

**Comparison of Issue Procedure of Housekeeping Consumables of
SoniManipal Hospital**

**Internship Training
at
SoniManipal Hospital**

**By
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**Under the guidance of
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**Post Graduate Diploma in Hospital & Health Management
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**Institute of Health Management Research
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TO WHOMSOEVER MAY CONCERN

This is to certify that Col Dharmesh Yadav student of Post Graduate Diploma in Hospital Management (PGDHM) from Institute of Health Management Research, Jaipur has undergone internship training at S K Soni-Manipal Hospital from 02 Feb 2014 to 30 Apr 2014.

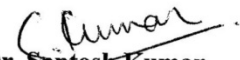
The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The internship is in the fulfilment of the course requirements.

I wish him all the success in the future endeavours.



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SMH/HR/TC/014

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To whomsoever it may concern

This is to certify that **Col. Dharmesh Yadav** pursuing his Post Graduate Diploma in Hospital and Health Care Management at IIHMR, Jaipur has completed his Dissertation Project on **“Comparison of Housekeeping consumable issues procedure”** at Soni Manipal Hospital, Jaipur from 18th February 2014 to 30th April 2014.

We wish him all success in future.

For Soni Manipal Hospital
(A Unit of Manipal Hospitals (Jaipur) Private Limited)


Nagendra Kumar,
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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled “Comparison of Issue Procedure of Housekeeping Consumables of SoniManipal Hospital” and submitted by Col Dharmesh Yadav, Enrolment No 1306 under the supervision of Dr Santosh Kumar for award of Postgraduate Diploma in Hospital Management of the institute carried out during the period from 18 Feb 2014 to 30 Apr 2014 embodies my original work and has not formed the basis of any degree, diploma associate ship,fellowship,titles in this or any other institute or other similar institution of higher learning.

Col Dharmesh Yadav

ABSTRACT

Comparison of Issue Procedure of Housekeeping Consumables of Soni Manipal Hospital

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Background

Health care has traditionally been dominated by the people of the medicine field and due to which aspects of clinical side has always been given weightage and priority however with the advent of modern management technique in health care the other aspects cannot be overlooked since it is no more just giving medical treatment but cost effective and quality treatment with full patient satisfaction. This makes it imperative that all round efficiency and quality has to be maintained and not just restricting it to clinical side, in this regard aspect of housekeeping have been on a backstage and have a good potential for improvement.

Keywords- Housekeeping consumables, patient flow, VED and ABC analysis, correlation and significance.

Objectives

Comparison of issue procedure of housekeeping consumables by linking it to patient flow and to study the relationship between patient flow and consumption of housekeeping consumables.

Method

The study was carried out at Soni Manipal Hospital, Jaipur as retrospective and analytical study for period Apr 2013 to Jan 2014. The sample population basically comprised of all types of items of housekeeping consumables being procured by the central stores and used for day to day maintenance and hygiene in the hospital. A total of 94 items were of the sample population which were put through VED to further select 40 items and later after ABC analysis 10 top items figuring in both VED and ABC analysis were selected. The data was collected from the documents maintained by the central stores and the housekeeping cell. The collected data was processed and partly analyses in MS Excel and later further analysis was done on SPSS 6.0 for carrying out correlation analysis and significance.

Results

During the analysis of data of 10 items it came to light that patient flow had a positive or negative swing on consumable items though the percentage increase or decrease differed but the direction of the swing was generally the same in all item. During the correlation analysis it was seen that 8 out of 10 items showed positive correlation out of which two items had a significant correlation as can be seen in the table below.

Correlation and Significance between Patients and Consumable Items

Item	Quantity	Pearson Correlation	Strength of Correlation	Significance
Bio Bag Black (18x18)	1450	0.712	Very strong +	Significant
Bio Bag Black (29x36)	1296	0.419	Strong+	
Phenyl White	4235	0.226	Weak +	
Bio Bag Yellow (18x18)	471.17	0.207	Weak +	
Bio Bag Yellow (29x36)	394	0.249	Weak +	
Sodium Hypochloride	3900	0.279	Weak +	
Bio Bag Red (29x36)	427.61	0.05	No/negligible	
Bio Bag Red (18x18)	283.03	0.735	Very strong +	Significant
Bio Bag Blue (18x18)	284.14	0.259	Weak +	
Room Freshener	170	0.038	No/negligible	

Conclusion

Today's manager should look for gaps in non-clinical aspect of hospital since they have better scope for incorporating modern day management techniques as compared to clinical aspects where nothing much can be done beyond a certain limit. The modern management tools would greatly benefit the organization to achieve near efficiency in day to day administration of.

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Col Dharmesh Yadav

TABLE OF CONTENTS

Topic	Page No.
1 Introduction	1
2 The Hospital	2
3 Literature Review	3
4 Executive Summary	4
5 Justification of study	5
6 Aim & Objective	6
7 Type of Distribution System	6
7 Factors Affecting Use of Consumables	7
8 Housekeeping Store Issue Procedure	8
6 Methodology	9
8 Observation	11
2.9 Correlation Analysis	26
10 Limitations	28
11 Recommendations	28
12 Conclusion	29
Appendix	31
Bibliography	37

LIST OF FIGURES

- Fig-11.1 Monthly Patients Flow and Bio Bag Black(18X18) Consumption
- Fig-11.2 Monthly Percentage Increase/Decrease of Patients and Bio Bag Black
(18X18)
- Fig-11.3 Monthly Patients Flow and Bio Bag Black (29X36) Consumption
- Fig-11.4 Monthly Percentage Increase/Decrease of Patients and Bio Bag Black
(29X36)
- Fig-11.5 Monthly Patients Flow and Phenyl Consumption
- Fig-11.6 Monthly Percentage Increase/Decrease of Patients and Phenyl
- Fig-11.7 Monthly Patients Flow and Bio Bag Yellow (18X18) Consumption
- Fig-11.8 Monthly Percentage Increase/Decrease of Patients and Bio Bag Yellow
(18X18)
- Fig-11.9 Monthly Patients Flow and Bio Bag Yellow (29X36) Consumption
- Fig-11.10 Monthly Percentage Increase/Decrease of Patients and Bio Bag Yellow
(29X36)
- Fig-11.11 Monthly Patients Flow and Sodium Hypochlorite Consumption
- Fig-11.12 Monthly Percentage Increase/Decrease of Patients and Sodium
Hypochlorite
- Fig-11.13 Monthly Patients Flow and Bio Bag Red (29X36) Consumption
- Fig-11.14 Monthly Percentage Increase/Decrease of Patients and Bio Bag Red
(29X36)

- Fig-11.15 Monthly Patients Flow and Bio Bag Red (18X18) Consumption
- Fig-11.16 Monthly Percentage Increase/Decrease of Patients and Bio Bag Red
(18X18)
- Fig-11.17 Monthly Patients Flow and Bio Bag Blue (18X18) Consumption
- Fig-11.18 Monthly Percentage Increase/Decrease of Patients and Bio Bag Blue
(18X18)
- Fig-11.19 Monthly Patients Flow and Room Freshener Consumption
- Fig-11.20 Monthly Percentage Increase/Decrease of Patients and Room Freshener

LIST OF TABLES

- Table-12.1 Correlation Analysis of Selected Housekeeping Items

List of Abbreviations

ABC-	Always Better Control
VED	Vital Essential Desirable
HIMS	Hospital Information Management System
OPD	Out Patient Department
IPD	In Patient Department
Incr	Increase
Decr	Decrease
Ltrs	Litres
BB	Bio Bag
Kg	Kilograms
No	Number
Fig	Figure
OT	Operation Theatre
Lab	Laboratory
Appx	Appendix

List of Appendices

Appx A	List of Housekeeping Consumables and Quantity Issued
Appx B	ABC Analysis of Selected Items
Appx C	IPD/OPD State from Apr 2013 to Jan 2014

1 –INTRODUCTION

1.1 Today economics is the game changer for each and every industry or business and the health care has not been untouched by this as well. The times have changed and this is the one of the most frequently asked questions to healthcare financial experts, especially during times when hospitals find it hard to augment their revenues. Reasons to this are numerous, some due to economic pressures like rising inflation rates as well as changing government policies and others being misallocation of funds, and technical and managerial inefficiency. All of these factors often make this balancing act a complicated affair. Practically all hospitals work towards obtaining a good profit margin without compromising on quality of healthcare delivery but the challenge here is to reduce operating cost in order to increase revenue and at the same time maintaining a high quality and efficiency.

1.2 Another misconception that hospitals these days live in are that, improvement of quality calls for an increase in operational cost. In fact, these two factors do not directly comprehend with each other. While operational cost is an amalgam of medical consumables, manpower, regular repairs and maintenance expenses as well as hospital services like housekeeping expenses, F&B, laundry, medical gases etc., that hospitals have to incur for their day to day affairs; quality is a result of high innovation, sincere effort, intelligent and skillful execution of work. In the wake of such circumstances, striking the balance between operating cost and revenue is quite meticulous.

1.3 Housekeeping consumables form a part of recurring expenditure which is normally taken as uniform and the share in the total expenditure is comparably very low in comparison to clinical expenditure but still it can make a difference to the overall operating cost of the hospital. The gap analysis of each and every aspect is

required to be carried out to get the optimum from each department, equipment and individual. There are always certain issues which take priority and the senior management tends to focus on them and neglecting the mundane activities which are not technical. In this era of TQM, every bit counts and must not be discounted how marginally it affects the overall goal.

2 -THE HOSPITAL

2.1 Soni Group of Hospitals was one of Rajasthan's largest multi-super specialty, trauma and general hospital group in the private sector with a corporate ambience, replete with all hi-tech ultra-modern facilities for total health care roof. The group consisted of Soni Hospital, JLN Marg and SK Soni Hospital, Sikar Road and is located in Jaipur. Founded by eminent Dr.B.R.Soni, the institutions have been envisioned with the aim of bringing to Jaipur the highest standards of medical care along with clinical research, education and training.

2.2 The hospital was constructed in a small span of 15 months and operational from Oct 2004, this hospital is now one of the top class healthcare institutes in northern India. Spread across, extensively over an area of 2, 55,000 sq. ft., the hospital is the first of its kind in private sector to be approved by the state government for medico legal Services. It is also the largest Hospital in Rajasthan accredited with both NABH & NABL. The institute includes a research centre, nursing college, nursing school and some minor medical school diploma courses. It has 315 beds with proposed capacity of 600 beds and over 120 critical care beds with 09 operation theatres catering to over 20 specialties. The Hospital houses six centres of excellence which will provide medical intelligentsia, cutting-edge technology and state-of-the-art infrastructure with a well-integrated and comprehensive information system.

2.3 It is the first private hospital in Jaipur to handle Trauma and Medico-legal cases related to accidents and injuries. This state of the art hospital is equipped with all modern world class equipment's and facilities. Featuring multi-specialty and super-specialty departments, we provide premier healthcare to all. A Team of 60 renowned consultants headed by 5 ex-principals & HOD's of medical Colleges are affiliated to serve patients and their respective needs. The hospital provides treatment in over 60 different specialities including Cardiology, CTVS; Oncology (Cancer); General and Advanced Laparoscopic Surgery; Critical Care; Neurosciences; Orthopaedics, Polytrauma, Joint Replacement and Sports Medicine; Gastro sciences and numerous others specialties. Recently the hospital has gone into agreement with Manipal Group of Hospitals where in the management of the hospital has been handed over to Manipal Group of hospitals since mid Feb 2014 and has been renamed as SoniManipal Hospital.

2.4 Manipal Hospital is a landmark health care entity in the whole of South India. Manipal Hospital is also highly regarded as a specialty referral centre in India. Manipal Group is a well-established brand in health care market in South India and has made foray in North India with this tie up.

3 - LITERATURE REVIEW

3.1 The aspect of housekeeping though plays an important role in patient satisfaction level in a hospital but has not found due weightage in various journals, blogs, seminars etc. Housekeeping activity in a hospital involves a set procedure and requirement with limited technical competence, as compared to various skilled and technical jobs being under taken by various other employees in a hospital. The more prominence on housekeeping has been found in the hospitality industry on which the current day housekeeping services in hospital are based and with time to come they

have evolved themselves with specific requirements in a hospital like greater emphasis on hygiene and sanitation. The literature concerning the subject was more available from the hospitality industry and just negligible from the hospital or health industry. The most of the available literature was in the form of books and journals being part of course curriculum in various institutions conducting courses in hospital and health management. There was a limited research work done as far as housekeeping was concerned and that too restricted to inventory management. This also carried broad coverage of the subject rather being supported by research based outcomes specific to the housekeeping aspects.

4 - EXECUTIVE SUMMARY

4.1 The importance of this study was that the emphasis here was on a subject considered to be routine and attracting not much attention of the staff and the patients with respect to dignity of labour and the cost involved in carrying out the related activities. In a hospital emphasis has always been given to the clinical side where as housekeeping related activities though play a major role in infection control and patient satisfaction don't get the due recognition.

4.2 In the era of TQM we have to consider all activities with due diligence so as to look for quality gaps and scope of further improvement to increase the productivity within the given resources or to say to achieve optimal utilization of the resources. There are number of factors which affect the output of housekeeping services but the issue of stores is a major factor which directly affects the overall output and has a visible impact on the environment.

4.3 SoniManipalHospital had the required setup for carrying out this study and since the summer training was carried out here so the system and its functioning was well acquainted and would assist in collection of required data and seeking assistance from various stakeholders. The training in a reputed hospital having high standard and quality of Medicare will provide greater exposure and knowledge on the current practices in hospital administration.

5 - JUSTIFICATION OF STUDY

5.1 Managing housekeeping services is a routine job which requires more of supervision of the staff and timely delivery of service, here apart from the staff and supervision the right stores in right quantity plays an important role. To arrive at the parameter of what is right quantity to be issued, there has to be some standard or criteria. The easiest way is to issue what one demands but that neither checks whether it is over or under issued, whether there is a waste being done due to any reason like lack of training, pilferage etc

5.2 The hospital is designed to serve the patients and the activities performed in any department of the hospital are in relation to the patient, so a linkage with the whatever activity is being performed in the hospital directly to the patient would result in a better outcome whether it is in terms of store utilization or deployment of manpower. Similarly the issue of stores of housekeeping consumables if issued in relation to the patient flow would likely render an effective management of stores for housekeeping services since the same cannot be applied to clinical stores as the store requirement is based on case to case basis and there are no fixed standards or requirement for any particular type of disease or procedure.

6 - AIMAND OBJECTIVES

6.1 The aim of the study was to carry out comparison of issue procedure of housekeeping consumables by linking it with patient flow.

6.2 The study had the following objectives:

- To study the relationship between patient load and consumption of housekeeping consumables.
- To identify scope of improvement within the same.
- To recommend effective solutions that is cost effective if any.

7 - TYPES OF DISTRIBUTION SYSTEM

7.1 **Requisition System-** This is also called ordinary order or fetch and carry or grocery system. The department requiring supplies demands required items from the central stores. The central store processes the requisition and issues stores, to the department. The entire process is repeated at regular intervals viz. weekly, fortnightly. In case of urgency, emergent demands are forwarded to the central stores. Central stores must do the inventory analysis before each requisition is processed further.

7.2 **Topping up System-** In this type of system each user or department is given a fixed number or quantity of items for which an attendant from central stores makes a round of all departments and replenishes the items at predetermined levels

7.3 **Total Supply Cart Exchange System-** In this system supply quotas are established in conjunction with each department where in a user's complete need for a period are issued. The quotas are revised and updated as and when required. This is also called regular complete stock issue.

7.4 **Clean Exchange**-The used item or the packing material of the used item is deposited back to the store to get a fresh or filled item on clean exchange basis. The initial issue is done based on the assessed daily or periodic requirement.

8 - FACTORS AFFECTING USE OF CONSUMABLES

8.1 **Patients Flow**-The flow of patients cannot be predicted since there are numerous factors which control the patient flow in a n hospital. There are factors which are within the control of the hospital like organizational procedures and SOP's, good patient management, publicity of its quality and services, impeccable track record etc which directly influence the patient flow. If we go into the details then would find various other minor and major factors which would affect the rate and volume of patients

8.2 **Weather**- Weather plays an important role since the disease pattern is more linked to weather and it follows the same trend year after year and this directly affects the patient's volumes. Bad weather periods like rain, storm, dust storm or any other form of disturbance due to weather which curtails movement of human or mechanical transport will not just affect the patients flow/volumes but also render additional efforts in form of maintaining the facilities thereby increased use of consumables for cleaning..

8.3 **Seasonality**- The trend of disease follows a set pattern as far as season is concerned. These are predictable and accordingly facilities cater for additional/drop in flow of patients and based on the usage of the facility the use of consumables increase or decrease.

8.4 **Budgetary allocation**- The budgetary allocation for purchase of housekeeping stores will dictate the amount of certain stores to be procured. The vital stores which

affect infection control and hygiene will have to be purchased at any cost but other may be avoided or procured in limited quantity depending upon the budget available.

9 - HOUSEKEEPING STORES ISSUE PROCEDURE

9.1 The stores at Soni Manipal Hospital for housekeeping are procured and controlled centrally. The demand of the stores are placed based on the requirement projected from various departments in the hospital, the same is then vetted and put up for approval of the hospital administrator and same are included in the annual and monthly forecast of demand. Once the order is placed and the stores are received by the central stores then they are taken into the ledger charge and ready for issue to the user.

9.2 The issue procedure adopted at the hospital is based on as on required basis i.e. the demand is generated by the concerned department and forwarded by hand to the central store where based on availability of stores the items demanded are issued and items not available are put for immediate delivery to the based on the criticality and essentiality of the item. A major chunk of housekeeping stores are issued to the housekeeping cell which further issues to its staff for utilizing the same in various departments where they are employed for upkeep and maintenance. The items so issued are documented in the Housekeeping items issue register which is maintained by Housekeeping in charge. The housekeeping items are issued by the housekeeping cell early in the morning and also on as required basis and the replenishment of the same are carried through a bulk demand from the central stores or at times on emergent basis depending upon the criticality of the items.

9.3 The existing procedure of issue of housekeeping stores gives scope for considering any alternate method of issue for issue of housekeeping stores. This could

be either based on the area being maintained, number of patients visiting the facility or as per acceptable standards as laid out for such institution if any. However in absence of any such mechanism the only option remains is requisition system which is felt to be more convenient and less procedural giving lot of flexibility to the user. It is here that the scope for using some alternate means for issue of stores can be looked into. Since the cost of the services directly depends on the number of users then the most appropriate comparison would be with the number of patients using the services. The use of consumables or to that matter any service in the hospital would directly depend on the number of patients using them. There are areas/departments which would require maintenance even if no patient comes to use the services.

10 - METHODOLOGY

10.1 **Research Question-**Can there be linkage between housekeeping consumables issue procedure and patient flow?

10.2 **Study Type-** The study being carried out was an analytical and retrospective study based on the data available for housekeeping consumables.

10.3 **Selection of Period of Study-**The study was carried out for period Apr 2013 to Jan 2014 for financial year 2013-14 but the period had to be reviewed and changed since the process of transfer of the ownership of the hospital from Soni Group to Manipal Group started in mid Feb 2014 due to which there was a miss match of available data, keeping the same into consideration the period of the study was restricted to 10 months from Apr 2013 to Jan 2014.

10.4 **Sample Population-** The sample population basically comprised of all types of items of housekeeping consumables being procured by the central stores and used for

day to day maintenance and hygiene in the hospital. The items having direct clinical use or related to some procedure were not included. A total of 94 items formed part of the sample population. The details of the same are at Appx A

10.5 Sampling frame-The sample frame comprised of items of housekeeping consumables which were procured and issued by the central store and for which data was maintained and was available with central store.

10.6 Sampling method for selecting items-Systematic sampling method was used to select the sample. The items of part of housekeeping consumables were put through VED analysis to find out the vital and essential stores so that the further analysis can be restricted to few important items. To further restrict the items then ABC analysis of the inventory was carried out and after matching the items with both the analysis the items as sample will be selected from the ones which would have higher volume in VED analysis and which have higher value/ procurement cost in ABC analysis.

10.7 Determining the sample size-The sample size was limited to 10 items from total inventory for housekeeping stores which was issued to housekeeping cell by the central store and would not include any clinical consumable.

10.8 Implementing the sampling plan-To implement the sampling plan the necessary permission was obtained from the Hospital Superintendent/Administrator. The required instructions were conveyed to all concerned so as to carry out the whole process of data collection smoothly and with full cooperation of concerned stakeholder.

10.9 Sampling and data collecting- Sample and data were collected from the records of central store and the housekeeping cell. The availability of data depended on the documentation procedures adopted by the hospital at various levels which were either based on standalone software or based on ledger or issue registers.

10.10 Tools used for data analysis-The initial data was collected in MS Excel sheet and basic data analysis was carried out in MS Excel however once the data had been arranged and collated, then SPSS 16.0 was used to carry out further analysis of selected data like correlation of variables and their significance.

11 - OBSERVATIONS

11.1 The initial data was first collected from the central store based on the housekeeping stores issue ledger and reports. The total item which figured in the list numbered 94 initially wherein certain items were such that they were not consumed at all whereas some items were sparingly used and issued. The initial list was put through VED analysis to sort out the items based on its volume and turnover and to arrive at sample which would be worthwhile to generate some meaning full outcome from the study.

11.2 VED Analysis-VED analysis was carried out on 94 housekeeping consumables. There were only 90 items which were issued from the central store during the period of study. As per the quantity or number of units issued there were 4 items which were issued in more than 1000 nos/ quantity during the period of study. There was one item which was issued more than 500 but less than 1000, 21 items were issued more than 100 but less than 500, 64 items were issued in less than 100 quantity. After VED analysis 40 items were shortlisted on the basis of more than 50 units of the items issued by central store during the period of study.

11.3 ABC Analysis- ABC analysis was carried out for 40 items which were shortlisted based on their usage and quantity consumed. The cost price of 40 items were obtained and same multiplied with the total quantity of item issued by the central store

to arrive at the total cost incurred on the item during the period of study. The figure so arrived of all the items of consumables was placed in in descending order which gave out cost wise ranking of the items. The total cost of 40 preselected items came out to be Rs7, 51,565 out of which 30 items only made up the 99 % of the expenditure in the overall cost however 70% of the cost was incurred on 8 items and the balance 30% cost was made up by 22items. The details are at Annx B.

11.4 Selection of items for further analysis- The process of further selection of items for carrying out analysis was based on selecting 10 items out of the total 94 items which would represent the housekeeping consumables fairly both in terms of volume/quantity and cost incurred. The top 10 items which would form part of further analysis were selected from the items which had greater/higher representation in both the VED and ABC analysis, this was done to have only those items which had a major share in quantity and as well budget of housekeepingconsumables. The total cost of these items was Rs 6,09,990 and the percentage share of these items was 81.16%

11.5 Comparison of selected items with monthly patient flow- The selected items of consumables were put through comparison with the monthly patient inflow in the hospital from Apr 2013 to Jan 2014 as was the data available for monthly consumable usage for the same period. The details of the patients comprised of sum total of OPD patients, repeat OPD patients and IPD patients details of which are as at Appx C. The items which were included in the comparative analysis are as below:-

- Bio Bag Black (18x18)
- Bio Bag Black (29x36)
- Phenyl White
- Bio Bag Yellow (18x18)
- Bio Bag Yellow (29x36)

- Sodium Hypochlorite
- Bio Bag Red (29x36)
- Bio Bag Red (18x18)
- Bio Bag Blue (18x18)
- Room Freshener

11.6 The item wise comparison with patient flow of the above is as follows:-

11.6.1 **Bio Bag Black (18x18)**- This is a consumable which was extensively used for hospital waste disposal and this particular size was mostly used in patient rooms, lab, OT, investigation room, and almost all areas which were small and waste collection was not amounting to large quantity. As per volume 1450 units of the same were consumed during the period of study and their monthly consumption is as given out in Fig-11.1 and the percentage share of the total consumable cost was 20.63% of overall cost of housekeeping consumables. The change in demand of Bio Bag Black is corresponding to the change in flow of patients as can be seen in Fig-11.2.

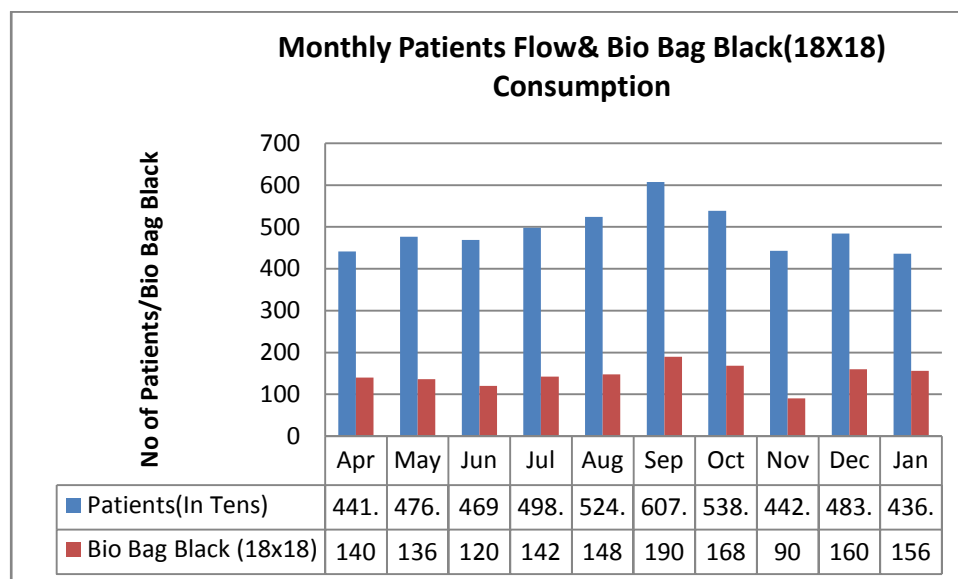


Fig-11.1 Monthly Patients Flow and Bio Bag Black(18X18) Consumption

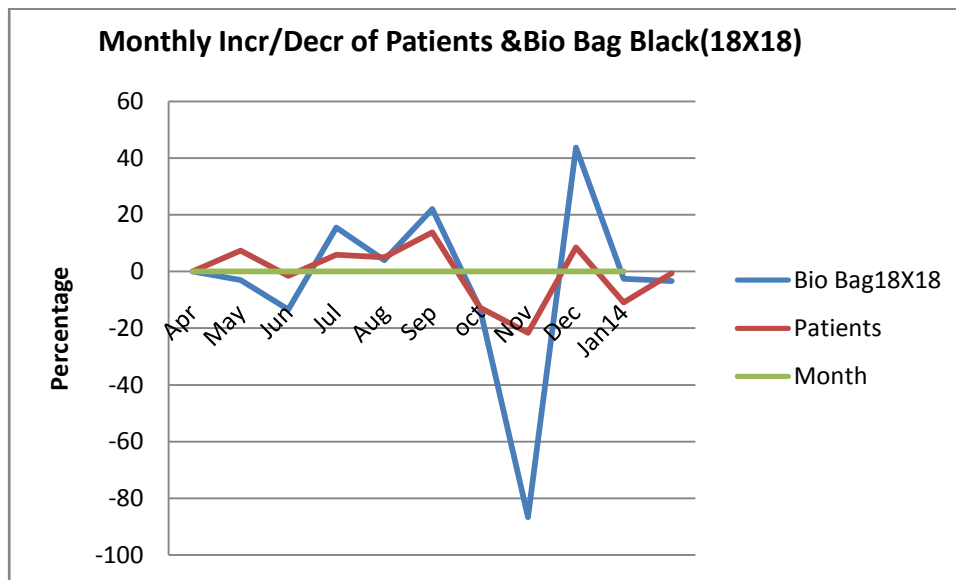


Fig-11.2 Monthly Percentage Increase/Decrease of Patients and Bio Bag Black(18X18)

11.6.2 **Bio Bag Black (29x36)**-This is a consumable which was extensively used for hospital waste disposal and this particular size was mostly used for areas which generated large quantity of hospital waste. As per volume 1296 units of the same were consumed during the period of study and their monthly consumption is as given out in Fig-11.3 and the percentage share of the total consumable cost was 17.34% of overall cost of housekeeping consumables. The change in demand of Bio Bag Black in comparison to the change in flow of patients as can be seen in Fig-11.4.

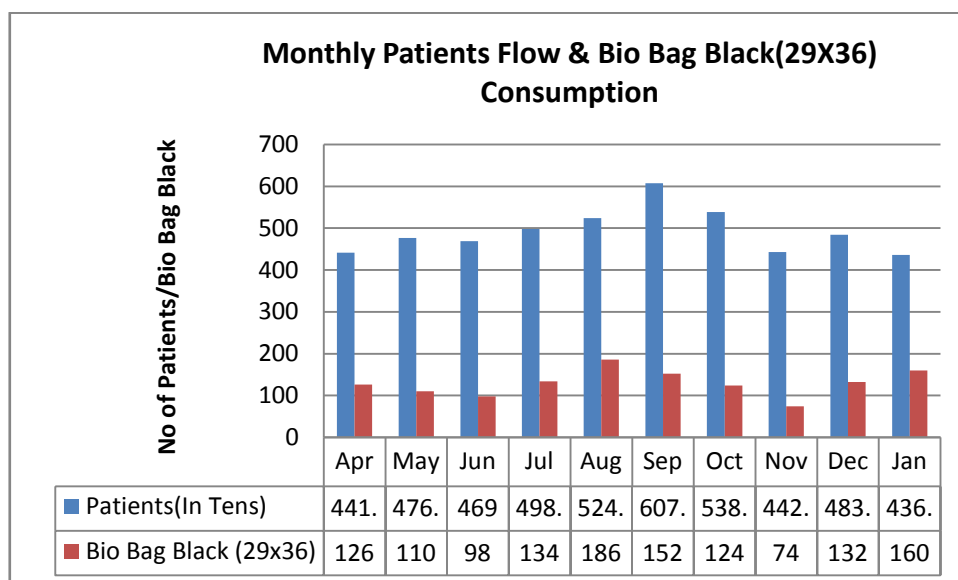


Fig-11.3 Monthly Patients Flow and Bio Bag Black(29X36) Consumption

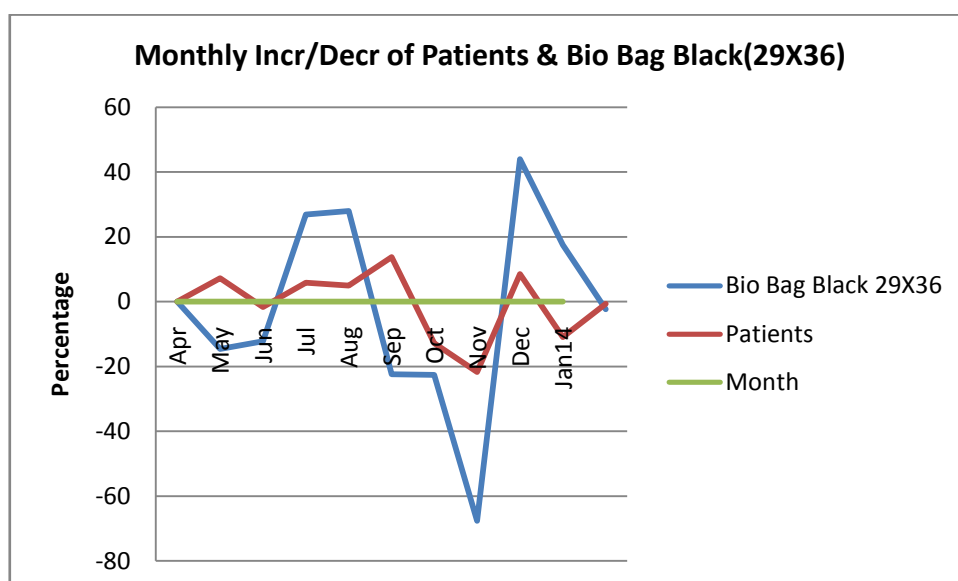


Fig-11.4 Monthly Percentage Increase/Decrease of Patients and Bio Bag Black(29X36)

11.6.3 Phenyl White-This is a consumable which was extensively used for cleaning and as disinfectant throughout the hospital for wet mopping of the floor. As per volume 4235 ltrs of the same were consumed during the period of study and their monthly consumption is as given out in Fig-11.5 and the percentage share of the total consumable cost was 7.08% of overall cost of housekeeping consumables. The change

in demand of Phenyl in comparison to the change in flow of patients as can be seen in Fig-11.6.

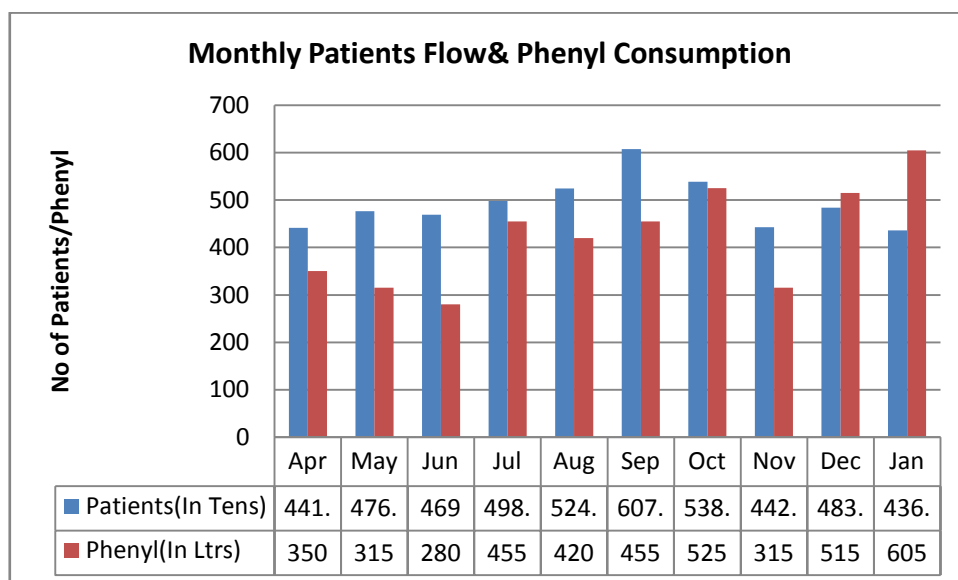


Fig-11.5 Monthly Patients Flow and Phenyl Consumption

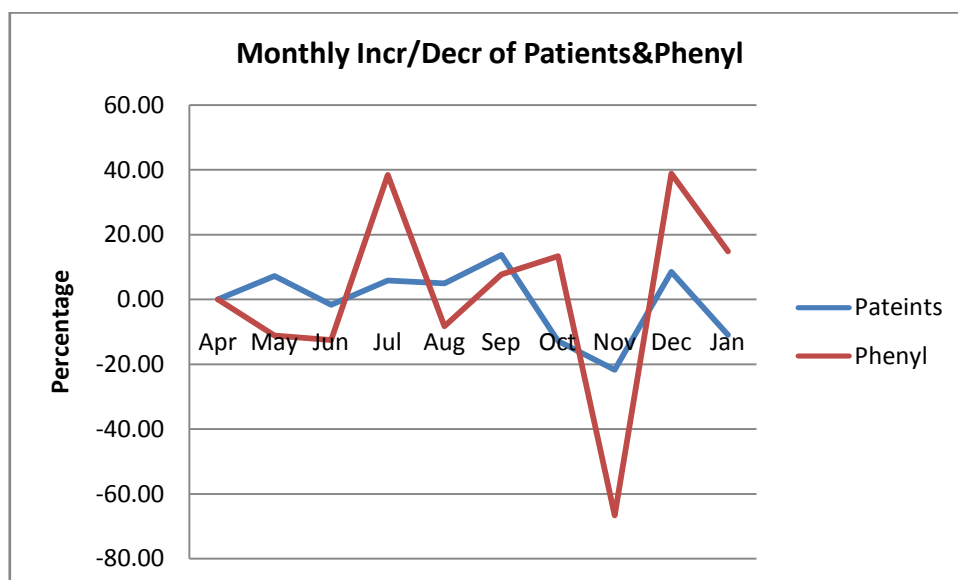


Fig-11.6 Monthly Percentage Increase/Decrease of Patients and Phenyl

11.6.4 Bio Bag Yellow (18x18)-This is a consumable which was extensively used for hospital bio medical waste disposal and this particular size was mostly used in lab, OT, blood bank, investigation room and waste collection was not amounting to large quantity. As per Nos471 units of the same were consumed during the period of

study and their monthly consumption is as given out in Fig-11.7 and the percentage share of the total consumable cost was 7.03% of overall cost of consumables. The change in demand of Bio Bag Yellow is corresponding to the change in flow of patients as can be seen in Fig-11.8.

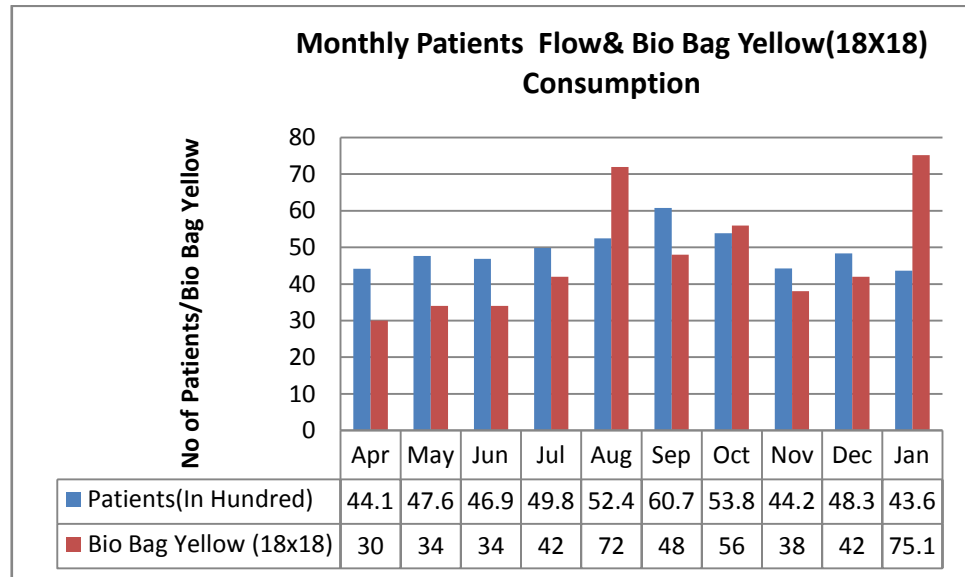


Fig-11.7 Monthly Patients Flow and Bio Bag Yellow(18X18) Consumption

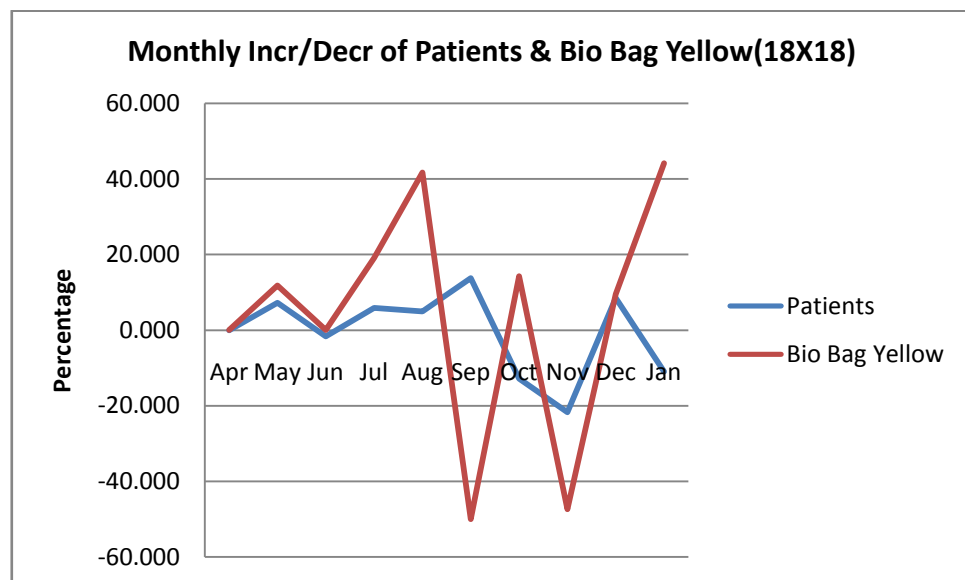


Fig-11.8 Monthly Percentage Increase/Decrease of Patients and Bio Bag Yellow(18X18)

11.6.5 **Bio Bag Yellow (29x36)**-This is a consumable which was extensively used for hospital for bio medical waste disposal and this particular size was mostly used in lab and OT where waste collection are amounting to large quantity. As per volume 394 units of the same were consumed during the period of study and their monthly consumption is as given out in Fig-11.9 and the percentage share of the total consumable cost was 5.89% of overall cost of consumables. The change in demand of Bio Bag Yellow in comparison to the change in flow of patients as can be seen in Fig-11.10.

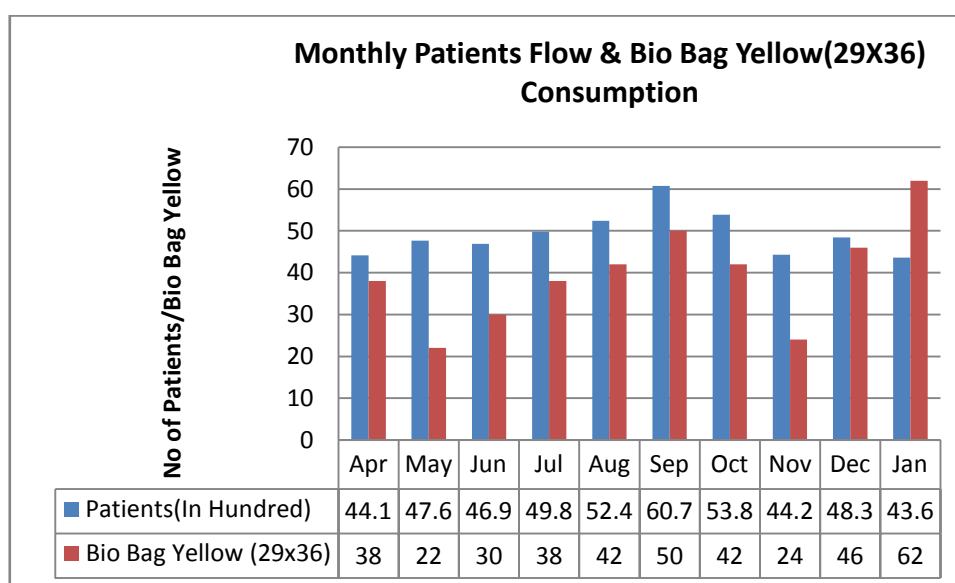


Fig-11.9 Monthly Patients Flow and Bio Bag Yellow(18X18) Consumption

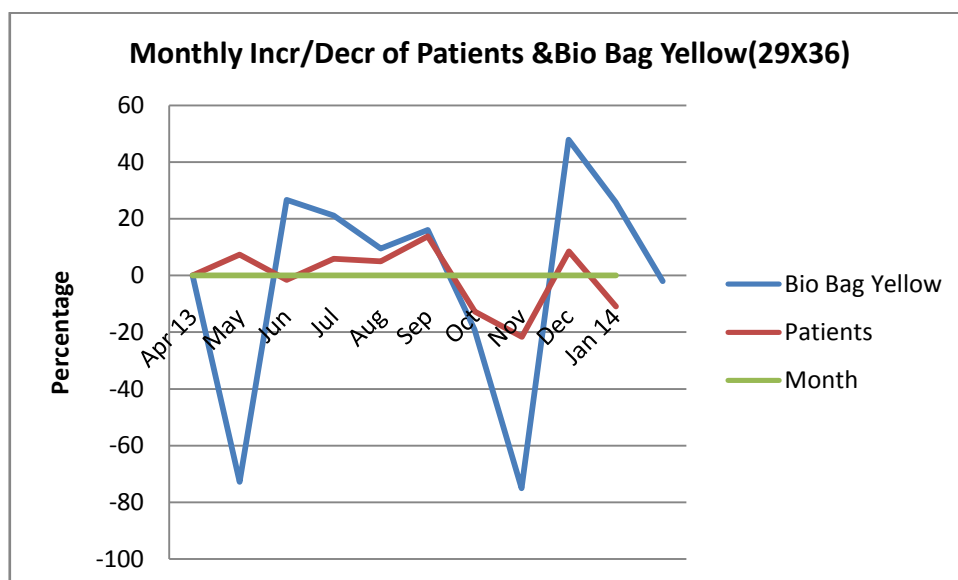


Fig-11.10 Monthly Percentage Increase/Decrease of Patients and Bio Bag Yellow(29X36)

11.6.6 Sodium Hypochlorite -This is a consumable which was extensively used in hospital for disinfecting and wet mopping of floor in OT, investigation room, and almost all areas which require strict infection control. As per volume 3900 units of the same were consumed during the period of study and their monthly consumption is as given out in Fig-11.11 and the percentage share of the total consumable cost was 5.88% of overall cost of consumables. The change in demand of Sodium Hypochlorite is influenced by the change in flow of patients as can be seen in Fig-11.12.

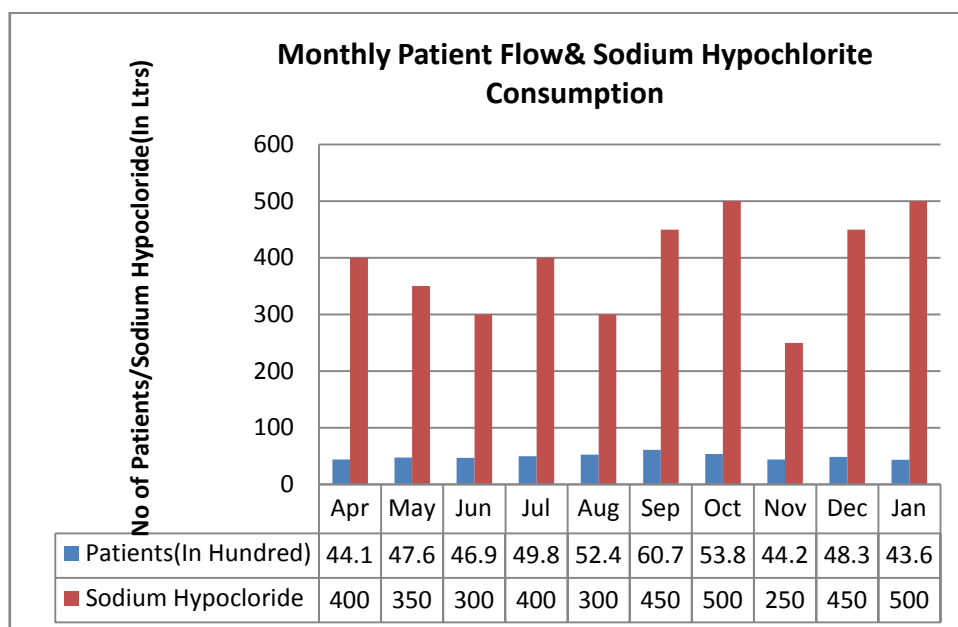


Fig-11.11 Monthly Patients Flow and Sodium Hypochlorite Consumption

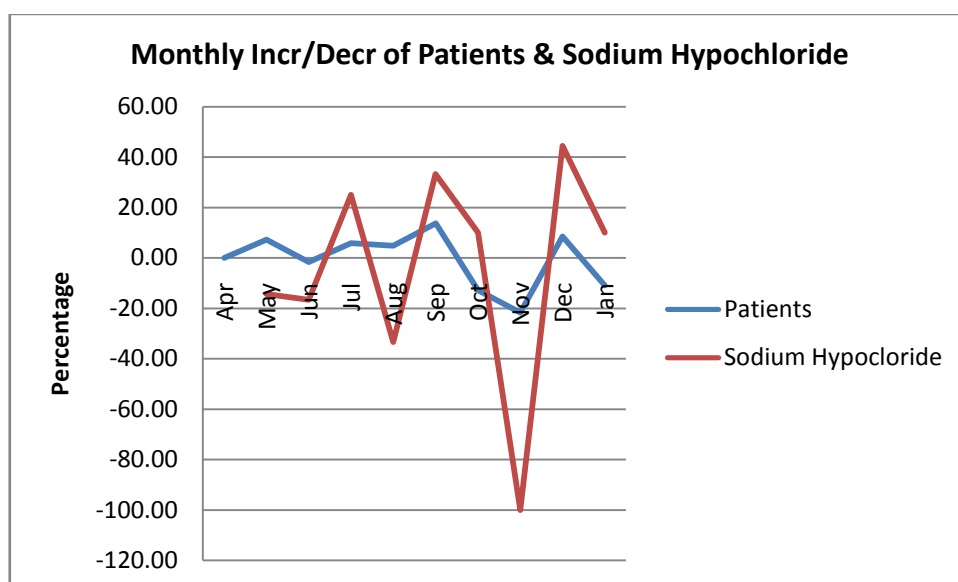


Fig-11.12 Monthly Percentage Increase/Decrease of Patients and Sodium Hypochlorite

11.6.7 Bio Bag Red (29x36)-This is a consumable which was extensively used for hospital waste disposal and this particular size was mostly used in lab, OT, investigation room, pharmacy, drug store and waste collection amounting to large

quantity. As per volume 427 units of the same were consumed during the period of study and their monthly consumption is as given out in Fig-11.13 and the percentage share of the total consumable cost was 5.38% of overall cost of consumables. The change in demand of Bio Bag Red was influenced by the change in flow of patients as can be seen in Fig-11.14.

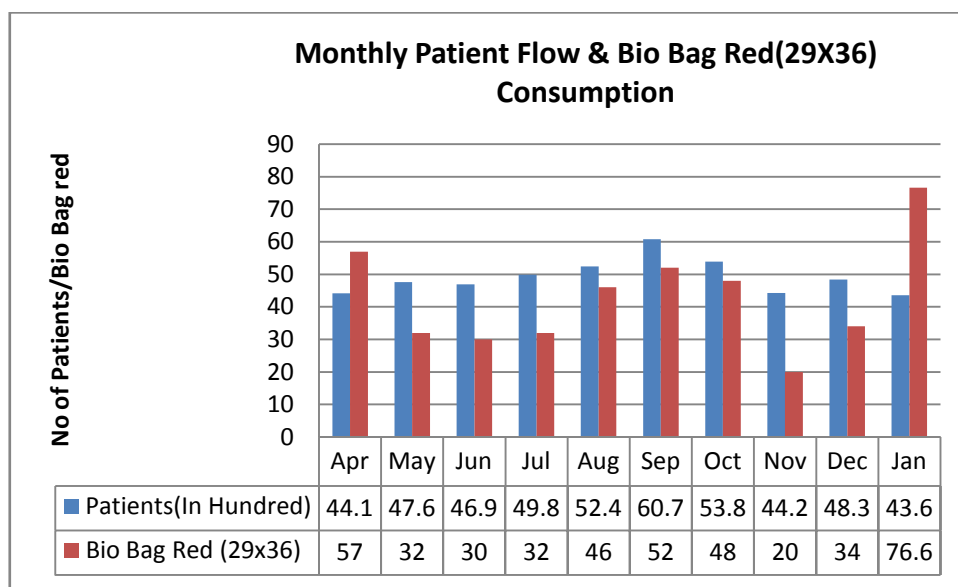


Fig-11.13 Monthly Patients Flow and Bio Bag Red(29X36) Consumption

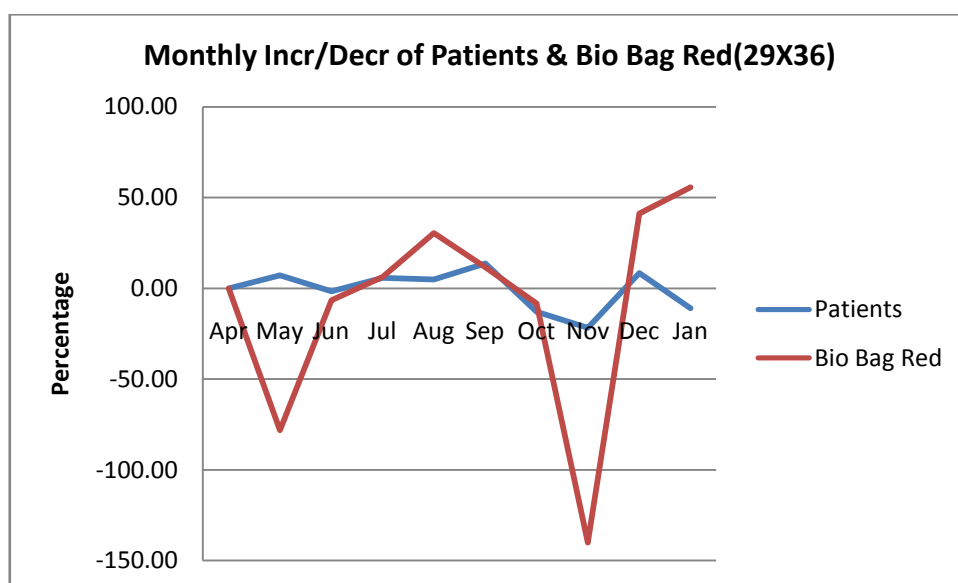


Fig-11.14 Monthly Percentage Increase/Decrease of Patients and Bio Bag Red(29X36)

11.6.8 **Bio Bag Red (18x18)**-This is a consumable which was extensively used for hospital bio medical waste disposal and this particular size was mostly used in lab, investigation room, and nursing stations where waste collection was not amounting to large quantity. As per volume 283 units of the same were consumed during the period of study and their monthly consumption is as given out in Fig-11.15 and the percentage share of the total consumable cost was 4.43% of overall cost of consumables. The change in demand of Bio Bag Red was influenced by the change in flow of patients as can be seen in Fig-11.16.

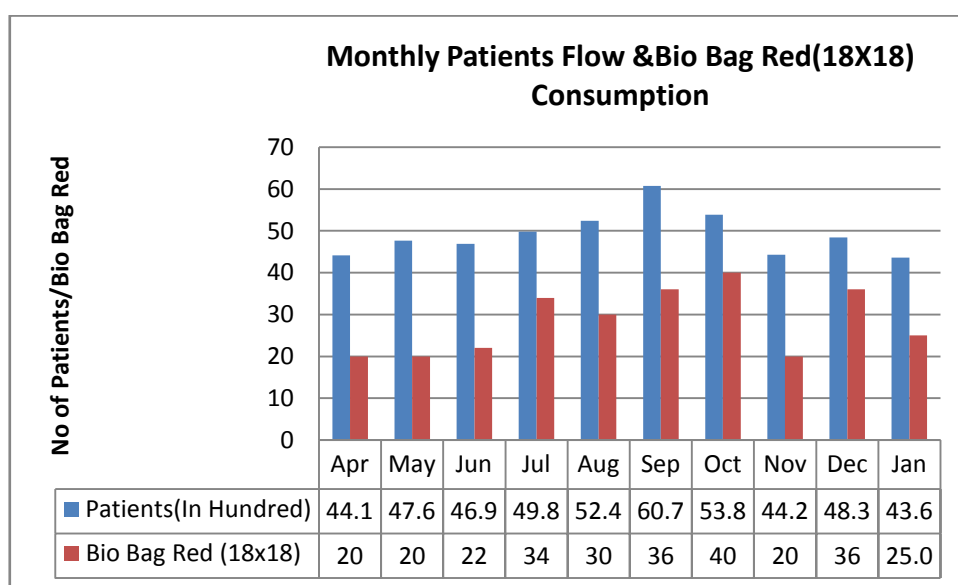


Fig-11.15 Monthly Patients Flow and Bio Bag Red(29X36) Consumption

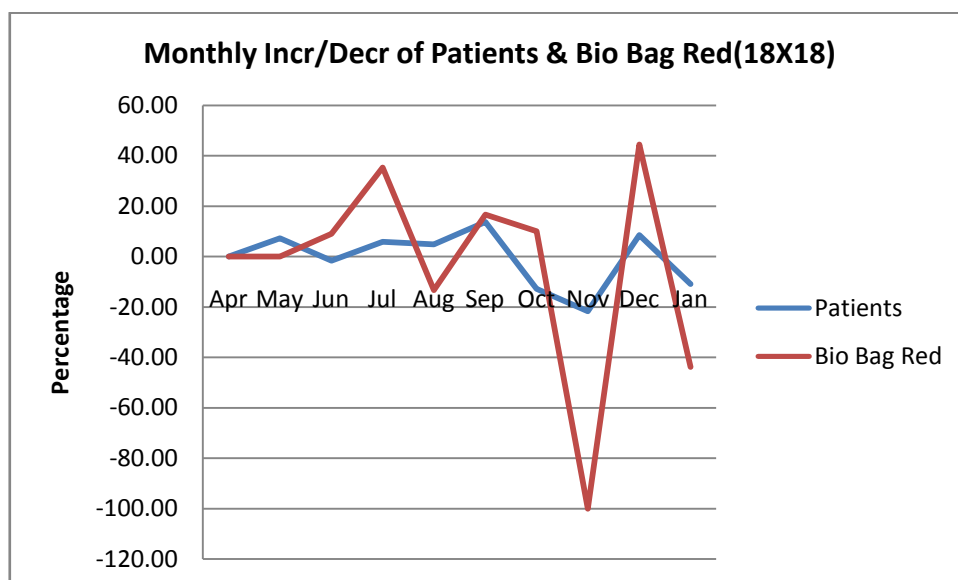


Fig-11.16 Monthly Percentage Increase/Decrease of Patients and Bio Bag Red(18X18)

11.6.9 **Bio Bag Blue (18x18)**-This is a consumable which was extensively used for hospital waste disposal and this particular size was mostly used in patient rooms, lab, OT, investigation room, and almost all areas which were small and waste collection was not amounting to large quantity. As per volume 114 units of the same were consumed during the period of study and their monthly consumption is as given out in Fig-11.17 and the percentage share of the total consumable cost was 4.32% of overall cost of consumables. The change in demand of Bio Bag Blue was influenced by the change in flow of patients as can be seen in Fig-11.18.

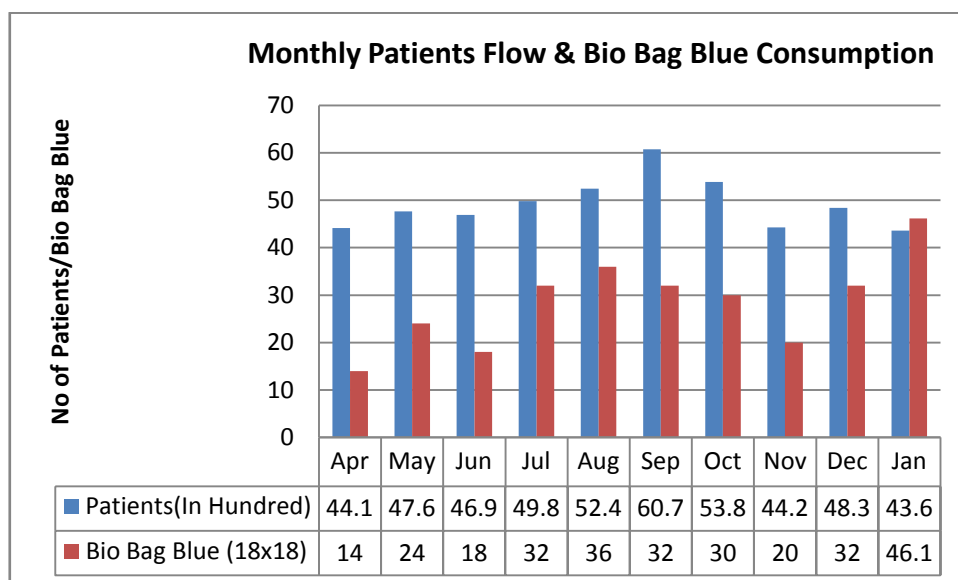


Fig-11.17 Monthly Patients Flow and Bio Bag Blue(18X18) Consumption

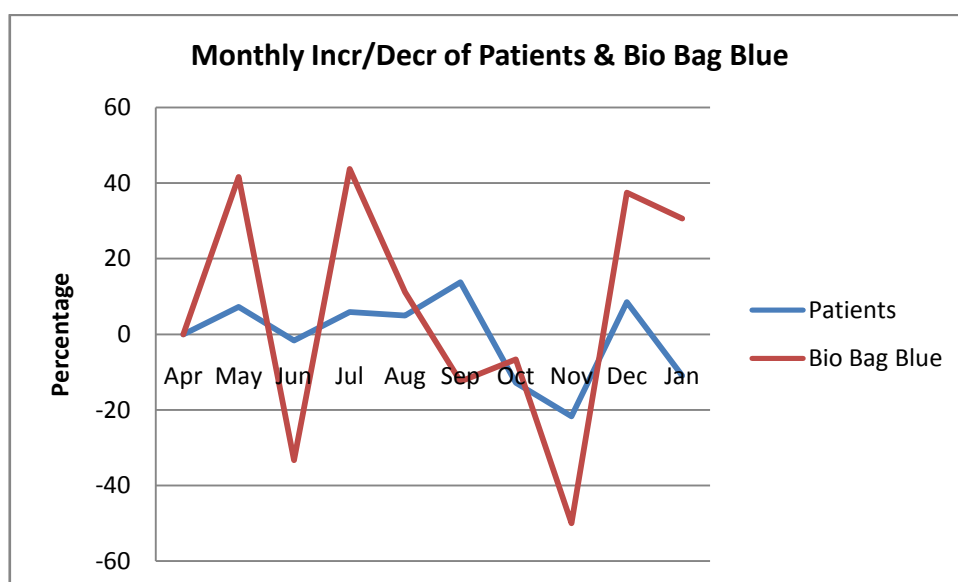


Fig-11.18 Monthly Percentage Increase/Decrease of Patients and Bio Bag Blue(18X18)

11.6.10Room Freshener-This is a consumable which was mainly used in areas which were frequented by both patients and hospital staff which was primarily in patient's room, waiting areas, toilets common utilities etc. As per volume 170 units of the same were consumed during the period of study and their monthly consumption is as given out in Fig-11.19 and the percentage share of the total consumable cost was

3.18% of overall cost of housekeeping consumables. The change in demand of Room Freshener was influenced by the change in flow of patients as can be seen in Fig-11.20.

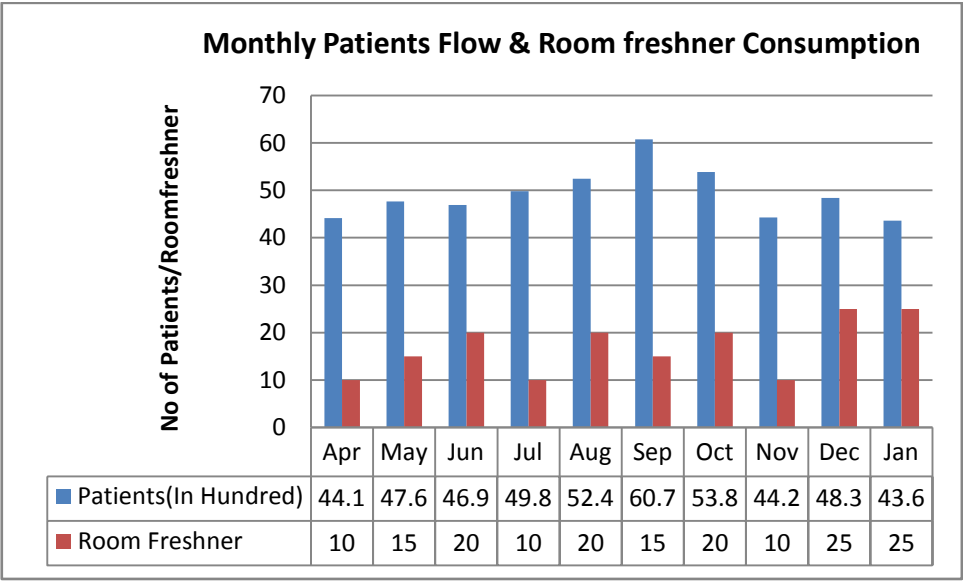


Fig-11.19 Monthly Patients Flow and Room Freshener Consumption

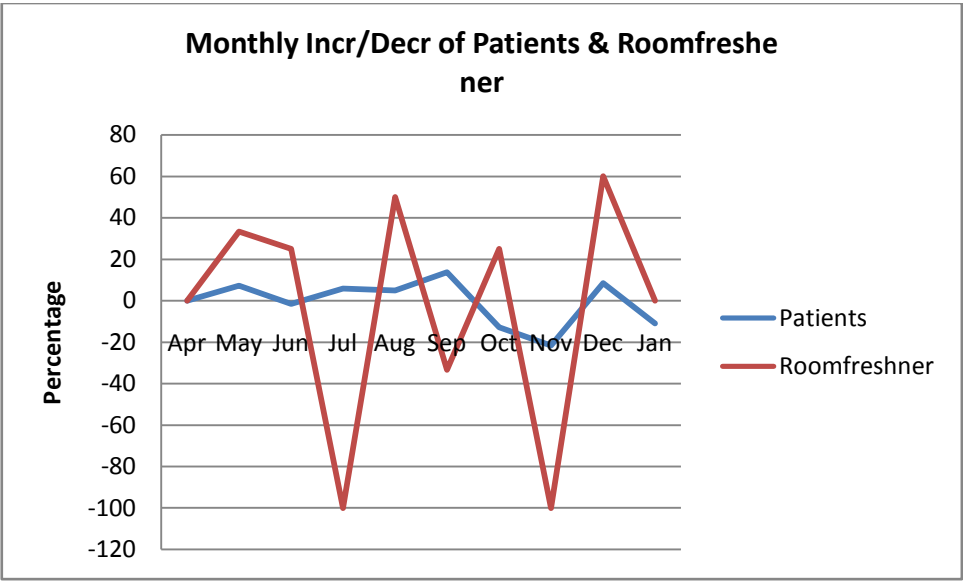


Fig-11.20 Monthly Percentage Increase/Decrease of Patients and Room Freshener

12 - CORELATION ANALYSIS

12.1 The correlation is one of the most common and most useful statistics. A correlation is a single number that describes the degree of relationship between two variables. It is a statistical technique that can show whether and how strongly pairs of variables are related. An intelligent correlation analysis can lead to a greater understanding of your data.

12.2 There are several different correlation techniques however the most common type is the Pearson or product-moment correlation. The main result of a correlation is called the correlation coefficient (or "r"). It ranges from -1.0 to +1.0. The closer r is to +1 or -1, the more closely the two variables are related. If r is close to 0, it means there is no relationship between the variables. If r is positive, it means that as one variable gets larger the other gets larger. If r is negative it means that as one gets larger, the other gets smaller (often called an "inverse" correlation).

12.3 Significance

12.3.1 A statistically significant finding is one that is determined (statistically) to be very unlikely to happen by chance. Statisticians are able to calculate the likelihood that any observed relationship between two variables (as indicated by any number of cases) could have happened by chance (or random variation). If it is calculated that there is less than a one in twenty chance (.05 or 5%) that the observed relationship could have happened by chance, the findings are designated as significant. If there is less than one out of one hundred chance (.01 or 1%), they are designated as highly significant. Significance is influenced by the number of cases in a sample, and the observed range (difference) of the sample.

12.3.2 The overall correlation of the item variable with that of patient variable was positive as can be seen in Figure wherein BB Black (18X18) and BB red (18X18) have shown a very strong correlation, BB Black(29X36) has shown strong correlation, Phenyl, BB Yellow (18X18),BB Yellow (29X36), Sodium Hypochlorite and BB Blue (18X18) have shown a weak correlation, BB Red (29X36) and Room Freshener have shown no/negligible correlation. The value of calculated correlation coefficient was greater than tabulated value of 5% level of significance in two cases whereas in balance other cases it was strong positive and no/ negligible in two cases therefore there is a strong positive correlation between the two variables.

Correlation and Significance between Patients and Consumable Items

Item	Quantity	Pearson Correlation	Strength of Correlation	Significance
Bio Bag Black (18x18)	1450	0.712	Very strong +	Significant
Bio Bag Black (29x36)	1296	0.419	Strong+	
Phenyl White	4235	0.226	Weak +	
Bio Bag Yellow (18x18)	471.17	0.207	Weak +	
Bio Bag Yellow (29x36)	394	0.249	Weak +	
Sodium Hypochloride	3900	0.279	Weak +	
Bio Bag Red (29x36)	427.61	0.05	No/negligible	
Bio Bag Red (18x18)	283.03	0.735	Very strong +	Significant
Bio Bag Blue (18x18)	284.14	0.259	Weak +	
Room Freshener	170	0.038	No/negligible	

Table-12.1 Correlation Analysis of Consumable Items

13 - LIMITATION

- The very first limitation of the study started with the change in the management of the hospital from Soni Group to Manipal Group in the mid of Feb 2014, due to this change the data was not readily available with the new management and was obtained from the old records which were not available with new management therefore the study period was also restricted within the period of Apr 2013 to Jan 2014.
- The data pertains to monthly usage where stores were drawn on any day of the month which could fall on any day since there was no fixed issue dates.
- The quantity of stores issued were not based on any standards fixed but were issued based on the demand generated by the housekeeping cell or the user.
- Lack of documentation at the user level was not able to give out the precise usage of housekeeping stores.
- The factor of non-availability of store or in short supply has not been taken into consideration.

14 - RECOMMENDATION

- There is ample scope of improvement in the existing issue procedure of housekeeping consumable stores, the same if linked to patient flow would result in savings in terms of procurement cost but also help in better inventory management.
- Setting up standards for use of different type of stores like floor area to be covered by a ltr of phenyl or sodium hypochlorite, no of tissues to be issued/used per patient, no of waste bags to be issued per room, hand wash

usage based on per patient or no of employees employed/using the facility for all possible stores.

- HMIS based issue of stores from procurement till the end usage would result in optimal utilization and accounting of the housekeeping stores.
- A large no of stores have significant or strong linkage with patient flow for which a detailed prospective study to can be carried out to find out association of high value stores with patient and accordingly set their scales of issue.

15 - CONCLUSION

The endeavour of today's manager is to optimize all available resources within the organization and delivering the best of the services to the client and with this aim he tries to look at all possible gaps which could be bridged so as to achieve zero error or zero gap situation which is quite impossible in a hospital environment and would require a six sigma type of work culture. The situation which are visible in health care scenario are quite different then the manufacturing sector. Here the end product is the life of a human being which has to be restored to the best possible level within the given resources therefore the scope of applying scientific management practices are acceptable to a limit as far as clinical aspects are concerned however there is lot of scope of utilizing them in the non-clinical aspects of hospital administration.

Scientific analysis of the existing procedure would surely result in closing existing gaps and increase optimal utilization of resources thus saving cost and also inculcating the habit of accounting and judicious use of resources. This would further save lot of time for the managers spent in assessing the requirement for future since these could now be linked to the patient flow and the demands can be automatically generated by the HIMS.

Considering the facts which have emerged out of the study it is amply clear that issue procedure of stores in isolation is neither scientific nor cost effective way of managing such inventory and management should look into all such areas where this kind of scientific analysis could yield better results

LIST OF HOUSEKEEPING CONSUMABLES AND QUANTITY ISSUED**FROM APR 2013 TO JAN 2014**

S No	Item	Quantity (In No/Kg/Ltr)
1	Phenyl White	4235
2	Sodium Hypochlorite 12%	3900
3	Bio Bag Black (18x18)	1450
4	Bio Bag Black (29x36)	1296
5	Attendance Card (Yellow)	930
6	Attendance Card (Blue)	480
7	Scotch Brite	472
8	Bio Bag Yellow (18x18)	471.17
9	Bio Bag Red (29x36)	427.61
10	Bio Bag Yellow (29x36)	394
11	Acid	360
12	Duster	348
13	Odonil	312
14	Bio Bag Blue (18x18)	284.14
15	Bio Bag Red (18x18)	283.03
16	Nirma Powder	274
17	Mop	263
18	Bio Bag Blue (29x36)	222
19	Window Shine	200
20	Room Freshener	170
21	All Clean	160
22	Handle Mop Refill	149
23	Harpik 500ml	131
24	Vim Powder	125
25	Germ Free	105
26	PanniJadhu	102
27	White Chart Paper	99
28	Scraber Plastic	89
29	Oswal Soap	83
30	Superlime	80
31	PhoolJhadu	65
32	Lifebuoy Soap	64
33	Room Freshener Bottle (Empty)	64
34	Urinal Cube	58
35	Handle Mop Comp.Set	53
36	Bleaching Powder	50

37	Wiper	46
38	Thread Ordinary(Hk)	44
39	KurtaPayajama (Grey Strip)	39
40	Seek Jahdu	37
41	Pillow Cover White	36
42	Napkin Towel White	35
43	Housekeeping Gloves	34
44	Toilet Honckey Brush	33
45	Dry Mop Refill	27
46	Dry Mop Comp.Set Big	26
47	Wooden Brush Small	25
48	Feather Brush	21
49	Naphthalene Ball	21
50	Apron Disposable	18
51	Plastic Mug	17
52	Dustpan	16
53	Glass Wiper Rubber	15
54	Sun (Jute)	15
55	Wooden Soft Brush (Carpet)	15
56	Dustbin (Paddle)	13
57	Small Pad	12
58	White Board Marker	11
59	Wiper Rod	11
60	Glass Wiper Cloth	10
61	Toilet Chock Remover	9
62	Door Mat 1.5X2	8
63	Scrubber Iron	8
64	Handle Mop Rod	7
65	Urine Container	7
66	Dustbin Small	6
67	Toilet Brush Round	6
68	Blanket Cover White	5
69	Fevi Quick Small	5
70	Flower Pot Plate	5
71	Lock 35mm	4
72	Lock 50mm	3
73	Note Pad No.8	3
74	Urine Bag	3
75	Cello Tape 1"	2
76	Issue Slip Book	2
77	Remote Cell	2
78	Soap Dispenser (Plastic)	2
79	Cobra File No.500	1
80	Food Coupon	1
81	Gum Boot	1

82	Plastic Bucket	1
83	Plastic Scale 12"	1
84	Register Page No.120	1
85	Valve Assy E500	1
86	Water Test Kit	1
87	White Fluid	1
88	Alum	0.5
89	Nara	0.5
90	NilaThotha	0.25
91	Hose Pipe	0
92	Opening Stock	0
93	Plastic Tray Med.(Tea)	0
94	Suction Hose E6050	0

ABC ANALYSIS OF SELECTED CONSUMABLES

S No	Item	Quantity	Unit Cost(Rs)	Total Cost(Rs)	Cum Cost(Rs)	Cum %	Item %
1	Bio Bag Black (18x18)	1450	106.93	155048.5	155048.5	20.63	20.63
2	Bio Bag Black (29x36)	1296	100.59	130364.64	285413.1	37.98	17.35
3	Phenyl White	4235	12.57	53233.95	338647.1	45.06	7.08
	Bio Bag Yellow						
4	(18x18)	471.17	112.12	52827.5804	391474.7	52.09	7.03
	Bio Bag Yellow						
5	(29x36)	394	112.32	44254.08	435728.8	57.98	5.89
6	Sodium Hypochlorite	3900	11.33	44187	479915.8	63.86	5.88
7	Bio Bag Red (29x36)	427.61	94.49	40404.8689	520320.6	69.23	5.38
8	Bio Bag Red (18x18)	283.03	117.54	33267.3462	553588	73.66	4.43
9	Bio Bag Blue (18x18)	284.14	114.28	32471.5192	586059.5	77.98	4.32
10	Room Freshener	170	140.77	23930.9	609990.4	81.16	3.18
11	Bio Bag Blue (29x36)	222	107.67	23902.74	633893.1	84.34	3.18
12	Window Shine	200	59.25	11850	645743.1	85.92	1.58
13	Germ Free	105	98	10290	656033.1	87.29	1.37
14	Handle Mop Comp.Set	53	171.49	9088.97	665122.1	88.50	1.21
15	All Clean	160	55.63	8900.8	674022.9	89.68	1.18
16	Handle Mop Refill	149	54.74	8156.26	682179.2	90.77	1.09
17	Superlime	80	100	8000	690179.2	91.83	1.06
18	Odonil	312	23.61	7366.32	697545.5	92.81	0.98
19	Nirma Powder	274	26.16	7167.84	704713.3	93.77	0.95
20	KurtaPayajama (Grey)	39	173.39	6762.21	711475.5	94.67	0.90
21	Harpik 500ml	131	44.1	5777.1	717252.6	95.43	0.77
22	PanniJadhu	102	47.89	4884.78	722137.4	96.08	0.65
23	ScochBrite	472	9.66	4559.52	726696.9	96.69	0.61
24	Acid	360	10.5	3780	730476.9	97.19	0.50
25	Urinal Cube	58	61.14	3546.12	734023	97.67	0.47
26	Wiper	46	60	2760	736783	98.03	0.37

27	Mop	263	8.25	2169.75	738952.8	98.32	0.29
28	Vim Powder	125	16.57	2071.25	741024	98.60	0.28
29	Duster	348	5.05	1757.4	742781.4	98.83	0.23
30	Seek Jahdu	37	44	1628	744409.4	99.05	0.22
31	Room Freshener Bottle	64	25	1600	746009.4	99.26	0.21
32	PhoolJhadu	65	20.36	1323.4	747332.8	99.44	0.18
33	Lifebuoy Soap	64	13.41	858.24	748191.1	99.55	0.11
34	Bleaching Powder	50	16	800	748991.1	99.66	0.11
35	Oswal Soap	83	9.38	778.54	749769.6	99.76	0.10
36	Attendance Card (Y)	930	0.78	725.4	750495	99.86	0.10
37	Attendance Card(Blue)	480	0.78	374.4	750869.4	99.91	0.05
38	Scraber Plastic	89	3	267	751136.4	99.94	0.04
39	Thread Ordinary(Hk)	44	3	132	751268.4	99.96	0.02
40	White Chart Paper	99	3	297	751565.4	100.00	0.04

IPD/OPD STATE FROM APR 2013 TO JAN 2014

Year/Month	IP Admission	OP New	OP Review	Total Patients
2013				
Apr	771	1423	2224	4418
May	891	1696	2178	4765
Jun	859	1731	2100	4690
Jul	880	1844	2260	4984
Aug	980	1787	2475	5242
Sep	1096	2245	2737	6078
Oct	958	1945	2485	5388
Nov	868	1425	2135	4428
Dec	893	1582	2364	4839
2014				
Jan	810	1381	2171	4362
Grand Total	9006	17059	23129	49194

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