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By

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SYNOPSIS

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TITLE

Radiology and Cardiology Equipment Landscape in Metropolitan Hospitals: A Holistic View

INTRODUCTION

The healthcare field is heavily dependent on medical equipment for early diagnosis and treatment. This is especially true with respect to the radiology and cardiology departments. Mindful selection, procurement and utilization of these equipment are pivotal for delivering high quality patient care within the hospital premises. Due to technological advancements in the past decade, capabilities of these radiological and cardiological equipment have been revolutionized, thus offering a large variety of options to choose from thereby making the decision-making process even more complex. Technological developments have brought about a substantial transformation in medical equipment, resulting in more accurate and efficient healthcare. With the use of complex algorithms and high-tech sensors, modern technology enables doctors to diagnose and treat patients more accurately. For example, modern MRI and CT scanners produce sharper, more detailed images, making disease identification earlier and more precise.

The global market size of medical devices was valued at a handsome \$512.29 billion in 2022 and is projected to grow from \$536.12 billion in 2023 to \$799.67 billion by 2030 at an impressive CAGR of 5.9% (1). India ranks 4th among the Asian medical device market after China, Japan and South Korea and is among top 20 markets globally. The size of the Indian medical device market is estimated at Rs. 90,000 crore (\$11 billion) in 2022 and is expected to grow up to \$50 billion by 2030 at a CAGR of 16.4% (2). 70% of the medical devices used in India are imported (3). Mumbai is considered to be the most important city of Maharashtra and is home to thousands of hospitals serving millions of people. Shifting away from a purely price-

driven paradigm towards a comprehensive model integrating patient outcomes, is anticipated to increase efficiencies and enhance health outcomes for patients (4). Empirical evidence suggests that adopting a value-based approach in medical equipment procurement holds the potential for improved health outcomes and heightened cost-effectiveness within hospital settings (4). For instance, research by Smith et al. (2019) highlights that radiation dose management and image quality are top priorities in the selection of radiology equipment rather than cost. Moreover, this approach bears promise in identifying avenues for innovation (4). However, a European study by Müller and Schmidt (2018) indicated that economic factors, including cost and long-term maintenance, played a significant role in decision-making.

The results of this study will be valuable for various stakeholders in the industry such as hospital administrators, equipment manufacturers, clinicals, technicians, patients etc. Even though there have been studies in the past which have discussed the important factors which influence the buying decision, there is a lack of study in which tells us what medical device companies are usually preferred in metropolitan hospitals and how satisfied are the users (hospitals and healthcare professionals) with these equipment. Against this dynamic backdrop, the purpose of this study is to understand the preference, user satisfaction level and weightage of different buying decision factors with respect to radiology and cardiology equipment. The results of the study will help the medical equipment companies to produce products which will satisfy their customers to the highest degree. It will also be useful for the hospitals as it will provide valuable information for the administrators thus resulting in better procurement behaviour and resource allocation. Hence, the results of this study will be helpful for all the different stakeholders involved with respect to medical equipment and ultimately result in better patient outcome.

RESEARCH QUESTION

“What are the preferred brands, their user satisfaction level and weightage of various factors influencing buying decision regarding radiology and cardiology equipment in hospitals of Mumbai Metropolitan Region?”

OBJECTIVES

1. To analyze and identify the preferred brands of radiology and cardiology equipment used in hospitals of Mumbai Metropolitan Region.
2. To understand the satisfaction level of the hospitals with the preferred medical equipment brands in the Mumbai Metropolitan Region.
3. To analyse the weightage of different factors which influence procurement of medical equipment by hospitals.

OUTCOME VARIABLES:

Preferred brands were determined on the basis of the number of the equipment being used in different hospitals of a particular brand

User satisfaction level was studied based on 5 different parameters – Accuracy, Ease of Use, Quality of Image, Durability and Support and Maintenance Services and therefore understand the overall satisfaction level/score.

Weightage of 5 different important factors – Cost, Safety Features, Performance, Brand Image and Technology, which influence the buying decision of the hospitals when it comes to procurement of medical equipment, was studied.

MATERIAL AND METHODS

STUDY DESIGN: The following study will be descriptive cross-sectional study. It will use structured questionnaire to collect qualitative as well as quantitative data from healthcare professionals of NABH-Accredited hospitals of MMR.

SETTING: The research will be conducted in Mumbai Metropolitan Region, India, which is home to numerous hospitals, clinics, dispensaries and healthcare facilities, and serves a vast and diverse population. The research will focus on hospitals across MMR, covering NABH-Accredited healthcare institutions with focus on their radiology and cardiology equipment.

STUDY POPULATION:

- **Inclusion Criteria:** Radiology and cardiology equipment which have been used for at least 3 years in a consenting NABH-Accredited Hospital.

- **Exclusion Criteria:**

Radiology and cardiology equipment which have not been used for at least 3 years in a consenting NABH-Accredited Hospital. Radiology and cardiology equipment which have been used for at least 3 years in a non-consenting hospital and in hospitals outside MMR.

- **Study Tools:** A structured questionnaire will be used to collect data on the type and brand of equipment, user satisfaction level and factors influencing buying decision regarding radiology and cardiology equipment.

DURATION OF STUDY: 8TH APRIL 2024 – 1ST JUNE 2024

SAMPLE SIZE: 100-150

SAMPLING TECHNIQUE: Purposive Sampling

DATA COLLECTION PROCEDURE:

- Development of detailed questionnaire and interview with the concerned professionals to gather information.
- Obtain permission from the different hospitals' administrators to conduct research in their facility.
- Take informed consent from all the participants before collecting the data.
- Administer the survey questionnaire to the participants and ensure confidentiality of the data collected.
- The quantitative variables will be measured using a quantitative scale such as Likert scale and qualitative data will be collected via an ordinal scale.
- Maintaining consistency during data collection procedure and adherence to all the ethical guidelines.

OPERATIONAL DEFINITION

Brand Preference: The degree to which certain brands of radiology and cardiology equipment are favoured by hospitals.

User Satisfaction Level: The level of contentment among the hospitals and healthcare professionals regarding the equipment

Buying Decision Factors: The different criteria which influence the procurement of radiology and cardiology equipment.

Accuracy: The degree ability of the equipment to produce results that are in line with the true results.

Ease of Use: Refers to how simple it is for the user to use the machine during procedure.

Quality of Image: The ability of the radiology and cardiology equipment to produce sharp and clear images.

Durability: The ability of the equipment to withstand wear and tear and be used repeatedly without much degradation or down time.

Support and Maintenance Service: The standard and rapidness with which technical support and preventive services are provided by the equipment manufacturer.

Cost: The amount of monetary resources that is required for procurement and maintenance of the equipment.

Safety Features: The functions incorporated in the equipment to ensure patient and user safety to the highest degree possible during the procedure.

Performance: The ability of the equipment to deliver accurate, reliable, high-quality results consistently.

Brand Image: The perception that the consumers have with a particular brand of radiology or cardiology equipment.

Technology: The new innovative features and technological capabilities installed within in the equipment.

DATA ANALYSIS PLAN

- Use of Microsoft Excel version 2019 in order to view the collected data on a spreadsheet.
- Quantitative data collected will be analyzed using descriptive statistics such a mean and mode.
- Qualitative data collected will be analyzed to identify any particular patterns and gain insights.

- Visualization tools such as pie charts, bar graphs and tables will be used to depict the data in a clear and concise manner.

ETHICAL CONSIDERATIONS

This study upholds the ethical standards by obtaining informed consent from all the participants and prioritizing data security, privacy and confidentiality. Measures are taken to anonymize the data, prevent unauthorized access and adhere to the pertinent regulations. Participant autonomy is respected and steps are taken in order to maintain transparency throughout the research process.

IMPLICATION OF RESEARCH

The findings of this study will help realize the potential for hospitals to optimize their resource allocation, maximizing their value of investment and ensuring patient safety. It also provides opportunity for the equipment manufacturers to develop products that meet the user's needs. Provision of reliable equipment leads to positive patient experience and thus patient satisfaction. Thus, the study has significant implications for the general public and the healthcare sector and ultimately results in improved patient care.

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