improves the quality of care and outcome measures.

Relationship between Nursing Units and Supplying Departments

Furthermore, JIT's supplier relationships can be applied to the relationship between nursing units and supplying departments such as central supply and pharmacy. Increasing nursing unit's financial responsibility for their inventory can encourage them to reduce their inventory levels and safeguard their inventories.

Physician Practices

The last area using JIT procedures is the physician's documentation-related processes. If orders for ancillary services are received faster, then there will be wait times for services and faster posting of results to patients' medical records, which will reduce the non value-added time. This can improve physician's use of their limited time.

III. METHODOLOGY USED

Every essential element of JIT may not be easily implemented and some elements are difficult to implement. These problems may be related to inappropriate understanding of JIT methodology or may be related to technical, operational and human problems.

There are some questions related to JIT system:

1. Which are the essential elements of JIT?
2. Which elements are important and difficult to implement?
3. Which elements can be easily implemented?
4. Which elements are highly beneficial for Health Care?

This section details the procedures for the study in the following subsections:

- Research design,
- Instrument,
- Survey participants
- Data collection, and
- Data analysis.

The main purpose of JIT is to eliminate wastage of all types. Present work analyses some vital issues of hospitals in JIT context on the basis of a questionnaire followed by several visits and conducting telephonic/personal interviews with the medical personnel. Fig. 4.1 shows the flow diagram of the methodology adopted.



Figure 4.1

Research Design

This study employed non-experimental quantitative research. Specifically, the design involves mail survey/speed post method, which is the most frequently used descriptive research design. This research design requires responses from the health care personnel and further requires quantitative data analyses. To increase the internal and external validity, the sampling procedure in this study applied the stratified random sampling technique.

Instrument

A survey was designed to find out the most important elements of JIT which are easy to A questionnaire regarding the importance and difficulties of JIT elements was designed and distributed in various hospitals. This study uses a mail survey/ speed post to distribute and gather the data. A mail survey provides the most appropriate method to obtain relevant, up to date information from a large number of hospitals.

IV. DATA COLLECTION

Data were collected following the self-administered mail survey/speed post method. Self-administered mail survey has the advantages of relatively low cost and easy access to widely dispersed samples. These people were also assumed aware of the general characteristics of the various activities of hospitals.

During the survey the mail/speed post include the following:

- i) The cover letter that informed an overview of the aim of the survey, confidential statement and identification of the researcher.
- ii) Details of the JIT elements identified for the survey.

After getting the responses from the hospital personnel a follow up email was sent to the participants 3 days later thanking for their whole hearty cooperation.

Data Analysis

The data was analyzed with the help of Analysis of Variance (ANOVA) Technique. The ANOVA technique is important in the context of all those situations where we want to compare more than two populations such as in comparing the yield of crop from several varieties of seeds. In such circumstances one generally does not want to consider all possible combination of two populations at a time for what would require a great number of tests before we would be able to arrive at a decision.

V. RESULTS AND DISCUSSION

The questionnaire was distributed in 20 hospitals taking 3 employees from each hospital. The questionnaire was collected from all the hospitals successfully with a very good response. Then all the responses were analyzed. The mean score for each element was calculated. There are two tables giving the mean score of JIT elements for importance and difficulties in context of Indian's hospitals. Table 5.1 and 5.2 reveal the degree of importance and degree of difficulties respectively.

5.1 DEGREE OF IMPORTANCE OF JIT ELEMENTS IN HEALTH CARE SECTOR

Table 5.1 describes the mean score of Degree of Importance of JIT elements in various hospitals.

Table 5.1: Degree of Importance of JIT Elements in Health Care

Sr. No.	JIT ELEMENTS	RESPONSE					Mean Score (0-240)
		4	3	2	1	0	
1	Relation between Supplier and Hospital	27	17	10	5	1	184
2	House Keeping	19	13	8	18	2	149
3	Quality Circles	24	21	9	3	3	180
4	5's	20	25	11	2	2	179
5	ABC Ranking Approach	19	12	20	8	1	160

6	Team Work	32	14	8	3	3	189
7	Top Management Support	28	11	15	5	1	180
8	Planning	27	11	10	9	3	170
9	Standardization	18	21	15	5	1	170
10	Total Productive Maintenance (TPM)	5	3	18	20	14	85

Table 5.1 indicates that Team Work has got the maximum value (i.e. 189), hence is the most important element of JIT for Health Care and Relationship between Supplier and hospital got 184, as mean score, which is second most important element of JIT where as TPM got 85 as mean, which is the least one, hence it can be termed as least important element of Just In Time in health care.

From Table 5.1, other most important elements are Quality Circles and Top Management Support Team Work, Standardization, Planning, Housekeeping (orderliness, cleanliness, discipline, safety) etc.

5.2 DEGREE OF DIFFICULTIES OF JIT ELEMENTS IN HEALTH CARE SECTOR

Table 5.2 describes the mean score of Degree of difficulties of JIT elements in various hospitals.

Table 5.2: Degree of Difficulties of JIT Elements in Health Care

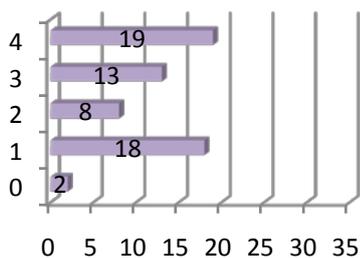
Sr. No.	JIT ELEMENTS	RESPONSE					Mean Score (0-240)
		4	3	2	1	0	
1	Primary Vendor Program	6	8	9	18	19	84
2	House Keeping	6	13	8	21	12	100
3	Quality Circles	4	17	9	16	14	101
4	5's	11	21	10	12	6	139
5	Team Work	8	12	12	19	9	111
6	Top Management Support	32	12	11	4	1	190
7	Kaizen	19	19	9	10	3	161
8	Customer Satisfaction	28	14	10	3	5	177
9	Planning	25	26	5	2	2	190
10	Standardization	8	11	13	22	6	113

From the above table the most difficult elements are Top Management Support, Planning, Kaizen, Customer Satisfaction etc.

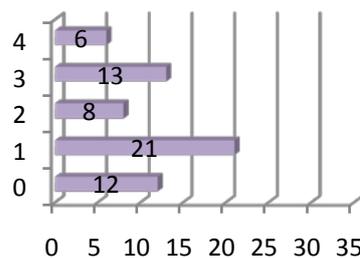
The least difficult elements from Table 5.2 are Primary Vendor Program,, Team Work, Housekeeping, Standardization etc.

1. Housekeeping

Degree of Importance

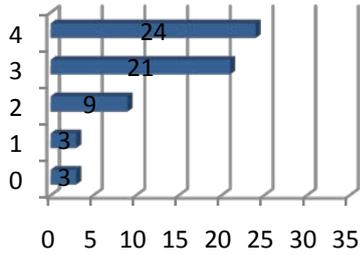


Degree of Difficulties

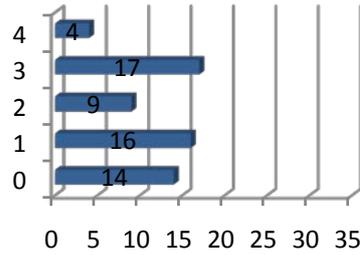


2. Quality Circles

Degree of Importance

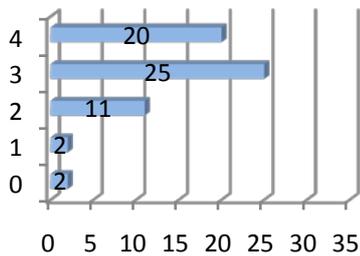


Degree of Difficulties

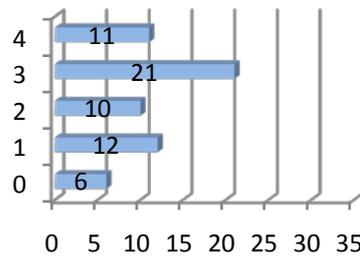


3. 5'S

Degree of Importance

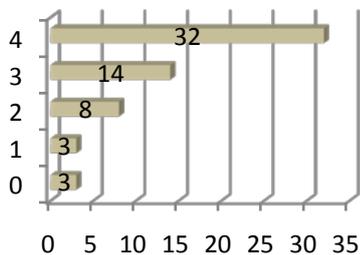


Degree of Difficulties

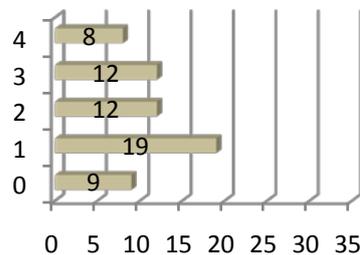


4. Team Work

Degree of Importance

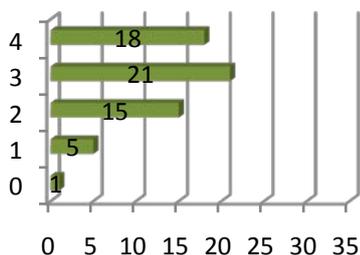


Degree of Difficulties

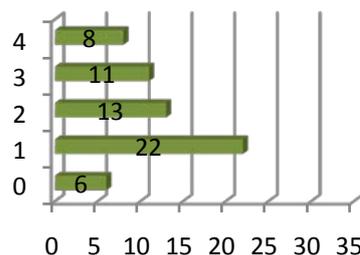


5. Standardization

Degree of Importance



Degree of Difficulties



V. CONCLUSION

This chapter presents some important conclusions obtained from present work. In this work, various vital issues of JIT implementation have been analyzed. The following conclusions have been drawn:

1. It has been identified from the comprehensive literature survey that JIT philosophy leads to improved patient care and cost savings through: waste reduction, process improvements, respect for human resources and efficient Supply Chain.

2. The JIT philosophy can be successfully adapted to the Health Care industry. JIT principles can be successfully implemented in inventory management operations in the Health Care industry. The result is significant cost savings, the elimination of duplication of effort, and a more efficient use of space. At the same time, the quality of patient care is improved through; i) an increase in nursing time that can be devoted to direct care responsibilities, ii) development of a team approach to delivering Health Care and iii) a more efficient use of medical supplies that emphasizes quality improvement.
3. JIT is not a short-term initiative, nor can it be implemented without detailed planning. Personnel at all levels must understand that their sustained efforts are vital to the success of the program. Much of the success of JIT lies in the ability to develop renewed and lasting relationships within and external to the organization. This commitment and team building does not occur without a great amount of effort and time.
4. It has been concluded that Hospitals have different priorities with respect to important and difficult elements for JIT implementation.
5. Most important elements of JIT pertaining to Health Care industry are as follows:
 - Team Work
 - Quality Circles
 - Relationship between Supplier and Hospital
 - Top management Support
 - Standardization
 - Planning
 - 5's
6. It has been observed that nine elements are the most important and relatively less difficult to implement. These are Relationship between Supplier and Hospital, Team Work, Primary Vendor Program, ABC Ranking Approach, Flexible Workforce, Quality Circles, Incremental Implementation, Housekeeping.

It is recommended that hospitals should practice most important and less difficult elements at the initial stage of JIT implementation.

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