Internship Training

at

International Institute of Health Management Research

Descriptive study on maintaince of equipment at Eye Q Hospital in Gujarat region

by

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2019-21

International Institute of Health Management Research

New Delhi

Acknowledgement

At the first, I would like to thank the Almighty God for showering his blessings and for being the wellspring of direction, wisdom and perseverance throughout the study, without which this study could not have been completed.

I am obliged to my mentor **Dr. Manish Priyadarshi, Associate Professor** for his constant encouragement, continuous motivation, boundless cooperation, significant direction, guidance, suggestions, and proposals which helped me to finish each part of this venture.

I am extremely grateful to **Dr. Sutapa Bandyopadhyay**, Director of IIHMR Delhi for giving me the opportunity to undertake this project.

I am also extremely thankful to all my faculties.

I express my profound gratitude to my family for providing me with unfailing support and love throughout my life and this thesis would not be possible without them.

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Abbreviations

- **CMD-** CHIEF MEDICAL DIRECTOR
- **OCT-** OPTICAL COHERENCE TOMOGRAPHY
- **AMC-** ANNUAL MAINTAINCE CONTRAC
- **CMC-** COMPREHENSIVE MAINTENANCE CONTRACT

Introduction about Eye Q

The Eye-Q hospital chain is committed to providing the best quality eye care at an affordable cost across India. We are an ISO 9001-2015 registered organization operating under our Founder and CMD leadership- Dr. Ajay Sharma- one of the most renowned eye surgeons in India, aided by a team of specialists with rich experience in their respective specialties from top hospitals across the country.

Established in 2007, Eye-Q is a chain of 37 Super- Speciality Eye Hospitals in Delhi-NCR, Haryana, Uttar Pradesh, Uttarakhand, and Gujarat. Also, two hospitals in Nigeria, Africa.

VISION

To be India's foremost chain of eye hospitals in terms of both Quality of eye care and the Number of patients handled.

MISSION

To make every patient an Ambassador for Eye-Q through a combination of

- Highest level of quality and technology in eye care.
- Exceptional personal care.
- Complete integrity to the patient and his/her needs.

VALUES

- Be honest and open in my communication and do what I say I will do
- I accept our individual & team responsibility and meet my commitments each & every time
- Our clinical & non-clinical team is supportive of each other's efforts and care for each other
- Give care, compassion & respect to patients and colleagues as I expect for myself
- I Will make a conscious effort to contribute in creating a social impact
- Will embrace and drive positive change
- Proud of Eye Q

PATIENT CARE EXPERIENCE

EYE-Q has over 14+ years in providing eye treatment to the patients. EYE-Q offers world class facilities to the patient and provides a conducive environment for quick recovery. EYE-Q doctors add the personal touch by offering comprehensive psychological counselling to the patients undergoing surgeries. The management and staff at EYE-Q hospitals give their best to offer the best services to the patients for their quick recovery. EYE-Q's record of successfully catering to 50+ lakh patients speaks about its holistic approach that EYE-Q follows.

EQUIPMENT IN EYE Q HOSPITAL

DIAGNOSTIC EQUIPMENT

- Non contact tomograph
- OCT
- Slit lamp
- Pachymetry
- Indirect ophthalmoscope
- A scan

SURGICAL EQUIPMENT

- Phaco handpiece
- Bipolar cautery machine
- Microkeratome
- Green laser
- Autoclave
- U V light
- Suction machine
- Fumigation machine

HOUSE KEEPING EQUIPMENT

- Water dispenser
- Tea maker
- Coffee machine
- Refrigerator

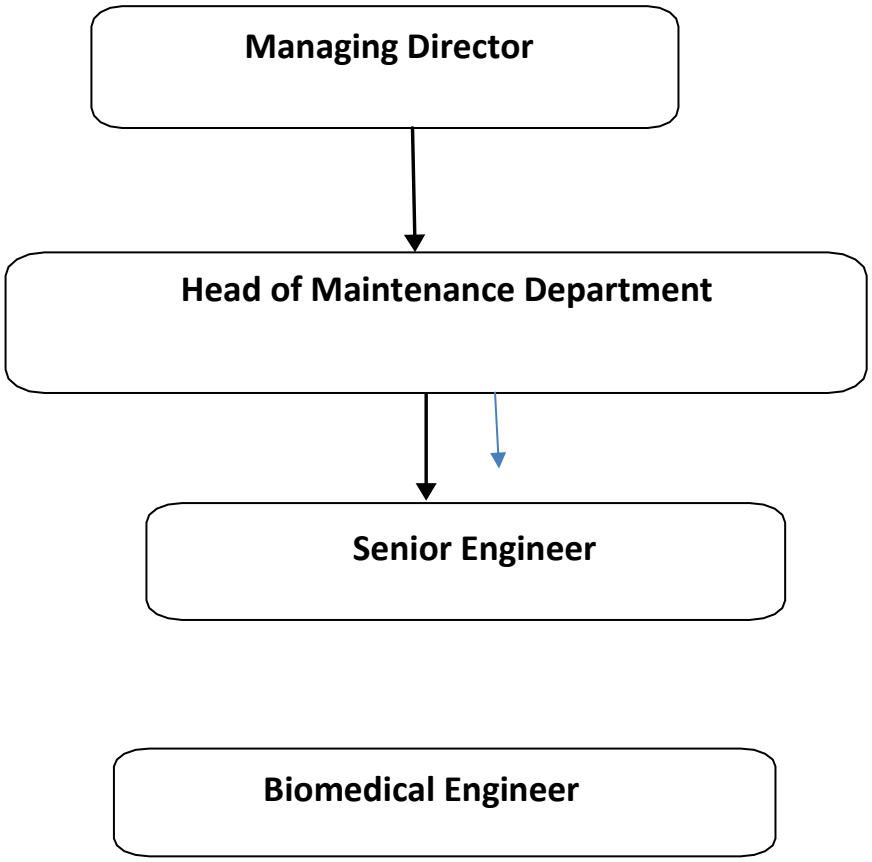


Figure 1: Organizational structure.

Table 1: Category of staff.

Sr.no	Staff	No
1	Head of the Department	1
2	Head of dept	1
3	Senior Engineer	1
4	Biomedical engineer	1
	Total	4

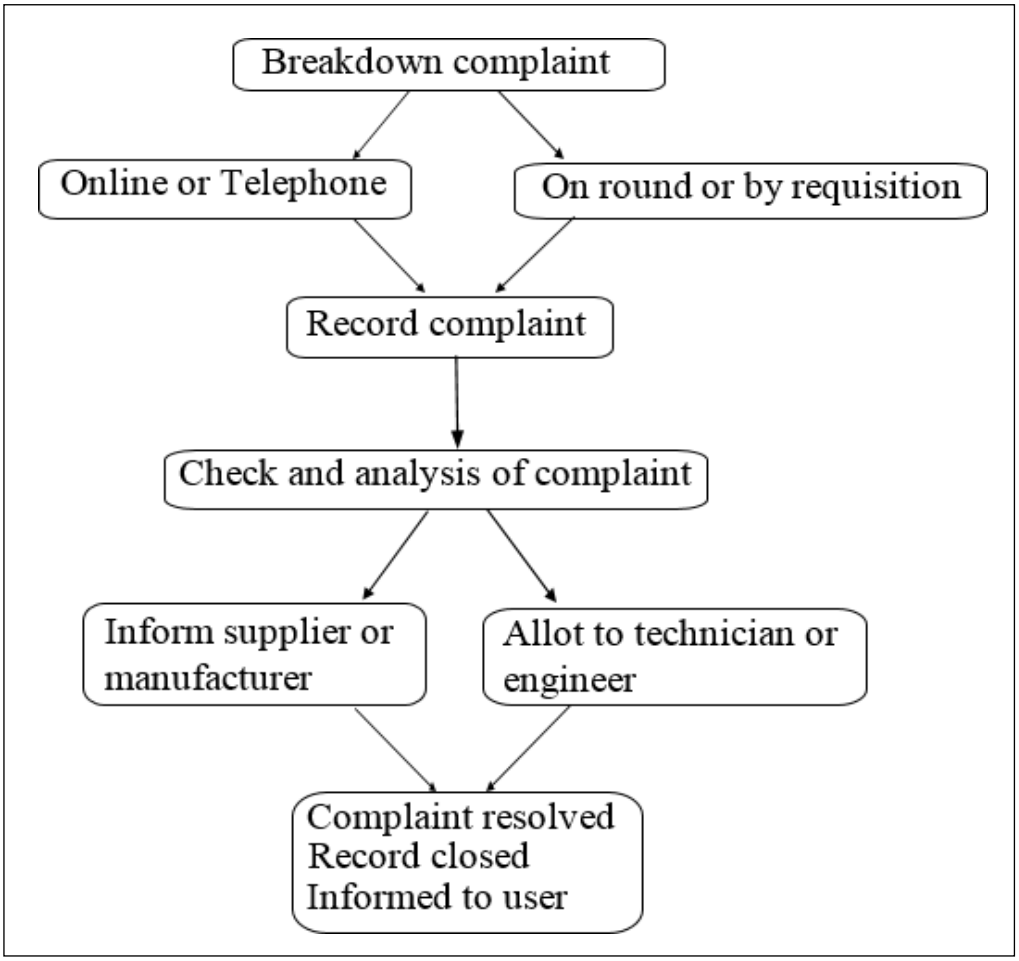


Figure 2: Workflow analysis in case of breakdown.

Review of Literature

- The maintenance department is one of the greatest levers of profitability that any capital-intensive organization has. Medical equipment contribute to almost 40-50% of costs in a tertiary hospital setup, the equipment at the time of purchase poses the threat of inevitable obsolescence within 6-7 years of installation. (5)
- Hospitals pay lot of attention to reduce and better manage their maintenance costs.[2] As per a study done by National Health Systems Resource Center, the dysfunctional rate in equipment could be as high as 60% in many areas of the world with dysfunctional rate in equipment averaging about 20%-30% even in areas with a fair medical equipment industry presence.
- The maintenance not only has a positive impact on the safety and effectiveness of healthcare technology, but also increases the lifetime of equipment and thus helps to save invested resources. It also enhances the demand for health services. Demand for services availability is crucial of functioning healthcare industry.[3]

Objectives:-

- The assess and monitor the ‘down time’ for the instrument or equipment with respect to hour loss by the hospital.

Specific objectives:-

- The assess and monitor the ‘down time’ for the instrument or equipment with respect to hour loss by the hospital.

Study design:

- Descriptive analysis based on data collection from organization Eye Q Hospital India from January 2020 to December 2020

Study state-

- The study involves data of all the centers in Gujarat along with all the equipment which needed maintenance or repair in the year 2020.

Study design:-

- descriptive comparative study

Inclusion criteria:-

- The study involves data of all the centers in Gujarat along with all the equipment which needed maintenance or repair in the year 2020

Exclusion criteria:-

- Data of year 2019 and 2021
- Data of any other region is excluded.

Limitation:-

- Due to covid the current years data was unavailable

Study duration-

- 1 year

Data collection technique- With the help of biomedical engineer the data was extracted from monthly reports submitted to the hospital and MS excel sheet was prepared

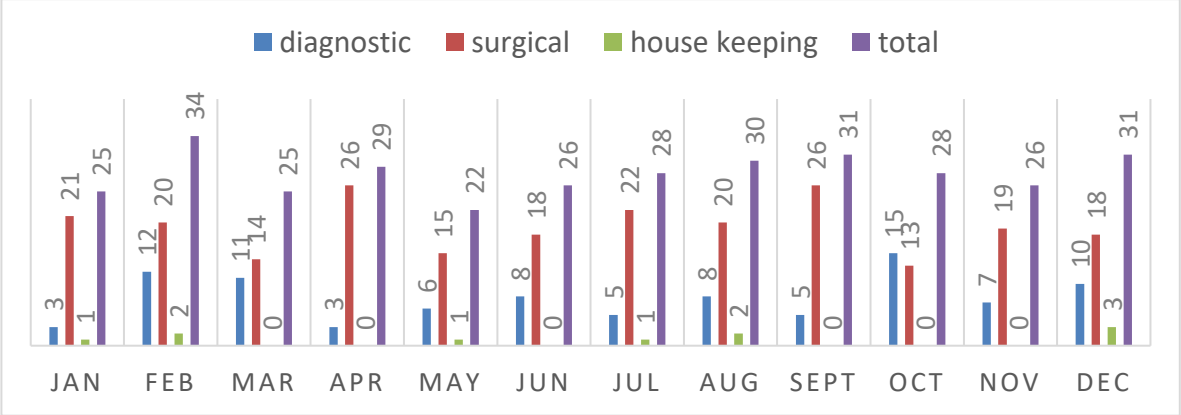
Ethical consideration-The data taken from the organization is untampered and with their consent..

Results

Data analysis

Breakdown analysis According the type of instruments used in hospital

The data of breakdown of medical equipment was collected for the period of five months from the January to December . The analysis was done according to type of instuments that caused breakdown of medical device.



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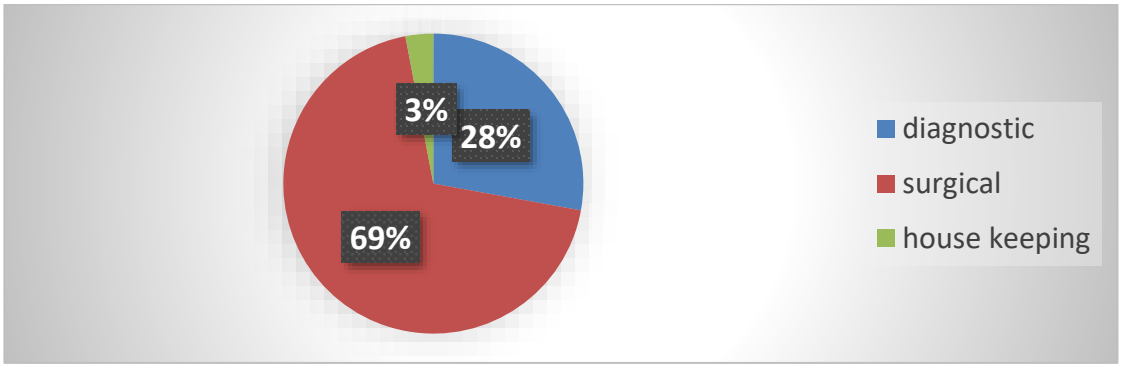

Contract	Surgical	diagnostic	house keeping	Total downtime (in hrs)
AMC	20	21	5	2484
CMC	20	25	2	616
Inhouse	179	32	0	4500
Warranty	12	15	6	1022
Total	232	93	13	8622

DOWNTIME ANALYSIS

***Annual Maintenance Contract, **Comprehensive Maintenance Contract**

- Downtime for the instruments was calculated from the month of January to December 2020 for 337 breakdowns. Later, the down time was analyzed as per the type of equipment contract provider.

- The total hours lost due to breakdown were 8622 .

- The number of breakdowns of equipment having in house repair were very high i.e. 211 out of 337 followed by AMC, Warranty and CMC i.e. 46, 33 and 47 respectively. This data analysis shows that about 66.26% of breakdowns were of the equipment having in house repair followed by AMC,Warranty and CMC equipments. The major cause of having high percentage of in-house breakdown was that all these in house repairs were small breakdowns and required greater time to repair.

Discussion

- About 70% of breakdown that occurred in the hospital was mainly in surgical equipments followed by diagnostic and house keeping equipments
- This was mainly because of lack of awareness of the staff and lacunas in training programme.
- Certain equipment is repaired in house by biomedical technician. AMC contracts are more than CMC contract as the cost of AMC contract is much lesser than CMC contracts.
- There were no medical equipment having insurance. Cost for CMC maintenance contract is higher so lowering this cost by good negotiation is also a crucial area for cost reduction. Also increasing the warranty period can reduce cost of maintenance.
- Average down time for the time period of 12 months came to around 8622 hours, which was quite high. Downtime for the equipment having warranty was 1022 hours. The hospital was at loss by taking equipment under A.M.C. or C.M.C in case of certain equipment

Conclusion

- Good and effective maintenance practices can reduce the cost of maintenance of equipment that arises due to breakdown. For effective maintenance, hospital should earmark adequate space to maintenance department so that the repair activities can be carried out smoothly within the hospital

- Managers of concerned department should also be involved in daily maintenance practices for effective functioning of equipment. To reduce the possibility of equipment malfunction following service or repair, all personnel involved in maintaining and servicing equipment should be trained.

- A cogent strategy for the maintenance must be followed by the hospital. Before going for any types of the contract it is necessary to find out what are the major problems that equipment could encounter and then how much will be the cost of repair and how frequently these breakdown can occur and then the management should be very careful to take the contract and insurance as it covers only the electrical damages and not the mechanical damage. So, instruments with higher probability of electrical damages should be taken under contract and insurance.

- C.M.C. should be taken for equipment which are very costly and can be repaired only by the service engineer of the company and its spare parts are not available in the open market. A.M.C. should be taken for that equipment which are less costly can be repaired by the biomedical engineer of the hospital and its spare parts are available in the open market.

- Management could give emphasis on in house maintenance by appointing expert biomedical engineer so that majority of repairs can be done within the hospital as downtime is very less for the in-house repairs. It will reduce the cost of maintenance.

Recommendation

- All personnel involved in maintaining and servicing equipment should be trained periodically.
- Monthly audit should be done of each equipment at each center to reduce the downtime.
- The hospital should have more CMC rather than inhouse to reduce the downtime
- Managers of concerned department should also be involved in daily maintenance practices for effective functioning of equipment.

Limitation.

- As due to COVID-19 second wave, current year data was unavailable for reseach.
- There was problem of time constraint.

References

- Tadia, Vijay Kumar, and Samadhan Kharate. "A Comprehensive Study on the Maintenance of Medical Equipment at Tertiary Care Hospital in India." *International Journal of Research in Medical Sciences*, vol. 8, no. 2, Jan. 2020, p. 464. *DOI.org (Crossref)*, doi:10.18203/2320-6012.ijrms20200034.

- Al-Bashir, Adnan, et al. "Downtime Reduction on Medical Equipment Maintenance at The Directorate of Biomedical Engineering in the Jordanian MOH." *International Journal of Online Engineering (IJOE)*, vol. 13, no. 02, Feb. 2017, p. 4. *DOI.org (Crossref)*, doi:10.3991/ijoe.v13i02.6422.

- Alsyouf, Imad. "The Role of Maintenance in Improving Companies' Productivity and Profitability." *International Journal of Production Economics*, vol. 105, no. 1, Jan. 2007, pp. 70–78. *DOI.org (Crossref)*, doi:10.1016/j.ijpe.2004.06.057.

- Sezdi, Mana. "Two Different Maintenance Strategies in the Hospital Environment: Preventive Maintenance for Older Technology Devices and Predictive Maintenance for Newer High-Tech Devices." *Journal of Healthcare Engineering*, vol. 2016, 2016, pp. 1–16. *DOI.org (Crossref)*, doi:10.1155/2016/7267983.

- Abdul Jawwad, Abdul Kareem, and Muhammad Saleem. "Criticality Analysis of Medical Equipment: A Case Study at King Hussein Cancer Center (KHCC) Amman-Jordan." *International Journal of Online and Biomedical Engineering (IJOE)*, vol. 15, no. 15, Dec. 2019, p. 18. *DOI.org (Crossref)*, doi:10.3991/ijoe.v15i15.11613.