

STUDY ON CONTROLLING THE INVENTORY LEVELS OF LINEN IN CLOUDNINE HOSPITAL, BANGALORE

**Internship Training
at
Cloudnine Hospital, Bangalore**

**By
Aditi Joshi**

**Under the guidance of
Dr. S.D. Gupta**

**MBA Hospital & Health Management
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**Institute of Health Management Research
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DISSERTATION

On

A study on Controlling the Inventory levels of Linen

In Cloudnine Hospital, Bangalore

Submitted By:

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In Fulfillment of the Award of the Degree of
MBA Hospital and Health Management
2013-2015

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TO WHOMSOEVER MAY CONCERN

This is to certify that Ms. Aditi Joshi student of MBA Hospital and Health Management from IIHMR University, Jaipur has undergone internship training at Cloudnine Hospital, Bangalore from 2/03/2015 to 10/05/2015.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



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Ref.No: KCIPL/Project/2015

12 May, 2015

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Aditi Joshi bearing Register Number 1405, studying MBA Hospital and Health Management from Institute of Health Management Research, Jaipur had undertaken a Project at our Organisation from 2nd March 2015 to 10th May 2015. On "A Study on Controlling the Inventory Levels of Linen in Cloudnine Hospital, Bengaluru".

She has completed her project successfully.

We wish her all success in future endeavors.

Thanking you,
With best wishes,
For
Cloudnine
(A unit of Kids Clinic India Pvt. Ltd.)

Siddharth S.N.
Chief People Officer

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled "A study on Controlling the Inventory Levels of Linen in Cloudnine Hospital, Bangalore" submitted by Aditi Joshi Enrollment No. IIHMR-U/01/2013-15/1405 under the supervision of Dr. S.D Gupta for award of MBA Hospital and Health Management of the university carried out during the period from 2nd March, 2015 to 10th May, 2015. Embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.



Signature

DECLARATION

I hereby declare that the present dissertation entitled “**A study on Controlling the Inventory levels of Linen in Cloudnine Hospital, Bangalore**” embodied in this study was prepared by me as per Dissertation period allocated by IIHMR University academic calendar (2013-15), at Cloudnine hospital, Old airport road, Bangalore under Supervision of **Dr. Shugota Chakrabarti, Business Head (OAR), Cloudnine Hospital, Bangalore** and **Dr. S.D. Gupta, President, The IIHMR University, Jaipur** during academic year 2013-2015.

It is further stated that no part of this dissertation has been submitted in part or full for the award of any degree or diploma of this or any other Institution

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LIST OF ABBREVIATIONS:

CSSD - Central Sterilizing Supplies Department

IPD- In patient department

LDR- Labor Delivery Room

OBG- Obstetrics and Gynecology

OPD- Out Patient Department

OR- Operating Room

USG- Ultrasonography

DCs- Delivery Challans

1. INTRODUCTION

1.1 Hospital Profile:

Cloud Nine is a single specialty hospital chain for Maternal and Child Care. It was co-founded by Dr. Kishore Kumar, a world renowned Neonatologist in 2007.

Seeing the abundant, insanitary government hospitals and poorly operated private nursing homes in the nation, Dr. Kishore Kumar together with his team of three co-founders chose to focus on providing quality Maternal, Neonatal and Pediatric care. Thus came into being CLOUDNINE HOSPITALS- a venture of the KIDS CLINIC INDIA, PVT LTD owned by Dr. Kishore Kumar and Scrips N Scrolls India- a Company into property development and investments.

Portfolio of services offered:

- Pregnancy Care
- High Risk Pregnancy Care
- Gynaecological Care
- Infertility Care
- Neonatal Care and New Born Intensive Care
- Paediatric Care

Vision:

To be the kind of leader in the space of women and health that India has not witnessed yet, by providing premier quality healthcare to women and children.

Aim:

Bridging the ever- widening gap between Indian and International standard care for mothers and babies.

Core philosophy:

Maternity is wellness and not an illness

Values:

- **Customer centricity**
- **Respect for the employee**
- **Bias for action**

Customer Promise: “We will deliver an experience that makes our customers feel cared for and happy”

Investors:

- Matrix Partners, India
- Sequoia Capital

Branches:

- **7 Cloudnine Hospitals:** Jayanagar, Old Airport Road and Malleshwaram in Bangalore, T.Nagar in Chennai, Mumbai, Pune and Gurgaon
- **1 Cloudnine Children’s Hospital:** Jayanagar Bangalore
- **1 Cloudnine Fertility:** J P Nagar, Bangalore
- **5 Cloudnine Clinic-** Whitefield, AECS, HRBR Layout, Sahakarnagar, Frazer Town, Bangalore

Other verticals of Cloudnine:

Sure Fertility: Provides specialized Fertility Services for couples who have difficulty conceiving. Stand-alone centre is at JP Nagar

- Separate Department: Sure Fertility as a separate department is present at all Units of Cloudnine.

Cryonine:

Cloudnine provides stem cell preservation facility under the brand Cryonine.

For future requirement, interested parents can book to preserve the Umbilical cord blood and tissue of their new born baby for 21 years, and insured for a sum of Rs. 10 lakhs.

Floor wise facility distribution:

FOURTH FLOOR:

- Admin. Office
- Corporate Office
- Cafeteria

THIRD FLOOR:

- Luxury Rooms
- Suite Rooms
- Baby Aquarium

SECOND FLOOR:

- Hearing Test Room
- Baby Aquarium
- Luxury Rooms

FIRST FLOOR:

- OBG Emergency
- Induction Room
- NICU
- Isolation Room
- CSSD
- NICU Lounge
- Labor Room
- Feeding Room

0 FLOOR (“M” FLOOR):

- OBG OPD
- USG Rooms
- Mom & Me
- Meri Yaadein
- Au Bon Pain
- Parent Support Classes Room

GROUND FLOOR:

- Reception
- Pediatric OPD
- Pediatric Emergency
- Fertility Center
- Baby Weighing Area
- Feeding Room
- Pharmacy
- Corporate Desk
- Cryonine
- Customer Relations Room

BASEMENT:

- Medical Records Department
- Store room
- Blood Bank
- In Patient Pharmacy
- Laboratory
- Sample Collection Room
- Housekeeping room
- Linen room

1.2 BACKGROUND OF THE STUDY

- The study “**Controlling the Inventory levels of Linen in Cloudnine Hospital, Bangalore**” has been done to control the levels of circulating inventory to avoid surplus or shortage.
- The hospital was facing an issue of shortage of linen because of excessive linen loss and there was no appropriate system for distributing the linen, leading to reduction in the stock of circulating inventory. There was a need to set an appropriate system of distributing the linen.
- To control the inventory levels focus was given on establishing a distribution system based on Par level requirement and reducing the linen loss.

1.3 SCOPE OF THE STUDY

- The study was conducted with a view to maintain the desired levels of linen. The focus of the study was on In- patient department as the problem was more in the IPD due to fluctuating demand.
- The outcomes of the study will assisted the Housekeeping department in controlling the levels of linen which is being circulated in the IPD by setting the Par level requirement and controlling the linen loss. It helped the department in maintaining the records, avoiding overstocking and depletion of stock, more economical means of purchasing can be made possible.

1.4 LIMITATIONS OF THE STUDY

- Shortage of time
- Lack of access to some of the relevant data: on account of being a management trainee, there was some hesitation on part of hospital administration in sharing the information

1.5 Key definitions:

Circulating Inventory

- Because of linen's recyclable nature, circulating inventory can be at one of four stages - processing, consumption, retrieval, and distribution - at any one point in time. These quantities are actively circulating throughout the linen cycle, as opposed to being stored in boxes, waiting to be injected into the cycle

Distribution

- Moving linen within a facility, typically from a linen staging area to consumer departments. An effective linen distribution program provides the right product at the right time and in the right quantity.

Linen

- A generic term for reusable textile products. Linen products are:
 1. Purchased by a customer (laundry or patient care facility)
 2. Processed by a laundry
 3. Used by Consumers
- Typically, a customer purchases linen according to specifications which usually include weight, size, fabric content, price, country of origin and intended product use.

Linen Loss:

- Items removed from the linen cycle via unauthorized means. These items may mysteriously disappear via theft from staff, patients, or visitors, inappropriate disposal (throwing linen into trash receptacles), or inaccessible inventory stashes.

Par

- A par is the quantity of a linen item used in one 24 hour period. For instance, 800 fl at sheets may be 2 par if a facility uses 400 sheets per day.

Par Levels (Standards)

- Par Levels are the specific quantities required for each item for a specific distribution point. For example, 100 sheets, 120 bath towels, etc. may be the par levels (daily requirements) for a specific distribution point.

Procurement

- New linen must be continually purchased to “feed” the circulating linen inventory. Replacing lost or worn linen or the “start up” of a new department or facility are the two most common reasons for purchasing new linen.

1.6 Rationale:

The term circulating inventory means the quantity of linen which can be at one of four stages - processing, consumption, retrieval, and distribution - at any one point in time. These quantities are actively circulating throughout the linen cycle, as opposed to being stored in boxes, waiting to be injected into the cycle. Maintaining the continuous supply of linen is key responsibility of the Housekeeping department. Inaccuracy in calculating the circulating inventory may lead to shortage or surplus of the linen which may result in patient dissatisfaction, more amount of replacement stock. Therefore, controlling the circulating inventory of linen is an important part of linen management.

1.7 Objectives of study:

- Broad objective: To control the inventory of linen

Specific objectives:

- To calculate par level requirement of bed linen for IPD
- To calculate the amount of missing linen in the last six months
- To identify the causes of linen loss
- To identify the opportunities for improvement

2. LITERATURE REVIEW:

2.1 Types of Inventories:

- **Recycled inventories**: Recycled inventories are those items that have limited useful lives but that are used over and over again in housekeeping operations. E.g. linens, uniforms, guest loan items, some machines and equipments.

- **Non-recycled inventories**: Non-recycled inventories are those items that are consumed or used up during the course of routine housekeeping operations. E.g. cleaning supplies, small equipment items and guest supplies and amenities

Linen is the most important recycled inventory item under the executive housekeeper's responsibility. Next to personnel, linen costs are the highest expense in the Housekeeping department. Careful policies and procedures are needed to control the hospital's inventory of linen supplies

Although linen is a basic commodity, it has unique qualities which make it complex to manage. Unlike a single use item, linen is a reusable product which requires the coordination of people, materials, and processes to maintain the asset for multiple uses. Specifically, it requires:

- 24 hour accessibility; inaccessibility can cause crises for staff and patients;
- Coordination within the supply chain (procurement, distribution, consumption and retrieval) for everyday use;
- Timely processing by laundries to maintain inventory levels;
- High standards of cleanliness, requiring separation from other supplies during distribution or retrieval;

- Availability for more expensive, revenue generating services to be performed (surgery, patient care, examinations, etc.).

A linen manager must continually balance five goals to have an effective linen management program:

- Provide clean, usable, quality products;
- In ample supply;
- On a timely basis;
- In a convenient location;
- To support patient care or staff linen needs;
- At a manageable replacement and processing cost.

2.2 Classification of Hospital Linen:

Hospital linen can be classified as follows:

1. Store linen (Patient's care and general purpose linens)

- Bed linen
- Body linen
- OT linen
- Staff linen
- Linen for housekeeping of offices and wards like curtains

2. Laundry linen

- Soiled Linen
- Contaminated/infected Linen
- Foul Linen
- Radioactive Linen

2.3 Linen Distribution:

Exchange Cart, Replenishment and Requisition:

The traditional ways to supply linen to end-users consist primarily of these methods: exchange cart, replenishment, requisition, or a combination of the three.

- **In an Exchange cart system**, each user area is allocated two shelved carts capable of holding a 24-hour supply of linen. As one full cart is delivered to the user area, the depleted cart is returned to the linen room to be refilled.

This method, popular with larger hospitals, is usually implemented in major inpatient departments—the operating and emergency rooms—and works well in conjunction with handheld data-collection devices for linen management software systems. Major considerations are the amount of space a hospital has for cart staging and the amount of inventory required to maintain the duplicate carts.

- **Replenishment systems** are the most common approach and are used for all categories of user departments. In this method, the linen distribution personnel take linen directly to user departments to stock carts and/or closets to a par level. The par level may be a specific amount established formally through statistical usage analysis, based on the judgment and experience of the linen distribution person stocking the cart, or simply whatever fits on the shelf.

While there are fewer issues with the amount of stocking space and inventory, one disadvantage of a replenishment system is a diminished ability to supervise staff during the stocking activity.

- **In a requisition system**, user departments place orders with the linen department for their linen needs on a daily/weekly basis. This method is most common in outpatient areas, clinics and medical office buildings (MOBs) that

utilize small amounts of linen or have unpredictable usage patterns. The disadvantage of the requisition system is that it relies on end-user department personnel to accurately assess their linen needs and not over order. Over ordering can easily lead to the buildup of excess linen, or “dead stock,” that pulls valuable linen product out of circulation.

For a good institutional health care system, the efficient linen service is a must. A sick person coming in the hospital gets tremendously influenced and soothed by the aesthetics or cleanliness of the surroundings and the linen. On the contrary, dirty linen tends to result in psychological dissatisfaction. Studies have proved beyond doubt that hospital acquired infections show an increase whenever laundry and linen services are inadequate. Thus for adequacy of bed linen there should be balance between demand and supply of bed linen.

2.4 Linen Flow Model:

- The Linen Flow Model demonstrates that linen circulation is an “open” system - one that is susceptible to increased costs when linen flows out of the cycle. Each time items leave the flow because of loss, wear, or inaccessibility, a cost is incurred and new linen must be procured. Finally, unnecessary events deplete or slow down the flow of linen.
- The Linen Flow Model shows that five primary processes must occur to keep linen circulating and inventory supplies consistent. Each process must be defined and have a formal policy to insure that activities occur in a timely, controlled manner.
- The linen cycle is dependent upon the coordination of dozens of consumers and multiple suppliers, so policies must address a wide variety of people and needs. Without policies in place to control linen flow and use, additional labor,

processing, and replacement costs will be incurred. Below are situations which may occur if policies are not documented or followed.

- Customer service issues arise from inadequate delivery times and inventory quantities, resulting in poor use of managerial time.
- Labor costs increase when user's inventory needs are unknown; multiple orders, phone calls and deliveries are required to satisfy user requests.
- New linen replacement costs increase to compensate for linen that was used improperly, stored in an inaccessible area, or removed from circulation.

2.5 Linen Flow Model Processes:

- Procurement - Purchasing new linen and injecting into the cycle.
- Distribution - Transporting linen from the linen/laundry area to consumers.
- Consumption - Using linen for patient care for staff needs.
- Retrieval - Retrieving soiled linen from consumer areas to collection points.
- Processing - Cleaning soiled linen and preparing it for customers.
- Customer service issues arise from inadequate delivery times and inventory quantities, resulting in poor use of managerial time.
- The number of individual inventory items, or stock keeping units, expands in response to specific user requests.
- Labor costs increase when user's inventory needs are unknown; multiple orders, phone calls and deliveries are required to satisfy user requests.
- New linen replacement costs increase to compensate for linen that was used improperly, stored in an inaccessible area, or removed from circulation.

Distribution:

An effective linen distribution program provides the right product at the right time in the right quantity, at the right place. To achieve these goals, there must be cooperation and communication between the department which supplies the products and consumers. Keeping an open line of communication is increasingly important since fluctuating patient volume and associated linen requirements can change dramatically within just a few hours.

- **Distribution schedules must support consumers work routines and patient acuity:**

In today's healthcare environment, patients have a higher acuity level than in the past. Patients typically stay fewer days, but may need more linen during their stay. It is more important than ever that linen is accessible 7 days a week, 24 hours per day. Therefore, deliveries need to be scheduled to support increased patient acuity and work routines (patient baths, bed changes, etc.).

- **Each distribution location must have a defined set of products and par levels:**

The distribution department must also periodically review the product selection with consumers to insure they receive appropriate products, in the correct quantities, for their changing needs.

- **Track usage data, by product, for each location:**

This data will be used to monitor and measure each location's consumption patterns and can also be used to determine linen related costs for each consumer.

- **Identify high volume users and periodically review utilization:**

A relatively small number of distribution points may account for a high percentage of a facility's total linen utilization. These areas should be reviewed continuously, using credible data to maintain controls and identify opportunities for improvement.

- **Monitor locations of low volume consumers:**

As the number of clinics and outpatient services grow, the number of linen stocking locations can increase dramatically. Examination rooms, cabinets and offsite storage locations should be periodically inspected to avoid build up of non-circulating linen

3. METHODOLOGY

Research Question:

Q1. What is the Par level demand of bed linen for IPD?

Q2. What are the causes of linen loss?

- **Study Area:** Cloudnine Hospital, Bangalore
- **Study Duration:** 2 Months

Research Procedure:

The study was descriptive in nature which included calculation of Par level requirement, calculation of total linen loss, identifying the causes of linen loss and identifying the opportunities for improvement.

- Linen par level was calculated using the bed occupancy rate.
- Total linen loss in the last six months was calculated by cross checking the Inventory reports.
- To identify the causes of linen loss the process of receiving, replenishing the clean linen and sending the soiled linen to the laundry was observed and observations were made in the department.

Data Collection:

Data was collected from the officials of the Hospital which comprises of:

- Records from linen log register.
- HMIS
- Inventory reports

4. CALCULATION OF PAR REQUIREMENT AND CIRCULATING INVENTORY FOR IPD:

PAR LEVEL CALCULATION FOR EACH BED LINEN ITEM:

1) Fitted Sheet Single

- Fitted Sheet Single is required on 38 beds
- Therefore in case of 56% bed occupancy, there is a requirement of 21 fitted sheets single.
- Circulating inventory will be 63.

2) Flat Sheet Single

- Flat Sheet Single is required on 38 beds
- Therefore in case of 56% bed occupancy, there is a requirement of 21 flat sheets single.
- Circulating inventory will be 63

3) Attender Sheet , Attender Pillow Cover & Attender Pillow Standard:

- Attender sheet, attender pillow cover & attender pillow standard required on 36 beds
- Therefore in case of 56% bed occupancy, there is a requirement of 20 Attender sheet, attender pillow cover & attender pillow standard.
- Circulating inventory will be 60

4) Standard Pillow, Standard Pillow Cover, Square Pillow, Square Pillow Cover & Blanket

- Standard pillow, standard pillow cover, square pillow & square pillow cover required on 42 beds
- Therefore in case of 56% bed occupancy, there is a requirement of 24 Standard pillow, standard pillow cover, square pillow & square pillow cover.
- Circulating inventory will be 72

5) Quilt And Quilt Cover Single

- Quilt and Quilt cover Single is required on 38 beds
- Therefore in case of 56% bed occupancy, there is a requirement of 21 quilt and quilt cover single.
- Circulating inventory will be 63

PAR LEVEL REQUIREMENT

Table 4.1

PARTICULARS	PAR REQ.
Fitted Sheet	21
Flat Sheet	21
Quilt	21
Quilt Cover Single	21
Attender Sheet	20
Attender Pillow STD	20
Attender Pillow Cover	20
Standard Pillow	24
Standard Pillow cover	24
Square Pillow	24
Square Pillow Cover	24
Blanket	24

REQUIRED CIRCULATING INVENTORY

Table 4.2

PARTICULARS	CIRCULATING INVENTORY
Fitted Sheet	63
Flat Sheet	63
Quilt	63
Quilt Cover Single	63
Attender Sheet	60
Attender Pillow STD	60
Attender Pillow Cover	60
Standard Pillow	72
Standard Pillow cover	72
Square Pillow	72
Square Pillow Cover	72
Blanket	72

5. CALCULATION OF TOTAL LINEN LOSS

1) MONTHLY MISSING LINEN

Table 5.1

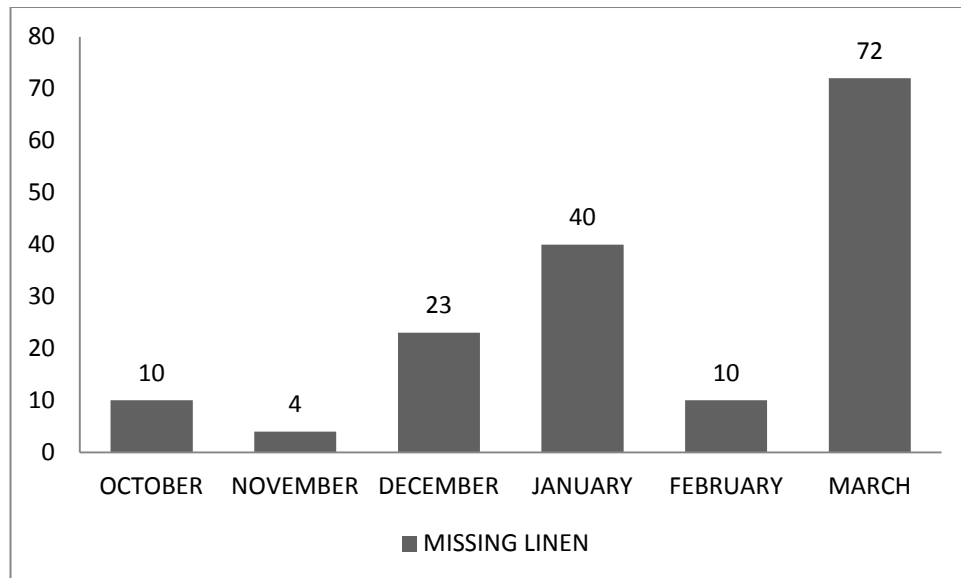
MONTH	MISSING LINEN
OCTOBER	10
NOVEMBER	4
DECEMBER	23
JANUARY	40
FEBRUARY	10
MARCH	72

2) TOTAL MISSING ITEMS

Table 5.2

ITEMS	TOTAL MISSING
Fitted Sheet (S)	40
Flat Sheet (S)	29
Duvet (S)	1
Duvet Cover (S)	6
Attender Flat Sheet	12
Attender Pillow Cover	0
Standard Pillow	2
Standard Pillow Cover	32
Square Pillow	10
Square Pillow Cover	12
Blanket	15

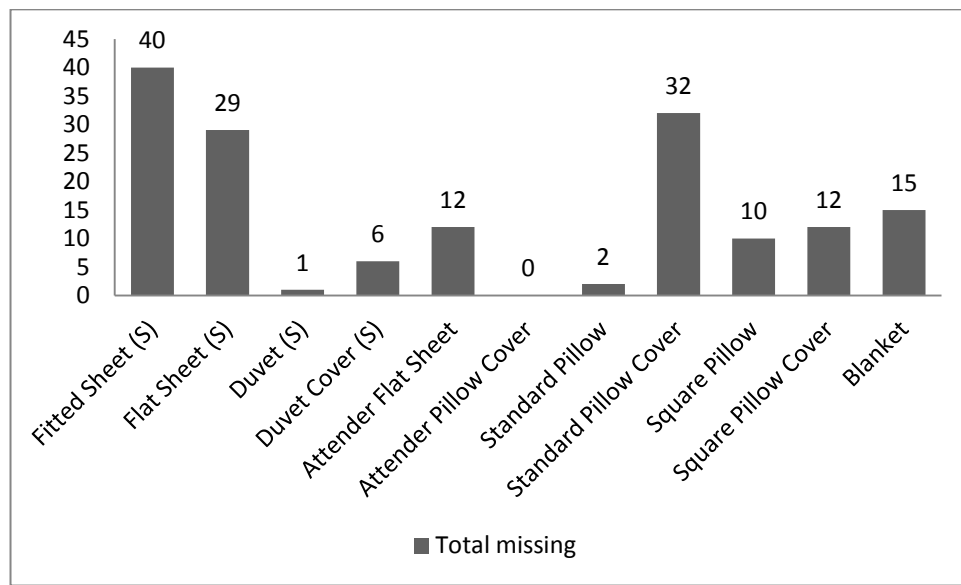
Figure 5.1



GRAPH SHOWING INCREASING LINEN LOSS

- The following graph shows that number of missing linen is increasing every month.

Figure 5.2



GRAPH SHOWING TOTAL MISSING ITEMS

- The following graph shows that there is a huge loss of the linen items required for bed making.

6. FINDINGS

Causes of reduction in stock of circulating inventory:

I. Excessive linen loss:

Linen loss was increasing every month leading to decrease in circulating inventory of linen.

The various causes of linen loss were:

1. Improper counting of linen:

- Linen was not counted properly at the time of receiving from the laundry.

2. Unorganized structure of capturing the data while sending the linen to the respective departments:

- Data was maintained in different log registers which was never audited leading misrepresentation.

3. Security Issues:

- Linen was not secured in the basement linen room. The door of the hospital storeroom was left unlocked, mainly for the convenience of the linen and hospital storeroom staff.
- The utility rooms on the floors were not locked.
- The vacant rooms also had linen and were not locked.
- Linen carts were kept open in hallways.
- No limited access to utility rooms and linen room. Housekeeping staff was asked to go directly to the linen room and obtain the required linen

II. No set guidelines for replenishing the linen to the departments

- Linen was distributed on the basis of what is asked by the nursing staff. This was leading to surplus in one ward and shortage in other.

7. RECOMMENDATIONS

i. To reduce the linen loss following measures should be taken such as :

1. Measurement:

- The documents showing the soiled linen given and the clean linen received should be cross checked at the time of receiving the laundry.

2. Proper monitoring:

- Appropriate format should be there to capture the entire data (clean linen supplied and the soiled linen received) to keep a better account of linen present in departments.

3. Securing the linen:

- The linen carts should be locked.
- Linen room and the utility rooms should be locked.
- There should be limited access to linen room.
- Linen in the vacant rooms should be locked.

ii. The distribution of linen should be based on the occupancy rate :

- The distribution of linen should be based on the occupancy report generated by the front desk to avoid the problem of linen loss from the department.

8. Results

1) Ease in maintaining the records:

- It became easier for the linen executives to main the record of quantity linen present in department.

2) No overstocking of linen:

- The problem of overstocking the linen in the linen carts was reduced as the linen executives started distributing the linen based on the bed occupancy.

3) Reduced shortage of linen:

- The problem of shortage of linen in the patient rooms was reduced as each area was given the linen according to the bed occupancy.

4) Sufficient amount of linen in the linen room:

- As the linen was distributed based on par level requirement, sufficient amount of linen was present in the linen room.

9. DISCUSSION

A proper control on the circulating inventory is important to maintain continuous supply of linen in all the departments. The issues such as Linen loss and demand and supply of linen should be addressed properly. Excessive linen loss was leading to shortages, inadequate delivery time which was resulting in Customer service issues. New linen replacement costs were increasing to compensate for linen that was used improperly, stored in an inaccessible area, or removed from circulation.

When user's inventory needs are unknown; multiple orders, phone calls and deliveries are required to satisfy user requests therefore it becomes essential to estimate the demand.

10.Conclusion

The study revealed that maintaining the par level requirement and reducing the linen loss are important factors to control the linen inventory. Therefore it is very essential for the Housekeeping department of Cloudnine Hospital to distribute the linen based on the bed occupancy and to keep a check on the security of linen to prevent linen loss.

Distributing the linen according the bed occupancy will help the housekeeping department to keep the track of linen present in each department, and avoiding overstocking in the linen carts present on the floors.

By reducing the linen loss housekeeping department can maintain the stock for a long time and it will also reduce cost due to purchasing of new linen.

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