Study on Process Mapping and Purchase Planning of Medical Equipment

By

Ishita Shah

Dissertation submitted for the partial fulfillment of the

MBA Hospital and Health Management

Academic year, 2016-2018

The IIHMR University, Jaipur

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INSTITUTE OF HEALTH MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

IIHMR UNIVERSITY

TO WHOMSOEVER MAY CONCERN

This is to certify that ***Ms. Ishita Shah*** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at GMERS General Hospital, Gandhinagar, Gujarat from 5th February 2018 to 4th May 2018.

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 his future endeavors.

Col (Dr) Ashok Kaushik
Dean, Academics and Student Affairs
The IIHMR University, Jaipur

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5861

No./GMERS/MCH/CERTI/AHA-0056/ /2018

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Tel: 079-23221913, 23221931, 32
Email: ms.gmers.gandhinagar@gmail.com

To Whomsoever It May Concern

The certificate is awarded to

Shah Ishita Ashwinkumar

In recognition of having successfully completed his

Internship in the department of

Biomedical Engineering

and has successfully completed his Project on

A study on Process Mapping and Purchase Planning of Medical Equipment

Duration of Study - 5th February to 05thMay 2018

GMERS General Hospital, Gandhinagar

Medical superintendent
GMERS Medical College attached
General Hospital, Gandhinagar

Date: 11/05/2018.
Place: Gandhinagar

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled A Study on Process Mapping and Purchase Planning of the Medical Equipment and submitted by Ishita Ashwinkumar Shah Enrollment No. MBA/HM-21/0426under the supervision of Dr. Ruchi Garg for award of MBA in Hospital and Health Management in Health and Hospitals of the University carried out during the period from 5th February to 5th May 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

Abstract

Earlier medical equipments were in low demand and very low volumes. There were very few people buying equipment within the organization, which made its procurement more easily managed. The purchasing of medical equipment had less impact and was therefore much less important than nursing and medical care. At that time, it was logical for Hospital managers to allow those people using medical devices have the authority, against an agreed budget, to choose and buy it.

Nowadays procurement of medical equipment is one of the most imperative works in hospital. It can expand the working proficiency to hold the key of medical equipment acquisition from 4 perspectives including the science of decision-making, the confirmability of bidding, invitation the right choice of the way of bidding, etc.So, some importantmedical equipment procurement processes are analyzed and discussed and some points for attention are raised.

In the government, procurement method occurs in three distinctive ways like emergency purchase, local purchase and GMSCL through purchase. Each purchase method has its own optimal process and its optimal time. In this purchase process from demand to installation there are many hurdles like site issues, person unavailability, communication gap and many more. Due to these hurdles, procurement delay happens thus increases more workload on the hospital staff and creates issues with the patient's treatment. To overcome these barriers some suggestions are given for improving the purchase process.

Acknowledgements:

The satiation and euphoria that accompany the successful completion of the project would be incomplete without the mention of the people who made it possible.

With immense pleasure, I express my heartful gratitude to the Chairman of IIHMR Jaipur and my mentor Dr.S.D.Gupta and Dean, Col.Ashok Kaushik for having giving me this opportunity to undergo internship.

I am extremely indebted to all the professionals at GMERS General Hospital, Gandhinagar for sharing generously their knowledge and precious time which inspired me to do best during my internship. I owe a great debt to Dr. Gaurav Dahiya, MD of NHM Gujarat for providing me an opportunity to do my internship here, at GMERS General Hospitals, Gandhinagar. I would like to thank Dr. Bipin Nayak, Medical Superintendent, mentor for the internship in GMERS General Hospital, without whose help it would not have been possible for me to understand the hospital to the extent as I have now.

I am also grateful to all the department heads and staffs for giving me time in spite of their hectic schedule. Without their active cooperation and participation, it would not have been possible to accomplish my task.

I am highly obliged to my mentor at The IIHMR University, Dr. Ruchi Garg for helping me from the beginning of this project throughout and till its completion, guiding me at every step. Thank you so much Ma'am.

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LIST OF FIGURES

ABBREVIATIONS

GMERS-Gujarat Medical Education Research Society

ECG- Electro Cardio Gram

ICU- Intensive Care Unit

GMSCL- Gujarat Medical Society Corporation Limited

OT- Operation Theatre

AT- Acceptance Tender

AO- Acceptance Order

AO- Account Officer

PO- Purchase Order

AMC- Annual Maintenance Contract

CMC- Comprehensive Maintenance Contract

ABOUT THE HOSPITAL

GMERS medical college attached General Hospital, Gandhinagar is 850 bedded hospital among them 650 is teaching beds while 200 beds are non-teaching. General Hospital, Gandhinagar is a Government District Hospital providing services to all irrespective of caste, creed or economic status. Being a Government hospital, its main objective of the hospital is to provide holistic healthcare services-preventive, promotive, curative and rehabilitative-under the allopathic system.

Vision: To be the network of The Best public healthcare institutions in the state of Gujarat, providing quality medical care services with the state of art technology with easy accessibility, affordability and equity to the people of Gujarat and beyond.

Mission: To serve the community needs, particularly the disadvantaged and unprivileged people, the GMERS Medical College attached Hospital shall actively partner with all Stakeholders, to impart education, offer scientific and bring about innovations in healthcare delivery to all those who need it the most.

Hospital providing following specialities:

- General Medicine
- Obstetrics &Gynaecology
- Paediatrics
- Orthopaedics
- Ophthalmology
- Dentistry
- General Surgery
- Dermatology
- Otorhinolaryngology
- Psychology
- Radiology
- Pathology Laboratory

The above services are provided on both Indoor and Outdoor basis as per the timings fixed by the Hospital. Emergency Services for basic specialties are available round the clock all 365 days to all patients irrespective of their place of residence, paying capacity etc.Medico legal cases are accepted round the clock and post mortem examination performed as and when necessary. Hospital having 70% Occupancy rate.

For Quality there are some programs run in the district hospitals like NQAS, NABH, LaQshya and Kayakalp under State Quality Improvement Program. In LaQshya program GMERS Gandhinagar hospital covers first rank in all our India. GMERS Gandhinagar is very finest hospital for maternal health.

Hospital also runs some of the government programs which are covering unprivileged people like JSSK, MAA yojana, AFHS (Adolescence Friendly Health Services Centre), RSBY project, RNTCP (Revised National Tuberculosis Control Program), NVBDCP (National Vector Borne Disease Control Programme), immunization, IDSP (Integrated Disease Surveillance Project) and SNCU.

GMERS Hospital provides auxiliary services like Dietary services (only for patients), Theatre Sterile and Supplies Department, Hospital Laundry & Linen Management, Stores (General, Medical), Mortuary and Post mortem room, Medical gases (Cylinders and piped medical gases), Security, Ambulance services, Medical record department, Administrative office, Hospital Management Information System, Rogi Kalyan Samiti.

GMERS Hospital, Gandhinagar also provides other services certificates like Medical fitness, Disability certificate, Health Certificates and Age Certificate.

2. INTRODUCTION

Hospital is a combination of various things like medical equipment, tools, medical instruments and many more. In the field of hospitals, the medical equipment play a vital role in diagnosis, monitoring and treatment of different kinds of medical condition. These devices are designed to maintain rigorous safety standards in order to ensure the safety of patients and the absence of these medical tools could significantly pull down the medical industry and become detrimental to the lives of billions of the people worldwide.

Hospital equipment nowadays are technically advanced but very expensive and hence problem arises when it comes to allocate the available funds and setting priorities. The amount of cost involved in the unit is enormous as the high technology equipment requires too many inputs. This kind of study gives the idea of understanding feasibility of such huge investment. It will analyze the factors influencing the utilization status of the equipment and to identify the cost implications that entail and effect theutilization level upon per unit cost borne by the hospital.

A good equipment planning includes careful attention to fixed and movable equipment that will be needed in operations. It is the responsibility of hospital administrator to determine all the items of equipments necessary and write their specification, recommended tender & purchase according to hospitals policy.

The lack of planning will result

- Wastage of millions of rupees
- Reduced operational efficiency
- Lower standards of patient care

There are three ways to purchase equipment in the hospital.

1) Emergency Purchase
2) Local Purchase
3) GMSCL through purchase

- Local purchase and Emergency purchase has been done within hospital while GMSCL purchase has been done by GMSCL (Gujarat Medical Services Corporation Limited).
- Emergency purchase and Local purchase comes into action when earlier our submission to GMSCL didn't except.
- Financial power limit of Medical Superintendent for emergency purchase of equipment is Rs. 50,000
- Following table shows the financial power limit of Medical Superintendent of local purchase, based on that procurement method should be follow by the hospital.

Financial power of the MS	**Procurement method**
Less than 50,000 Rs.	Quotation through local supplier
50,000 – 2,00,000 Rs.	Paper tendering method in local paper
More than 2,00,000 Rs..	E-tendering on "nprocure" website

3. PROCESS FLOW

3.1. Emergency Purchase

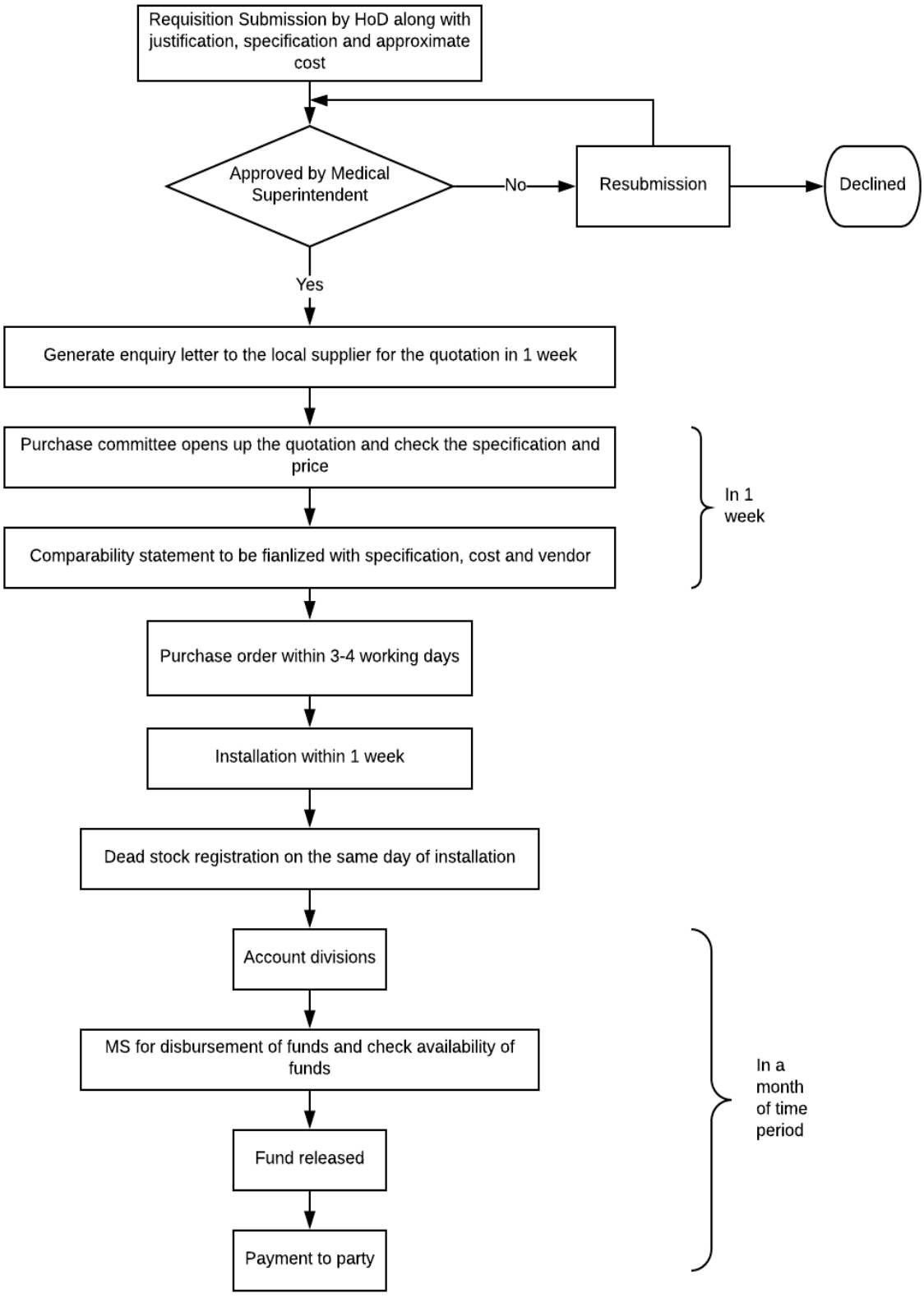


Figure 1

Comprehensive process of Emergency purchase

- Purchase process starts with the submission of requisition by Head of the Department. This requisition consists of justification, specification and approximate cost. Then it goes for the approval of the Medical Superintendent.
- Generally Medical Superintendent approves the requisition and allow to do the further process. In case of any documents has been not submitted or any further details not mentioned then it goes for the resubmission or clarify the doubts.If the requisition is not look like beneficial to the community and system, then it will be declined.
- After taking approval of the Medical Superintendent, enquiry letter has been generated to the local supplier and supplier have to submit the quotation within 1 week to the hospital. This enquiry letter having the specification of the equipment as well as delivery time period and further terms & conditions of the maintenance of the equipment.
- For the maintenance of the equipment, AMC, CMC and warranty period also defined in the enquiry letter.
- Purchase committee open the sealed quotations only if three or more quotation submitted by the supplier and check the specification and price. Further they compare the quotation specification with hospital's specified specification and create comparability statement.
- If one or more company's specification suitable for the hospital then price take place; whoever's price is lowest, purchase order would give to them.
- Purchase order usually generated within 3-4 working days. After generating purchase order company should deliver and install the equipment within 1 week.
- After installation of equipment in the hospital, dead stock registration must be required. Dead stock registration consists data of equipment like order no., quantity, model no., serial no., company name, amount, and department where the equipment is installed.
- Further process goes to the account divisions and then Medical Superintendent decides which fund should be released for the payment.
- Sometimes fund is not enough to pay the party at that time payment delayed and hospital should wait for the release of the fund from upper level.
- After getting fund or from available fund payment has been done to the party.
- Generally, payment process done within 1 month after installation.

Example of Emergency purchase equipment

1) ECG machine

Company name	:Vesta
Model No.	:301i
Quantity	: 5
Demand Date	:26th January 2018
Purchase committee meeting date	:29th January 2018
Quotation enquiry date	:2nd February 2018
Quotation submission due date	:10th February 2018
Quotation opening date	:16th February 2018
Competitive statement generated on	:20th February 2018
Purchase order date	:5th March 2018
Installation date	:29th March 2018

Gap: Installation not done within 1 week after giving the purchase order.

Figure 1.1

3.2 Local Purchase

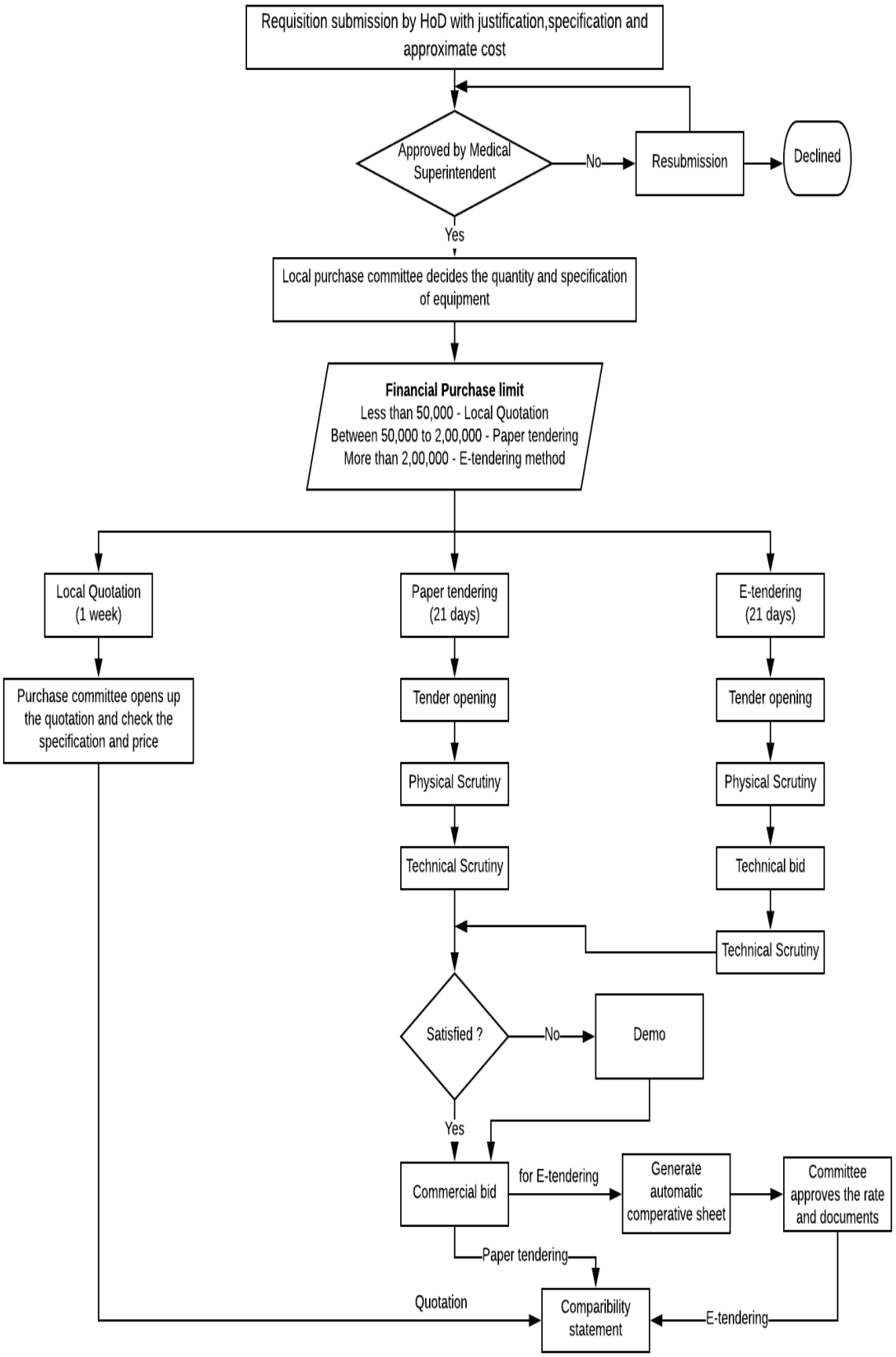


Figure 2.1 (Local Purchase Flow-1)

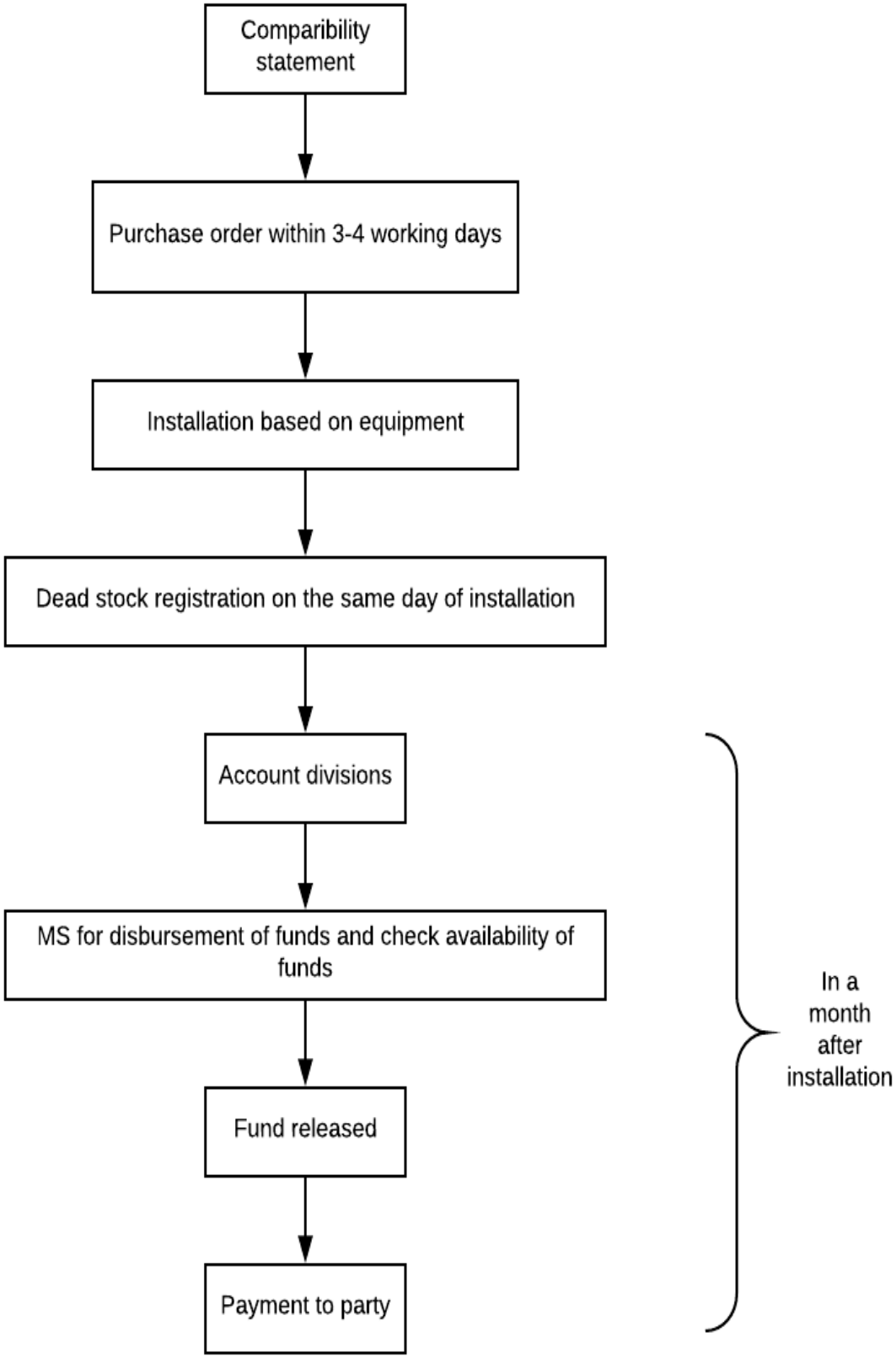


Figure 2.2 (Local Purchase flow-2)

Comprehensive process of Local purchase

- Purchase process starts with the submission of requisition by Head of the Department. This requisition consists of justification, specification and approximate cost. Then it goes for the approval of the Medical Superintendent.
- Generally Medical Superintendent approves the requisition and allow to do the further process. In case of any documents has been not submitted or any further details not mentioned then it goes for the resubmission or clarify the doubts.If the requisition is not look like beneficial to the community and system, then it will be declined.
- After taking approval of the Medical Superintendent, Local Purchase Committee take place. Local Purchase Committee members are Medical Superintendent (MS), Resident Medical Officer (RMO), HoD of Surgery, HoD of Medicine, HoD of Pharmacology, Subject expert and Account officer (AO).
- These committee decides the quantity, specification and approximate cost.
- Following table decide the procurement method based on the approximate cost.

Sr. No.	Price range	Procurement method
1	Less than Rs. 50,000	Direct Quotation
2	Between Rs. 50,000 – 2,00,000	Paper tendering
3	More than Rs. 2,00,000	E-tendering

Direct Quotation

- In the direct quotation procurement method, enquiry letter has been generated to the local supplier and supplier have to submit the quotation within 1 week to the hospital. This enquiry letter having the specification of the equipment as well as delivery time period and further terms & conditions of the maintenance of the equipment.
- Purchase committee open the sealed quotations only if three or more quotation must be submitted by the supplier and check the specification and price. Further they compare the quotation specification with hospital's specified specification and create comparability statement.
- If one or more company's specification suitable for the hospital then price take place; whoever's price is lowest, purchase order would give to them.
- Purchase order usually generated within 3-4 working days. After generating purchase order company should deliver and install the equipment within 1 week.

- After installation of equipment in the hospital, dead stock registration must be required. Dead stock registration consists data of equipment like order no., quantity, model no., serial no., company name, amount, and department where the equipment is installed.
- Further process goes to the account divisions and then Medical Superintendent decides which fund should be released for the payment.
- Sometimes fund is not enough to pay the party at that time payment delayed and hospital should wait for the release of the fund from upper level.
- After getting fund or from available fund payment has been done to the party.
- Generally, payment process done within 1 month after installation.

Paper Tendering

- In paper tendering, advertisement published in the paper and who so ever is interested has to submit it within 21 days with mentioned documents to the hospital.
- With the completion of the 21 days Local purchase committee opens the submitted tender and do the physical scrutiny.
- In the physical scrutiny, following document verification has to be done.
    I. Certified copy of Company Registration Document that reflect Company Name, Registration number, date of registration and active Directors or Members;
    II. Certified copy of Shareholders' certificates;
    III. Certified copy of ID documents of the Directors or Members;
    IV. Last three years audited/reviewed financial statements;
    V. Letter of guarantee from a registered Financial Institution or Financier covering 3 months' operational costs as per Bidder's proposed costs;
    VI. Proof of Public Indemnity Cover for minimum of R1 million;
    VII. Letter of Good Standing with Department of Labour for Unemployment Insurance Fund;
    VIII. Letter of Good Standing with Department of Labour for Compensation for Occupational Injuries and Diseases.
- If any company didn't submit any of the documents, then it will be out of the race.
- With the remaining company further technical scrutiny take place.
- In the technical scrutiny, Catalogue/ Brochure based specification verified with the required specification by the committee.

- If it is similar and the committee members are satisfied, then commercial bid will be opened. But in case any of the committee members are not satisfied with the specification which is mentioned in the catalogue/ Brochure then demo will be given by the company and then commercial bid will be opened.
- In the Commercial bid, quotation of the equipment opened and make comparability statement.
- Comparability statement consist of different company's specs along with price. Whichever company's price is lowest, purchase order would give it to them.
- Purchase order usually generated within 3-4 working days. After generating purchase order company should deliver and install the equipment within 3 weeks. If the equipment is foreign make, then sometimes it will take more time for installation
- After installation of equipment in the hospital, dead stock registration must be required. Dead stock registration consists data of equipment like order no., quantity, model no., serial no., company name, amount, and department where the equipment is installed.
- Further process goes to the account divisions and then Medical Superintendent decides which fund should be released for the payment.
- Sometimes fund is not enough to pay the party at that time payment delayed and hospital should wait for the release of the fund from upper level.
- After getting fund or from available fund payment has been done to the party.
- Generally, payment process done within 1 month after installation.

E-tendering

- E-tendering has been done on the e-procure government website, who so ever is interested has to submit the documents to the hospital as well as they have to upload the documents within 21 days.
- With the completion of the 21 days Local purchase committee opens the submitted tender and do the physical scrutiny.
- In E-tendering, physical scrutiny done as same way as paper tendering.
- After completion of the physical scrutiny, technical bid has been followed. In the technical bid, verification done of the uploaded documents and if any of the documents missing then that company will be discarded. Then technical scrutiny would take place.

- In the technical scrutiny, Catalogue/ Brochure based specification verified with the required specification by the committee.
- If it is similar and the committee members are satisfied, then commercial bid will be opened. But in case any of the committee members are not satisfied with the specification which is mentioned in the catalogue/ Brochure then demo will be given by the company and then commercial bid will be opened.
- After opening of the commercial bid, automatic comparative sheet generated, and committee approves the rate and documents.
- With the approval rates Comparability statement created. Commercial bid, quotation of the equipment opened and make comparability statement.
- Comparability statement consist of different company's specs along with price. Whichever company's price is lowest, purchase order would give it to them.
- Purchase order usually generated within 3-4 working days. After generating purchase order company should deliver and install the equipment within 3 weeks. If the equipment is foreign make, then sometimes it will take more time for installation
- After installation of equipment in the hospital, dead stock registration must be required. Dead stock registration consists data of equipment like order no., quantity, model no., serial no., company name, amount, and department where the equipment is installed.
- Further process goes to the account divisions and then Medical Superintendent decides which fund should be released for the payment.
- Sometimes fund is not enough to pay the party at that time payment delayed and hospital should wait for the release of the fund from upper level.
- After getting fund or from available fund payment has been done to the party.
- Generally, payment process done within 1 month after installation.

Examples of Local purchase equipment

1) Cystoscope

Company name	: Richard Wolf
Demand date	:25th December 2017
Tender date	:11th January 2018
Tender submission due date	:2nd February 2018
Cover opening date	:12th February 2018
Physical Scrutiny	: From 12th February 2018 to 20th February 2018
Technical Scrutiny	:9th March 2018
Commercial bis opening date	:17th March 2018
Approval of commercial bid date	:20th March 2018
Purchase Order date	:20th March 2018
Installation date	:31st March 2018

Gap: Due to unavailability of the persons, cover opening date has been delayed.

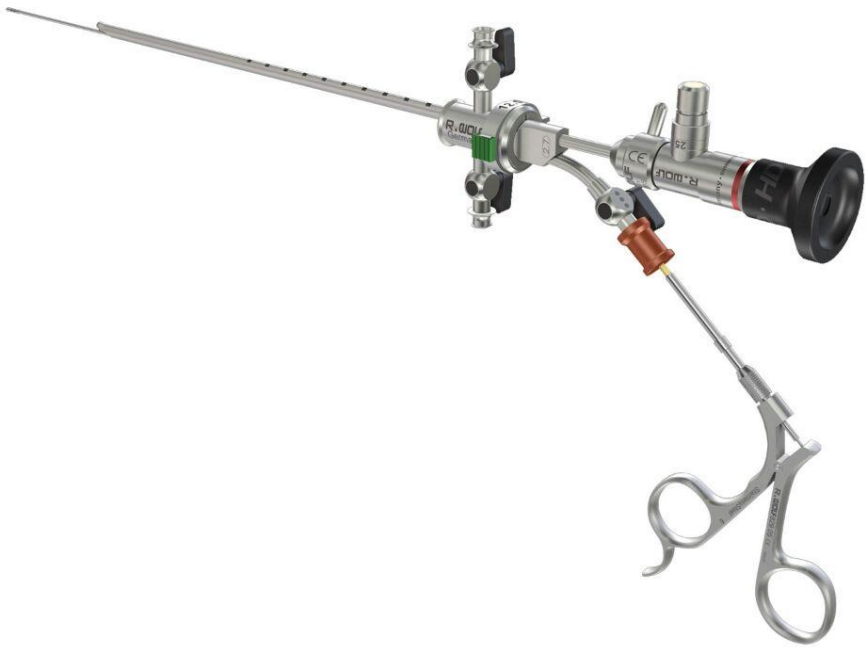


Figure 2.1

2) OT dual dome ceiling Light

Company name : Surgitech

Model No. : JB 04

Demand date :25th December 2017

Tender date :11th January 2018

Tender submission due date :2nd February 2018

Cover opening date :12th February 2018

Physical Scrutiny : From 12th February 2018 to 20th February 2018

Technical Scrutiny :9th March 2018

Commercial bis opening date :17th March 2018

Approval of commercial bid date :20th March 2018

Purchase Order date :20th March 2018

Installation date :5th May 2018

Gap: Installation delayed because of site was not ready.

Figure 2.2

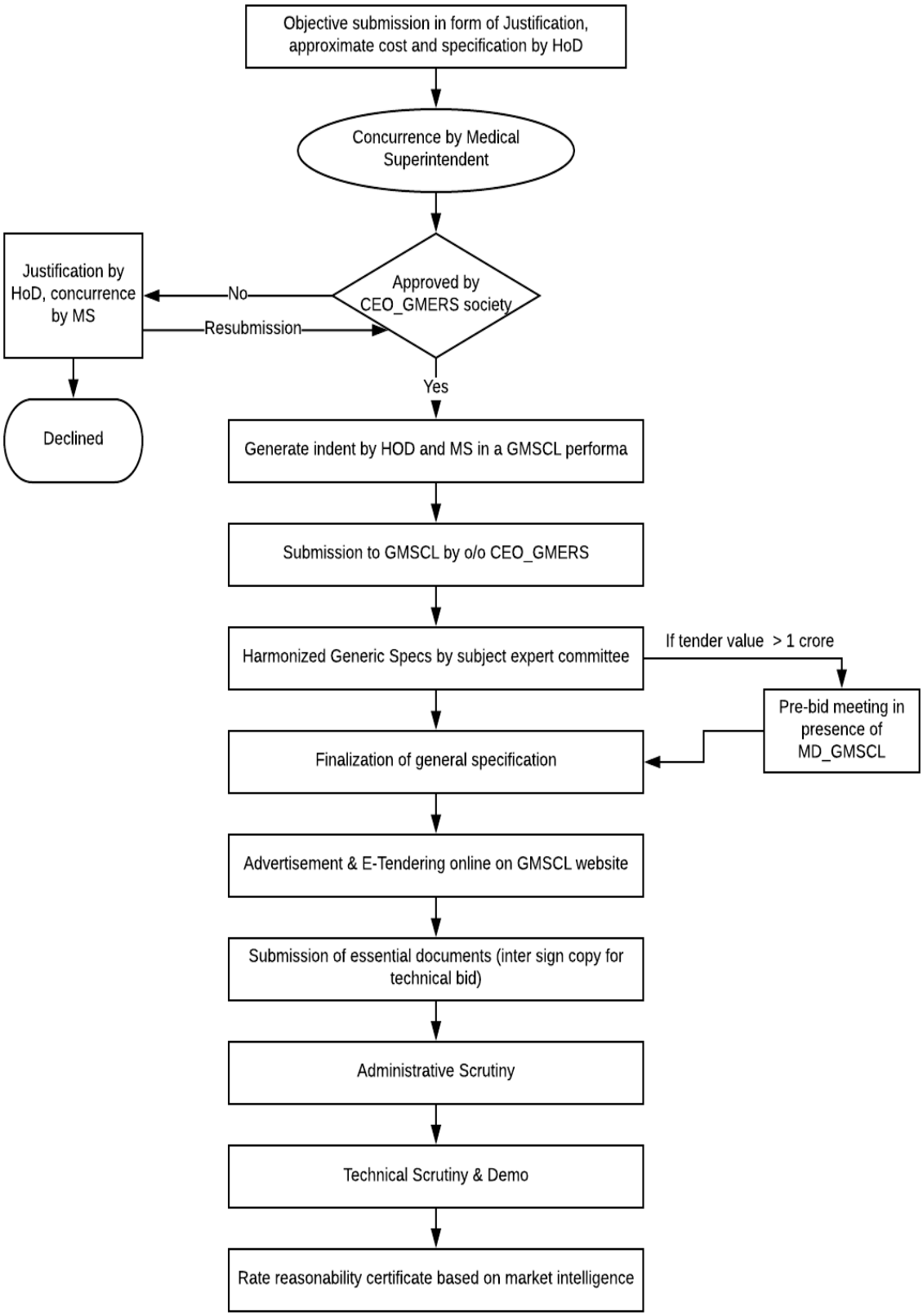
3) Ureterorenoscope

Company name	: Richard Wolf
Demand date	:25th December 2017
Tender date	:11th January 2018
Tender submission due date	:2nd February 2018
Cover opening date	:12th February 2018
Physical Scrutiny	: From 12th February 2018 to 20th February 2018
Technical Scrutiny	:9th March 2018
Commercial bis opening date	:17th March 2018
Approval of commercial bid date	:20th March 2018
Purchase Order date	:17th April 2018
Installation date	: yet not installed

Gap: Due to communication gap between upper level and end use, instrument returned.

Figure 2.3

3.3 GMSCL through purchase



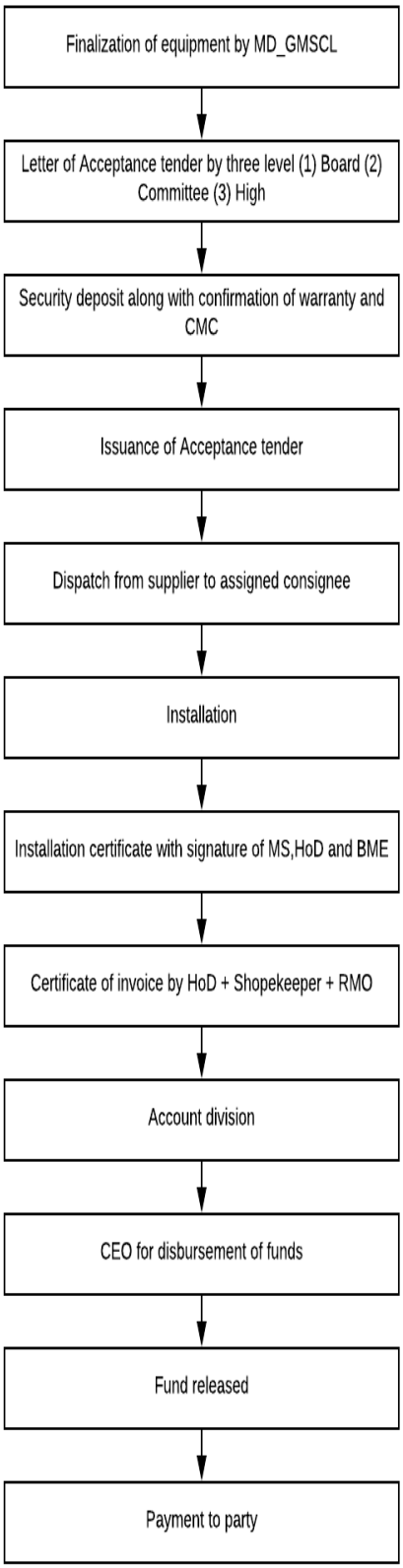

Finalization of equipment by MD_GMSCL
Letter of Acceptance tender by three level (1) Board (2) Committee (3) High
Security deposit along with confirmation of warranty and CMC
Issuance of Acceptance tender
Dispatch from supplier to assigned consignee
Installation
Installation certificate with signature of MS,HoD and BME
Certificate of invoice by HoD + Shopekeeper + RMO
Account division
CEO for disbursement of funds
Fund released
Payment to party

Figure 3

Comprehensive process of GMSCL through purchase

- Objective submission in the form of justification, specification and approximate cost by Head of the department to the Medical Superintendent.
- With the concurrence of Medical Superintendent, requisition submitted to CEO of GMERS society for the approval.
- After taking approval of the CEO, indent generated by HoD and Medical Superintendent in a GMSCL Performa, which having 14 columns along with checklist.
- If the any compliance required in the requisition, then justification given by the Head of the Departmentand resubmitted to the CEO. If it approves then further process follows otherwise request will be declined.
- Prepared indent submitted to GMSCL (Gujarat Medical Services Corporation Limited) by the Office of the CEO of GMERS.
- After getting indent, harmonized generic specs by the subject expert committee.
- If generic specs not settled, then reschedule the meeting.
- In case of tender value is more than 1 crore rupees, then pre-bid meeting occurs with the presence of the MD of GMSCL.
- Finalize the generic specifications and place the advertisement and e-tendering on the GMSCL website.
- Generally, for e-tendering, company have to submit the documents within 21 days to the GMSCL and also upload the document on the website.
- Administrative scrutiny in which further detailed documents are verified and if company clears the administrative scrutiny it goes for the technical scrutiny.
- In the technical scrutiny, equipment specification verified and demo would be given by the respective company.
- If the company clears the technical scrutiny then, rate reasonability certificate generated based on the market intelligence.
- After getting the rate reasonability certificate MD of GMSCL finalize the vendor and equipment.
- Letter of Acceptance Tender created by the three level, 1) Board 2) Committee 3) High.
- Company has to submit the security deposit along with confirmation of warranty and CMC.
- Issuance of Acceptance Tender to the company as well as to the consignee by the GMSCL.

- Dispatch from supplier to the assigned consignee and installation done within 180 days after opening of the tender.
- After installation, installation certifivcate generated with the sign of Medical Superintendent, Head of the Department and Biomedical engineer.
- Also created certificate of invoice by HoD, shopekeeper and RMO.
- Further process goes to the account divisions and then CEO decides which fund should be released for the payment.
- Sometimes fund is not enough to pay the party at that time payment delayed and hospital should wait for the release of the fund from upper level.
- After getting fund or from available fund payment has been done to the party.
- Generally, payment process done within 1 month after installation.

Examples of GMSCL through purchase equipment

1. Adult Ventilator

Demand Date: 15th March 2016

Purchase Date: 24th October 2016

Installation Date: 22th December 2016

Company: Neumovent

Model: Graphnet TS

Quantity: 2

Price: Rs.9,21,717

Figure 3.1

2. Birthing Bed

Demand Date: 15th March 2016

Purchase Date: 22nd March 2017

Installation Date: 25th May 2017

Company: Surgitech

Model: MB-111

Quantity: 18

Price: Rs.79,000/-

Figure 3.2

3. Electro surgical Digital Cautery Machine

Demand Date: 15th March 2016

Purchase Date: 24th May 2016

Installation Date: 19th July 2016

Company: ALAN

Model: Easy 360 M+

Quantity: 3

Price: Rs.99,506/-

Figure 3.3

4. Horizontal Steam Sterilizer

Demand Date: 15th March 2016

Purchase Date: 31st March 2017

Installation Date: 5th February 2018

Company: Surgitech

Model: HHP22

Quantity: 1

Price: Rs.1,56,000/-

Figure 3.4

5. ICU Fowler Bed with Remote Control

Demand Date: 15th March 2016

Purchase Date: 28th March 2017

Installation Date: 18th August 2017

Company: Confident

Model: ICU bed 18 A

Quantity: 8

Price: Rs.1,39,117/-

Figure 3.5

6. Multipara Monitor with Capnography

Demand Date: 15th March 2016

Purchase Date: 28th March 2018

Installation Date: 12th April 2018

Company: Truescope

Model: truescope ii

Quantity: 6

Price: Rs.1,79,121/-

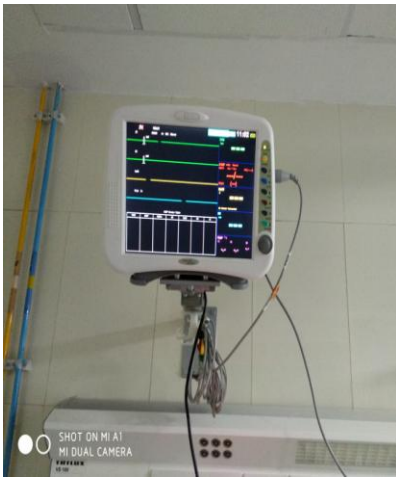


Figure 3.6

7. NST Machine

Demand Date: 15th March 2016

Purchase Date: 31st March 2017

Installation Date: 24th August 2017

Company: Huntleigh

Model: SonicaidTream IP

Quantity: 1

Price: Rs.1,39,117/-

Figure 3.7

8. Obstetric ICU Beds

Demand Date: 15th March 2016

Purchase Date: 6th February 2017

Installation Date: 6th May 2017

Company: Surgitech

Model: H5/EAS

Quantity: 6

Price: Rs.53,550/-

Figure 3.8

9. Pulse Oximeter

Demand Date: 15th March 2016

Purchase Date: 31st March 2016

Installation Date: 26th October 2016

Company: Contec

Model: CMS 5000

Quantity: 4

Price: Rs.13,600/-

Figure 3.9

10. Spot Light

Demand Date: 15th March 2016

Purchase Date: 31st March 2017

Installation Date: 31st May 2017

Company: Sparx

Model: LED F004

Quantity: 6

Price: Rs.10,400/-

Figure 3.10

4. LITERATURE REVIEW

Hospital is much more complex than other manufacturing organizations, for it undertakes medical and health responsibilities that deal with the lives of people, and it must also account for health economics which is different from economic production inimportant respects. On the one hand, the importance of medical equipment, effective management of such equipment, and advances ofthis technology in prevention, diagnosis, and treatment of diseases is evident. Without medical equipment, diagnosisand treatment will be done at very basic, insufficient levels. On the other hand, for years extortionate costs have beenpaid for procurement and maintenance of hospital equipment in the health and medicalcenters of Iran and theequipment has been largely supplied by foreign countries. This certainly has had negative consequences for thecountry and necessitates attention, care, maintenance, and proper use of hospital equipment.Moreover, incorrect use of medical equipment leads to detrimental consequences for the safety and health of thepatient, and malfunctioning equipment due to inappropriate maintenance can affect the health of patients and theperformance of hospitals. Considering the lack of research in this area, the researcher, who has been working inmedical centers and has witnessed the misuse of medical equipment, decided to examine the processes ofprocurement, distribution, control, and maintenance of medical equipment in general training hospitals affiliatedwith Tehran University of Medical Sciences, using databases and assistance of experts. [2]

It is normal that choices made with regards to the wellbeing framework, are prove based and subsequently bolstered by dependable examinations, satisfying populace needs. Restorative gadgets keep assuming a part of obvious significance in human services, hence the presentation, utilize and spread of these advances ought to be founded on innovation evaluation (TA) contemplates. Be that as it may, these current investigations dependably look for a more monetary introduction. The absence of concentrates incorporating a more comprehensive approach is prominent. This the truth was in fact the driving component behind this exploration. Attractive Resonance Imaging (MRI) is an exceptionally costly and late restorative gadget with a promising future. Settling on a choice on its buy ought to be a delicate issue, particularly when it is asserted that it isn't simply the innovation that is driving up wellbeing uses, yet rather the way they are (wastefully) embraced and utilized. Additionally, since "hardware buy are a simple route for the wellbeing framework to squander assets key acquiring is alluring". Since 1988, the Ministry of Health has approved the acquisition and establishment of costly

therapeutic advances in people in general and private segment. Be that as it may, there are as of now no powerful techniques for managing the dissemination of wellbeing gear in the private division. Nor is there experimental confirmation that can reveal insight into how the basic leadership process concerning the buy of such costly innovation is being finished.[3]

The United States Food and Drug Administration (FDA) and device manufacturers continue to work to improve device safety, but since no device is completely safe in every environment, the medical device purchaser or purchasing committee is responsible for selecting the medical device that is safest for their targeted environment. Unfortunately, anecdotal evidence suggests that many health care professionals believe that FDA approval ensures device safety and that any approved devices must be comparably safe. Moreover, it is unclear to what extent the health care professionals charged with making purchase decisions are trained in the techniques of evaluating patient safety, or whether these considerations are being incorporated into the device purchasing process. It is also unclear whether those making the purchase choices understand how to make patient safety issues a priority in the decision-making process and what criteria need to be included.[2]

Hospitals use a variety of channels to purchase and will often base their decisions on the channels which are most time and cost efficient, while still providing them the highest quality products. To achieve this, GPOs and distributors play a role in purchasing for some purchasing scenarios, while purchasing from a vendor's direct sales force will play a role for others. Within the industry, consolidation, pushed by increased cost-sensitivity, has led to a growing number of stakeholders involved in buying decisions. However, the industry has also become more centralized as physicians have been driven toward cost-conscious management-led organizations, such as hospitals. These changes affect medical device companies as they face more preferred vendor programs and a shift away from the physician preference model [define: "…, where physicians' preferences take top priority in a purchasing decision." [4]

5. RATIONALE

In the field of hospitals, the medical equipment play a vital role in the diagnosis, monitoring and treatment of different kinds of medical conditions. These devices are designed to maintain rigorous safety standards in order to ensure the safety of the patients and the absence of these medical tools could significantly pull down the medical industry and become detrimental to the lives of the billions of people worldwide. Having an in-depth knowledge about specific medical devices is only part of what is needed to select and specify the most appropriate technology and systems for use in any healthcare facility**.**

The logistics unit of the hospital is responsible for purchasing, and for the medical equipment to correspond to the actual needs of the hospital, there must be proper connection and coordination between the logistics unit and the maintenance and biomedical engineering department.

Sufficient and high-quality purchasing from valid sources within the designated time and with appropriate price is an important issue. Nowadays, patients are treated by hi-techmedical devices(electronic and mechanical) and biomedical engineering department is responsible for using, maintaining, and control ling patient care systems. Thus, this department must be careful in choosing and purchasing the devices. Equipment purchase process is critical and required so many further process to finalize the equipment. The process and plan for purchasing medical equipment involves three major components:

1. Determining the actual needs for medical equipment
2. Evaluating the place for installing the devices
3. Examining the available medical equipment inside and outside the country.

Improper purchase planning of medical equipment leads to hospital in crisis as well as creates wastage of money and most important patient suffers due to unavailability of the equipment.Less number of equipment creates overload on existing equipment and staff have to go to other department for the equipment use which creates unnecessary work load.

6. AIM

To identify the gap between purchase process of the medical equipment and establish the smooth process flow.

7. OBJECTIVE

- To assess the process mapping of purchasing of medical equipment and the barriers associated with it.
- To give recommendation accordingly for the equipment purchase process.

8. METHODOLOGY

- Study design: Cross sectional & Retrospective study
- Data Source: Secondary
- Duration: 5th February 2018 to 5th May 2018
- Sampling technique: Purposive sampling
- Sample Size: 14 equipment(63 in Total) (Last 3-year purchase of equipment in OBG department)
- Data collection tool: Interview (Medical Superintendent, Biomedical engineer, Account Officer) and secondary data from records, files of particular equipment.

9. RESULT

9.1 End to end Process:

In this end to end process from demand to installation time-period is included. The sample size was 63 among all the purchase process.

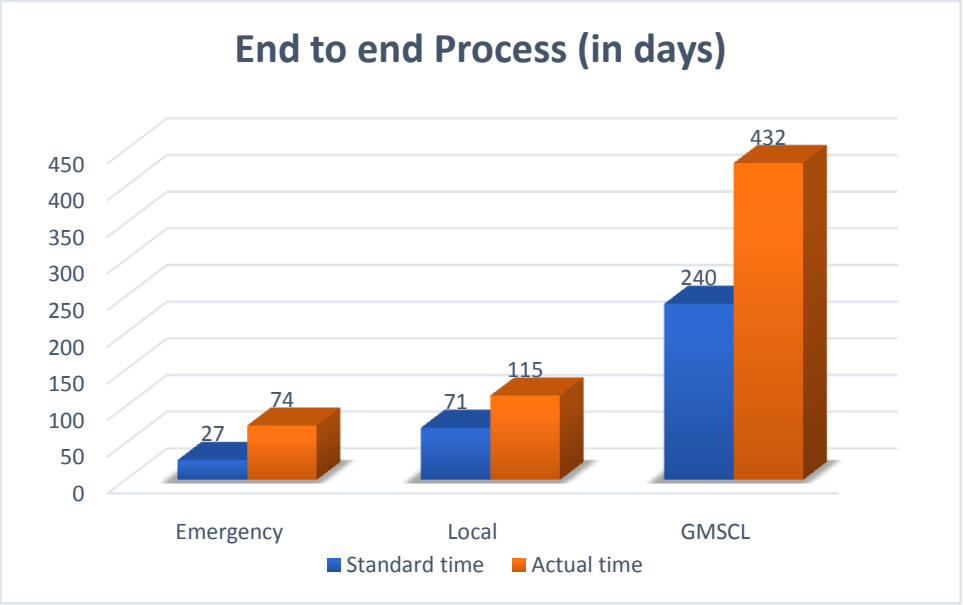


Figure 5.1

Above figure shows that,

- For the Emergency purchase process sample size was 5. The standard time for an equipment from the demand is generated to installation in the hospital is 27 days, but in the study total TAT observed of (5 equipment)showed an average **delay** of 47 days.
- For the Local purchase process sample size was 8. The standard time for an equipment from the demand is generated to installation in the hospital is 71 days, but in the study total TAT observed of (8 equipment) showed an average **delay** of 44 days.
- For the GMSCL purchase process sample size was 50. The standard time for an equipment from the demand is generated to installation in the hospital is 240 days, but in the study total TAT observed of (50 equipment) showed an average **delay** of 192 days.

9.2 Demand to Purchase order:

The time-period between Demand and Purchase order.

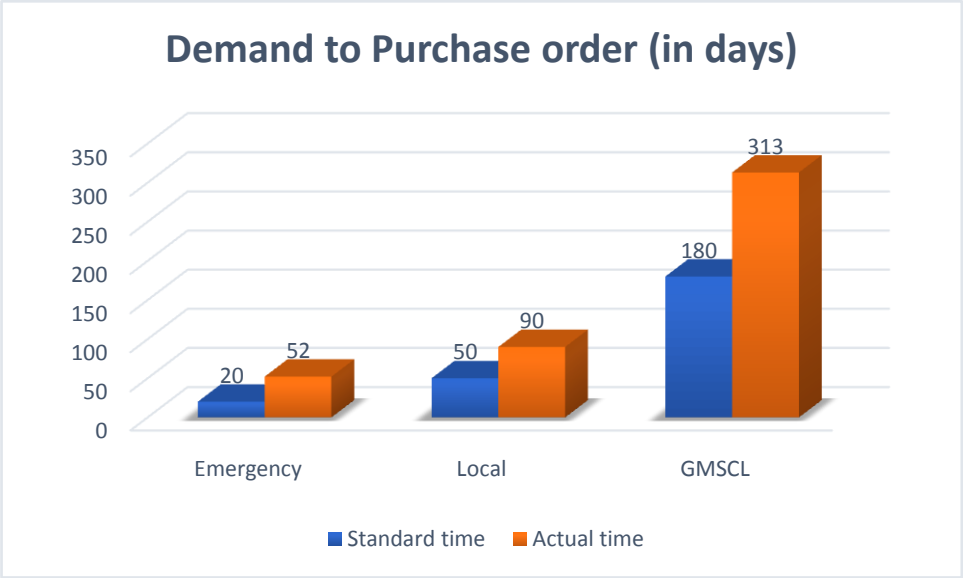


Figure 5.2

Above figure shows that,

- For the Emergency purchase, standard time from demand to purchase order is 20 days while here delay was observed to be around 32 days.
- For the Local purchase, standard time from demand to purchase order is 50 days while here delay was observed to be around 40 days.
- For the GMSCL purchase, standard time from demand to purchase order is 180 days while here delay was observed to be around 133 days.

9.3 Purchase order to Installation:

Which shows the time-period taking between Purchase order to Installation.

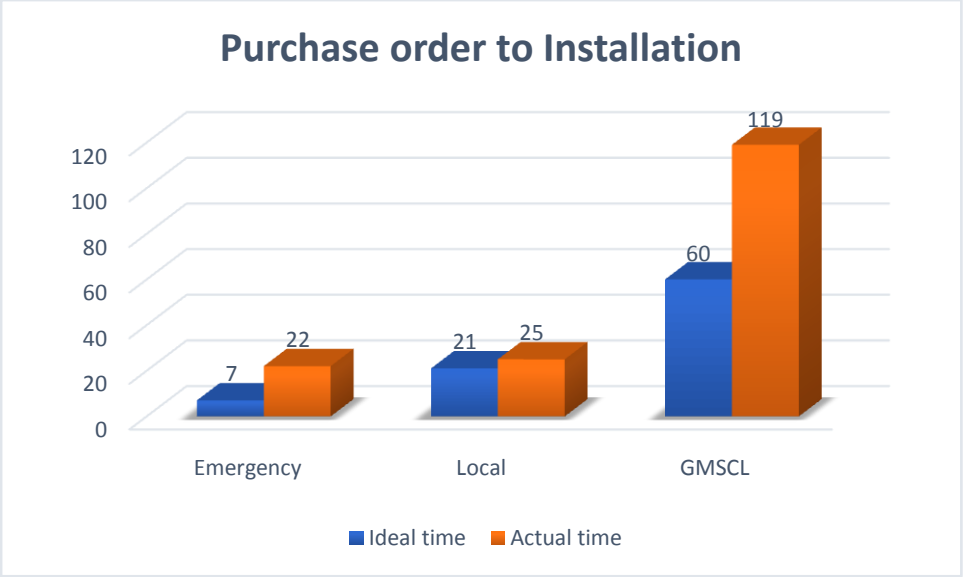


Figure 5.3

Above figure shows that,

- For the Emergency purchase, standard time from purchase order to installation is 7 days while here delay was observed to be around 15 days.
- For the Local purchase, standard time from purchase order to installation is 21 days while here delay was observed to be around 4 days.
- For the GMSCL purchase, standard time from purchase order to installation is 60 days while here delay was observed to be around 59 days.

10. GAP ANALYSIS

- Due to unavailability of persons, meetings are delayed, and thus decision process takes more time.
- Verbal meeting reminders are not considered for official meeting.
- Equipment installation delays occur because of unpreparedness of the sites. (For e.g. insufficient power supply, water connectivity, cooling system, drainage system,power backup)
- There has been a Communication gap between committee members and end users.
- The delay in delivery also happens due to technical issues of equipments.
- From GMSCL purchase some of the foreign made equipmentsface the problem with custom clearance.

11. RECOMMENDATIONS

- Committee should include more people or else from the same background more than one people must be there.
- Proper Meeting invitation through mails should be sent to all the participants priorly.
- At the time of placing the purchase order, site verification should be done priorly at the hospital level only.
- Committee should involve the end users in the technical scrutiny process.
- MOM (Minutes of meeting) must be circulated to all the stakeholders about every meeting.

12. CONCLUSION

This project gives the actual scenario of the procurement of medical equipment. Each process has some bottlenecks with it. In the end to end process, Emergency purchase delays observed is 47 days in which purchasing the order takes more time rather than installation. Same case was in the Local purchase and GMSCL purchase where delays were observed to be 44 days and 192 days respectively.The main reason for the delay is that such processdidn’t follow any timing criteria associated with it but if such issues can be solved at the hospital level, then medical equipment purchase process will give the better outcome.

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