UNIT 3  CONTROL AND MAINTENANCE OF EQUIPMENT

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3.0  OBJECTIVES

After going through this unit, you will be able to:

- explain the meaning, importance and principles of controlling, maintaining equipment and inspection;
- define material management;
- list the purposes of material management;
- discuss the elements of material management system;
- define logistics and its steps;
- discuss Receipt and Inspection of equipment;
- describe method of inventory control;
- define ABC analysis and VED analysis; and
- explain nurses role in material management.

3.1  INTRODUCTION

You may recall that in your work place you had an opportunity to have an exposure towards management of materials that are used for patient care. This management includes procuring, controlling, maintaining, together will inspection of articles and materials.

In this unit we will be frequently referring to controlling, maintaining and inspection of equipment and materials.
Equipments or materials are very important resources to achieve the objectives of health care organization. More than 50% of budget of an organization is spent on human resources or staff and less than 50% of the funds are used for providing equipment and supplies or materials. Staff or human resources i.e. right people, at the right place, in right numbers, at the right time are very important to provide best care. However if the equipment and supplies are not available efficient staffs also will not able to provide care to the patients. Therefore, it is more vital that materials of right quality and quantity are supplied to the staff in right quality, right time and at the right place for use.

To protect the patients and employees from injury, you must ensure that all patient care equipment are fully functional and serviceable at all times so that in emergency you are not let down and patient care is affected or precious life is lost. All defective equipment are promptly repaired or replaced. You should know how to operate sophisticated equipment, so that you can ensure proper care and storage of equipments when needed. You are also responsible for the continuous vigilance of care of equipment. This is inspection.

You should refuse to use faulty equipment or that which was not designed for use in the situation where it is ordered. Therefore, let us see what is controlling, maintaining equipment and inspection. This will be explained to you in this unit. You will also become familiar with the purposes, principles of controlling and inspection of equipment, which can be of great help while working in various clinical areas. This entire unit is presented to you with a view to give you a basic idea of controlling, maintaining equipment and inspection; along with the process of purchase and transactions.

This will enable you to contribute towards cost effectiveness in patient care and make you an efficient and effective nurse in your roles. Though the presentation of this unit is descriptive, yet you will be encouraged and motivated to critically analyse various issues and examples from your working place.

### 3.2 CONTROL AND MAINTENANCE OF EQUIPMENT

#### 3.2.1 Meaning

A large variety of materials are used in the hospitals. An average hospital needs more than 3000 items of instrument and equipments. This shows the type of stores used for patient care in the hospital and therefore its management and maintenance itself is very important. Material management is an important aspect of resource management. Proper management of materials are very crucial to all the organization and we the nurses play a vital role in controlling, maintaining and inspecting the materials time to time for efficient and effective patient care.

#### 3.2.2 Definition

Material management is defined as a system of planning, organizing, directing and coordinating, controlling and maintaining adequate equipment and supplies where by there will be right quantity of stock of items properly stored, easily retrievable and distributed for the use whenever required.

#### 3.2.3 Purposes of Controlling and Maintaining Equipment

Material or equipment management is very important in nursing. All the nursing procedures starting from simple to complex, non-invasive to invasive techniques require materials. In other words no nursing procedures can be done in a scientific way without adequate and appropriate materials.

- To make materials available in safe and viable condition as necessary for both elective and emergency situation.
- To increase efficiency of the organization.
- To provide material at an optional cost.
- To cut down material cost through standardization.
- To ensure recycling of materials wherever feasible.
Material Management

- To ensure appropriate and safe waste disposal, which arises out of the use of materials and supplies.

Waste management is a specialized branch with a separate entity.

Check Your Progress 1

List the purposes of controlling and maintaining equipment.

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3.3 ELEMENTS OF MATERIAL MANAGEMENT SYSTEM

In this sub-section you will learn about elements of Material Management System. You will come to know the purchasing of material storing, issuing and the use of material.

Material management consists of the following elements that are in themselves interrelated and independent, it consists of:

i) Demand Estimation
ii) Procurement
iii) Receipt and Inspection
iv) Storage
v) Issue and Use
vi) Maintenance and Repair
vii) Condemnation and Disposal
viii) Accounting and Information System/Inventory

Let us learn each of these elements in detail.

3.3.1 Demand Estimation

Estimation of right amount of each equipment is the most crucial factor for maximum use and minimum wastage. Reduce number and variety of materials will lead to less problem of management. Demand estimation of category of material should always be done keeping in view the trend in consumption pattern over the last 2-3 years, the objective of the organization, change in the clientele, changing emphasis on various programmes and activities in the health field or organization this is known as casting and forecasting in nursing service administration.

3.3.2 Procurement

When you have listed down the requirements the next process is procurement of those items. Most hospitals have a set of rules and regulations regarding the procedures of ordering materials. A purchase department may be available and financial authority may or may not be vested in this department. In some institutions a purchase committee may be established beyond the purchase department to scrutinize all the indents or demands as per priority for procurement of materials. The basic principle in all these rules and regulations of procedure is to maximize the value of money invested in purchase.

Process of Purchase

As we have already discussed generally most of the institutions have a purchase department it may be centralized or decentralized or a combination of both. The policy on purchase may vary according to the size, structure and complexity of the institution. However, this will provide better control over material management, less of over lapping and duplication and ensures high quality and quantity.
Different systems are available for procuring materials from manufacturing companies. Few of them, which are practiced in our country, are explained here.

1) **Fixed Quantity Contract**: This type of contract is generally extended, where firms are called to offer materials and a definite number are asked to supply.

2) **Running Contract**: These are contracts for the supply of an approximate quantity of materials at a specific price during a certain period of time.

3) **Rate Contract**: These are the most important contracts as far as health institutions are concerned. In this, the firms are asked to supply materials at specific rates during the period covered by the contract and fixed quantities are not mentioned. The list of materials required is given to the contractors and they provide materials to the demanding office. Watch very carefully the progress of rate contract procedures.

A purchase committee or department can provide maximum flexibility in ordering specified quantities of material at regular interval. This helps us to maintain optimum inventories and minimize the chance of deterioration or obsolescence of materials. Here the quality of the material to a large extent is assured because only the needed material is given for contract.

**Value Analysis**

The basic principle of material use is the right quality of material is done by questioning and analyzing each specification whether it could be amended or substituted so that the use of materials will be at the maximum level. The process of analysis of the intrinsic value of the material for achieving the objectives of the organization is termed as “Value Analysis”. This is an important function of a materials manager.

**How is value analysis carried out?** To carry out Value Analysis we need to answer few questions for better understanding such as:

1) Can the material be dispensed with?

2) Can it be simplified?

3) Will a standard material do?
4) Is the value proportional to its cost?
5) Is anything cheaper but equally good available in the market?
6) Would it not be better to manufacture it?

### 3.3.3 Receipt and Inspection

As soon as the ordered materials are received in the goods receiving store, inspection should be carried out. The material should be picked upon a random sampling method and it should be inspected physically and chemically (where required). The organization should have inspection policy, procedures and the basic facilities for the inspection and examination. Investment should be done on sound sampling policy and procedures. This will assure the right quality of materials supplied to the organization.

#### Points to Remember

1) Receive all items.
2) Check the same against specification and arrange for inspection.
3) Inform the end users regarding the receipt of materials.
4) Prepare receipt notes and inform excess or shortage of items received.

### 3.3.4 Storage

Materials after being inspected and received are stored in the storeroom till its distribution and consumption. The store should be located near the other stores of the hospital. It should be accessible to the suppliers and indentors. Location should be as per activity of the stores. Size should be adequate to accommodate all materials such as instruments, appliances, steel racks with shelves. Refrigeration should be available for storing thermolabile items. Many stores maintain two bins method or card system. This method separates the entire stock of each item into two bins or boxes. One bin contains main stock and the second bin contains enough stock to satisfy the demand during lead-time. Lead-time is the time between placement of order and receipt of the same order. As soon as the first bin is exhausted, demand for the order is placed and the second bins item are issued. Part of new stock received is placed in the second bin as reserve.

### 3.3.5 Issue and Use

Arrangement of materials can be done Alphabetically or Group wise. Both are easy for identification and retrieval. Materials should be stored on both sides of open rack. These racks are always filled from backside and issued from front side. Materials received later from the suppliers should be stored behind. By this you maintain the principle of "FIRST IN FIRST OUT". "FIFO" means issuing items first which are received first.

#### Check Your Progress 2

1) List the elements of material management.

2) Define value analyses

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### 3.4 INVENTORY DEFINITION

Let us now discuss about inventory or accounting of items and information system. You must be very familiar with word inventory.
Definitions

1) An inventory is a record of all goods or materials procured, received, stored and used for day to day requirement of consumer’s for the organization.

2) An inventory is a detailed list of all materials, their specification and standard number or quantity. Specification makes it possible to identify the material by size, number or description. The standard indicate the quantity that is kept on the ward/unit.

Physical Inventory: The actual count of articles that is made on the wards are known as physical inventory.

3.4.1 Purposes of Inventory Taking of the Ward/Unit

Following are the purposes of inventory taking:

1) To make an account of materials on hand and to check against standard. Corrections are made as necessary.
2) To dispose excess and obsolete materials.
3) To recommend changes in standard.
4) To determine the serviceability of all materials/equipments.
5) To request for repair or replacement if necessary.
6) To return equipment to its proper place if borrowed e.g. central supply department, or another ward.
7) To maintain and trace materials.

Check Your Progress 3

1) Define inventory. 

2) List the purposes of taking inventory in the ward or unit.

Certain items need a daily count on a small scale e.g. torch, scissors, stethoscope, sphygmomanometers etc. These items disappear or are easily broken and early discovery of loss items will enhance the patient care. Some items are counted weekly or monthly. For others like furniture biannual or annual are sufficient. However, when annual inventory is taken, every item in the ward should be counted. Inventory of the ward should be done on a selected day/days when patients are less in ward. Time and assignments should be planned and all personnel should assist in the count of materials.

3.4.2 Inventory Control

Meaning

Inventory control means stocking adequate number and kind of material that are available whenever and wherever required. This has to be according to the financial availability of resources. High inventory level leads to high cost of inventories by:

a) Blocking the finance
b) Large storage space
c) Large handling and administrative charges
Material Management

d) Obsolescence
e) Spoilage etc.

On the other hand low inventories may lead to frequent stock outs and high storage cost. A scientific inventory control can balance the cost of carrying high inventories and cost of shortages.

Guidelines to Keep Inventory Control in the Optimum level

A Items
1) Tight Control
2) Rigid estimate
3) Strict and close watch
4) Safety stocks should be low
5) Management of items should be done at top management Level.

B Items
1) Moderate controls
2) Purchase based on rigid requirements
3) Reasonably strict watch and control
4) Safety stock moderate
5) Management be done at middle level.

C Items
1) Ordinary control measure
2) Purchase based on usage estimates.
3) Control exercises by storekeeper
4) Safety stocks high
5) Management be done at lower levels.

Rate of Consumption

Close study of each item of the store, its movement or consumption is a strong tool for proper inventory control. The items can be classified into:

1) Fast moving
2) Slow moving
3) Non-moving
4) Obsolete.

An understanding of the movement of items helps to keep proper levels of inventories by deciding a rational policy or re-ordering of items.

VED Analysis

The materials can be analyzed and classified into Vital, Essential and Desirable items.

Maintenance of Buffer Stock

A stock of additional items which is maintained for meeting the emergency demands is termed as Maintenance of Buffer Stock.

Preventive Maintenance means Monitoring, Protecting and Maintaining of all equipments used for patient care services. Various sophisticated biomedical equipments are maintained through service contracts.

3.5 ROLE OF NURSES IN MATERIAL MANAGEMENT

Material management also includes economy of materials, prevention of wastage and recycling or reuse of materials whenever possible. Effective material management is primarily concerned with logistics management.
As you know a lot of finance is involved in procuring the materials for patient care. Therefore, it is extremely important to manage the materials efficiently, effectively and economically while providing nursing care. The ward/unit incharge is the key person who controls and maintains patient care activities daily also. S/he along with her/his team is responsible for material management in ward.

1) Ensure regular and adequate flow of materials.
2) Standard and quality materials should be procured which are durable.
3) Monitor quality and safety of materials.
4) Prevent and control wastage/misuse of materials.
5) Develop policies, procedures and routine for indents.
6) Receive, store and check timely replenish all necessary materials.
7) Maintain emergency and buffer stock.
8) Arrange for preventive maintenance wherever needed.
9) Maintain proper inventory and stock of all materials. Periodic or daily or weekly inventory done.
10) Arrange for condemnation of broken and worn equipment as per the policy and procedure of the organization.
11) Assist in the audit materials as and when required, time to time inform loss, misplacement and shortage.
12) Orient all the nursing personnel regarding the policies of material management.
13) Participate in developing policies for material management.
14) Participate in the purchase of materials and advise to purchase materials as per specifications.
15) Evaluate the system of material management.

Effective and efficient material management is concerned with logistics management. Activities of planning, organizing, directing and controlling material is known as logistics.

Logistics include:
1) Procurement
2) Delivery of items including transportation.
3) Regular flow of adequate quantity of materials.
4) Maintenance of materials.
5) Monitoring the quality and viability of materials.
6) Monitoring the quantity of materials.

Check Your Progress 4

1) List the role of nurses in material management.

2) Write six elements of logistics material management.
3.6 LET US SUM UP

In this unit we have discussed how to control and maintain materials and the purposes of maintaining equipment. We concluded the unit with the role of nurses in material management.

We have discussed elements of Material Management System under the following headings:

- Demand Estimation
- Procurement
- Receipt and Inspection
- Storage
- Issue and Use
- Maintenance and Repair
- Condemnation and Disposal
- Accounting and Information System/Inventory.

In discussing procurement, we have explained different system available in our country.

1) Fixed Quantity Contract
2) Running Contract
3) Rate Contract

Value analysis and how to carry out value analysis.

Important points related to receipt, inspection and storage of materials and inventory control.

ABC Analysis
VED Analysis

We do hope that you have found this unit interesting. We wish you would manage the materials in your area economically and efficiently.

3.7 KEY WORDS

| Buffer stock | An organization's equipment and supplies |
| Consumption | Obtaining |
| Contract | Buying |
| Inventory | An agreement |
| Materials | A detailed list of goods, furniture and equipment |
| Procurement | Additional items are stocked to meet the emergency needs |
| Purchase | Using up of resources |

3.8 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

i) To make materials available in safe and viable condition as necessary for both elective and emergency situation in required quantity and quality for carrying out health care activities.

ii) To increase efficiency of the organization.

iii) To provide material at an optional cost.

iv) To cut down material cost through standardization.

v) To ensure recycling of materials wherever feasible.
vi) To ensure appropriate and safe waste disposal which arises out of the use of materials and supplies.

Check Your Progress 2

1) i) Demand estimation
   ii) Procurement
   iii) Receipt and inspection
   iv) Storage
   v) Issue and use
   vi) Maintenance and repair
   vii) Condemnation and disposal
   viii) Accounting and information system/inventory

2) The process of analyzing the intrinsic value of the material for achieving the objectives of the institution is formed as value analysis.

Check Your Progress 3

1) Definition of inventory are:
   i) An inventory is a record of all goods or material procured, received, stored and used for day to day requirement for the patients.
   ii) It is a detailed list of all materials, their specification and standard number or quantity, specification makes it possible to identify the material by size, number or description. The standard indicate the quantity that is kept on the ward/unit.
   iii) The actual count of articles which is made on the wards is known as physical inventory.

2) i) To make a count of materials on hand to check against standard and corrections are made as necessary.
   ii) To dispose excess and obsolete materials.
   iii) To recommend changes in standard.
   iv) To determine the condition and loss of all materials/equipments.
   v) To request for repair or replacement if necessary.
   vi) To return equipment to its proper place if borrowed e.g. central supply department or another ward.
   vii) To maintain and trace materials.

Check Your Progress 4

1) Role of nurses are:
   i) Ensure regular and adequate flow of materials.
   ii) Standard and quality materials should be procured which are durable.
   iii) Monitor quality and safety of materials.
   iv) Prevent and control wastage/misuse of materials.
   v) Develop policies, procedures and routine for indents.
   vi) Receive, store and check timely replenish all necessary materials.
   vii) Maintain emergency and buffer stock.
   viii) Arrange for preventive maintenance wherever needed.
   ix) Maintain proper inventory and stock of all materials. Periodic or daily or weekly inventory done.
   x) Arrange for condemnation of broken and worn equipment as per the policy and procedure of the organization.
xi) Assist in the audit of materials as and when required, time to time inform loss, misplacement and shortage.

xii) Orient all the nursing personnel regarding the policies of material management.

xiii) Participate in developing policies for material management.

xiv) Participate in the purchase of materials and advise to purchase materials as per specifications.

xv) Evaluate the system of material management

2) The six steps are:
   
i) Procurement
   ii) Delivery of items including transportation
   iii) Regular flow of adequate quantity of materials
   iv) Maintenance of materials
   v) Monitoring the quality and viability of materials
   vi) Monitoring the quantity of materials.

3.9 FURTHER READINGS


Sahni, Ashok, *Hospital and Health Administration*, Indian Society of Health Administrators, Bangalore, 1999.