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## PATIENT SATISFACTION IN HEALTHCARE SYSTEM USING ADVANCE TECHNOLOGY AND BUSINESS INTELLIGENCE

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**Abstract:** Improving patient satisfaction has become a significant objective for medical services suppliers in recent times. In the count of keeping your patients healthy and joyful from the point of view when clinics and hospitals are improving patient satisfaction and experience, they can appreciate more noteworthy repayments that would be able to utilize to additionally improve the nature of the care they give. Improved patient satisfaction is basic for building a solid patient-doctor relationship and may even positively affect the patient's health. Advanced technology plays an important role in a healthcare organization. A lot of technologies are available in the market and it is depending upon the organization which one is best for them. Using these technologies will improve the patient satisfaction level and also help management, staff, and doctors to satisfy patients in a more effective way.

**Keywords:** Healthcare; Healthcare Framework; Healthcare Organization; Advance Technology; Business Intelligence

### I. INTRODUCTION

Healthcare frameworks keep on moving their points of view about the patient experience, an extraordinary patient understanding comes from something other than the patient-doctor association; it's affected by everybody and everything inside a healthcare framework from top to bottom. it's impacted by the whole healthcare system. Healthcare frameworks are constantly seeking after the patient experience, active for more data about how quiet fulfillment and experience find a way into the greater medical services picture. Medical services frameworks and management can keep on improving the patient experience and better deal with a lot of factors adding to its complex nature. Indian hospitals are kept on changing their shape with the ongoing patterns. These day's system transmission and innovation are getting utilized in Telemedicine [6].

Through its therapeutic administrations may be passed on at out of reach, planning can be presented to the healthcare worker for remote hospital assistance and various other health organizations can be given at passage step. Robots are used for Robotic clinical methodology from the start which was looking inconvenient. A number of advanced lockup applications are creating to give Emergency care subsequently to deal with health-related crises. System of rescue vehicle service and get in touch with for medicinal offerings workers in an emergency are additionally advanced in oversee through these applications. 3D printing right here is advancing out. In India, professionals are utilizing careful models made through 3-D innovation to direct surgical operation formerly and all through the method. Symptomatic imaging gadget has brought a change stage from simple to advanced and imaging. Digital radiography, Doppler ultrasound, Advance CT scan

technology, and Medical robotics are anticipating change and utilize the most recent innovation to fulfill the need of the system. Stem cells: feature in India is creating in government and private section moreover[1].

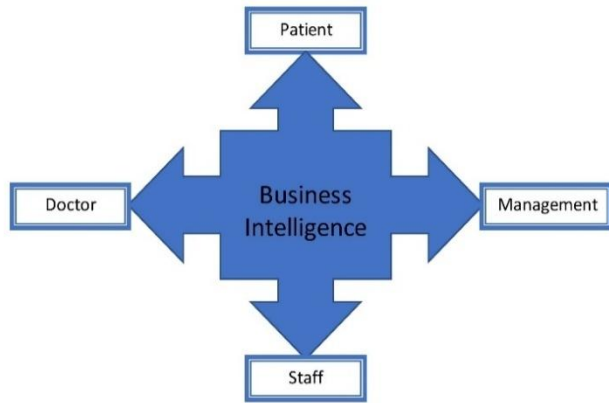


Figure 1: Satisfaction levels in Business Intelligence

Most Healthcare organizations are focusing on patient satisfaction for so many years and working thoroughly to improve patient satisfaction. In the above fig. 1 satisfaction levels in Business Intelligence are shown. Many healthcare organizations are conducting surveys and personal interviews to improve the quality of care and treatment of patients and also fill the gaps in the healthcare system. Patient satisfaction levels and fulfillment are more particular and emotionally predictable. Patients thought and understanding changes significantly. A few patients are hurried to the clinic and hospital by rescue vehicle or ambulance, with blasting alarm. Some patient arrives quietly. Some patients stay for hours and some patients stay for 1 or 2 days, week, or for a long time. All the patients enter the emergency department in the hospital for a variety of injuries and illnesses. The common thing about all patients is that they have their own opinions and experience for the length of stay in the waiting area and the length of stay in the emergency room, the quality of service they are getting, and the quality of food. Understanding patient requirements and making a move to keep patients satisfied is currently a basic part of medical care conveyance. Even after a fruitful treatment for a significant sickness, a patient may leave a clinic or hospital office disappointed for a variety of reasons. Clinics or hospitals need to realize how fulfilled or disappointed their patients are and distinguish those parts of their administration that are in the most earnest need of progress.

Factors affecting patient satisfaction:

- Capability of specialist or doctor for treatment.
- The overall quality of care and the final result of treatment.
- Patient comfort level, food, medicines, and costing.
- Available facilities in hospital for quick diagnosis.
- Daily visit of doctor and update health records timely.

- Service provided by nurse, technician, and other supporting staff.
- Waiting time in visiting area or emergency room and treatment to start.
- Transportation facility to the hospital and ambulance facility.
- Full-time availability of manager in the hospital.
- Convenience for guests or visitors in the corridor or lobby, flexible visiting hours, canteen, parking, and security.

## II. ADVANCE TECHNOLOGY AND BUSINESS INTELLIGENCE

The usage of the healthcare data framework will improve and accessibility of clinical records. It will moreover support the system to correspondingly change from a paper-based system to an electronic system. Best utilization of asset labor, apparatus, or foundation by appropriate arranging and sharing. The use of an electronic system will assist with coming to, best case scenario conclusion and treatment by means of talking with particular experts worldwide for getting the best encouragement. The Electronic Health Record (EHR), Computerized Practitioner Order Entry (CPOE), Healthcare Decision Support System (HDSS), Picture Documenting and Communication Framework (PDCF), Bar Code (BC), QR Code (QRC), and Appointment Booking System (ABS), these are a part of the developments used to follow and manage the clinical facility ongoing work. It is like enterprise resource planning frameworks and the idea suggests joining one IT framework and activates electronic correspondence among associations [1].

In India development will go about as a particular preferred position for passing on the therapeutic administration's organizations. The advancement will be altogether and on direct will be gotten by private human administrations zone. The cost advancement will truly improve IT arrangement execution and will turn into an indispensable piece of the executive's data framework, tolerant consideration, and patient administration. As the clinical protection part is developing will require a powerful data recovery and capacity framework. It will expand requests on human services suppliers to utilize innovation and outfit the current foundation with the most recent gear. The change of medicinal services with most recent and present-day advancements like remote advances and distributed computing. These advances will expect a noteworthy activity to meet the work need. Teleradiology, emergency clinic data framework, remote preparing of healthcare laborers, telemedicine, electronic clinical record keeping, and advance administration data framework will be conveyed in not so distant future and a ton of progression will be seen. For the development of medical clinic productivity mechanization and digitalization of various divisions like charging, drug store, organization, understanding consideration, money, and different zones will be finished. It is actually a test to embrace and execute

innovation with a low spending plan, need IT specialists, hesitance for preparing, obstruction for use from staff, insufficient help from sellers. These components must be managed most extreme consideration for powerful utilization of adjusted framework.

Business Intelligence in healthcare organizations is a tool by which enormous scope of saving data and patient information. The Healthcare industry is the only industry in the world that can reach everybody's life. It is the only industry that has the power to save life and a continuous path towards advancement and excellence. Business Intelligence is the only service framework that can help to cut cost, patient care, information analysis, report, and data visualization through the dashboard. Healthcare Business Intelligence tool is used for data collection and information sharing in order to help doctors and managers to improve hospital outcomes, improve performance, improve efficiency, quality of care, and other services provided by the healthcare organizations. If hospitals and clinics want to improve patient care and increase efficiency then, hospitals must use this tool for patient care, record keeping, costs, diagnoses, report generation, etc.

Monitoring and information sharing can be easily done by the Healthcare BI tool.

1. Sharing real-time data and information.
2. Avoid excessive waiting time.
3. Optimization of patient treatment and care.
4. Patient's balance information.
5. Monitoring staff's performance.

### III. HEALTHCARE SYSTEM

The level of healthcare framework in India is a lot lower than that of developed nations. India is one of the significant nations where illnesses are yet not leveled out. India's medicinal services division, nevertheless, falls underneath overall benchmarks for the physical establishment and work and even falls underneath the standards existing in developed countries. Health frameworks in India are deficient when contrasted and the worldwide norms. It lingers behind the worldwide regarding healthcare framework and healthcare centers. The absence of a productive and responsible general health segment has prompted the heightening of an exceptional factor in private division [2].

- a) Clinical Devices and Diagnostic Centers: The Healthcare Industry are clinically equipped and diagnostics centers are emotionally attached with the network of emergency clinic administrations and thus they are additionally developing persistently with expanding request. Clinical gadgets assume in screening, diagnosing, and treating patients yet in addition to reestablishing patients to typical lives and inconsistently checking wellbeing markers to predict illnesses. With mechanical progressions, the clinical gadgets are

currently growing to improve the nature of care over each phase of the medicinal services [3].

- b) Medical clinics and Infrastructure: The requirement of multispecialty hospitals in small towns and primary care centers in rural areas is high in India. There is a wide gap among the availability and need of successful organizations in India which has made it a necessity for extra health centers and established to serve a larger number of people [3]. The enormous hole sought after and supply of value healthcare facilities and administrations have pushed human services specialist organizations to grow inorganically by converging with contenders or by tolerating huge capital infusions [4].

### IV. PRIVATE HEALTHCARE SYSTEM

Clinical consideration in India has been in the late past productive by private medicinal services suppliers. The activity of the private part is getting more grounded considering the government's cash-related obliges in broadening the prosperity system and growing social protection costs. A quickly expanding middle-class incline toward private clinical consideration. The reasonable deficiency of assets in government-run clinical consideration foundation has additionally moved the interest towards private concerns. Moreover, the improvement of private security net suppliers and extending the spread of clinical assurance is furthermore giving a lift to private clinical thought. The fast advancement of the private sections has offered rise to specific concerns. The need, appropriateness, and capability of care passed on by clinical thought workplaces are logically under request. The issue is exacerbated by the nonattendance of rules and institutional strain to cut down 'cost per infection scene. Despite these worries, the private human services area is developing and getting more grounded. The development of private medicinal services part has been to a great extent observed as a shelter, anyway, it adds to ever-expanding social division [2].

#### a) Appointment Booking System (ABS)

Improving patient satisfaction starts with making a basic and helpful arrangement booking an appointment. Set up an appointment booking system that permits patients to cause arrangements by whatever technique they like, via telephone, by means of email, on the web, or face to face. After a patient has booked their appointment, send them an update message about the appointment and to arrive at the office. This permits time for the patient to reschedule if essential or contact the office with any inquiries they may have. The patient is coming in for a medical procedure or more confusing method, make sure to give all required guidelines about how they should be a plan for their arrangement and appointment.

- i. *Quick appointment check-in and reduce wait time*

At the point when the patient arrives and asks about their booked appointment then the patients should be coordinated and ask for waiting in the waiting area and given an expected time. In the meanwhile, if any crisis or emergency emerges then inform patients regarding the circumstance and give a suitable time. Long waiting time can be a major basis of dissatisfaction for the patient's satisfaction level. What makes patients down is feeling they have been holding up quite a while as real stand-by time or waiting time. For clinics and hospitals as there are numerous measures in which they can take decisions for outward waiting time, but sometimes it is not possible to decrease the real waiting time.

Here are a couple of approaches to decrease patient's waiting time:

- Provide clarifications for significant delays to the patient.
- Create a happy and comfortable waiting zone for patients.
- Keep the patient busy in some activities or entertainment.
- Provide important assistance during the waiting time.
- Pay attention to anxious and emergency patients.

The above steps definitely will decrease the waiting time for patients and improve the satisfaction among patients.

#### *ii. Positive interaction in hospital*

The most basic factor affecting patient satisfaction is the nature of patient communication with specialists or doctors and staff individuals in the hospitals and clinics. While giving top-notch care may appear to be a higher priority than giving great patient care, the fact of the matter is numerous patients can't precisely check the nature of the care they are getting. This implies that regardless of whether excellent consideration is given, patients may even now report low satisfaction if their communication with specialists or doctors and staff individuals were not helpful. Fortunately, specialists or doctors can without much of a stretch improve patient satisfaction by following a couple of straightforward rules for better patient support and more humane consideration:

1. Good Communication with patients.
2. Spent more time in the primary care of the patient.
3. Accountability with the patient during treatment.
4. Supportive nature of hospital staff.
5. Proper hygiene and sanitization.
6. Transparency in the billing process and payment.
7. Easy discharge process and medication.

#### *b) Facilities in Healthcare Organization*

Facilities play an important role to satisfy patients, because patients need different types of facilities before treatment, during treatment, and after treatment. Whenever a patient is

admitted to the hospital or planning for any surgery or treatment then the patient or his family members looking for the available facilities in the hospital, and they don't want to shift patients from one hospital to another or from one diagnosis center. More available facilities more satisfied patient and less available facilities less satisfied patient [8].

Following are the basic facilities available in the eight hospitals of Mandsaur district.

Table 1: Available facilities in hospitals

Hospitals Facilities	H1	H2	H3	H4	H5	H6	H7	H8	Facilities Percentage
	X-Ray	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
X-Ray (Dental)	Yes	No	No	No	No	No	No	No	12.5
Sonography	Yes	Yes	Yes	No	No	Yes	Yes	Yes	75
CT-Scan	No	No	No	No	No	No	No	No	0
MRI Machine	No	No	No	No	No	No	No	No	0
ECG Machine	No	Yes	Yes	No	No	Yes	Yes	Yes	62.5
EEG Machine	No	No	No	No	No	No	Yes	Yes	25
TMT Machine	No	No	No	No	No	No	Yes	Yes	25
Nebulizer Machine	Yes	Yes	Yes	No	No	Yes	Yes	Yes	75
Echo	No	No	No	No	No	No	Yes	Yes	25
2-D Echo	No	No	No	No	No	No	Yes	No	12.5
Ventilator	No	No	Yes	No	No	No	Yes	Yes	37.5
C-ARM (Orthopedics)	Yes	No	Yes	No	No	Yes	No	No	37.5
Baby Warmer	No	No	Yes	No	No	No	Yes	Yes	37.5
Central Line (O <sub>2</sub> )	Yes	No	Yes	No	No	No	Yes	Yes	50
ICU	No	No	Yes	No	No	No	Yes	Yes	37.5
NICU	No	No	Yes	No	No	No	No	No	12.5
SNCU	No	No	Yes	No	No	No	No	No	12.5
OT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
COVID Ward	No	No	Yes	No	No	No	No	No	12.5
Laboratory	No	No	Yes	Yes	No	Yes	Yes	Yes	62.5
Medical Store/ Pharmacy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
Blood Bank	No	No	Yes	No	No	No	No	No	12.5

Here, in Table 1: H1, H2, H3...H8 represents hospitals from 1 to 8 and available apparatus and machines facilities in the hospitals.

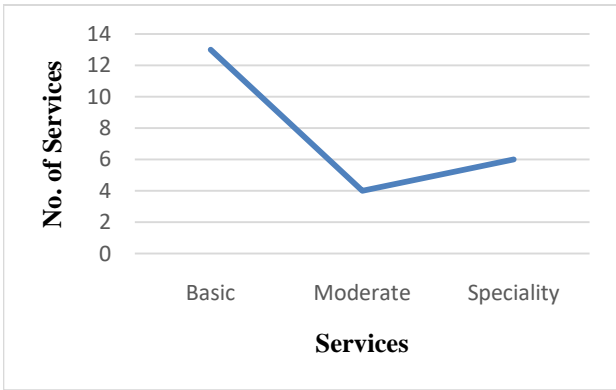
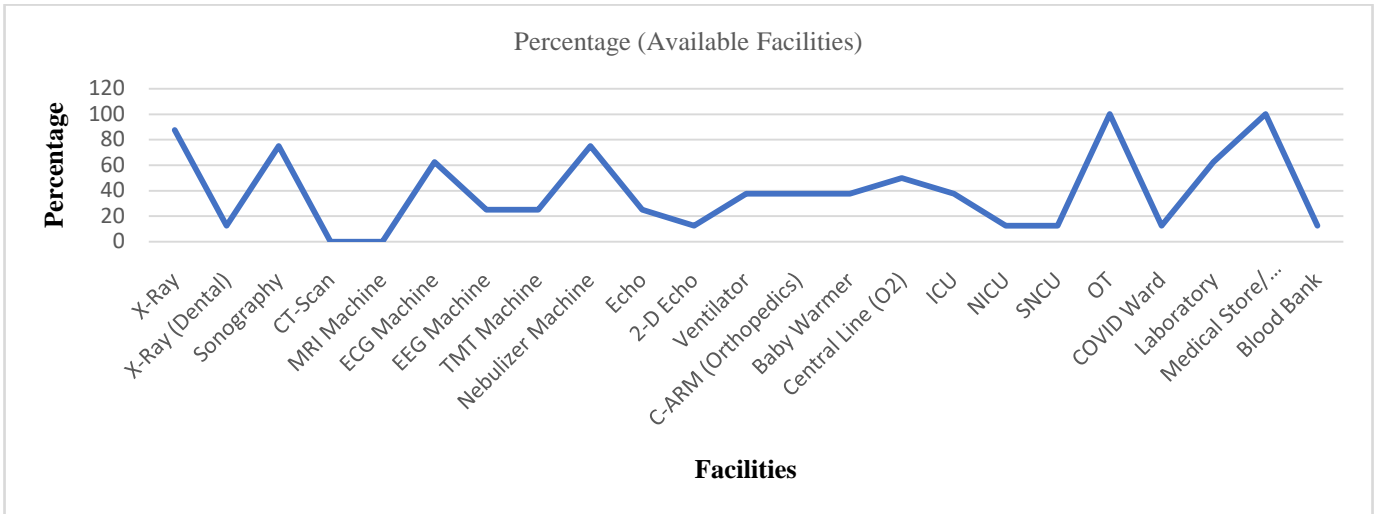


Figure 3: No. of Services

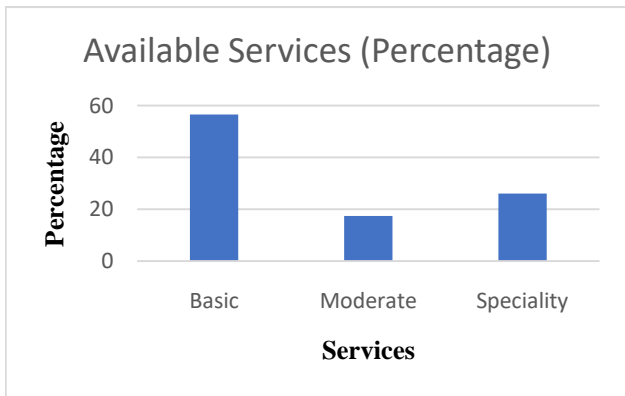


Figure 4: Services Percentage

Figure 3 represents the number of services by line graph and Figure 4 represents the percentage of services by bar graph.

V. PATIENT SAFETY AND CARE

There are various potential harms related to clinical preventive organizations, for instance, counterfeit positives, anxiety, stamping, physical harms, and opportunity costs. These harms can result from clinical preventive assistance likewise from extra follow-up tests or from prescriptions. In order to improve open-minded security, we know anyway much as could be normal about the tradeoff of potential focal points and harms of clinical preventive organizations. It gives off an impression of being befuddling that there may be harms related to clinical preventive organizations. It is correspondingly basic to distinguish how patients see these harms and how to pass these harms to clinical preventive organizations in a social space that favors more negotiation over less. Dynamic clinical preventive organizations require an understanding of people-based assessments of harms to the particular states of the individual patient. Appraisal of approaches to manage, improve the possibility and other correspondence related to clinical preventive organizations should consolidate patients from grouped establishments and patients with limited prosperity training.

Late undertakings to reduce costs and smooth out the transport of care have headed to critical changes in the human administration's working condition. These modifications in working conditions have impacted healthcare administration workers, and many acknowledge that they have influenced the idea of the thought gave. Since the experience of various endeavors shows that differentiation in the rigging and physical characteristics of the workspace, changes in the work system, and differences in staffing can impact the idea of the things or organizations they produce, it may be reasonable to hypothesize that modifications in the human administration's workplace may be affecting the idea of care. Be that as it may and expected to comprehend if those consequences for quality really exist, what they are, and how fruitful negotiations can be supported. The applications supported in reaction to this Request For Applications (RFA) will start to create methodical information on the effect of the physical condition, work process plan, workforce staffing, and authoritative culture on tolerant wellbeing and nature of

care. Along these lines, candidates must have the option to show that they will quantify the effect of working conditions on medicinal services laborers and on clinical execution [5].

#### Benefits of Patient Satisfaction

1. Mouth publicity by the patient itself.
2. Proper hygiene in the hospital.
3. Proper response by the staff members.
4. Good diagnosis by the doctor.
5. Available facilities in the hospital.
6. Transparency in the billing process.
7. Proper information about the medicine and the discharge process.

#### VI. ADMINISTRATIVE CHALLENGES IN HEALTHCARE ORGANIZATION

Numerous clinical facilities and therapeutic administration providers are fighting with out-of-date information advancement in India today. A significant test for our country and the healthcare industry would be exclusively to hold the medicinal services workforce additionally to build up a domain, which would pull in those abroad to return. The developing interest for quality medicinal services and the nonattendance of coordinating conveyance instruments represent an incredible test. There is an intense deficiency of staff of clinical instructors everywhere throughout the nation. One of the crucial elements to support the anticipated development of the healthcare industry in India would be the accessibility of a prepared workforce, other than less expensive innovation, better framework, and so on. Another test will be to discover acceptable ability in India to give the subordinate medicinal services administrations; particularly the voice-based ones which require great English relational abilities as well as generally excellent scientific aptitudes. The growing expense of human administrations that is paid by “out of pocket” portions is making social protection too much costly for a number of people [2,7].

#### Functions of Management

1. Prepare strategies, policies, and planning for the organizations.
2. Prepare financial planning and budget development.
3. Arrangement of proper healthcare facilities and services.
4. Observe staff performance and skills.
5. Accountability and provide information to government officials.

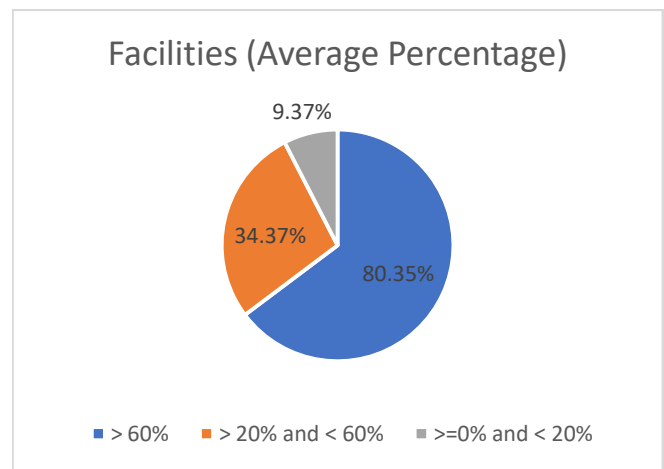
#### VII. RESULT ANALYSIS

X-ray facility is available in maximum hospitals, Sonography and Nebulizer machine are available 75% hospitals, OT and Medical stores are available in all hospitals, Laboratory and ECG machines are available in

62% hospitals, Central Line (O2) is available in 50% hospitals, Ventilator, C-ARM, Baby Warmer, and ICU is available in only 37% hospitals, EEG Machine, TMT Machine and Echo are available in 25% hospitals. X-Ray (Dental), 2-D Echo, NICU, SNCU, COVID Ward, and Blood Bank are available in only 12% of hospitals and only two facilities; CT-Scan and MRI Machine is not available in any hospital.

Some basic facilities which are lacking in hospitals are Echo, 2-D Echo, Ventilator, Baby Warmer, Central Line (O2), and ICU. These basic facilities are necessary for every hospital to fulfill the requirement of treatment and care.

In figure 5, greater than 60% of basic facilities are available in 80% of hospitals, greater than 20% & less than 60% of moderate facilities are available in 34% of hospitals and greater than equal to 0% and less than 20% of specialty facilities are available in only 9% hospitals.



#### VIII. CONCLUSION

The healthcare sector is improving day by day to meet the requirement of healthcare organizations. Now the government is more focused on the healthcare sector because of COVID-19 and improving the efficiency and performance of healthcare organizations. From Table 1 & Figure5 it is clear that 80% of facilities are basic facilities in hospitals, but it is lacking in some hospitals, 34% of facilities are moderate facilities, and 9% of facilities are specialty facilities. The 9% specialty facilities are available in only 66% of hospitals and there is no hospital with 100% facilities.

The government is also enhancing the infrastructure and equipping the hospitals with the latest technology and facilities. With the help of the BI tool hospitals can easily diagnose the disease, improve the quality of care, timely decision making, etc. The manpower working in these hospitals must know the use of these latest technologies, available facilities and BI tools to satisfy the patient. Because a satisfied patient brings more patients to the hospital and the result is profit. In case of the absence of



these latest technologies and facilities, the healthcare sector can't achieve its full potential and the patient is not satisfied. Government and private healthcare organizations need to work hand in hand as a team for future requirements and progress to make India a global leader in healthcare manufacturing and services in the world.

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