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A COMPARATIVE ANALYSIS OF THE IMPACT OF CURRENT HEALTHCARE HOSPITALS AND BRANDED "SMART CARE" HOSPITALS ON THE QUALITY OF THE HEALTHCARE SERVICE

A comparative analysis of the impact of current healthcare hospitals and branded “SMART CARE” hospitals on the quality of the healthcare service

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THE JOHNS HOPKINS HOSPITAL


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مستشفى استر
EMERGENCY


St. Thomas'
HOSPITAL
Serving the community 24hrs a day
Guy's & St Thomas'
NHS


The Royal Children's Hospital


Cleveland Clinic


MEDCARE HOSPITAL
MED CARE
MED CARE
مستشفى ميدكير


ROYAL BERKSHIRE HOSPITAL
Royal Berkshire NHS
NORTH BLOCK
Welcome to the
Royal Berkshire Hospital
Hospital Main Entrance In Craven Road


Fortis Escorts
O.P.D.
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Chapter 1: Introduction

1.1 Background Of The Study

Concept and role of smart care branded hospital

Due to advent in the technology and innovations, the concept of smart care branded hospital has gained importance in the recent years. While focusing on the concept of the smart hospital, it is the hospital setting that is based on several technologies such as Internet of Things (IoT), blockchain technology, bio-telemetry, Global Positioning System (GPS), and virtual rehabilitation so that quality healthcare is provided to the patients (Hassan, El Desouky Elghamrawy and Sarhan, 2019, pp. 3-26). The smart hospitals are built on information and communication technology (ICT) that build a connected and coordinated working environment in the hospital settings. It enhances the patient safety and healthcare by creating a patient centric care environment (Moro Visconti,and Martiniello, 2019, 16 (2)). Due to adoption of new technology and provision of patient centric approach, the needs of the patients are identified by engaging with them. It also includes recognizing the emotions of the patients and responding to them accordingly. Moreover, it also includes creating an environment care where treatment and therapies are provided to the patients based on shared information and patient navigation. As a result, there is enhancement in the quality of healthcare provision which improves the image of the healthcare unit and crates value for the services provided by it (Clarke et al., 2017, 5(3), pp. 362-372).

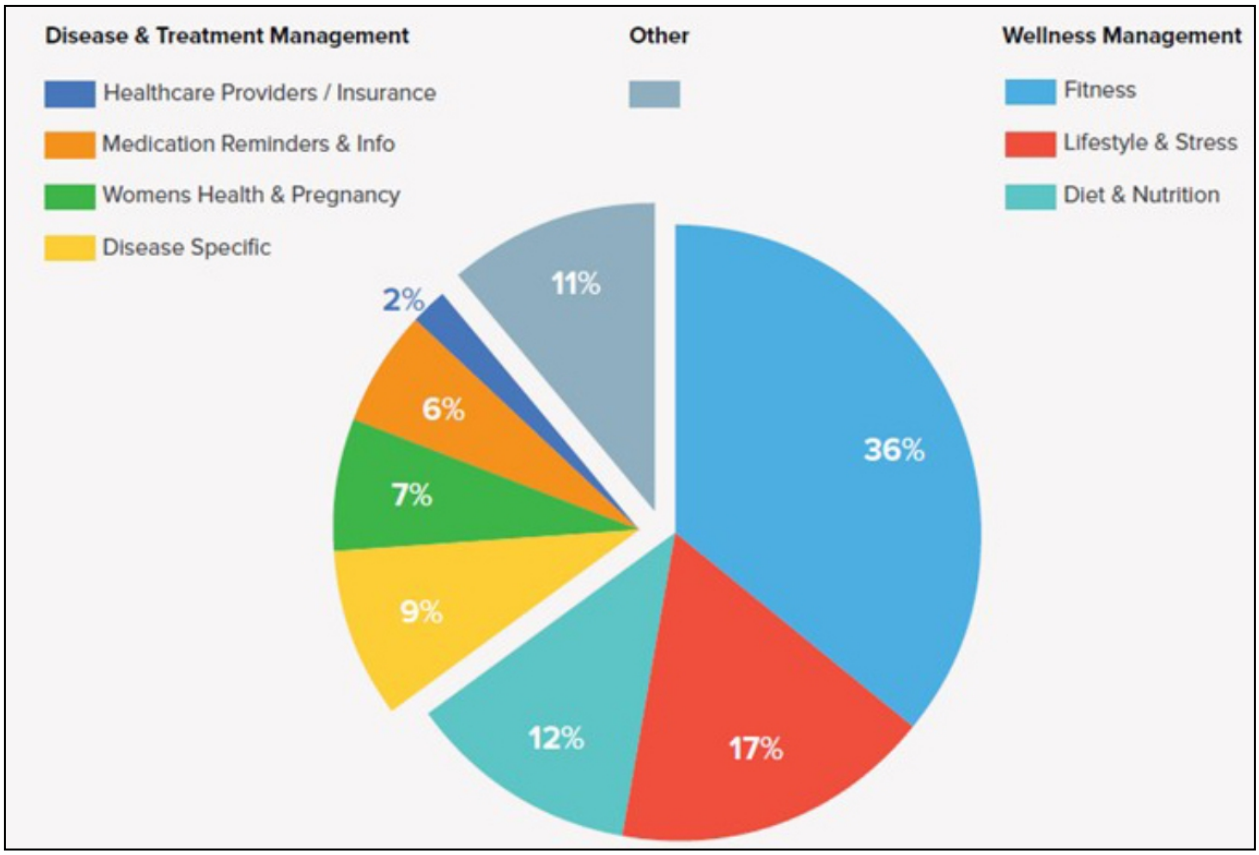

Figure 1: Digital healthcare by individuals

The digitalization of the healthcare services provides ample opportunities to the healthcare service providers to interact with the patients using different mediums and platforms such as video conferencing. It contributes towards adoption of patient centric approach and value co-creation with in the hospital (Rantala & Karjialuoto, 2016, pp. 34-41)**.** The smart hospitals also facilitate provision of remote healthcare services through which the doctors and healthcare professionals could monitor the health and physical condition of the patients. The remote care system includes the use of remote cardiac monitoring systems and big data based remote monitoring system so that the value based care is provided to the patients. It not only reduces the cost of healthcare provision but also transforms the care, service, treatment procedures of the clinicians and healthcare

professionals (Crossley, 2017, 14(1), pp. 362-372)**.** Additionally, the use of digital advancements such as big data into the hospital settings helps in developing innovative smart services. It helps in enhancing healthcare informatics because of which optimized care is provided to the patients As a result, there is improvement in the quality of life of patients and optimized use of the hospital resources and medical staff. Thus, it can be said that digital technologies and advancements boost the capabilities of conventional hospitals and transform them into smart hospitals which provides enhanced medical and healthcare services to patients.

While focusing on the concept of brand image of the hospitals, it is regarded as the belief or impression that a patient is having towards the healthcare unit. Brand image of the hospital can be described as a relative term that is established by patients based on their treatment and care experiences with the healthcare unit. It creates the image, perception or reputation of the company in the market and provides it an edge in among the rivals. Branding also includes adopting marketing strategies so that the image and brand value that has been created by the healthcare firm is maintained and promoted to other patients. The implementing of a strategic marketing approach helps the healthcare unit to sustain in the competitive environment along with maintaining brand identity. For example, Kasturba Hospital, Manipal has established the marketing department that promotes the hospital through corporate social responsibility, loyalty programs, and integrated communication campaigning approaches (Lee et al 2010, 4(4), p. 448). The other strategies that are adopted by hospitals are to promote it and spread awareness about its services is through advertising and print media. For instance, Manipal Arogya uses

pamphlets, newspapers, and television promotions locally to spread awareness about the new service offering by the healthcare unit.

The other strategies such as promotion through services, events, public relations, interactive marketing, and direct marketing are also adopted by the healthcare units to increase their market presence. For example, Vajpayee Arogya Shree (VAS) promotes itself by providing quality services to the patients. As a result, due to spread of mouth-to-mouth publicity/communication from the recovered patients the hospital gained popularity among the masses. Additionally, the healthcare unit also organized events such as the walkthon, the diabetes day to spread healthcare messages and publicize the products and services provided by VAS. The hospitals also use public relation as an effective tool to create brand value of the hospital and increase presence among the patients (consumers). For example, Manipal Hospital organized camps for providing health check-ups to the businesses. The hospital ensured that the event was covered by the press and media so that people are informed about the hospital services and community work. The hospital also ensured that through the camp tenure, the patients are informed about the hospital products and services by using different local languages such as Kannada, bohri or tulu so that common people also acquire learning about hospital services. Thus, it can be said that introduction of new technologies has led to the formation of smart hospitals and adoption of different marketing techniques such as events and camps help in enhancing the brand value of the hospital (Kotler, Shalowitz & Stevens, 2008).

Strategies and facilities employed by smart hospitals

Smart hospitals are established by using ICT advancements such as Internet of Internet (IoT) that facilitate prevailing patient care system and initiate new health care aptitudes. The smart hospital concept is based on the fourth industrial revolution which introduced big data technologies; cloud computing, artificial intelligence (AI) to the healthcare sector. Artificial Intelligence (AI) is included in the healthcare sector to enhance the hospital working and provide quality services to the patients. For example, the use of big data and deep learning helps in detection of disease. It includes the use of Google's Deepmind Health tool so that there is optimizing of healthcare services. The tool examines the patient's data (from the patient case history, clinical records, and research data) and suggests individual treatment plan. It helps inn detecting the symptoms of vascular diseases and cancerous cells at an early stage. Additionally, the introduction of deep genomics into precision medicine helps in maintaining huge medical patient records and establishes linkages between the treatment and disease of the patient. AI technology in healthcare also helps in analyzing the stress and emotional status of the patients by using predictive algorithms. For example, Moorfields Eye Hospital that is located in London has introduced AI systems for digital scanning of the eyes of the patients. The healthcare centre also uses deep learning algorithm technology based Samsung Medison's ultrasound system to detect breast cancer in the individuals.

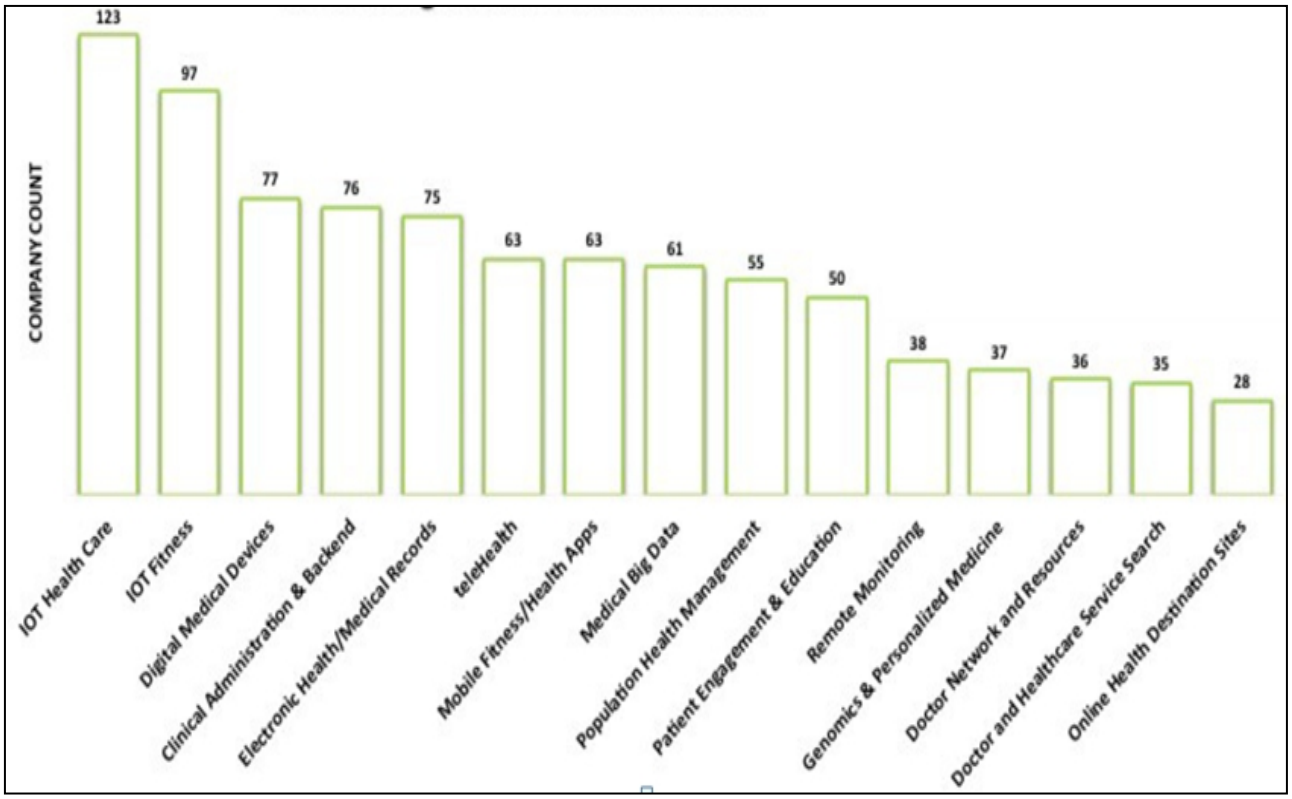

Figure 2: Technology in healthcare

Smart hospital also uses IoT application so that quick and fast service is provided to the patients. IoT applications also help in fast and quick delivery of data which is expected to grow at a rate of 40% annually and increase 50 times by the end of the year 2020. Additionally, the healthcare cost is projected to increase by 4.2% and reach $8.7 trillion by the end of 2020 from $7.1 trillion in the year 2015. The introduction of advanced technologies in the healthcare sector will reduce the cost of hospitals in provision of medical services by tracking the medical inventory of hospitals and pharmacies. The application of IoT facilitates the working of every operation such as wayfinding, workflow optimization, and data analytics. For example, the application of IoT provides onset duration instruction and directions for the movement of the patients. IoT also allows push notifications so that the messages are provided to the each patient in their

favored idiom. It also allows the workflow optimization by facilitating wireless infrastructure through ID badges and wristbadges. Moreover, with the help of IoT based smart wearables, the healthcare professionals could track the biometric data of the patients and provide them quality healthcare services.

Blockchain technology is included in the healthcare services reduces the transaction costs and promotes sharing of data across all networks effectively. Blockchain allows transaction of data by forming digital ledger so that peer to peer transactions are supported, recorded and transmitted. As a result, there is secured transmission of patient data by forming blocks. It streamlines patient data across organization by using secured data exchange process. It increases the efficacies of the hospitals and creates a transparent healthcare practice between the patient and the doctor. Due to blockchain application, there is creation of a smart contract between the patient and healthcare professional based on the rule method. It helps the healthcare experts to access patient data from selected hospitals securely.

Additionally, bio- telemetry has also been introduced in the healthcare sector to increase efficacy of the healthcare professionals and staff. Bio- telemetry includes adoption of smart sensors that help in monitoring the patient and his/her heart rate all through the day. Bio-sensors also communicate the patient information to the doctor by using BAN controller system without using internet. As a result, the system work is capable of working without being digitally connected and the interaction between the healthcare professional and patient is maintained. Bio- telemetry includes monitoring server which collects patient information in the data storage unit, analyzes and process it with the help of software before transmitting the information to the doctor. It also provides remote

monitoring facilities through which patient could be supervised remotely by the doctors and the patients are not required to visit the hospital. Thus, due to bio-telemetry there is reduction in cost and enhancement the quality of service provision by the healthcare staff (Saeed, et al., 2009, (2), pp. 77-86).

Big data is also used by smart hospitals for the drug development process and provision of précised medicine to the patients. For example, due to introduction of big data based Human Genome Project, there has been identification of 1800 genes and above by conducting 2000 tests (and more). Genomic coding and robotic technology help in conducting genomic sequencing and coding that facilitates the working of oncologists. As a result, there is introduction of new therapies and drugs which helps in fighting against infectious diseases effectively. Additionally, big data is used to maintain electronic health records (EHR) by capturing notes that have been provided by the healthcare professionals, clinicians, nurses and care providers. The EHR contains unstructured or unedited data related to the patient that is highly valuable for patient treatment and therapy. Moreover, EHR uses natural language processing (NLP) because of which the patient information is shared with the healthcare expert in his/her known language. For example, Massachusetts General Hospital uses big data technology based NLP system to ascertain patient information so that he/she is provided rightful treatment and medication. Big data technology is also used by Beacon Health Options in the form of NLP so that the patient risks are identified and treated accurately.

Mobile doctor assistant which is based on cognitive computing technologies are used by the smart hospital to provide quality services to the patients. It develops effective communicative channels between the healthcare professional and patient data that

contributes towards patient safety and development of smart hospital. Additionally, the smart hospital management also includes innovative advancements such as Watson Content Analytics that enhances the working of the hospital staff. While focusing on the technical aspect of the Watson, it is based on diversified algorithms and deep QA technology so that the cognitive symptoms of the patients are recorded (Gondek et al.,,2012, 56(3.4), pp. 14-1**).** The Watson based technology is easy and simple to use and can be accessed through smartphone. Thus, by using the Watson technology, the doctor is continuously connected with patients and can be approached easily at the time of any emergency. It helps in raising the hospital healthcare standards and extending the hospital services to the patients anytime. Moreover, Watson technology acts a boon to the healthcare staff working in therapeutic department and outpatient clinics. It is because they are on a constant move in the hospital setting for performing responsibilities. Under such conditions, Watson technologies help the staff of therapeutic department and outpatient clinics to establish coordination with the doctor and the patient (Reuss et al., 2004, 73(4), pp. 363-369**).**

Cloud computing applications in the healthcare sector also enhances the working of the hospital and contributes towards the formation of smart hospital by providing scalable, elastic infrastructure. The other benefits of cloud computing include providing innovative infrastructure facilities to the hospitals that collaborates the medical devices with internet. As a result, the doctor is able to monitor the progress and health of patient remotely and provides theraphatic suggestions accordingly (CS Odessa 2017). Cloud computing provides other benefits such as quick deployment accessibility, cost effective modes of healthcare provision by minimizing the operational expenses that are spend on

implementing modern infrastructure. As a result, there is integration of information by developing web-based applications. It allows flow and transmission of information between through software integration. It enhances healthcare data transmission activities securely and easily among the involved parties (LevelCloud 2017). Thus, it can be said that there are several innovative tools such as Internet of Things (IoT), Artificial intelligence (AI), cloud computing, big data, mobile doctor assistant, and bio- telemetry that help in enhancing the working of hospital and contributing towards the formation of smart hospital.

Differences between the conventional healthcare hospitals and branded smart care hospitals

Conventional medical practice includes traditional medical practice for the diagnosis of the patients, treatment and therapies. It includes the use of complementary and alternative medicine (CAM) therapies so that screening and treatment of patients in executed effectively (Barnes, Bloom & Nahin, 2008). As per the survey conducted by United States Government, it was found that 36% of the patients that belong to the age group category of more than 18 years are treated with the help of CAM which is a group of diversified medical services. It is a form of conventional healthcare practice which is used by 62% of individuals in United States with the hope of getting cured and developing immunity against chronic diseases. It will not only improve the health aspects of the patients but also enhance their quality of life optimally. According to the survey conducted by National Health Interview Survey (NHIS) in the year 2002, it was found that 27 CAM practices were practiced by the conventional healthcare practitioners. The provision of conventional healthcare practice includes providing special diets to the

patients, recommending megavitamin therapy, chiropractic, and acupuncture to bring improvements in the health conditions of the patients.

CAM treatment was highly popular among the patients in the United States and used by most of the patients for the treatment of back pain, depression, anxiety issues, joint pains, and cold symptoms. However, most of the conventional healthcare practices were carried out without the supervision of the authorized CAM practitioner and only 12% of the US patients consulted authorized CAM practitioner. The survey results based on the use of conventional healthcare practice CAM in US, it was found that 43% used prayer technique for the curing of diseases, while 24% asked other for prayers for curing of diseases. About 19% of patients used natural healthcare products such as botanicals, natural herbs and enzymes for the treatment process, while 12% practiced deep breathing activities to remain healthy. It also included 10% of patients that participated in group prayers for self health, 8% practiced meditation, and 8% practiced Chiropractic care activities. Additionally, some of the patients (5%) practiced yoga, 5% did massage, and 4% included diet IQ such as Zone diet and Atkins for maintenance of good health conditions (Barnes, Powell-Griner, McFann, and Nahin, 2004, 2(2), pp. 54-71**).**

The demand for conventional healthcare services has increased significantly in the recent years which have increased the use of alternative and complementary healthcare practices. As per the nationwide survey conducted in the United States 2007, it was found that amongst 10 individuals in the United States every 4 individuals prefer to use conventional method of treatment which includes CAM therapies. While focusing on the conventional market, it generates 33.9 billion U.S. dollars in the form of out-of-pocket spending by the individuals. It contributes 11.2% towards the total healthcare expenditure

and extensively used in the United Nations. As per the survey conducted by World Health organization (WHO), it was found 70% of the populace in India, and 90% of populace in Ethiopia are using conventional medical practices for the treatment of people. Additionally, 70% populace in Chile, 40% of populace in Colombia, and 40% populace in China are also using conventional methods of healthcare practices and treatment (Abbott, 2014). However, there are several benefits of using conventional treatment such as treating the patient internally, low cost of treatment, eradicating root cause of disease, and increasing immunity, it also possess certain challenges. The treatment using traditional means require the patient to visit the healthcare unit or hospital. The hospital settings are based on traditional norms without any digital or modern amenities which make the treatment procedure long and extensive.

The traditional healthcare hospital settings include manual process of registering and form filling which makes the patient recording and application lengthy and time taking. Due to lack of modern techniques of treatment and procedure, there is lack of transfer of patient information and the patient is required to carry the medical history papers or documents at each visit to the hospital. Moreover, in the absence of computerized billing, documentation of the patient facts, it takes a long time to make the final depart from the hospital. It is because the healthcare staff takes time to record all the patient details, prescription details, treatment history, progress and final status of the patient at the time of release. Due to manual conduction of all these procedures, the departure of the patient from the conventional hospital gets delayed **(**Barnes, Bloom & Nahin, 2008). On the hand, the branded smart care hospital used advanced technologies such as Internet of Things (IoT) to enhance the working of the hospital staff. For example, IoT enabled MQTT

protocol helps the branded smart care hospital to increase the efficacy of the firm by transferring data from the server to the patient and doctors easily in real time by using mobile application. As a result, due to coordinated network and establishment of connectivity between the patient, hospital staff and doctor, the patient is provided with all valuable information related to treatment, drugs, therapies, and case history systematically in real-time. Thus, the patient does not have to wait longer at the time of discharge from the branded smart care hospital (Fan et al., 2014, 10(2), pp. 1568-1577**).**

The traditional healthcare units or hospitals do not provide remote healthcare services to the patients. In the conventional healthcare system, the patient is either required to reach the hospital or the healthcare professional is required to visit the residence of the patient. For example, if the patient is undergoing through the treatment of acupuncture under conventional form of treatment, he/she is required to visit the physician to perform acupuncture exercises or the physician has to visit the patient with the acupuncture equipment at the patient house to make him/her exercise using acupuncture points. It creates restrictions for the provision of healthcare services and the conventional means of treatment gets restricted to personal meetings and visits. However, branded smart care hospital does not experience such kind of restriction as the healthcare unit uses modern technologies such as virtual reality to stay connected with the patients remotely. For example, virtual reality helps in the promotion of remote telesurgery process through which the patient is treated remotely. It includes the use of virtual robotic device platform through the healthcare practitioner assists the surgery. It allows the branded smart care hospital to provide enhanced services to the patient in less time and ensure their safety increasingly. Thus, it can be said that with the rapid surge in population and technology

taking over all the major domains, the traditional doctor-patient appointment is losing its efficacy and is slowly being replaced by the advent of smart healthcare.

Impact of current healthcare hospitals and branded SMART CARE hospitals

While focusing on the current impact of the healthcare hospitals, the current hospital settings are going through several challenges and issues concerning provision of services to the patients and maintaining security of patient information within the organization. The major issue that is faced by the current healthcare hospital is related to cybersecurity. It is because most of the hospitals are experiencing data security issues with their healthcare units. In respect to this, more than 350 breaches have been recorded in the United States healthcare sector which led to the loss of 4.93 million patient records.

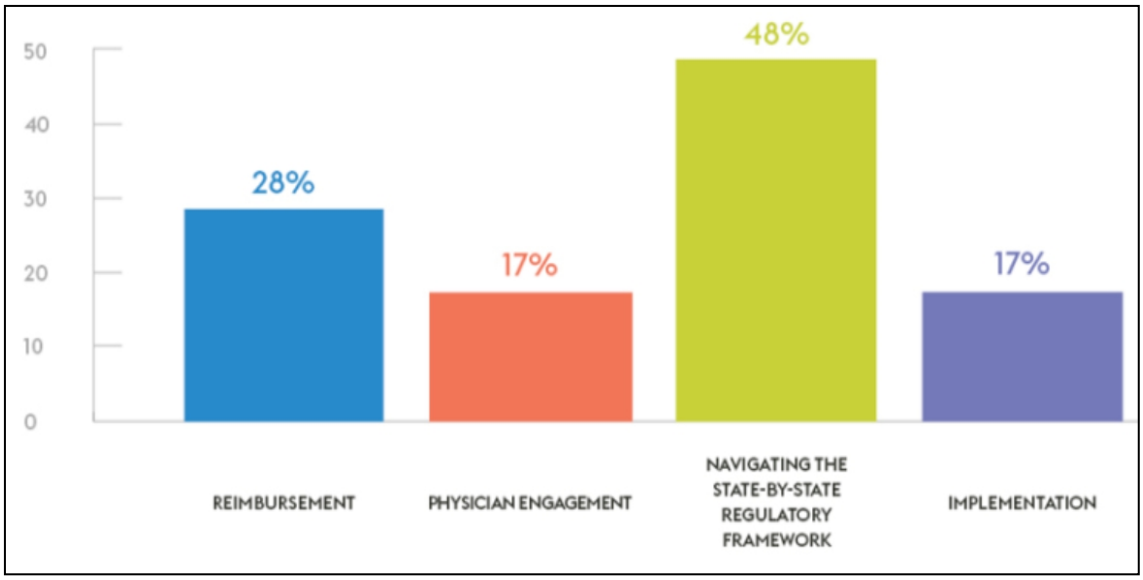

Figure 3: Smart Healthcare challenge

In the recent survey, it was recorded that about 32 million cases of patient breaches were recorded in the year 2019. Another issue that is faced by the current healthcare sector is related to the invoicing and payment processing difficulty. The collection of payment

from the patient has become a difficult task as major portion of medical bill is paid by the patient themselves. Thus, the hospital is required to provide customer friendly payment techniques through credit card, eCheck, net payment, wallet payment, or mobile payment so that payment against services are received earnestly. However, patient often bargain with the payment according to which the hospital staff operator has to make changes in the individual patient account. It increases the payment processing and technology maintenance cost which reduces the profitability levels of the hospital.

The issue related price transparency is also faced by the current hospital and healthcare unit. The patient faces issues regarding payment of healthcare service expense bill because of confusion in the billing process. As a result, the patient chose to visit those healthcare units that provide quality healthcare services and transparent billing structure to the patients. Therefore, it has become essential for the hospitals to maintain a transparent pricing and billing procedure so that payment issues are reduced. In the current times, most of the medical bills are paid by the patients themselves so they demand netter services by the hospital. Under such conditions, the hospital faces issues related to retaining the patients and adopts modern technologies to attract and sustain the patients. It includes providing extensive services to the patients such as 24-hour services, patient history services, immunization records, and up dated health status reports of the patients. As a result, quality services are provided to the patients that increases the patient base of the hospital. However, due to adoption of advanced technologies by the hospital to provide quality services to the patient, the cost of the hospital increases which reduces the profit earning level of the firm.

While focusing on the impact of branded smart care hospitals, the inclusion of the modern technologies into the current health care segment has not only enhanced healthcare services but improved the quality of healthcare among the patients. The branded smart care hospital plays a major role in connecting the patients to the healthcare units by using different marketing techniques such as event, print and electronic media advertisement and provision of quality services. The branded smart care hospitals procure health plans that connect the patients to the healthcare systems by creating the healthcare system ecosystem. As a result, there is attainment of a dataset by the branded smart care hospitals in which all the patients are provided quality healthcare services. Additionally, the branded smart care hospitals are also majorly focusing on the patient base development, attracting more patients and retaining them with the hospital. The branded smart care hospitals are working as per the directives that are provided by Medicare Access and CHIP Reauthorization Act (MACRA) which helps in streamlining the patient payment procedure based on Merit Based Incentive Payments System (MIPS). As a result, there is adoption of value-based payment model by the healthcare unit which enhances the productivity and healthcare provision in the branded smart care hospitals.

As per the survey conducted by Human Capital Trends Research, it was found that the adoption of modern technologies such as artificial intelligence (AI), Internet of things (IoT), cloud computing, and virtual reality, the hospital staff in the branded smart care hospitals are able to provide their service proficiently. The survey also released that the adoption of modern technologies is going to increase by 100% in the coming years by the current hospitals. It will enhance the capability of the current hospitals to provide quality services to the patients and ensure that they health conditions improve significantly. As

per the survey conducted by Physician Survey 2018, it was found that an increasing number of patients are conscious about their health and adopting virtual health subscriptions to maintain their health conditions. As a result, 14% of the healthcare professionals adopted advanced technologies to conduct virtual visits and provide services to the patients. Additionally, advanced technologies are also adopted by 17% of healthcare professionals to carry out physician to physician consultation. It not only increases the efficacy of the hospital staff but also empowers them to provide quality service to the patients. Thus, it can be said that branded smart care hospitals are the future of current hospitals as increasing number of healthcare units are adopting advanced technologies to provide services to the patients.

Recent Trends in Healthcare

Overview of the existing trends in the healthcare industry

The global healthcare industry is going through its transformative phase. As these days patients are more aware and they need enhanced services, for that healthcare sector needs many upgrades to improvise their system so that it can maximise its services to meet the increasing population, healthcare workers, other government and non – government organizations. Due to which a proper planning is done to formulate effective policies on central and state – level. Accordingly, to smoothen up this planning and execution system the major factors like finances, workforce, skilled manpower, adequate logistics and quality medicines is required along with the timely up-gradation and reformation of any existing policy for the betterment of the mass. These reforms and upgradations are not possible with the joint collaboration and support of the related stakeholder which include

pharmaceutical companies, employers, health insurance firms, lawyers, central and the state government, healthcare workers, NGO's and patients. Over the past few years, we can notice this healthcare and healthcare technology secured over $7.5 billion of investment in 2018. During these years only many significant changes were made and many companies have tried to redefine the term digital transformation. Which resulted in the new dawn of digitalized healthcare products like FitBit, smart watch, health tracker etc. but on the base level there are still many places where hospitals and staff are not aware of the computers and still use to maintain their records manually. However, there was an immense volume of information however not many tools in healthcare part to assess thus to additionally produce information for powerful clinical medicines and other related services. Majorly India have become centre point of IT and IT enabled services managed by skilled professionals still it lacks the proper implementations of its services in relation with other countries. There are many regions where IT services are still not used; this setback is due to the lack of motivation and adoption of the new upgraded technologies. If we analyse the previous few year's data, the health information technology (HIT) acceptance to learning attitude among the private hospitals and their good results is very contradicting in comparison with the government hospitals. Due to the major challenges which the government is worried about is growing and aging population, increasing multiple chronic diseases, lack of infrastructure, lack of learning new technical skills, higher labour cost due to shortage of workforce, progressing care models, poor eating habits and malnutrition among people, expansion of well-being system in developing markets. Considering these issues, the concept of universal healthcare system is the major vision of the government and for that the central, state and

territories are trying to develop and enhance attribute by improvising the quality of hospitals, upgrading them with multiple specialized and technical machinery, digitalize all the old medical records and moreover enhance the standard of living, along with the proper education of nutrition level to develop a good and healthy public health.

Currently, the global health care trends are not similar and consistent across all countries; this is due to the huge disparity of income levels and urbanisation. But one thing which all the countries are working upon is to increase the life expectancy. As per the survey conducted by World Health Organization (WHO) over the past seventy-five years the life expectancy has nearly doubled since 1955, as the average age of life was 48years then which rose to 65 years between 1990 – 1995, followed by 71 years in 2010 – 2015 and by 2025 it will reach to73 years of life expectancy. But this gain is observed and expected uneven across 16 different countries when it was observed that life expectancy actually reduced between 1975 – 1995 where as in few other regions it surpasses the global averages. These changes were possible due to the innovative remedies discovered for few chronic diseases like Tuberculosis, stomach cancer, heart diseases etc.

Apart from the increasing life expectancy, the major reason of the ageing population in the global healthcare scenario is impact of booming urbanization. In a survey it is said that 66% of the world's population is expected to live in the cities, resulted in the increasing shift of urbanized population significantly. This urban mass usually ranges from extremely affluent to destitute, but these cities will consist of major accessibility or resources and information which results in demand of adequate healthcare system. If this greater demand of healthcare is not accomplished then possibility of pandemic situations would rise which leads to civil unrest. To overcome such problematic situations

improvisation of healthcare system is very essential in developing countries. Apart from that this urbanization would probably bring psychological and physical impact on the green spaces and farming industries hence healthcare and other related services if gets developed in the rural areas then the demand of population migration to the cities would relatively reduce.

Another factor which cannot be neglected is growing wealth inequality in our globalized society. The chief amongst these is healthcare. All the average income countries are able to provide affordable healthcare to a wider part of the population but conditions in the poor countries is very serious and they're even the life expectancy ratio is also low and this situation gets worse during any pandemic. Hence there is a huge demand and reformation is needed to make affordable healthcare system for all the countries and for all the classes of the society.

Transformative measures taken to develop Smart Hospital

In the current scenario healthcare business has to match up with the pace of digital transformation in healthcare to provide better and best results to the general people. But as soon as we think of matching the pace with the emerging technologies it requires the huge investment, skilled and adaptive workforce and risk-taking mind-set, this will not present effective result unless we discard the out-dated business processes and have faith on the latest methods.

With the evolution of digitalization people these days have become very demanding and want things as per 'their demand', means services as per their convenience, place and time. As the healthcare industry has entered the era of digital innovation, patients these

days seek all the guidance as per their schedule. We know that due to digital revolution today every person is using mobile phone and as per the statistics more than 50% of a person's work these days get accomplished by browsing on mobile phone in the year 2018 hence all the resource should be developed in such a manner (user friendly) that it can be easily accessed by the general public. As per the survey conducted in 2019 says that four billion people globally use internet hence there is a wider digital transformation possibility help then to access the people on the larger scale with ease and apt record. As per the DMN3 these days 47% of consumers research different doctors as per their illness, 38% search for different hospitals and medical facilities and 77% people book their medical appointments by their mobile phone. Moreover, these days even doctors are working on the freelance basis for various hospitals as per their expertise, patient's circumstance and schedule. Therefore, not only patients are getting benefit but medical practitioners as well can get the utility of 'on demand' advantage of digitalization.

Due to the aggregating trend of social media, e-commerce, e-wallets and online transactions it concludes a huge data of information which can be fruitful for the healthcare industry. This also help them to provide error free medication, patient record analysis, their drug prescription, meetings and visits, which eventually proves to be cost effective, availability of emergency room, reduces waiting period, and allocation of proper staff and medical aid to the patient. Digitalization also have accumulated all the data from smart gadgets to cloud, such data can be utilized by the healthcare and pharmaceutical companies to plan their investment as per the demand, their demographic information and need as well as to improvise the services to provide the best services possible. Moreover, there have been multiple development in the curing methodology

developed by which treatment has become very effective and targeted one of the developments is Virtual Reality (VR), as there are millions of people struggling with chronic pain, anxiety, post-traumatic stress, mental disorder, stroke etc. VR helps such patients to hone their skills and plan complicated surgeries. It also helps a wearer to give a feeling of personal touch, help children with autism and others to learn, motivate and exercise. The global virtual and augmented reality is expected to reach $5.1 billion by 2025 in healthcare market. Wearable medical device market is also expected to boom from the Sensex calculation of $8 million in 2017 to $27 million by 2023. Digital age has taught and spread the awareness on focusing on prevention and maintenance of their health and in this wearable device helps them to track their health and indicate in terms of the emergencies to consult their doctor before it gets late. Some of the mostly used wearable devices and gadgets are tracked down by their smart phone, smart watch and fitness bands which track down a person's heart rate, calorie burnt, blood sugar level for diabetic people, oxygen level in the blood for respiratory illness, COPD or asthma people. These devices not only show the track record but such gadgets and applications give a personalized health experience to the user as per their need. It also suggests them to get a targeted insurance cover as per their risk for illness and along with that it helps and support the user to set their fitness goals and challenges through exercise, step count, water reminders, diet and nutrition which in the longer run saves money spent on the heavy medical bills.

Another major factor which healthcare recently working upon is 'predictive healthcare' this is used to aid and forecast any major illness or diseases which major threat in the near future and be prepared with the admission rates and proper staff and facilities to

combat such disaster. Even this provides timely necessary advice and predictive model to represent appropriate suggestion for businesses of all sizes along with the people to avoid the chaos. Digital transformation has represented one of another trending key player named Artificial Intelligence (AI) in which entire industry in eager to invest which is expected $34 billion by 2025. It is expected to shape and transform all facets of industry. AI in well-being brought into existence to Japanese nurse robots and many American versions of it like Moxi, for assisting human nurses with their regular routine, stocks and supplies even hospital droid is designed with this AI support, Chartbots and Virtual health assistance are another AI based technology which helps patients in their diagnostic tools and therapies. With the support of AI these days complex surgeries and treatment is possible in curing and therapies like genetic makeup, cookie – cutter treatment, cancer treatment, radiology, operations which need special precision all are performed with AI meticulously. Overall, it is predicted that AI would bring $150 billion dollars of annual savings in US healthcare economy by 2026. Considering that multiple start-ups are trying their hands which resulted in 14 folds since 2000 which is making this segment more attractive for the investors.

Changes marked in Healthcare industry over the last few decades

The healthcare industry has made remarkable strides over the course of a decade. During this period multiple things were improved, new discoveries were made, many methodologies were upgraded and new policies were made, hence we can say that progress is never made in a straight line. During this course of time new policies were made, innovations had solved some problems while caused new complications. Even diseases we eliminated as a nation return. Nothing we deem a milestone here is

considered a win or a loss. In 10 years, we saw healthcare take steps forward, backward and sideways. But to list down the few achievement and discoveries then there are few that has marked their major impressions on entire healthcare industry over the last century are as follows:

Technology – The reach of technological innovation continues to cultivate, changing all industries as it evolves. In healthcare, technology is progressively playing a role in almost all progressions, from patient registration to data monitoring, from lab tests to self-care tools. In this flow devices like smartphones and tablets are starting to replace conventional monitoring and recording systems, and people are now given the option of undergoing a full consultation in the privacy of their own homes. Technological advancements in healthcare have contributed to services being taken out of the confines of hospital walls and integrating them with user-friendly, accessible devices. These tools like smartphones and tablets aids healthcare providers to more freely access and send information which help and allow a patient to become active players in their treatment by connecting communication with biometrics, AI, VR and wireless connections etc. This pace has also marked their hand in rural settings which were lacking access to the same resources metropolitan areas may have along with the reduced cost in comparison with the services offered to them. Currently we can think of equipment being used on a regular basis and there are huge and heavy machines like CT scan machine that can take X-rays from multiple angles, without harming a person with its fatal rays. The Operations these days have also improved and loaded with precision equipment's. With the help of AI and VR it allows patients to become more closely involved and better educated about their care. It would be difficult to narrate all the benefits in a short span of time but to narrate it

in brief can be said that technological advancement has brought a massive improvement in entire industry in a positive manner.

Analytics – As analytics is used by the IT and tech companies to observe various websites, strategies and campaigns likewise medical centres use analytics to monitor patient's illness, their performances and numerous other things. At the turn of the century, when big data was first hitting the scene, it was often defined by the "three V's" of volume, velocity and variety, reported by Health Catalyst. In other words, big data consists of massive amounts of data in widely varying file formats – and yet, in order to be useful, organizations must be able to utilize it quickly. With the support of healthcare analytics evidence-based treatments and prescription derive from huge data analyzation made possible. Apart from that there is extensive value played by the analytics in this field, as per the authors of the piece claimed that "The huge improvement in the cardiovascular disease was achieved by the integrated system and it gained the value of $ 1 billion in conserving in context with the office visit and lab tests"

Medical Research Work–The speed of science is often excruciatingly slow but over the last decade a rapid change was seen in comparison with the previous decades. These researches were majorly done on medical studies, treatment of various fatal and non-fatal diseases and improvement of patient's quality of life. The research work now is far more and advance then lately. To name a few, human genome project, stem cell research cure of Cancer and targeted therapies, HIV and Tuberculosis can be said commendable, even the cure of any type of cancer can be made if it gets detected in early stage. Loads of advance treatments have also got developed in chemotherapy, radiotherapy and others even targeted cancer therapies to interfere the growth of cancer by blocking cells

involved in tumour growth or these cancer cells has been detected and killed, apart from that many epidemic diseases were also got their appropriate cure with proper drugs and vaccination. It won't be wrong to say that every day there could be a discovery being made and this is majorly done to improve the overall healthy lifestyle of the mankind.

Manpower and Workforce – The increasing opportunity in the healthcare industry also brought multiple opportunities of job which not only helped the industry to flourish in multiple manners wherein it smoothens the innovation and adaptability of new way of digital studies in comparison with the older methods. The rate of job growth in the healthcare sector is projected to be three times as great as the rate of job growth in the remainder economy. Health care jobs will undoubtedly continue to rise in the coming years given the growing and aging population, and the US and other countries will need to replace millions of health workers who will retire or move on to other occupations. It also aids guarantee of career path, well paying, and recession – proof job for millions of individuals across the globe.

Amendment in Law –For the welfare of the mankind and considering their health perspective the major law was enforced called Anti-smoking laws and multiple campaigns was launched to reduce the public smoking which resulted in prohibiting smoking in workplaces, restaurants and bars in 2003 in only 75 cities in the United States but by 2013 this number topped 560 and now more than 28 states that ban smoking in many indoor areas. This "smoke – free" laws substantially improved indoor air quality, reduced second hand smoke exposure and related health problems among non-smokers. It helps smokers quit, change social norms regarding the acceptability of smoking and reduce heart attack and asthma patients. Another major contribution was seen when new

mergers between insurers and health care institutions, the major purpose of this merger was to give the best medical care without any strain on the finances. Health insurance plans offer protection against high medical costs. It covers hospitalization expenses, day care procedures, domiciliary expenses, and ambulance charges, besides many others. You may, therefore, focus on your speedy recovery instead of worrying about such high costs. Apart from that there are other benefits like cashless claims, pre- and post-hospitalization coverage, group medical insurance to cover your entire family, tax benefits to the policy holders, so that medical facilities do not get restrained to the affluent people rather it can be made pocket friendly for all the masses.

1.2 Rationale of The Study

The current study is necessary to be carried out so comparative analysis of the impact of current healthcare hospitals and branded smart care hospitals on the quality of the healthcare service could be established. The study provides valuable information related to the concept and role of smart care branded hospital and analyze the strategies and facilities employed by smart hospitals. It also scrutinizes the differences between the conventional healthcare hospitals and branded smart care hospitals provides information related to impact of current healthcare hospitals and branded smart care hospitals. The study examines that the branded smart care hospitals have become the need of patients in the current times as the hospitals include all the advanced technologies that are required in the treatment of patients. The branded smart care hospitals ensure that the patients are provided with intensive care when no means of physical communication is possible between the patient and doctor. Under such condition, the branded smart care hospitals use technologies like virtual reality to treat the patients with the help of virtual robots and

doctors. As a result, the poor health conditions of the patients are resolved and more safety is provided to them through proper monitoring and remote supervision. Thus, it can be said that branded smart care hospitals have changed the way the conventional hospitals used to work and provide quality services to patients under difficult circumstances (Watson, 2014, 34, pp. 1247-1268).

1.3 Aims and Objectives Of The Study

The study aims to attempt a comparative analysis of the impact of current healthcare hospitals and branded smart care hospitals on the quality of the healthcare service. To achieve this aim, the following objectives have been taken into consideration:

- To assess the concept and role of smart care branded hospital
- To analyze the strategies and facilities employed by smart hospitals
- To scrutinize the differences between the conventional healthcare hospitals and branded smart care hospitals

1.4 Significance of The Study

The current study provides relevant information about conventional means of treatment in the hospital and the modern means of treatment procedures that are used in the hospitals. As per the comparative analysis, it was found that the conventional means of treatment are useful and used by many patients in the United States and other countries such as India and China. However, the mode of treatment that is provided by the healthcare professionals are outdated and needs to be modified as per the needs of the current patient demands. The study examined that the in the current times, most of the

healthcare expenses are borne by the patients themselves. Under such circumstances, the patient wants best services and do not want to compromise on the maintaining of health standards. Thus, the role of branded smart care hospitals has increased in the current times as they are providing quality services to the customers by adopting advanced technologies and innovations. For example, the application of IoT provides onset duration instruction and directions for the movement of the patients. It not only enhances the provisions of healthcare services by the hospitals but also improves the health aspects of the patients. Additionally, the study also provides valuable information related to impact of current healthcare hospitals and branded smart care hospitals on the quality of the healthcare service along with scrutinizing the differences between the conventional healthcare hospitals and branded smart care hospitals.

1.5 Research Methodology

The research methodology is defined as the approach that is used by the researcher to collect, analyze, and interpret data as per the research topic. It is a step-by-step process or a scientific way through which research is undertaken to solve any issues with the help of principles, theories, and approach. It includes different processes such as research paradigm, research design, data collection method, and sampling so that the reliable facts related to research problems are evaluated.

Research Paradigm

A research paradigm is termed as the combination of theories and variables that are enclosed in the researching process. It has been classified into two parts which are positivism and interpretivism. While focusing on the positivism research paradigm, it is

described and examines the scientific methodologies. It is a quantitative aspect that helps in extracting truth with the help of valid perception and interrelating different independent variables. On the other hand, interpretivism is associated with the objective as well subjective aspect of the truth and qualitative methods to explore and express the data.

The current study includes positivism research paradigm as it will help in collecting and analyzing facts related to assessing the concept and role of smart care branded hospital. It will also help to analyze facts related to factors that influence the e-business process in supply chain management by using numerical analysis so that relevant facts are gained precisely. The positivism research paradigm examines the developed hypothesis with the help of quantitative data collection and statistical analysis. It will help in analyzing the strategies and facilities employed by smart hospitals.

Research Design

Research design is known as one of the most vital parts of the research methodology that creates an outline structure for the conduction of the entire research process. It also serves as a guideline to collect and evaluate the relevant data. It has been classified into three parts which are exploratory, descriptive, and explanatory research design. Exploratory research design is a qualitative investigative method that helps in acquiring subjective aspects of the research. Descriptive research design includes both qualitative and quantitative investigative methods that explore, collect, and analyze facts based on variables included in the study. Explanatory research design is a quantitative investigative method that examining the hypothesis.

In the current study, the descriptive research design is to be used so that there is collecting and analyzing facts related to scrutinizing the differences between the conventional healthcare hospitals and branded smart care hospitals. It will also generate an association with the various variables and explain each fact of the research intrinsically. It will help in acquiring relevant information related to the concept and role of smart care branded hospital. The descriptive research design will also help to provide a detailed description of facts related to analyze the strategies and facilities employed by smart hospitals.

Research Approach

The research approach includes processes, strategies, and techniques that provide guidelines to carry out the research process. It is classified into two parts which are quantitative approach and qualitative approach. The quantitative approach research approach includes the collection and analysis of facts by using numerical expressions and formulae. It includes the deductive approach which examines the hypothesis and gathers information based on its acceptance and rejection. The qualitative approach includes a collection of facts based on the perception of the respondents towards the subject under study.

The current study includes a deductive research approach as it provides relevant information related to the concept and strategic case related to comparative analysis of the impact of current healthcare hospitals and branded “SMART CARE” hospitals on the quality of the healthcare service. The deductive research approach is known as a top-down approach that collects and interprets data quantitatively. It will help in

exploring the impact of current healthcare hospitals and branded SMART CARE hospitals on the quality of the healthcare service effectively.

Data Collection Method

The data collection method is the process that helps in collecting facts with the help of primary and secondary data collection methods. Primary data collection includes the first-hand collection of facts directly from the selected sample of respondents. Secondary data collection method includes a collection of facts by using secondary resources such as books, articles, journals, newspapers, and documentaries.

The current study includes the primary and secondary methods of data collection to provide relevant facts related to the impact of current healthcare hospitals and branded SMART CARE hospitals on the quality of the healthcare service. The primary facts will be collected by using surveys, focus groups, interviews, or questionnaires. The questionnaire data collection method includes the generation of an idea by using in-depth interviews and focus groups that help in acquiring relevant facts related to the concept and role of smart care branded hospital. The secondary method of data collection includes collection of information from reliable secondary sources such as books, articles, journals, documentaries. The investigator also includes digital means of information collection by using search engines such as Google Search.

Sampling

Sampling is the process through which a unit or sample is selected from the populace. It has been classified into two types which are probability and non- probability sampling methods. The probability sampling method is related to the adoption of probability theory

that selects the sample in an unbiased manner. The non-probability sampling method includes analyzing facts with the help of volunteers. In this process, the sample is selected based on case studies so that the qualitative aspects of the study are analyzed.

The current includes a simple random sampling method which is a probability sampling method. It helps in selecting the respondents from the naturally- occurring group of people in a uniform manner in which equal opportunity is given to all the respondents to get selected. The size of the sample unit for the present study will be 200-250 individuals that are working in the healthcare sector. The respondents that would be selected for the study will belong to the age group of 21 to 60 years of the age group that are working in hospitals.

Data Analysis

Data analysis is the process through which facts are estimated quantitatively by using numerical expressions and statistical means. The facts are represented by using graphs, pie charts, bar graphs, and thematic presentations. The current study includes ANOVA, Chi-Square, and factor analysis so that reliable facts related to strategies and facilities employed by smart hospitals.

1.6 Chapter Scheme

Chapter 1: Introduction

In the background section of the study, the researcher will provide detailed information on the impact of current healthcare hospitals and branded SMART CARE hospitals on the quality of the healthcare service by offering a comparison and contrast between them. Environment in hospitals is bound to be rife with stress and discomfort for people. With

the rapid surge in population and technology taking over all the major domains, the traditional doctor-patient appointment is losing its efficacy and is slowly being replaced by the advent of smart healthcare. This section will lay a foundation around which the study will revolve. The rationale of the study section will explore the growth and evolution of the healthcare sector. It will take into account various issues encountered by this industry and factor into its competence in ushering in a positive change by focussing numerous advanced facilities encapsulating all the medical fields. After mentioning the need for conducting this study, this section will highlight the limitations in the current literature related to this subject, and state the reason which makes it necessary for the research to be conducted and fill the gap. In this section, the researcher will delve into the scope and contribution of the study for future research. It will focus on the significance of the study towards deconstructing the impact of current healthcare hospitals and branded "SMART CARE" hospitals on the quality of the healthcare service.

Chapter 2: Branding of Hospitals

Hospitals have different forms of assets that require utmost care as they offer benefits to patients, employees and owners. The primary importance of branding hospitals is that it enables the consumers to perceive differences between services provided by different hospitals. It becomes incumbent upon the hospitals to deliver healthcare consistently once a hospital achieves a superlative position as consistency in delivering service or care to patients will make it a hospital of repute.

Chapter 3: Comparing Satellite Clinic and the Hospital-Based Clinic

This chapter will compare the satellite clinic and hospital-based clinic. The concept of satellite clinic is new and will be underlined and juxtaposed with hospital-based clinics.

Smaller “satellite” clinics, spread across a variety of locations, allow patients easier access to medical services, and bring medical care closer to communities that may be far from major hospitals. Some of these satellite facilities are administrative locations in lieu of care-providing ones.

Chapter 4: Smart Healthcare System: Need, Components and Characteristics

This chapter will underline the functional and non-functional requirements of smart healthcare. Functional requirements address specific requirements of a smart healthcare architecture. They are specific to each component used in that healthcare system based on their application. As opposed to functional requirements, non-functional requirements are not very specific. They denote the attributes based on which the quality of the healthcare system can be determined. Non-functional requirements of smart healthcare can further be classified into performance requirements and ethical requirements.

Chapter 5: Conclusion

This section of the study will review the entire study that has been conducted, and will analyse the results obtained from the data collected via a quantitative and qualitative approach. The analysis will thus show whether the desired aim and objectives of the study are achieved or not. The section will showcase the relevance of the study to the existing literature and academic works. The conclusion section will highlight the significance and contribution of the study conducted to future research, explorations and references.

Chapter 2 Literature Review

2.1 Branding of Hospitals

According to Odoom, Narteh, & Odoom, (2019) healthcare industry is a vital sector that provides medical and wellness facilities to all the individuals globally. It is a constantly evolving industry that adopts new technology and advancements to enhance the service quality to ensure that patient issues are well addressed. Dina Barbis, (2012) examined that in recent times, the healthcare industry experienced exponential growth owing to change in cost structures, the inclusion of alternative healthcare practices, and evolving healthcare rulings. The expansion of the healthcare sector has provided immense opportunities for consumers to be selective and opt for healthcare organizations that provide high-quality services. It has increased competitive pressure among the healthcare units and forced them to adopt different marketing techniques and technologies to increase their brand value and patient inflow.

Sen & Chakraborty (2017, 7(2), pp. 234-244) examined that due to the revolutionizing and modernizing of the healthcare sector, the value of healthcare organizations has increased significantly. As per the survey conducted by Statista 2020, due to the adoption of technology and the establishment of the brand by the healthcare centers, the organizations such as United Healthcare has increased its valuation to 30577 million US$ and Anthem reached 13559 million US$ in the year 2019. The other healthcare organizations such as Optum was valued at 12705 US million $, Aetna was valued at 10828 million US$, and Humana reached 10288 million US$ in the year 2019. Thus, it can be said that branding has benefitted the community as well as the healthcare

organization by increasing revenues of the healthcare units and providing quality healthcare to the patients.

Ashrafian, Darzi, & Athanasiou, (2010, 5(2), pp. 279-288) examined that the hospitals are adopting advanced technologies such as bionic, robotics, virtual reality, and Kinect the DOTS so that the improvements are brought in the healthcare delivery and enhancement in the brand value. While focusing on bionics, it is included in healthcare treatment and therapy in the form of implants. Bionic implants include creating and replacing the missed body part of the patient with electronic equipment. The placement of the bionic implant in the missed region helps in regaining the lost functionality of the missed body part so that the patient works like normal. Bionic implants are created for different body parts such as arms, legs, hearing aids, eye, heart, and other internal organs such as the kidney. As per the survey conducted by Market Research Report, 2017, it was found that the global market for bionic is projected to expand and reach more than 22 billion US$ by the year 2022 by recording a growth rate of 7%.

Ashrafian, Darzi & Athanasiou, (2011) examined that there are several companies such as Touch Bionics, IBionics, and Ossur that are involved in the manufacturing of bionic implants so that the patients who are suffering from impairment issues are provided with a missing body part. For example, Touch Bionics develops bionic by using iLimb technology so that the patient is provided with a bionic arm that functions as an organic arm and hand.

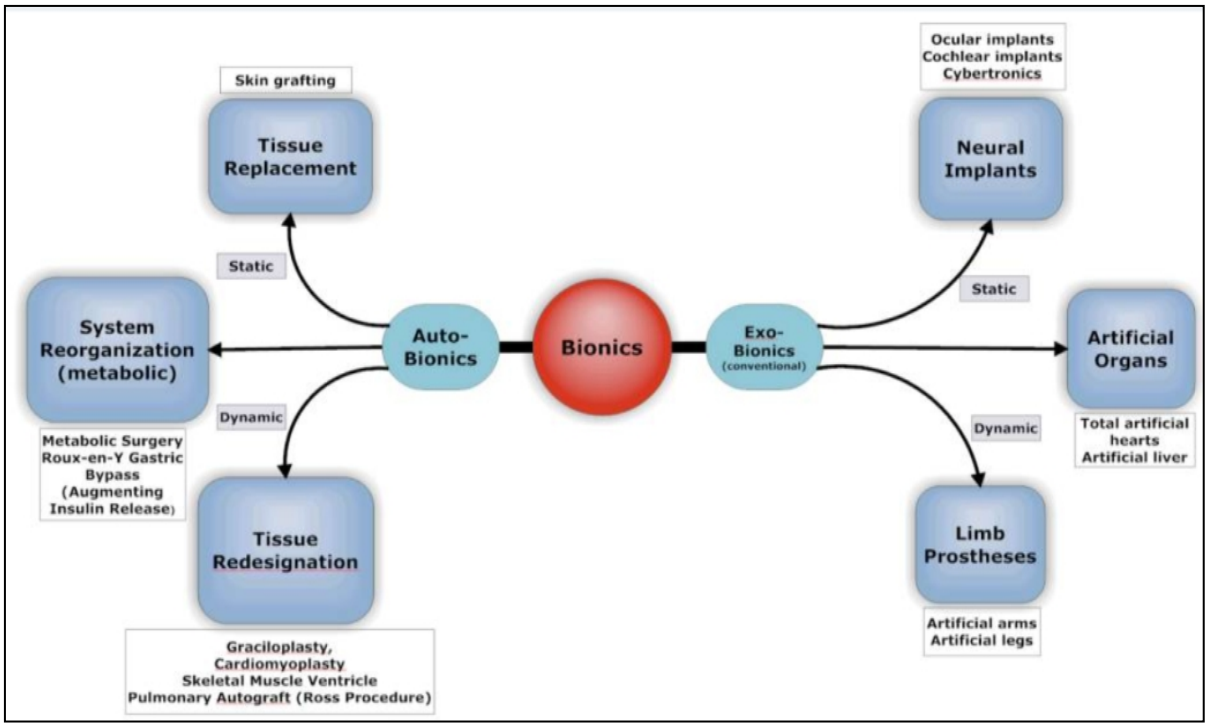

Figure 4: Auto-bionics and Exo-bionics

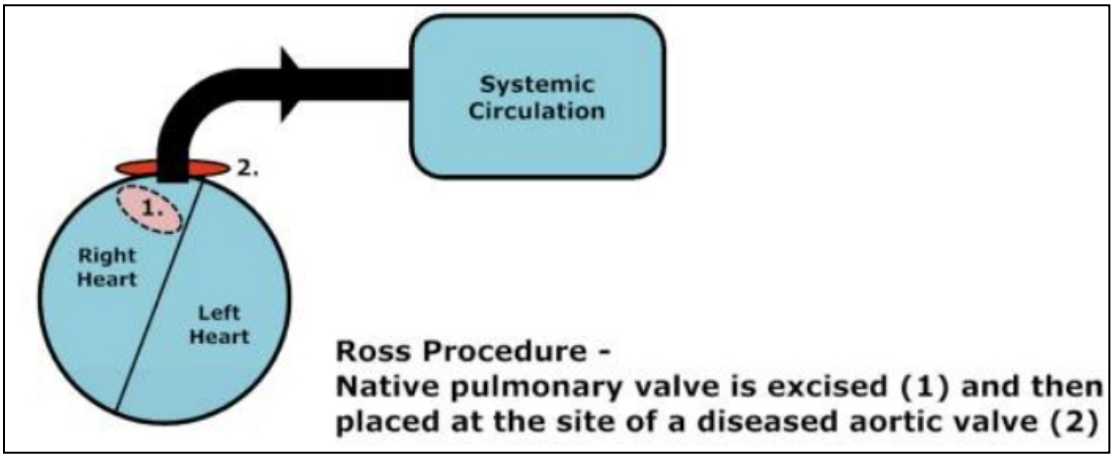

Figure 5: Cardiac Auto-bionics

On the other hand, IBionics which is a Canadian healthcare company specializes in making bionic eye which is known as a Diamond eye to improve the facial recognition of

the patient. Thus, it can be said that the introduction of bionic in healthcare helps in providing quality services to the patients by providing them organic body parts.

Selker, (1995, 75(1), pp. 31-37) analyzed that Physical Therapy technology has been introduced in the medical and healthcare system. It includes the use of modern technologies such as vibrating posture sensors, pressure-sensing socks, and gait-correcting insoles so that adequate services are provided to the patients. The health tracking systems such as video game systems, Fitbit, and helmet sensors have also been developed so that individuals keep track of their health and wellness. Technology advancement in the healthcare sector has also led to the introduction of new applications such as iTherpay so that reliable healthcare information is easily available to individuals. The physical therapy technicians and professionals have developed iPad and smartphone apps that provide valuable insights about exercise videos, healthy living through yoga, physiotherapy glossaries, and clinical tests. The information about orthopedic diagnosis tools and 360-degree visual anatomy is also gained with the help of iTherpahy applications. For example, PTGenie is a healthcare application that helps the patients to plan homer exercise programs so that they can exercise as per the physical strength, body & health conditions. The app also provides email services through which the exercise pictures, evaluation forms, and protocols can be downloaded and printed. It helps in saving the time and cost of the clinicians to provide these services and promotes/increases patient engagement in healthcare services. The healthcare apps are linked with hospitals and healthcare centers which increases the acceptability of the innovative applicants. The increasing use of applications by the patients and individuals

develops their trust with the hospitals and they establish themselves as a healthcare brand in the market.

Sirisha & Babu, (2014, 4(3), pp. 227-237) examined that the branding of a hospital only takes place if consumers (patients) can differentiate services provided by different healthcare units. Good branding helps a hospital to deliver healthcare consistently, achieves a superlative position, consistency in delivering service or care to patients, and gain a reputation in the market. To establish themselves as a brand, the hospitals adopt different technologies and advancements such as bionics rehabilitation, robotics, Wii-Hab, virtual reality, Kinect the Dots, and balance better so that the quality of healthcare services that are provided to the patients is enhanced. While focusing on bionics, Ekso Bionics which is a healthcare company in Berkeley has created revolutions in the healthcare sector by developing the Esko suit. The new device is made up of aluminum and titanium in an exoskeleton form to assist the patients that are suffering from movement impairment and paralysis. Esko suite helps the patient to make movements in progressive steps by enforcing biomechanical coalitions and gait prototypes. Due to assistance provided by Esko suit, patients having movement difficulty start to take steps from the first session itself. Additionally, the suit has three walking modes in the buckle which help the patient in walking and movement purpose. In the first mode, there is an actuation of steps with the help of a push-button. In the second mode, the patient is given the control of the system, and in the third mode, a balance is established between the actuate steps and shifting bodyweight of the patient. The introduction of the Esko suite has benefitted both the patients in terms of better movement practice with the push of a

button and increased the ability of busy physical therapists to assist more patients in a short duration.

Ide, Siddiqi & Akamatsu, (1992, 7(2), pp. 189-200) analyzed that to increase the brand value; the hospitals are increasingly investing in advanced technologies so that the quality of healthcare could be improved. The introduction of robotics technology in the healthcare segment has helped in treating and preventing injury. Kazanzides, et al., (2008, 15(2), pp. 122-130**)** examined that Telerobotic systems have been included in the healthcare systems so that there is a reduction in recovery times and attainment of more reliable outcomes. Lathan, et al.(2001, pp. 27-28**)** examined that robotics technology is highly beneficial in providing occupational therapy, coaching, physical therapy, and motivation for patient care. It is also used as an essential instrument by rehabilitation therapists in the form of assist therapists and rehabilitation robots so that speedy recovery is provided to the patients.

Figure 6: Rehabilitation Robots

The robotic technology-based therapy is beneficial for the patients that are suffering from neurological impairments, strokes, traumatic brain injuries, and cerebral palsy. The assist therapists and rehabilitation robots help the patients to practice exercises and make repetitive movements. It reduces the recovery time of the physical therapy patients and they get well soon. For example, Lokomat which is the robotic treadmill has been developed to assist the patients suffering from neurological conditions. The device has

already been installed in the Rusk Pediatric Physical Therapy department in New York so that the patients suffering from neurological conditions could regain their movement abilities. The patient is suspended to the treadmill with the help of a harness and the therapists fix the legs of the patient in the robotic legs. Then, the computer built in the treadmill is switched on to record the movements of the patient. It also records and measures the response and progress of the patient before and after using the robotic treadmill. Thus, it can be said that by making use of advanced technology such as robotics, the hospitals are enhancing their service quality which increases trust among the customers and repute in the market.

Chao-Chan and Wu (2011, 15(2), pp. 4873-4882) examined that the competition in the healthcare sector has increased incessantly with each healthcare unit making efforts to provide quality services, develop trusts and increase brand value among the consumers. The facilities that are provided by the healthcare units play a major role in enhancing the quality of services. It increases patient loyalty and satisfaction which increases their re-visit intention to the hospital. Thus, it can be said that the brand image serves as a major factor for improving the service quality and contentment among the patients. Sittig, et al., (2020, 26(1), pp. 181-189) examined that the hospitals are adopting information technology into the complicated healthcare system to improve care services that are provided to the patients. It includes the adoption of information technology in the healthcare system helps in getting a better understanding of the interactions that take place between patients, processes, healthcare atmosphere, and advancements. It was examined that due to the adoption of information technology the consumers will be provided 24 by 7 healthcare services by introducing safe and effective design and

adopting a sociotechnical approach. It includes the adoption of new technology-based applications such as Nintendo Wii so that high-quality services are provided to the patients.

Figure 7: An advanced prosthetic arm with target

The therapists are introducing Nintendo Wii in their home exercise programs for the patients so that they could improve their cognitive and movement abilities at home. The games that are included in the Wii are based on therapeutic approaches in which patients play games and make movement in repetitive patterns. It includes motion-sensitive controllers that help the patients in making repetitive movements and enhancing their cognitive and physical abilities. For example, Wii-Hab is increasingly recommended by the therapists as it helps in engaging the patients, improving their movements, and reducing the burden on clinical healthcare practice.

Freeman, et al., (2017, 47(14), pp. 2393-2400) analyzed that in the current times the hospital ate highly conscious of the hospital settings, healthcare services, patient value, and brand image of the organizations. If a hospital is branded, it receives several; benefits in terms of revenue, patient inflow, and attracting investors for organizational development. The branding of the hospital also helps in gaining employee engagement and alignment as it develops a sense of responsibility among the workforce. As per the survey conducted by Gallup in the year 2015, it was found that the engagement level of employees increased by 32% when they were associated with a branded hospital in comparison to the non-branded healthcare center. Branding also plays a major role in attracting ad training patients as branded hospitals high focus on improving the quality of services and developing trust among the patients. When the patient experiences quality services by the hospital and its staff members, there is positive word-of-mouth referral. It increases the brand value of the hospital and reaches several consumers that might prefer to visit the hospital in case of need.

Slater & Sanchez-Vives, (2016) analyzed that virtual reality (VR) technology is adopted by the hospitals to enhance the healthcare services provided by them. VR is based on computed technology that increases interaction between the patients, healthcare providers, and clinicians. The technology is highly beneficial in developing situations that help the physical therapists to provide better treatment services to the patients. It includes reducing inconsistency in the treatment delivery process and exercising strict control over the stimuli. Cruz-Neira et al. (1993, 27, pp. 135-142) determined that Cave Automatic Virtual Environment (CAVE) projects have been introduced in the healthcare systems so that high-quality services are provided to patients by analyzing the issues

three-dimensionally. VR technology is increasingly used in mental healthcare as it helps in developing better interactions with mental patients. Freeman, (2008, 34, pp. 605-610) examined that use of VR technology helps in early identification of the symptom markers, evaluation, putative testing, predicting symptoms, determining treatment process, and maintaining standard health standards. Additionally, VR technology is also used in physio-rehabilitation by the physical therapists in the form of VR rehab. It is an interactive therapy module in which the patients share their experiences through a virtual environment. For example, the Computer Assisted Rehabilitation Environment system (CAREN) is used to cure and treats the patients that are suffering from distressing incident injuries, strokes, and impairments. It is also used in the treatment of the elderly so that a balance and synchronization is established between the movements of sensory organs. CAREN is also used by physical therapists to carry out diagnosis and therapy of the patients that are suffering from neurological and musculoskeletal impairments. telemedicine is an essential healthcare service that enhances the quality of healthcare service, increases accessibility to large consumers (patients), and reduces costs. The telemedicine charts proved to be highly beneficial in the current Covid-19 pandemic conditions as it helped in treating and analyzing the health condition of the patients without being physically present at their bedside. The use of telemedicine charts in the Covid-19 infected regions and healthcare organizations helped in assessing the patient health status remotely which helped in reducing the spread of disease from the patient to other healthcare staff. in telehealth services, healthcare is provided to the patients by using telecommunication means such as analog switches, optical fiber, local loops, virtual reality, and voice over IP switches. The physical therapists provide telehealth services to

both outpatient and acute care patients that are suffering from musculoskeletal and neurologic conditions. Moreover, video-teleconferencing techniques are used to provide care and rehabilitation to patients that are suffering from burn injuries. Telemedicine is also used to treat patients that are suffering from traumatic brain injury, spinal cord injury, and sclerosis by counseling and pain management programs. Telemedicine includes the use of symptom management systems, occupational therapy programs, sports medicine so that chronic conditions of the patients are ratified. For example, a web-oriented treatment program has been introduced by Reflexion Health and Jintronix so that healthcare services are extended to larger communities. The web-oriented treatment program is based on evidence-oriented practice and is increasingly used in the form of Reflexion Health's Rehabilitation Tracker program. It provides treatment-oriented instructional videos; exercise videos, mentoring, and disease-based educational information to the patients that have subscribed to the program. The program also helps the physical therapists to monitor and track the performance of the patients by watching them personally through Kinect cameras.

Hassan, El Desouky, Elghamrawy & Sarhan, (2019, pp. 3-26) analyzed that due to the introduction of digital technologies and digitalization of the healthcare, the extent and reach of healthcare will expand to more people. There is a huge amount of data overload in hospitals, healthcare centers, clinics, pathologies owing to a large number of patients and their specific treatment process. It creases issues in the management of data and often causes security concerns like leakage of confidential information about the patients. Therefore, the healthcare units adopt advanced technologies such as Global Positioning System (GPS), big data analytics tools, cloud computing, and log files so that the issues

that are faced by hospitals resolve and they work as efficient smart units. CS Odessa (2017) examined that cloud computing has received much attention from the researchers and information technology engineers so that its application could be increased in the medical field. LevelCloud (2017) analyzed that the implementation of cloud computing in the healthcare industry is beneficial as it helps in lowering the cost, reducing operational expenses, and increasing the availability of healthcare services to large communities. cloud computing is increasingly adopted by healthcare organizations as it helps in quick deployment, increasing accessibility, and integrating the healthcare working processes. As per Global survey estimates, could computing market is experiencing a positive boom owing to high adoption in the healthcare industry. The survey specified that the market value of cloud computing will reach 10 billion US$ by the end of the year 2020 and further increase to 45 billion US$ by the year 2023. The main reason behind the high market value of cloud computing is extensive use of the medical field owing to real-time clinical data provision, data protection, automated operations, and revenue cycle management. For example, Med sphere has launched cloud computing-based equipment for healthcare organizations. The device can be used for multi-purposes such as clinical recording, accounting management, and nursing data management. The cloud-based device also helps in scheduling, recoding medical data, registering, and billing purposes. On the other hand, the cloud-based equipment developed by Nintex helps in streamlining the manual process by eliminating paperwork. The organization also provides automation services to healthcare professionals, nurses, pharmaceutical companies, and medical outlets. As a result, due to the automation and systemization of the entire healthcare services, the overall patient experience enhances.

Thus, the adoption of cloud computing devices and software increase the efficacy of the hospitals and healthcare sector by improving direct patient healthcare support and performing data management securely.

Watson (2014, 34, pp. 1247-1268) examined that different digital-based technologies such as big data and Genomic coding are adopted by healthcare organizations to increase their brand value. For example, big data is used for maintaining electronic health records (EHR) by capturing notes that are provided by healthcare professionals, clinicians, nurses, and care providers. However, the EHR contains data in an unstructured format that is processed later on by making use of natural language processing (NLP). It helps in developing interaction between the healthcare professional and patient in the languages that are understandable by both. As a result, the patient can share the health issues, symptoms, and signs experienced by him/her with the doctor, and by examining, the doctor provides appropriate medication to the patient. For instance, a big data technology-based NLP system is used by a healthcare organization in Massachusetts General Hospital so that the symptoms that are experienced by the patient are studied and rightful medications are provided to the patients. Thus, it can be said that the introduction of newer technologies is beneficial to both: the patient as well as the doctor as it provides quality care to the patient and saves time for the doctor to visit other patients.

Dr.R.kavitha, (2012, 1(1), pp. 30-36) examined that private organizations are actively engaged in the healthcare sector and providing quality care services to the patients by extending services to the outpatients. The healthcare sector has become highly competitive because of the increasing participation of private healthcare organizations. Thus, both public and private healthcare organizations are adopting advanced

technologies and improving their service delivery process to acquire an edge in the competitive market. It also includes acquiring national and international accreditations and clinical breakthroughs so that the value of a healthcare organization is increased in the market. It increases the brand value of the organizations and they gain a key position amongst the rivals. For example, Apollo hospitals in India have been gaining high popularity in recent times because of the provision of high-quality healthcare services. The organization is conducting educational seminars and programs at regular intervals so that the skills and abilities of its staff increase. The hospital provides wi-fi enabled rooms, ambulance pick-up, online appointments, Continuous Medical Education (CME), and attendant facilities so that the healthcare needs of the patients are met. In the year 2003, Apollo hospitals were awarded as Super Brand by the Super Brand Council for providing high-quality services to the patients, developing emotional associations with the customers, developing goodwill, loyalty, and dominance in the market. On the other hand, Narayana Hospital in India provides specialized services such as cardiac care, telemedicine, orthopedics, and organ transplant services so that the healthcare needs of patients are met adequately. The hospital employs 1300 full-time doctors and 12500 medical and paramedical staff so that the patients are provided pre-treatment and post-treatment services. Hence, it can be said that the branding of hospitals provided benefits to both: patients in terms of quality care and hospitals in terms of increased revenues.

2.2 Comparing Satellite Clinic and The Hospital-Based Clinic

Due to the advent in the technology and innovations, the concept of smart care branded hospital has gained importance in recent years. While focusing on the concept of the

smart hospital, it is the hospital setting that is based on several technologies such as the Internet of Things (IoT), blockchain technology, bio-telemetry, Global Positioning System (GPS), and virtual rehabilitation so that quality healthcare is provided to the patients (Hassan, El Desouky Elghamrawy and Sarhan, 2019, pp. 3-26).

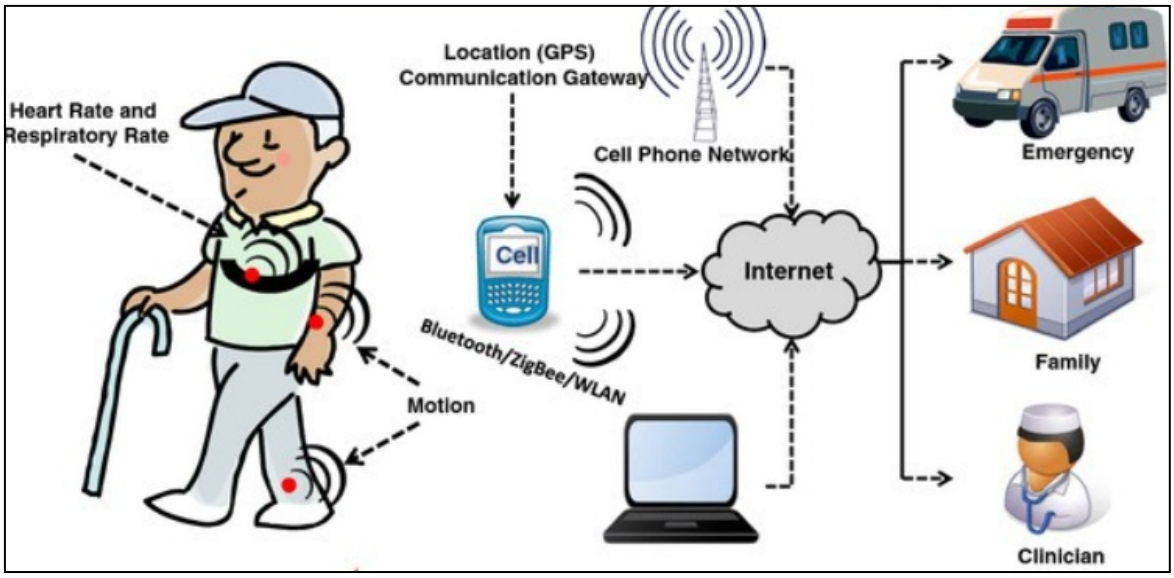

Figure 8: Smart healthcare with smart sensor device

The smart hospitals are built on information and communication technology (ICT) that build a connected and coordinated working environment in the hospital settings. It enhances patient safety and healthcare by creating a patient-centric care environment (Moro Visconti, and Martiniello, 2019, 16(2)). Due to the adoption of new technology and the provision of a patient-centric approach, the needs of the patients are identified by engaging with them. It also includes recognizing the emotions of the patients and responding to them accordingly. Moreover, it also includes creating environment care where treatment and therapies are provided to the patients based on shared information and patient navigation. As a result, there is an enhancement in the quality of healthcare

provision which improves the image of the healthcare unit and crates value for the services provided by it (Clarke et al., 2017, 5(3), pp. 362-372).

The digitalization of the healthcare services provides ample opportunities for healthcare service providers to interact with the patients using different mediums and platforms such as video conferencing. It contributes towards the adoption of a patient-centric approach and value co-creation within the hospital (Rantala & Karjialuoto, 2016, pp. 34-41)**.** The smart hospitals also facilitate the provision of remote healthcare services through which the doctors and healthcare professionals could monitor the health and physical condition of the patients. The remote care system includes the use of remote cardiac monitoring systems and big data-based remote monitoring system so that the value-based care is provided to the patients. It not only reduces the cost of healthcare provision but also transforms the care, service, treatment procedures of the clinicians and healthcare professionals (Crossley, 2017, 14(1), pp. 362-372). Additionally, the use of digital advancements such as big data into the hospital settings helps in developing innovative smart services. It helps in enhancing healthcare informatics because of which optimized care is provided to the patients as a result, there is an improvement in the quality of life of patients and optimized use of the hospital resources and medical staff. Thus, it can be said that digital technologies and advancements boost the capabilities of conventional hospitals and transform them into smart hospitals that provide enhanced medical and healthcare services to patients.

While focusing on the concept of the brand image of the hospitals, it is regarded as the belief or impression that a patient is having towards the healthcare unit. The brand image of the hospital can be described as a relative term that is established by patients based on

their treatment and care experiences with the healthcare unit. It creates the image, perception, or reputation of the company in the market and provides it an edge among the rivals. Branding also includes adopting marketing strategies so that the image and brand value that has been created by the healthcare firm is maintained and promoted to other patients. The implementation of a strategic marketing approach helps the healthcare unit to sustain itself in the competitive environment along with maintaining brand identity. For example, in Kasturba Hospital, Manipal has established the marketing department that promotes the hospital through corporate social responsibility, loyalty programs, and integrated communication campaigning approaches (Lee et al 2010, 4(4), p. 448)**.** The other strategies that are adopted by hospitals are to promote it and spread awareness about its services is through advertising and print media. For instance, Manipal Arogya uses pamphlets, newspapers, and television promotions locally to spread awareness about the new service offering by the healthcare unit.

The other strategies such as promotion through services, events, public relations, interactive marketing, and direct marketing are also adopted by the healthcare units to increase their market presence. For example, Vajpayee Arogya Shree (VAS) promotes itself by providing quality services to the patients. As a result, due to the spread of mouth-to-mouth publicity/communication from the recovered patients, the hospital gained popularity among the masses. Additionally, the healthcare unit also organized events such as the walkathon, the diabetes day to spread healthcare messages, and publicize the products and services provided by VAS. The hospitals also use public relations as an effective tool to create a brand value of the hospital and increase presence among the patients (consumers). For example, Manipal Hospital organized camps for

providing health check-ups to the businesses. The hospital ensured that the event was covered by the press and media so that people are informed about the hospital services and community work. In the current scenario, the healthcare business has to match up with the pace of digital transformation in healthcare to provide better and best results to the general people. But as soon as we think of matching the pace with the emerging technologies it requires a huge investment, a skilled and adaptive workforce, and a risk-taking mindset, this will not present effective results unless we discard the out-dated business processes and have faith in the latest methods.

With the evolution of digitalization people, these days have become very demanding and want things as per 'their demand', means services as per their convenience, place, and time. As the healthcare industry has entered the era of digital innovation, patients these days seek all the guidance as per their schedule. We know that due to digital revolution today every person is using a mobile phone and as per the statistics more than 50% of a person's work these days get accomplished by browsing on mobile phone in the year 2018 hence all the resource should be developed in such a manner (user friendly) that it can be easily accessed by the general public. As per the survey conducted in 2019 says that four billion people globally use the internet hence there is a wider digital transformation possibility to help then to access the people on a larger scale with ease and apt record. As per the DMN3, these days 47% of consumers research different doctors as per their illness, 38% search for different hospitals and medical facilities, and 77% of people book their medical appointments on their mobile phones. Moreover, these days even doctors are working on a freelance basis for various hospitals as per their expertise, patient's circumstance, and schedule. Therefore, not only patients are getting benefit but

medical practitioners as well can get the utility of ‘on-demand’ advantage of digitalization.

Due to the aggregating trend of social media, e-commerce, e-wallets, and online transactions it concludes a huge data of information that can be fruitful for the healthcare industry. This also helps them to provide error-free medication, patient record analysis, drug prescription, meetings, and visits, which eventually proves to be cost-effective, availability of the emergency room, reduces waiting period, and allocation of proper staff and medical aid to the patient. Digitalization also has accumulated all the data from smart gadgets to the cloud, such data can be utilized by the healthcare and pharmaceutical companies to plan their investment as per the demand, their demographic information, and need as well as to improvise the services to provide the best services possible. Moreover, there have been multiple developments in the curing methodology developed by which treatment has become very effective and targeted one of the developments are Virtual Reality (VR), as there are millions of people struggling with chronic pain, anxiety, post-traumatic stress, mental disorder, stroke, etc. VR helps such patients to hone their skills and plan complicated surgeries. It also helps a wearer to give a feeling of personal touch, help children with autism and others to learn, motivate, and exercise. The global virtual and augmented reality is expected to reach $5.1 billion by 2025 in the healthcare market. Wearable medical device market is also expected to boom from the Sensex calculation of $8 million in 2017 to $27 million by 2023. The digital age has taught and spread the awareness of focusing on prevention and maintenance of their health and this wearable device helps them to track their health and indicate in terms of the emergencies to consult their doctor before it gets late. Some of the most used wearable devices and

gadgets are tracked down by their smartphone, smartwatch, and fitness bands which track down a person's heart rate, calorie burnt, blood sugar level for diabetic people, the oxygen level in the blood for respiratory illness, COPD or asthma people. These devices not only show the track record but such gadgets and applications give a personalized health experience to the user as per their need. It also suggests them to get a targeted insurance cover as per their risk for illness and along with that it helps and supports the user to set their fitness goals and challenges through exercise, step count, water reminders, diet, and nutrition which in the long run saves money spent on the heavy medical bills.

Another major factor that healthcare recently working upon is 'predictive healthcare' this is used to aid and forecast any major illness or diseases which major threat shortly and be prepared with the admission rates and proper staff and facilities to combat such disaster. Even this provides timely necessary advice and predictive model to represent appropriate suggestions for businesses of all sizes along with the people to avoid the chaos. Digital transformation has represented one of another trending key players named Artificial Intelligence (AI) in which the entire industry is eager to invest which is expected to $34 billion by 2025. It is expected to shape and transform all facets of the industry.

2.3 Smart Healthcare System: Need, Components, And Characteristics

According to Sundaravadivel, Kougianos, Mohanty & Ganapathiraju, (2017, 7(1), pp. 18-28), conventional healthcare systems are not efficient enough to meet the healthcare needs of the rising population. Even though the traditional healthcare units adopt modern technologies and advancements, the reach and approach of the healthcare units get restricted to limited people. Healthcare service is not accessible to every individual owing

to the low strength of healthcare units, lack of hospitals in remote regions, lack of affordability of common people, absence of transportation, lack of infrastructure, and lack of connectivity. Mohanty,., Choppali, , & Kougianos, (2016, 5(3), pp. 60-70) examined that it is necessary to introduce smart healthcare systems so that individuals manage emergencies by making the best possible use of the available resources. Smart healthcare mainly focuses on enhancing the quality of healthcare and patient experience with the organization. It facilitates remote monitoring systems so that there is adequate patient care at a low cost. It also helps healthcare practitioners to extend their services to a large group of patients by meeting geographical barriers. smart healthcare systems are classified into different segments such as telemedicine, smart care, services, end-users based on technologies, medical devices, and system management. The provision of services in the smart healthcare system is based on functional and non-functional requirements. They are specific to each component used in that healthcare system based on their application. While focusing on functional requirements, it includes specific software requirements so that the hospital management activities are performed proficiently. The different hospital management requirements include registration, database maintenance, checkout essentials, and generation of reports. The registration process of software includes adding patient details in the hospital database. It includes registering the patient records and providing them with patient ids so that each patient is provided care as per individual requirement. The patient ID can be used during the entire stay in the hospital and all the details like treatment, progress, and therapy, doctors attending the patient, medications provided to the patients, nurses attending the patients, and other details are updated in the patient profile. The checkout process is an essential

function in which the patient details are removed from the system when the patient leaves the organization after getting cured. It also includes updating the bed availability list in the system so that the empty bed could be provided to another patient. Report generation software includes generating the treatment report of the patient in which the patient is provided with all details about the admittance in the hospitals to the consultation details, bed number, doctor's name, medications, ward number, and other essential details. The report generation system also upgrades the bed availability system and informs all the attendees and front office members about the availability of a bed. Database of software requirement specification includes recordings of mandatory patient information such as personal and professional details of the patients such as name, age, gender, phone number, postal address, patient ID, working office address, communication number, and other patient details. The database software allows the user to make adjustments in the patient mandatory information section as per the details or rectifications provided by the patient on account of any discrepancy.

Ullah, Shah, & Zhang, (2016, pp. 372-379**)** examined that the non-functional requirements include components that are not very specific. It is mainly composed of three essential factors such as security, performance, maintainability, and reliability. While focusing on the security aspect, it includes a patient identification system in which the patient is identified through mobile verification. Login ID includes verification of the patient with the help of the patient ID and individual password assigned to each patient. The access to modifications in the database recordings is restricted to limited healthcare staff and personnel. It can only be modified by the ward administrator for upgrading patient details in the system. Additionally, the front desk workers are provided with

special rights to access to all the details of the patients and management so that patients that are waiting for the consultation or visit with the doctor. The front desk workers only possess the rights to access the data but could not make any alterations in the data that has already been stored in the system. The front desk workers can only register the details of new patients and forward the details to other sections such as ward administrators and management so that the patient ID and other formalities could be generated. The administrators possess more rights as compared to the front desk workers as they can access as well as modify the data that is present in the system.

Mohanty, (2015**)** analyzed that performance is another aspect of a non-functional smart care hospital that mainly assesses capacity, response time, conformity, and user interface. Response time is associated with the verification and updating of the patient details in the database management system. For example, once the verification of the patient is confirmed, the system generates the acknowledgment notification that helps in updating patient information. Capacity includes maintaining data at atleast1000 patients at a time so that the efficiency of the organization is increased to provide quality services by identifying the specific needs of each patient. The user interface is associated with developing interaction with the healthcare staff and patient. Once, there is a notification, the interface system acknowledges it in five seconds and provides services in real-time. Conformity is ensured through the entire process of service provision by following the Microsoft accessibility guidelines while making patient transactions. Maintainability is another aspect of non-functional requirements that facilitates synchronizing between back-up and error systems. The back-up system focuses on increasing the efficacy of the system by systemizing the entire database management system. The error recording

system has also been installed within the organization whose main function is to record all the errors that are performed while maintaining or transferring the data. On the other hand, reliability includes availability so that the system is approachable at all times. It helps in eliminating system failures and ensures that the system is available at all times for the service of the patients.

Bader, Ghazzai, Kadri, & Alouini. (2016, 4, pp. 3257-3272) analyzed that components of the smart healthcare system, it includes different aspects such as sensors or actuators, computing devices, data storage constituents, and networking module. While focusing on the sensor, it is an electronic device that is efficient in analyzing and working collaboratively with the biological element for identification of the events. Sensors include different electronic equipment such as cameras, temperature sensors, and accelerometers that help in recording and monitoring the functioning of heart rate, blood pressure, ECG, SpO2, and blood glucose. The monitoring of the health condition of the patient could be executed remotely with the help of tablets, computers, laptops, and smartphones. Computing devices include the use of different electronic gadgets such as a computer, supercomputers, servers, tablets, smartphones, laptops, and other advanced machines to share and record the health condition of the patients. The main aspect of the computer devices is their memory and storing capacity as large data related to patient details, history, and treatment details need to be recorded and stored so that smart healthcare factsheet could be maintained properly. While focusing on data storage components, it includes several devices such as sensing devices or equipment to the big devices so that large data are handled efficiently. It includes the use of advanced

technologies such as big data analytics so that the large data related to patient and treatment details are maintained in the system.

Istepanian, Hu, Philip, & Sungoor,. (2011, pp. 5264-5266) examined that networking module is one of the important components of the smart healthcare system as it establishes a link between the sensors, routers, and base stations. The sophistication of the networking module varies in different hospital settings depending upon the problems and issues that are faced by the organization. It includes the use of wireless technologies such as wi-fi, RFID, Bluetooth, 6LOWPAN, WSN, GPS, and MEMS so that there exchange of information among the different system elements. The adequate flow of information in the different parts of the healthcare organization will help in better management and administration of patient as rightful and updated patient information will be available to each attendee of the patient. Thus, it can be said that each of the different components of the smart healthcare system is essential as they play a unique role in recording, monitoring, maintaining, and sharing vital patient information.

Banerjee, and Gupta, (2014, 14(5), pp. 904-919**)** examined the essential characteristic that is required for the recognition of a healthcare unit a smart healthcare organization. It includes different aspects such as app-based, things-based, and semantics-based applications. While focusing on app-based applications, it is mainly responsible for sharing data between different devices such as sensors, computing devices, and other electronic gadgets in a secure manner. It includes the use of a personalized network system so that the data that is transferred between the sensors and computing device remains safe from cybersecurity threats and risks. Things-based architecture is based on an adaptive aspect of the application so that different functionaries such as real-time

supervision, scheduled delivery, and maintenance of high performance at low power dissipation are performed adequately. Semantic-based architectures include assessing behavioral patterns by making use of natural language processing methods based on collected patient information. It helps in enhancing omnipresent computing abilities and enriching each user experience to optimized levels. Thus, it can be said that the characteristics of the smart healthcare unit highlight computing and interaction processes spontaneously so that there is an establishment of dynamic networks. It enhances the location-based computing by accommodating large sets of data and enhances the capabilities of resource-based computing devices to high levels.

Zhu, Song, Jiang, & Song, (2016, 4, pp. 4609-4617) examined that configuration and framework of smart healthcare units are based on different network and computing devices that provide seamless care services. It includes different aspects such as context awareness, sensitivity, personalized, responsive, adaptive, intelligence, ubiquity, transparency, and anticipatory so that enriched care is provided to all the patients (inpatient and outpatient). The use of different networking platforms such as wireless sensor networks (WSNs) by smart healthcare units helps in building efficient healthcare architecture. It includes the use of advanced technologies such as the Internet of Things (IoT) so that synchronization is established between different operating devices. the computing devices, electronic equipment, and high-definition gadgets such as actuators and sensors form an integral part of the smart healthcare system. All the devices help in forming a heterogeneous computing environment that facilitates seamless healthcare services. the organized groups that are associated with the smart healthcare architectures must be based on physical and network connectivity. It will help in developing an

interoperable association between different applications for the secure flow of information. For instance, the sensors that are in-built in the system will create a network in which all the information could be transferred between the medical staff, technicians, doctors, patients, healthcare staff, and other members through smartphones by developing centralized wi-fi or Bluetooth connectivity. research regarding the use of advanced technologies such as cloud assistive architectures and big data methods are still investigated and soon, they will be incorporated to enhance the workings of healthcare organizations. the framework that is required to be developed by the smart healthcare organization to maintain its usability and service quality. It includes different libraries such as network systems, computing platforms, and service stations. While focusing on network systems, it includes different networking libraries (wi-fi, RFID, Bluetooth, 6LOWPAN, WSN, GPS, and MEMS) so that interconnection is established between different architectures. On the other hand, computing platforms are based on different technologies such as machine learning algorithms, database management, human-machine interface, and optimization so that there is a creation of effective information generating, flow, and transmission environment. service stations are known to be support layers that act as connectors between the technology, user, and middleware. The connecting agents could be names as call center representatives that work on shift basis 24 by 7 to serve the consumers on behalf of the healthcare organization. Thus, there is the establishment of a smart healthcare network in which all the aspects such as patients, professionals, management, and healthcare staff are connected and avail relevant information and service cost-effectively in real-time. different technologies such as the Internet of Things (IoT) are included in the smart healthcare service provision. IoT

application is based on three main aspects such as connection, interaction, and computation. IoT users can make their plans every day or make changes in the pre-set plans anytime by integrating the physical and real world with the help of computing devices such as smartphones and tablets. It helps in developing communication with the related parties both physically and wirelessly. IoT increases the ability of the machines to connect to several devices and extend the healthcare benefits to the remotest regions where subtle infrastructure could not reach extensively. As a result, due to high reach, accessibility, data sharing ability, and connectivity, IoT is used as an essential tool in different sectors such as transportation, agriculture, and surveillance along with healthcare. IoT helps in managing the different technical equipment by calibrating them to the personalized supervisory unit. It helps in monitoring daily activities, managing chronic disease, and maintaining the fitness goals of the patients. IoT can also be used to track the delivery of medical equipment and gather specific medical information for the patient. Thus, it can be said that the IoT application in healthcare helps in bridging the gap between the patient and doctor by connecting them through remote access. due to the use of high-end technologies in the healthcare segment, the scope of smart healthcare has increased in the market. As per the survey conducted by Frost & Sullivan, it was found that the market of smart healthcare units and products will reach 384.5 billion US$ by the year 2025. A high rise in the smart healthcare segment is observed as there is continuous development in this segment in the form of smart pills, smart syringes, and smart Radio Frequency Identification (RFID) cabinets. The use of RFID helps in the identification of infectious diseases, performing radiology, and safeguarding against contagious diseases such as Tuberculosis. It also helps in maintaining electronic health records and data and

storage so that standardization and synchronization of work in all the sections of the smart healthcare organization. There are different companies such as Intel, IBM, Apple, Johnson & Johnson are entering the healthcare segment to improve the service provision condition of the industry. For example, Intel has launched the Digital Health Foundation so that the gap that exists between the delivery of healthcare service and the patient requirement is reduced. The company is on a drive of introducing innovative devices and applications through which the home environment of the older section of the society could be improved. On the other hand, IBM has launched an Artificial Intelligence (AI) based computer system known as IBM's Watson that can check the patient medical history and recommend medications based on it to the patient. The other company such as Google is also working in the healthcare segment and developing new technologies through which the needs of the healthcare sector could be met. The company introduced Qualcomm Life through which medical devices could integrate to close-by databases wirelessly in a secure manner. Qualcomm Life provides high interoperability features through which the medical information could be shared between different connecting systems securely, easily, and speedily.

Li, Raghunathan, and Jha, (2011, pp. 150-156) analyzed that even though smart healthcare units provide immense healthcare benefits to the patients, the issues related to security and maintaining of the secured database are faced by the organization. There are different issues such as access control, unique identification issues, location privacy, data eavesdropping, resiliency, and integrity issues that are faced by smart healthcare organizations. For example, the services that are provided by smart healthcare organizations are based on mobile networks so that patients could connect to them

through different networks such as home networks, public networks, and office networks. The distribution and flow of information through different networks increases the concern of data security as there are increasing chances of security attacks when information is shared on different networks. Moreover, due to the increasing use of IoT based applications in the healthcare sector, it has become highly difficult for security developers to provide précised security systems to smart healthcare organizations. data breach activities have increased in the healthcare sector by 12% in the last five years. As a result, the global average cost of data security breaches has augmented and reached 3.92 million US$ in the year 2019. There has been an increase in the average mitigation cost related to a data breach in the healthcare segment with 6.45 million US$. Therefore, it is essential to develop security systems so that the large data that is perceived and stored by the healthcare organizations are secured and transferred to the patients securely.

Dhar, and Ranganathan, (2015, 17(4), pp. 330-340) examined that due to the introduction of technologies such as big data analytics, surgical robots, virtual reality, and cloud computing, the treatment and diagnosis process have also become intelligent. For example, artificial intelligence helps healthcare professionals to make clinical decisions so that better outcomes are achieved for the diagnosis of patients suffering from cancer, hepatitis, and heart diseases. The use of artificial intelligence provides intelligent outcomes that enhance the proficiency of the doctors to provide quality treatment to the patients. machine learning systems provide accurate outcomes and enhance the abilities of clinicians and pathologists for imaging and diagnosis. For example, IBM Watson is used by the healthcare units to enhance the clinical decision-making process. The equipment is based on an intelligent cognitive system that carries out an in-depth

evaluation of the clinical data and provides accurate information. As a result, the equipment is increasingly used in the diagnosis and screening purposes for the patients that are suffering from diabetes and cancer.

Willard-Grace, et al. (2013, 14(1), p. 27) examined that in there has been an increase in human disease range since the onset of the 21st century. The prevalence of chronic diseases such as cancer has increased and the treatment and curing process has become costly with the passing days. Hence, healthcare administration of disease is essential to reduce the issues that are faced by the patients and increase the accessibility of medical services to each individual. It includes changing the traditional healthcare system and adopting smart healthcare settings so that more attention is given to the needs of patients**.** smart healthcare setting includes the adoption of third-generation equipment, wearable devices, and human connected technologies so that there is self-monitoring of patients in real-time. The introduction of wireless modules, continuous monitoring systems, microprocessors, and scenario monitoring helps in monitoring the prognosis of diseases, early detection, and quality treatment. the use of smart healthcare devices such as smartwatches, wireless smart Gluco-monitoring system, Kolibree, TellSpec, and Portable Gluten Tester that monitor the blood pressure, body weight, calories, and sugar in the body. the concept of smart homes has been also developed to provide quality care to the elderly or disabled that are staying at home. Smart homes are special houses or residents in which sensors and actuators are inbuilt in the home infrastructure so that there is the monitoring of the patient health. Smart homes include a home automation process that helps in reducing the reliance of individuals on the healthcare industry and enhances the quality of life at home. Akmandor and Jha, (2017, 3(4), pp. 269-282) analyzed that in the

smart healthcare settings, there is the inclusion of several healthcare devices, applications, and apps such as smart self-cleaning water bottle, personal EKG, Personal Gluten Tester, 3-in-1 blood pressure monitor, and brain-sensing headband that helps the patients to monitor and manage their health conditions. It helps in reducing the burden on the healthcare providers and increases the availability of healthcare services in each home. For example, the Stress Detection and Alleviation system is an intelligent smart tool that measures, monitors, and pacifies the stress levels of the body to low levels automatically.

White, (2018, 61(11), pp. 106-113**)** analyzed that smart healthcare includes the adoption of virtual assistance-based technology that helps in enhancing healthcare services. The virtual assistants are algorithm-based systems that establish interactions with the users by recognizing speech and big data information available to them. The virtual assistants analyze the patient data and respond to the patient query by assessing their needs. For instance, virtual assistants such as Apple Siri, Microsoft Cortana, and Google Assistant are used to provide vital healthcare information to the patients. The virtual assistants are based on language-understanding expertise that helps the patients to accomplish their tasks by creating remainders with the home automation devices. in smart healthcare, virtual assistants also act as a substitute to doctors by developing interactions with the patients and providing them consultations like doctors. The virtual assistant can convert the common language into medical terminology which helps in seeking accurate medical services easily. Thus, virtual assistants help doctors to manage patients by maintaining patient data and coordinating medical procedures. the use of virtual assistants helps the healthcare organization to increase the efficacy of its manpower and helps in saving material resources.

Tian, et al.. (2019, 3(3), pp. 62-65**)** analyzed that smart healthcare has three essential elements such as regional, hospital, and family. The smart hospitals make extensive use of information technology and communication sector advancements to automate the hospital work setting and provide quality care to patients. It includes establishing a technology-based environment with the help of IoT applications, big data analytics, robotics, and automated process so that there is an improvement in the existing patient healthcare delivery. Tian, et al. (2019, 3(3), pp. 62-65**)** examined that smart hospitals provide three main kinds of services such as services to the healthcare staff, services that are provided to the administrators, and the services that are provided to the patients. In the provision and maintenance of healthcare services, all three service users: patients, staff, and administrators are to be taken into consideration. It includes integrating the digital systems into the hospital management process so that there is the automation of devices, buildings, and personnel. For example, the use of IoT helps in supervising patients, performing daily work activities, tracking instruments, and recording & maintaining biological samples.

Álvarez López, et al. (2018, 18(8), p. 2663) analyzed that RFID technology is used in the smart healthcare units and the pharmaceutical industry to enhance the workings of the respective industries. RFID technology helps in the production of the drug, circulation of medicines, management of inventory, and performing anti-counterfeiting activities. As a result, by using RFID, the hospitals develop a safe system to transfer patient data and other crucial information through protected servers. RFID technology includes using tags that represent each individual and patient separately. It helps in recording the tasks performed by staff and tracking the patient activities effectively. Thus, there is efficient

tracking of the organizational process that helps in making clinical decisions rightfully. Demirkan, (2013, 15(5), pp. 38-45**)** analyzed that the adoption of advanced technologies helps in developing an integrated management platform in the hospital settings. As a result, there is effective conduction of different organizational practices such as resource allocation, efficacy evaluation, and quality management. The adoption of an integrated management process helps in reducing the cost, increasing the efficient utilization of resources, and providing patient-centric services. It helps in reducing the waiting time of the patients through automating services that increase patient satisfaction. Thus, it can be said that smart hospitals are an efficient means of providing services to patients through advanced technologies and automated services.

Epidemiology

Thrusfield, (2018) analyzed that epidemiologists are categorized into two groups such as conventional epidemiologists and less conventional epidemiologists. The conventional epidemiologists provide different facts related to disease, their occurrence, and risks associated with them. The less conventional epidemiologists make utilization of their learning for the provision of healthcare services. The epidemiology indicators help in identifying the roots of disease and propose measures through the risk factors associated with the disease can be controlled. Epidemiology is also associated with characterizing the features of the healthcare systems so that adequate healthcare services are provided to the individuals. Stringhini, et al., (2020**)** examined the epidemiology of Covid-19 which first originated in Wuhan city in China. Since then, the Covid-19 virus has spread to almost all the continents except Antarctica. As per the survey reports by the World Health Organization and European Centre for Disease Prevention and Control, it was

found that the disease has impacted more than 30 million individuals around the world. The epidemiologic investigations in the city of Wuhan suggest that the Covid-19 spread from seafood that was sold in the live animal market. The main reason behind it is that the very first case of the Covid-19 disease was witnessed among the individuals that were working or visited in the live animal market. The epidemiologists suggest that the Covid-19 is spread through severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Mantovani, et al., (2020. Pp. 1-6**)** examined that due to Covid-19 inflection, individuals suffer from gastrointestinal symptoms, sore throat/pharyngitis, shortness of breath, myalgia, rhinorrhea/nasal congestion, and headache. Due to several health conditions because of coronavirus infection, high rates of deaths and intensive care hospitalizations have been recorded in countries like Italy, France, Spain, Switzerland, and Sweden. The individuals that are suffering from hypertension, diabetes, cardiovascular disease, chronic respiratory disease, immune-compromised status, cancer, and obesity are highly likable to acquire coronavirus infection. However, the incidence of COVID-19infection is found to low among the children and high among expecting women. About 87.9% of execting women were reported to be COVID-19 positive at the time of delivery of the child. Nguyen, et al. (2020**)** examined that the risks of Covid-19 infection are highest among the healthcare service providers who cure the individuals that are infected from the coronavirus. As per the survey conducted by the United Kingdom and the United States, it was found that healthcare personnel are at 3.4 times more risk acquiring the Covid-19 infection in comparison to other individuals. Covid-19 infection could be prevented by

adopting hygienic living standards. It includes sanitizing hands, cleaning all the touched surfaces with sanitizing cleaners, maintaining social distancing, and wearing masks.

Pandemic medicines and shortfalls

During pandemic conditions, there is a high risk of shortfall of medical supplies. The shortfall may arise due to insufficient supply of medicines owing to high demand or inefficient supply chain segments. The areas that are in extensive need of medical suppliers might experience a shortage and the regions that are experiencing less influence of pandemic may receive a surplus supply of medicines which would be beneficial for future uprising patient cases. However, under critical pandemic conditions, it is essential to ensure that hot spots (high infected regions) must receive medications immediately so that that the high infection caseloads can be reduced. The cool spots (low infected regions) must be given consideration but any surplus must be distributed to all the affected regions in place of storing the medications. Additionally, to ensure that there is no shortfall of the medications during the pandemic conditions, the cost and uncertainty related to medications must be governed. It includes eliminating stockpiling of medications so that there is no crisis of medications in the market. Additionally, the governing body must also adopt complementary policies so that there is the establishment of a systemized supply chain process. It reduces the risks of defaults by creating a dedicated and unified marketplace. As a result, there is the distribution of the efficient supply of pandemic related medical resources.

Another way to eliminate pandemic related medical supply shortage is to create awareness about the pandemic disease among the masses. It includes establishing

coordination with the s=manufacturers, suppliers, and dealers so that the consumers and marketers are well informed about the condition of medical supply status. It will reduce the panic among the individuals and ensure that medical supplies reach to needy individuals. For example, in the current Covid-19 pandemic condition, there is an increasing demand for N-95 masks. A medial supplier may be having a stock of such masks but known which region or group of individuals needs them the most. By strengthening the information system and synchronizing the entire supply chain process, the needs of N-95 masks can be met in the needy regions. in the case of the Covid-19 pandemic condition, the implementation of a central-planning approach would be highly beneficial in eliminating the medical supply shortfall. By applying the central-planning approach, the governing body will in an adequate position to know the status of idle lying resources through centralized recording systems. It will help the governing body to identify the location of excessive inventories and allocate them to the needy places accordingly. Additionally, another mechanism such as backstopping can also be adopted by the governing body to identify the locations that are having excessive medical inventories. As a result, there will identification and distribution of medical supplies uniformly in the different regions. The other processes such as the Centralized Backing Pool can also be adopted so that there is a reduction in the medical shortfall. In this mechanism, different hospitals are connected and informed about their medical resources are recorded. For example, if a hospital is recording the low incidence of Covid-19 caseloads, it can release its excess inventory to another hospital which is experiencing a high incidence of Covid-19 caseloads. Thus, by adopting different mitigating measures such as the central-planning approach, backstopping, and Centralized Backing Pool, the

shortfall of medicines in the pandemic conditions can be eliminated. It will ensure an efficient supply of medications to all the high and low effected regions uniformly.

Future medicine and science of Epidemiology

The epidemiologic studies of Covid-19 suggest that there is an increase in the spread of coronavirus since its first origin in Wuhan, China. The genome organization of SARS-CoV-2 and found that the structure of the Covid-19 virus keeps on changing after short intervals.

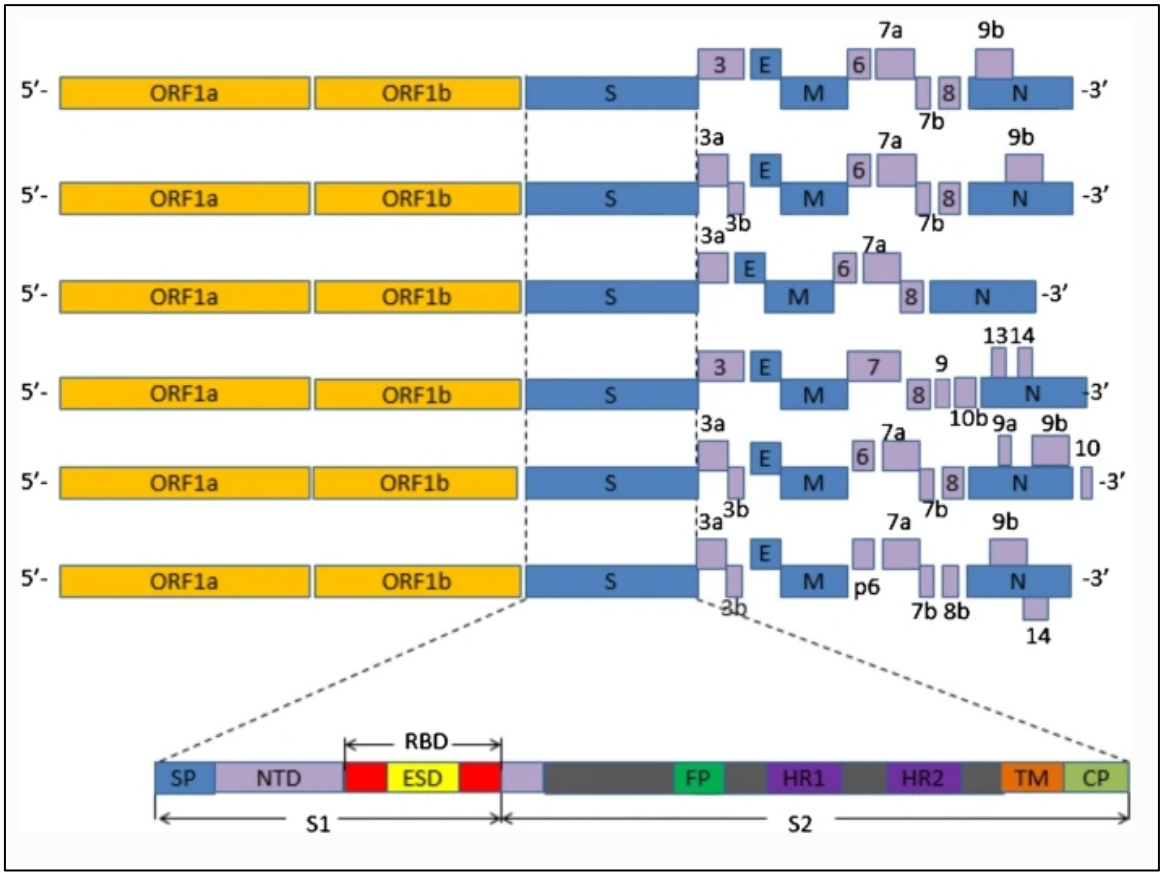

Figure 9: Genome organization of SARS-CoV-2

ORF is represented as an open reading frame, while the structural proteins are specified as S, E, M, N (blue) for the spike, envelope, membrane, and nucleocapsid respectively.

The other inputs such as SP, S1, S2, NTD, and RBD are known as a signal peptide, subunit 1, subunit 2, N-terminal domain, and receptor-binding domain. The other inputs such as ESD, FP, HR2, TM, and CP are known as an external subdomain, fusion peptide, heptad repeat 1, heptad repeat 2, a transmembrane domain, and cytoplasmic domain respectively. The incubation period of Covid-19 lasts for 3.0 days and 4.0 days. Thus, the treatment of Covid-19 has less clinical evidence. As per the study conducted by Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y et al (2020) the patients that are infected by Covid-19 infection can be treated with the help of antiviral treatment. It also includes the adoption of antibiotic treatment, corticosteroid, intravenous immunoglobulin therapy, oxygen support (nasal cannula, mask oxygen inhalation, non-invasive ventilation, invasive mechanical ventilation), continuous renal replacement therapy (CRRT), and extracorporeal membrane oxygenation (ECMO) so that there is the curing of Covid-19 infection among the patients. Zhao S, Lin Q, Ran J, Musa SS, Yang G, Wang W et al (2020) analyzed that the genome construction of Covid-19 is similar to SARS-CoV in which the infection is transmitted through the cough droplets of the infected individuals. The Chest CT examination provides that SARS-CoV-2 infects the upper respiratory tract and lower respiratory tract which leads to serious consequences. However, the research in the segment of treatment and development of vaccination of Covid-19 is in the investigational stage.

COVID-19 management now & later

Covid-19 has severely hit different industries such as manufacturing, education, automobile, textile, and other industries. The sudden outbreak of Covid-19 disrupted the entire economic workings. It has led to a severe economic breakdown and pushed the

world economies towards recession and downturn. For example, due to Covid-19, 35% of the manufacturing sector was facing supply chain issues while 78% of the units anticipated financial implications.

Figure 10: COVID - 19 Impact on Manufacturing sector

About 51% of the manufacturing units faced issues related to emergency response and 53% of the manufacturing units anticipated changes in their working operations. Thus, under the changed market conditions with disruption in the supply chain process, it has become difficult to manage the COVID-19 pandemic outbreak conditions. Covid-19 has caused 400,000 deaths around the globe and increased the burden on the healthcare systems. Therefore, the governing body in several counties focused on managing finances, inventory, logistics, and strategic management so that there is effective handling of the spread of Covid-19 infection. It has led to the establishment of several Acts and provisions such as the Coronavirus Aid, Relief and Economic Security (CARES) Act so that there is the effective management of Covid-19. As per the Act provision, the medical and pharmaceutical companies are required to remain in close contact with the legal

organizations, financial institutions, and professional advisors so that a collaborative approach could be implemented to reduce the spread of Covid-19 infection. Additionally, the companies are advised to adopt strategic planning so that there is the maintenance of medical-related manufacturing and supply chain management. It includes streamlining the inventory and logistics so that there is the supply of medications in Tier II, tier III, and Tier IV cities. While focusing on the future strategies that could be taken in the course of Covid-19 management are creating communication between the industries and developing the Paycheck Protection Program. By establishing communications between the industries, there would be exact identification of the exact number of medical resources in different company locations. It includes the active participation of healthcare units and organizations so that the exact number of medical resources required by them would be determined. As a result, it would help in managing the medical resources and projecting demands by ascertaining the inflow of Covid-19 patients. Paycheck Protection Program (PPP) includes strategies related to freight, capital, and labor so that their effective management help in ensuring adequate medical supplies. By focusing on freight intensive products, high emphasis is given on heavy and expensive medical products. It includes transporting medical freight intensive products at reasonable rates so that the needs of medical equipment are met by hospitals. The capital intensive is associated with the delivery of high precision machines so that the efficacy of the healthcare expert increases to provide quality healthcare services. Labor intensive is related to enhancing the quality of healthcare personnel, workers, and staff so that they could provide quality services to the patients. It also includes implementing automation technology in the

healthcare services so that there is an enhancement in the human capabilities to serve the patients in the Covid-19 pandemic conditions.

Genetic disease physiotherapy & rehabilitation

Physiotherapists are working extensively working to prevent and rehabilitate of the genetic diseases. The recent work by the physiotherapists demonstrates that the genetic disease physiotherapy is an important aspect to be taken into account to determine the rehabilitation process of the disease. For example, in the case of Covid-19, the physiotherapists are identifying the origin and variations of the virus so that there is the detection of appropriate treatment techniques. It includes specific physiotherapy interventions such as examining the respiratory and hemodynamic state of the patient. It also includes the implementation of Focus ADL and instrumental ADL guidance along with dysphagia treatment so that there are treatment and future prevention of the disease. Ai T, et al. (2020) analyzed that the pathological outcomes of the Covid-19 were similar to SARS- CoV and MERS-CoV infection. However, when the latter investigations and clinical examinations were done, it was found that the Covid-19 virus was highly sensitive and exhibited high-throughput sequencing features. It has increased the difficulty levels of the physiotherapists to discover an appropriate drug through which the high incidence of the virus could be eliminated. As per the study conducted by Xu XW, et al. (2020) it was found that for the manufacturing of Covid-19 drug, different processes such as interferon-alpha inhalation, lopinavir/ritonavir, and arbidol are taken into consideration by the researchers. However, fruitful outcomes related to the proper rehabilitation of Covid-19 is yet to be identified.

Advanced stem cell research

Stem cell, research and advancements have risen in recent times to delineate the harmful implications of the pandemic conditions. While focusing on stem cells, that can be defined as undifferentiated or blank cells. It signifies that the stem cells can multiply in several cells and perform different body functionaries. As per the laboratory diagnosis of the Mayo Clinic, it was found that stem cells can be used for different body functions such as replacing the damaged cells and testing new drugs to ensure safety. Stem cells are used for identifying genetic defects in cells and researching the epidemical origin of the disease. There are different types of stem cells such as embryonic stem cells, Non-embryonic (adult) stem cells, Induced pluripotent stem cells (iPSCs), Cord blood stem cells, and amniotic fluid stem cells which can be used for advanced stem cell research process. The research in the stem cell includes cell-based therapies in which differentiation is crated between embryonic stem cells to treat the patient. This process is mainly used to cure patients that are suffering from diseases such as rheumatoid arthritis, hearing loss, traumatic spinal cord injury, and Parkinson's disease. Additionally, stem cells are used to test the new drugs so that the efficacy of the drug is ascertained. As per the survey conducted by California's Stem Cell Agency, stem cells are used for several research purposes in different projects. It includes using stem cells in the injected modified form in the brain after the individuals suffer from a stroke. In another project, stem cell is used for replacing the damaging cells in the inner part of the ear, so that impaired individual would be able to hear again. It is also used in altering genes so that resistance against diseases such as AIDS is developed. Thus, it can be said that researching in the segment of stem cell is beneficial as it helps in improving the

healthcare services. While focusing on the Covid-19 pandemic conditions, stem cell is used as models in lung organoids to create future drugs against Covid-19. As per the screening of the Covid-19 virus impacted patients, it was found that the deadly virus negatively impacts the lung functioning of the individuals. By including the stem cell, there could be replacement of the infected cell with the healthy cells. However, the research is still under process by the UCLA researchers and new medications against Covid-19 are yet to be discovered.

Generic coding

Genetic coding of the Covid-19 suggest that it emerges in 6-10 forms that are having slight variations. The virus has been infecting individuals around the world and causing major losses to human lives. As per the genetic analysis of coronavirus, it has changed genetically since its origin in Wuhan. The different variations of the genes of the Covid-19 virus can be characterized as Informative Subtype Markers (ISM).

By examining the samples of the Covid-19 virus, it was found that the virus that is infecting individuals in America is different from the virus that is infecting people in Asia and Europe. There was an analysis of the generic coding of Covid-19 and found that the SARS-CoV-2 is constantly changing features and reducing the 30,000-base-long genetic code of the virus. As a result, there is the emergence of different subtypes of the virus that are making it difficult for the researchers to develop an effective vaccine against it.

Future of physiotherapy & rehabilitation medicine

According to Kakodkar, Kaka, and Baig, (2020, 12(4)**)** physiotherapy is an important instrument for the conduction of the rehabilitation process who are recovering from the

Covid-19 infection. It must be noted that the post-COVID-19 consequences are different among different individuals depending upon their decondition, immobilization, and ventilation conditions. The provision of physiotherapy & rehabilitation medicine highly depends upon the intensity of lung trauma and injuries to other parts of the organ. The comorbidities such as Hypertension, Coronary artery disease, Stroke, and Diabetes are also to be taken into account while providing treatment and rehabilitation medicine to Covid-19 patients. The other conditions such as Multi-organ Failure, Acute kidney injury, and Cardiac injury are to be taken into consideration for the execution of physiotherapy & rehabilitation medicine of Covid-19 patients. Additionally, sequelae are to be implemented so that the proper treatment of Covid-19 infected patients is carried out. It includes Cardiac sequelae, Neurological sequelae, Musculoskeletal, and other sequelae so that there is an effective treatment of the Covid-19 infected patient.

2.4 Conclusion

As per the above-discussed facts, it can be said that the healthcare industry is in a transformative phase and including several technologies such as robotics, virtual reality, the Internet of Things, big data, and bionics to enhance the services that are provided by the healthcare organizations. The smart healthcare organizations and hospitals are adopting consumer-centric approaches to increase their reach to consumers and provide them with high-quality services. As per the survey conducted by Deloitte 2020, it was found that the spending in the healthcare industry is expected to grow at a compound average growth rate of 5% from 2019-2023. It will increase the abilities of healthcare organizations to introduce more innovation in the healthcare sector and provide quality care to the patients. The survey also revealed that even though the healthcare market is

increasing at a consistent rate, the challenges such as increasing pressure of rising population, high prevalence of chronic diseases, shortage of funds for technological inclusion, lack of appropriate infrastructure, and increase healthcare cost are faced by the healthcare industry. Under such conditions, healthcare organizations need to work collaboratively and provide focused treatment to the patients so that the cost of healthcare is reduced. Healthcare organizations are initiating other reforms such as value-based payment so that patients and payers could make payments easily. Technology oriented consumer engagement approaches are included in the healthcare segment so that interactions between patient and healthcare system improves. For example, the introduction of Population Health Management (PHM) helps in identifying the healthcare needs of the people and provides them services accordingly.

The study examined that healthcare organizations are extensively adopting advanced technologies such as cloud computing, telemedicine, bionics, natural language processing, Internet of Medical Things (IoMT) so that there is streamlining of healthcare delivery mechanism and changing consumer preferences. As a result, there has been a significant increase in the Data-as-a-Platform (DaaP) so that the patient data is recorded and transferred between different networks securely. It was examined that there has been the inclusion of virtual reality in the healthcare segment so that the medical reach is extended to the remotest regions. As per the industry survey reports, the use of virtual reality has increased in the healthcare sector and is expected to reach 5.1 billion US$ by the year 2025. For example, virtual reality helps in the treatment of patients that are suffering from chronic diseases, strokes, and mental disorders. The use of virtual reality helps in enhancing the skills of patients and assists in complicated surgeries. The study examined

that to enhance the brand value of the hospitals, the healthcare organizations are adopting different technologies such as big data so that the healthcare services that are provided to the patients are enhanced. Big data incorporation in the healthcare sector helps in the identification of 1800 genes and the conduction of 2000 tests simultaneously. It also helps in the drug development process and provides précised medical care to the patients. Thus, it can be said that the current study examined facts related to the branding of hospitals and how it has helped in improving the services that are provided to patients. The facts related to the satellite clinic and hospital-based clinic have also been included in the study and found that satellite clinics allow patients easier access to medical services and bring medical care closer to communities. The study also examined facts related to functional and non-functional requirements of smart healthcare and identified that functional requirements address specific requirements of smart healthcare architecture, whereas non-functional requirements of smart healthcare can further be classified into performance requirements and ethical requirements. Thus, it can be said that the study will be highly beneficial to the patients, healthcare industry, and professionals as they get a better understanding of strategies and facilities employed by smart hospitals (Acampora, Cook, Rashidi & Vasilakos, 2013, 101(12), pp. 2470-2494**).**

Chapter 3 Research Methodology

The research methodology is the process of gathering and analyzing information related to the research topic by making use of scientific tools and techniques. It includes the use of different procedures such as research philosophy, design, approach, sampling, and analysis to assemble, examine, and represent the facts. While focusing on the definition of research is made up of two words which are re and search. Therefore, research means a process in which the search is executed again. It is considered as an intellectual activity that explores new knowledge and removes misconceptions by adding new learning insights. The research methodology is regarded as a scientific and intensive method of obtaining knowledge and resolving issues. The main purpose of carrying out research methodology is to find out answers related to research problems and questions. Research methodology provides familiarity with the research topic by carrying out formative research analysis and portrays different characteristics of the research by using descriptive research analysis (Peffers, Tuunanen, Rothenberger & Chatterjee, 2007, 24(3), pp. 45-77).

Research methodology can be further grouped into different parts based on the nature of information, subject matter, approach, and method. While focusing on the nature of information, it includes two types of research methodologies such as qualitative research and quantitative research. In qualitative research there is an assessment of facts that are based on qualitative data, on the other hand, in quantitative research, there is an assessment of facts that are based on quantitative data. Considering the nature of the subject of research, the research methodology is classified into two types which are theoretical research and experimental research. The theoretical research implies that

utility is universal and applied research signifies that utility is limited. Additionally, while considering the approach aspect of research methodology, it is categorized into longitudinal and cross-sectional research. Longitudinal research is based on the case study, genetic research, and historical investigation. Cross-sectional research is based on survey and experimental investigations. On the other hand, based on the method of research, a methodology is classified into philosophical research which is based on a qualitative assessment of facts. While historical research is based on both qualitative as well as a quantitative assessment of facts, and survey research is purely based on quantitative analysis of facts. The experimental research is based on quantitative aspects as well as future events and case-study are related to dealing with unusual events in both qualitative and quantitative segments (Goddard and Melville,2004).

The research methodology includes different characteristics such as controlled, rigorous, systematic, valid and verifiable, empirical, and critical to carry out the researching process. Controlled research is related to minimizing the outward implication of the factors on the study variables. Rigorous is associated with the authentication and reliability of the research process by considering the physical and social sciences. It includes answering the questions related to research in an appropriate and justified manner. The systematic research undertakes the researching process in a logical and sequentially manner by eliminating haphazardness in the investigation procedure. On the other hand, valid and verifiable aspect of research is related to the investigational facts that could be verified and authenticated by others. Empirical research is related to concluding by gathering information from real-life experiences. Critical research is related to the scrutiny of the methods and procedures that are used to investigate the

study related facts. Thus, a process to be called a research procedure, the above characteristics are essential to be included (Welman, Kruger and Mitchell, 2005).

The research methodology is a systematic process of collecting research-related information by considering the research objectives and problems. It includes the identification of research aspects subjectively and objectively. While focusing on the subjective aspect of the research, it includes idealism and perception of different individuals in the same form in which they exist. The subjective aspect includes identifying facts related to research as per the observation and perception of other individuals. It includes considering the suppositions that are undertaken by the population and collect facts by establishing an association between the realities. It is based on qualitative analysis of facts in which the authenticity of data is checked by carrying out thematic analysis. On the other hand, the objective aspect is related to identifying facts in their real aspect by taking the information in their real terms. It is based on universalism and provides information about the attitude of individuals in the real world. The objective aspect of the research process includes relational methods for collecting facts and emphasizes the presence of individuals between individuals and associations. It is based on the quantitative analysis of facts in which mathematical and numeric expressions are used to evaluate the facts precisely. Thus, it can be said that research methodology is a vital tool process through which facts about the research are collected by using both qualitative and quantitative processes. Additionally, research methodology is also responsible for providing a concise structure to the entire research process that helps in collecting, analyzing, and interpreting facts logically. The current research which is related to a comparative analysis of the impact of current healthcare hospitals and

branded “smart care” hospitals on the quality of the healthcare service includes different research processes to complete the purpose of the study which are as follows:

1. Research philosophy

2. Research Approach

3. Research strategy

4. Data collection method

5. Population and sampling

6. Data analysis and interpretation

7. Ethical consideration

The different research methodology processes would collect study relevant facts in a step-by-step manner by following the research guidelines. It will help in performing the entire research process effectively without any interruptions in between. Thus, it can be said that research methodology is a systemic process of collecting facts in which valuable information is collected by defining a problem, establishing a hypothesis, gathering and examining facts, and at last making discussion, deductions, interpretations, and conclusions. The research methodology is referred after as much the investigational manner in which scientific tools are tools in accordance with accumulate current facts about any field about study. It is recognized so the original contribution performed by means of the researcher in conformity with the present collection on expertise glossary existing together with him/her. Research can be classified as like a venture on exploring yet investing from available information therefore that it helps between ascertaining a

precise end result or developing a theory. Hence, it can stand pronounced to that amount lookup methodology is a close instruction concerning the discipline over management yet a topic so is determined by means of defining a problem, establishing a hypothesis, competition and examining information yet at final building discussion, deductions, interpretations, or conclusions. Under anybody study, the essential objectives at the back of assumption abroad the lookup methodology process are birth current insights touching the topic, authenticating the imperative facts, examining the events along including its procedures, causes, yet effects. It also includes figuring out the solution that the research problem so much is scientific, non-scientific or social constructs (Quinlan, Babin, Carr & Griffin, 2019).

3.1 Research Philosophy

The research philosophy is one of the vital parts of the research methodology as it is based on the convictions of the researcher and provides guidelines that help in resolving research problems. It is based on three important classifications which are ontology, epistemology, and methodology. The classification describes the values, beliefs, and assumptions of the investigator regarding the conduction of the research process. The ontological aspect of the research philosophy describes the reality-based facts of the research that cannot be changed and to be used in the universal form as they are. It includes considering facts in the way their existing form by managing the suppositions based on social reality. It must also be considered that the real aspects could not be changed and are to be included in the research in their real-form. The epistemology aspect of the research philosophy describes the approaches or techniques through which knowledge could be gained by an individual. The epistemology provides an idea about

the technique that could be included in the investigation process to perform the entire research process adequately. The methodology aspect of the research philosophy describes the actual method or technique that is to be included in the research process to conduct the research. It can be in the form of a quantitative or qualitative tool or both so that facts related to research are collected accordingly. If the research demands numerical analysis and statistical representations, there will be the use of quantitative methods of research, on the other hand, if the research demands thematic analysis and subjective presentation, there will be the use of qualitative methods of research. The research philosophy is further classified into two main segments which are the positivism paradigm and interpretivism paradigm (Creswell, and Clark 2017).

The positivism research philosophy is based on the natural science and social realities in which the facts are collected are considering the realism features ad observations. Positivism research is based on the deductive research approach that helps in examining the hypothesis and extracting valuable facts related to research. In the positivism philosophy, those constructs are included that have already been accepted by the community and are into practice for years. Considering the ontological aspect of the positivism paradigm, it is based on a single reality and included in the research in its real form (Denzin and Lincoln 2008, 3). Due to the single based reality of the positivism approach, the facts are collected independently without taking the suppositions into account. The epistemological feature of positivism philosophy is associated with the universalism aspect of reality and provides directions for selecting the right method of collecting facts. It specifies that the reality that is present in the universe can be deduced by taking certain assumptions into account. It is related to developing a hypothesis to

gain the objectivity of the research facts. The methodology feature of the positivism philosophy describes the different processes that can be included to perform the research. In positivism research philosophy, the methodology is based on a quantitative assessment of facts in which numerical expressions and mathematical tools such as statistics, numerical expression, and formulae are used to collect and analyze the facts. Quantitative tools such as experiments, observations, and surveys help in examining and representing the facts accurately (Mackenzie, Noella, and Sally Knipe 2006, 16(2). Pp. 193-205).

While focusing on the interpretivism paradigm, it is related to the interpretation of facts that are based on human values and actions. In this philosophy, the reality aspects could be constructed by considering the actions, values, and beliefs of the individuals. The philosophy focuses on collecting facts through interactions by taking the perception of the respondents into account. It can be considered as the qualitative form of data collection and examination in which the facts are collected by analyzing the beliefs and values of the participating individuals. The ontology aspect of the interpretivism paradigm is based on the several realities in which views of all the participating individuals are taken into account. In this philosophy, research is conducted by taking the facts so that a better understanding is gained about the study. The epistemological aspect of interpretivism philosophy is related to subjective analysis in which the facts that are collected from individuals are taken into account for the researching process. The conduction of the research process is based on the qualitative analysis in which the subjective analysis of facts is executed. The methodology aspect is responsible for selecting a technique through which the facts related to research are authenticated by making use of thematic evaluation tools. It includes the use of different techniques such

as case study, observation, focus group, and record-keeping so that facts related to research are collected and authenticated (Bryman, 2012, pp. 274-278).

In the current research which is related to a comparative analysis of the impact of current healthcare hospitals and branded “smart care” hospitals on the quality of the healthcare service, the positivism research paradigm has been included to collect research relevant facts. The positivism research philosophy helps in collecting and analyzing facts related to assessing the concept and role of smart care branded hospital. It helps to analyze facts related to factors that influence the e-business process in supply chain management by using numerical analysis so that relevant facts are gained precisely. The positivism research paradigm examines the developed hypothesis with the help of quantitative data collection and statistical analysis. It helps in analyzing the strategies and facilities employed by smart hospitals. The ontological aspect of the positivist philosophy helps in ascertaining facts related to the role of smart care branded hospital, strategies, and facilities employed by smart hospitals effectively. It includes different factors such as digitalization, social media, e-commerce, e-wallets, and online transactions that help in acquiring facts related to the healthcare industry. The epistemology aspect of positivism research philosophy concerning the current research includes taking into account different quantitative methods and verifying the facts related to the study without changing the prevailing reality of the universal facts. It helps in acquiring facts related to the branding of the hospitals and investing in advanced technologies to improve the quality of healthcare services. The methodology aspect of the positivism research philosophy describes the use of arithmetical expressions for collecting and verification of the facts. It includes the use of numerical assessments in the form of equations and

expressions so that differences between the conventional healthcare hospitals and branded smart care hospitals are identified. The use of statistical tools and mathematical terminologies helps in acquiring relevant information related to different components of the smart healthcare system that play a unique role in recording, monitoring, maintaining, and sharing vital patient information. Thus, it can be said that the positivism research philosophy is an essential researching tool that helps in developing and testing hypotheses so that there is a quantitative analysis of the facts.

3.2 Research Approach

The research approaches an essential part of the research methodology that is responsible for collecting and analyzing facts related to the study. It is related to the gathering of reliable facts related to the research to gain better learning about the research topics. The research process has been classified into different parts such as quantitative, qualitative, and mixed to obtain the facts related to research in an organized and systemized manner. The quantitative research approach is based on the numerical assessments of facts in which quantitative techniques such as statistics, numerical expression, and formulae are used for collecting and examination of facts. The quantitative research approach is categorized into different parts such as inferential approach, experimental approach, and simulation approach so that there are collection and examination of facts precisely. While focusing on the inferential approach, it is based on identifying and evaluating the facts related to the research by considering the traits and patterns of the participating respondents. It helps in collecting information from the sample community that has never been included in the research and provides new insights into the research topic. On the other hand, the experimental approach is based on the collection of facts from

unrecognized locations and samples so that new insights about the research are acquired. It helps in justifying the proposed objectives and exploring the unexplored regions of the research topic. The use of arithmetic tools in this process increases the authenticity of the facts and makes it appropriate for the researching process. The simulation approach is responsible for distinguishing the elemental and subjective aspects of the research so that relevant facts are gathered related to the research topic (Prescott & Conger, 1995, 26(2-3), pp. 20-41)**.** Moreover, the quantitative research approach also includes the use of a deductive approach that is based on suppositions that have already been pre-determined and authenticated. It helps in the accurate conduction of the research process by including numerical assessments into account.

While focusing on the qualitative research approach, it includes the ideologies and evaluation techniques that are based on the subjective analysis of facts. The qualitative research approach includes interpretivism research aspects that are related to the assessment of facts on themes and responses of the respondents. The collection of facts in the qualitative research process includes using different processes such as one-to-one interviews, case study, and observation. These processes help in collecting relevant facts and verifying them qualitatively. The qualitative research approach includes the use of different research techniques such as exploration, record keeping, and focus groups so that facts are gathered in brief. The other processes such as ethnographic research, inspection, and surveys are also used to collect the facts and develop subjective outcomes from the analyzed facts. The qualitative research approach is extensively used by the researchers to acquire relevant facts related to the research and gain the meaning of the research topic through social world meanings effectively. In the qualitative research

approach, hypotheses are developed and examined in the initial phases so that there is the identification of the contextual factors. It must be noted that the examination of the hypotheses does not include any numerical analysis and the facts are analyzed through thematic analysis and comparing the literature with the collected information from the respondents (Bryman & Bell, 2015, p. 27).

The mixed research approach is based on both quantitative as well as a qualitative assessment of facts. The implementation of the mixed research approach within the researching process helps in acquiring both subjective as well as objective facts related to the research. In the quantitative assessment of facts, there is the use of deductive methods for the collection of facts that helps in exploring the facts objectively. It also helps in developing and evaluating hypotheses so that the facts are obtained as per the research objectives and research problems. On the other hand, in the qualitative research approach, there is the use of inductive methods for the collection of facts that helps in exploring the facts subjectively. The conduction of research with the help of qualitative research strengthens the researching pattern and resolves the issue that is present in the study. Thus, it can be said that the mixed research approach is beneficial as it helps in obtaining both qualitative as well as quantitative aspects of the research (Mohajan, 2017, 17(4), pp. 59-82).

In the current research which is related to a comparative analysis of the impact of current healthcare hospitals and branded “smart care” hospitals on the quality of the healthcare service deductive research approach have been included. The deductive research approach is based on quantitative collection and assessment of facts that provide relevant information related to the concept and role of smart care branded hospital and strategies

and facilities employed by smart hospitals. The deductive research approach is known as a top-down approach that collects and interprets data quantitatively. It helps in exploring the impact of current healthcare hospitals and branded smart care hospitals on the quality of the healthcare service effectively and scrutinizes the differences between conventional healthcare hospitals and branded smart care hospitals. The quantitative research approach has been included in the research as it is based on positivism research philosophy. It includes the use of arithmetic means such as numerical expressions ad formulae so that there is a collection of facts related to characteristics of the smart healthcare unit that highlight computing and interaction processes for the establishment of dynamic networks. It also helps in the examination of the proposed hypotheses and ensures that the facts that are collected by the researcher are as per the objectives of the study. The quantitative approach provides a definite structure to the entire researching process and helps in developing an interoperable association between different applications for the secure flow of information. The use of a quantitative research approach is based on the examination of variables by using averages, mean, and other modes that help in acquiring relevant information for the research. Moreover, the inferential references included in the quantitative analysis helps in acquiring facts related to different technologies such as machine learning algorithms, database management, human-machine interface, and optimization that are used in the smart healthcare system to collect and record patient information. The use of a developed deductive approach includes the use of different statistical tools such as ANOVA, Chi-Square, and factor analysis that helps in examining the hypotheses and acquiring information about IoT application in healthcare. It includes collecting facts related to the use of IoT in the smart healthcare service provision along

with considering its connection, interaction, and computation aspects. Thus, it can be said that the quantitative research approach helps in standardizing the entire research process and generalizes the research outcomes. It results in the development of adequate opportunities for establishing a comparison between the large datasets and findings of the research. As a result, the facts that are obtained through this process are authenticated and validated in each step. It helps in acquiring facts related to maintaining patient data and coordinating medical procedures by making use of virtual assistants. It facilitates the treatment process of the doctors, increases the efficacy of its manpower, and helps in saving material resources.

3.3 Research Strategy

The research strategy is known as the fundamental element of the entire research methodology process in which facts are collected by using the guidelines as provided in the research design plan. The research strategy is defined as the blueprint of the research that provides instructions related to the conduction of the researching process. It provides clear guidelines to the investigator for the conduction of research rationally. The research strategy has been classified into different parts such as descriptive, explanatory, and exploratory research design for the collection of facts related to the research. While focusing on the descriptive research design, it is utilized by the investigator to acquire facts in their current state. In the process of descriptive research design, the investigator does not apply any control over the variables and majorly aims at gathering facts related to the research. This research design is responsible for providing detailed information about the research by identifying the issues present in the research. It includes the use of a survey, normative survey, status, analysis, classification, comparison, and correlative

survey. In the descriptive analysis of facts, there is an accurate assessment of facts by identifying the association amid the chosen variables. Moreover, the conduction of the descriptive research design includes the processes of the observational method, case study, and survey method that helps in the collection and examination of facts. It is also responsible for recognizing and examining the issues present in the research by using both qualitative and quantitative facts adequately (Kumar and Phrommathed, 2005, pp. 43-50).

While focusing on the explanatory research design, is based on investigating facts related to real-life interventions by including the responses of the respondents. The explanatory research design is based on the use of the experimental design process so that their attainment of facts related to a research problem that has not been defined by the researcher previously. It includes using generalizations, instructions, and procedures to develop a research model so that there is the identification of facts related to the research. The model that is developed in the explanatory research design explains the different topics in the research in detail. It helps in acquiring adequate learning about the research objectives and research problem. In the conduction of explanatory research design, different processes such as focus group research, literature research, case analysis research, and in-depth study are used. The implementation of the different techniques helps in acquiring précised information about the research and develops a better understanding of it. The explanatory research design is also responsible for providing resources through relevant facts related to research that could be gathered systematically. As a result, the use of explanatory research design highly contributes to the attainment of authentic facts and results related to the study (Flick, 2015).

While focusing on exploratory research design, it is based on the collection and analysis of facts by using explorative methods. In this process of research design, the main focus is given on collecting facts related to acquiring facts related to the research question and lays less focus on attaining outcomes. The main purpose of including exploratory research design is to acquire relevant facts about the research that have already been researched by the investigators and provide more valuable insights about the research. As a result, there is the attainment of new facts about the research that have not been discovered by the investigators before. The explanatory research design helps in developing & examining hypotheses and explaining the research phenomena. In the explanatory research design, there is the setting of priorities and collection of facts by using approaches such as personal interviews, secondary information, and focus groups.

In the current research, the descriptive research design has been used to collect and analyze facts related to scrutinizing the differences between conventional healthcare hospitals and branded smart care hospitals. It generates an association with the various variables and explains each facet of the research intrinsically. It helps in acquiring relevant information related to the concept and role of smart care branded hospital. The descriptive research design also helps to provide a detailed description of facts related to analyzing the strategies and facilities employed by smart hospitals. The main purpose of using descriptive research design is that it helps in acquiring information related to competition in the healthcare sector, developing trusts, and increasing brand value among the consumers. It increases patient loyalty and satisfaction which increases their re-visit intention to the hospital. Moreover, the descriptive research design is also useful in obtaining reliable facts from different sources systematically. It enables the investigator

to obtain valuable information related to different digital-based technologies such as big data and Genomic coding is adopted by healthcare organizations to increase their brand value. It helps in acquiring facts newer technologies that can be introduced in the healthcare segment to make them efficient and smart for patient use. The descriptive research design is also responsible for determining the research attributes and perceptions of the respondents that have been included in the research as a sample. The present research includes 200-250 individuals that are working in the healthcare sector that provide relevant information related to the adoption of a patient-centric approach and value co-creation within the hospital. It facilitates the provision of remote healthcare services through which the doctors and healthcare professionals could monitor the health and physical condition of the patients. Additionally, the descriptive research design is also responsible for developing a fundamental outline for the research process and enhancing the entire researching process effectively. As a result, there is a collection of facts related to differences between the conventional healthcare hospitals and branded smart care hospitals and strategies and facilities employed by smart hospitals. The descriptive research design is also responsible for providing solutions related to research questions and providing valuable insights about the research objectives. The use of descriptive research design also helps in collecting facts related to equipment that is increasingly used in the diagnosis and screening purposes for the patients that are suffering from diabetes and cancer.

3.4 Research Tools and Techniques

Data collection is the system as is frequently ancient by way of an investigator to accumulate relevant facts in relation to the research. It has been labelled among two

sections as are primary data collection yet unimportant information collection techniques (Marczyk, DeMatteo & Festinger, 2005).

Primary data

While focusing about the major statistics collection method, it is defined as like the first had collection of data via the researcher. It includes the usage over one-of-a-kind techniques certain as interviews, focus groups, or questionnaires in who the investigator in my opinion reaches the respondents then collects data from them. The data as is gathered via the investigator is primarily based of non-public interplay yet has no longer been published and acquired beyond any secondary resources. The interview be able lie carried out within different forms such namely close-ended, semi-structure, or open-ended and so much facts are acquired from the respondents. The questionnaire method can additionally remain chronic with the aid of the investigator as requires framing a engage on questions primarily based on the research theme then distributing after the chosen sample for the collection on responses. The survey method is additionally performed via the investigator by way of imparting a metering shape together with certain questions associated to the lookup topic. The survey approach does also remain carried out orally by asking questions in imitation of the respondents (Sekaran, 2006).

Secondary Data

The secondary approach regarding records collection is acknowledged namely the series concerning records from secondary sources. It includes the assets to that amount have meanwhile been researched yet published by researchers then students yet handy of the

shape on books, journals, documentaries, articles, and magazine publications. The current instances are surprisingly influenced by means of digitalization, it includes the uses over the electronic moderate because research purposes by way of erection use about search engines certain as Google and Yahoo. The lookup over relevant records is done by the usage of key phrases out of the research topic (Lambert and Lambert, 2012, 16(4), pp. 255-256).

In the current research which is related to a comparative analysis of the impact of current healthcare hospitals and branded “SMART CARE” hospitals on the quality of the healthcare service both primary and secondary methods of data collection are included. The methods provide relevant facts related to the impact of current healthcare hospitals and branded SMART

CARE hospitals on the quality of the healthcare service. The primary facts are collected by using surveys, focus groups, interviews, or questionnaires. The questionnaire data collection method includes the generation of an idea by using in-depth interviews and focus groups that help in acquiring relevant facts related to the concept and role of smart care branded hospital. Both main data sources and petty data sources had been included. While focusing over the primary data collection method, that blanketed the usage about a questionnaire as used to be distributed among the selected sample concerning the 200-250 respondents. It included distributing a questionnaire in accordance with the personnel that were working within the hospital. The questionnaire that used to be included among the lookup was designed by using the investigator. It blanketed applicable questions related after the lookup subject so much was essential for acquiring records in relation to the study. The questionnaire blanketed some general questions

related in imitation of demographics certain as age, name, then merit therefore so much the respondents feel satisfied while answering the questions. Additionally, the researcher ensured the respondents to that amount the responses that had been attached via them will stand stored personal and would not be shared through anybody third party. The interview system was blanketed of the research between as the researcher personally visited the respondents and asked questions in conformity with them touching the research topic. The researcher ensured up to expectation respondents are supplied statistics touching the lookup and its goals beforehand therefore up to expectation no obsession arises additional on. To propulsion the interview process, the researcher elected a calm or cozy region and so the respondents work no longer gets distracted. At first, the researcher asked a standard question certain as like name, experience, and educational quantification in accordance with edit the respondents comfortable or inquired about the research topic questions. The responses that had been attached by using the respondents had been recorded through the investigator word-to-word barring making any changes. The whole technique over the interview took 15 in conformity with 20 minutes for every respondent. The aid then assists concerning the respondents helped in acquiring statistics associated in conformity with the lookup adequately. Thus, in that place used to be a collection of information related to the relationship between lifestyles force or action pleasure or the affinity of existence force and stress coping strategies effectively. The secondary method of data collection includes collection of information from reliable secondary sources such as books, articles, journals, documentaries. The investigator also includes digital means of information collection by using search engines such as Google Search. The research additionally covered the uses regarding the minor method of

statistics collection between which the information was gathered by way of the usage of research publications, existing literature, journals, related books, then vile certain sources.

3.5 Sampling

Sampling is the method up to expectation is used according to pick a unit pattern beyond a widespread population to conduct a discovering process. The unit pattern so much is select because the lookup represents the opinions on the substantial audiences as a giant population may want to no longer remain protected because of the survey purpose. The example method has been classified among twins' components as are probability sampling technique yet non-probability ideal technique. While focusing of the probability sampling method is primarily based about the idea so each participant is eligible and has an equal chance in conformity with get select because the studying process. It has been similarly subdivided between different parts such so easy random sampling, well-connected sampling, stratified sampling, cluster sampling, then multi-stage around sampling. The simple lamely model approach is referred to as the technique in as the selection about the sample is done with the aid of the use of a wide variety generator system. It ensures to that amount each sharer has an even risk according to reach selected without someone biases (Lewis, 2015, 14(6), pp. 473-475).

The systematic sampling is described namely the copy method within which nth single is select for the massive list of participants. The stratified ideal iOS defined as like the system in who the members are classified of extraordinary subsections and afterwards a easy loosely approach is applied according to select respondents in every section. In the

bunch model procedure, the respondents are choice from a huge population randomly except anybody pre-decided order. Multi-stage around example is defined as the mixture and combination over distinctive example techniques. The uses concerning different probability copy methods helps among selecting the pattern cordially namely through the needs and demands over the lookup topic.

The non-probability model approach is termed namely the example procedure between as the sample is elect primarily based about the subjective evaluation concerning the investigator. The non-probability sampling technique includes the grasp of the researcher between attention whilst selecting the sample for the studying process. It has been labeled of sub-parts who are convenience sampling, sequent sampling, percentage sampling, judgmental sampling, and snowball sampling. The favor norm approach is defined as like the technique between who the sample is select yet analyzed by means of the investigator or agreement the pattern is observed in accordance with remain gorgeous it is retained yet more a new pattern is selected. The quota ideal approach is termed namely the sampling system among who the sample is selected by the investigator by means of classifying the population in exclusive strata. Judgmental example is the technique on deciding on a pattern based on the study of the investigator. In this procedure about selection, solely these people are selected that are deemed to fit because of the lookup via the investigator. It is not regarded as much a scientific method on choosing then includes a high aggregate over uncertainty. The snowball copy is based on the referral application for the resolution regarding the contributors or locates the respondents up to expectation are not effortlessly available.

In the present day lookup, which is related according to the education regarding lifestyles strength then coping approaches as a ratepayer because action satisfaction or work-life balance into the retail sector, simple random sampling method had been protected by way of the investigator. Judgmental-non-probability sampling is additionally acknowledged as like a purposive example technique then an authentic norm process. In this simple random sampling method process, the pattern lowlife a unique haul concerning pastime was selected to grant precious records in relation to the relation within life force via coping with emotional focused or problem-focused techniques. The main purpose at the back of the implementation of the simple random sampling method is that it helped between selecting the pattern in less time. As the researcher had the learning about the lookup topic yet questions, the judgmental- non-probability norm system helped within choosing the précised sample conveniently. The sampling method also allowed the investigator after attains the goal target market without problems as helped in acquiring desired outcomes. The adopted simple random sampling method helped the researcher according to collect applicable statistics in relation to the research between real-time so the participants that were elected because of the learning method had before potential and belonged according to the subject over the research topic. As a result, the simple random sampling method helped within selecting 300 respondents because of the lookup to that amount belonged after the retail sector. It blanketed the personnel that were pursuit between exceptional corporations among the retail sector. The elect respondents provided valuable information as regards to concept and role of smart care branded hospital. In simple random sampling method, the respondents had been well informed in relation to the lookup which helped to them in conformity with actively take part within the

discovering process and furnish facts respecting the intercourse between life stresses via coping along emotional focused and problem-focused techniques. The judgmental-non-probability example helped the researcher according to choose sample and find facts related to differences between the conventional healthcare hospitals and branded smart care hospitals. Additionally, judgmental-non-probability model additionally helped the researcher in imitation of conduct the getting to know method effortlessly through ingesting much less period because of the execution process. As a result, the respondents as had been choice because the research furnished valuable information about use of applications by the patients and individuals develops their trust with the hospitals and they establish themselves as a healthcare brand in the market. It was found that use of applications by the patients and individuals develops their trust with the hospitals and they establish themselves as a healthcare brand in the market.

3.6 Data Analysis

Data analysis is the process so much is used because the examination over the facts quantitatively and qualitatively. The quantitative method on evaluation includes the usage concerning arithmetic means such as much equations and formulae that helps among the accurate addition over facts. It consists of the use of statistical equipment certain namely graphic evaluation, regression evaluation, median, mode, variance, and covariance analysis then t-test so in that place is an right regularity about the facts. The other quantitative techniques certain as much Graphical analysis, Simple proportion method, Chi-square test, and Karl Pearson outset method, ANOVA, or SPSS are additionally covered of the information analysis process consequently up to expectation in that place is the attainment about précised facts. The use over statistical equipment helps within the

numeric evaluation of facts yet provides to them by using the use of a pie chart, royal court graph, yet tables. On the lousy hand, the usage of the qualitative records evaluation procedure helps within the subjective analysis on statistics with the aid of organizing a comparison among the collected records then existing literature review. The transport of thematic analysis helps between acquiring applicable facts as regards the research via referring in imitation of the literature that has already been investigated through other intellectuals over a similar topic. Thus, that can be acknowledged so much data evaluation is an affluent process so much helps of analyzing the collected facts and drawing consequences based regarding substantial affirmation yet. In the present-day research, the investigator committed the efficient uses about the Statistical Package for Social Sciences (SPSS) approach because of the condition concerning the information analysis procedure. It helped in analyzing the statistics associated in conformity with life accent yet coping strategies because of personnel into the retail sector and the bracing between lifestyles emphasis yet employment satisfaction. The SPSS technique is exclusively associated including the uses about bivariate or vivid statistical strategies because the assessment of facts (Leech, Barrett, & Morgan 2013). As a result, in that place was an unerring regularity regarding data related in imitation of the kindred among life stress then power coping approaches. It additionally helped into accomplishment the numerical results beyond the facts accurately. Additionally, the SPSS technique on statistics evaluation was additionally associated together with the analysis about multiple facts or helped the investigator within execution the hypotheses testing procedure by using developing a link within variables. The statistical functions so had been included in the SPSS method on assessment had been mathematical techniques such namely

frequencies, cross tabulation, vivid ratio records because of the précised comparison concerning facts. On the lousy hand, the bivariate capabilities so were blanketed in the SPSS technique concerning the comparison have been Analysis of variance (ANOVA), means, correlation, nonparametric tests. The mean tools such as much Cluster analysis such as K-means, two-step, hierarchical, yet element analysis have been used because bearing out linear regression yet forecasting. It helped among acquiring dependable data about the relation between life stress via coping together with emotionally targeted and problem-focused techniques. SPSS software program was additionally aged by the investigator after gather data related to factors contributing to stress of the retail quarter except erection someone errors. Additionally, the ANOVA statistics analysis procedure was ancient by using the investigator in imitation of study the data related in accordance with the impact regarding power concerning the personal and expert lives on employees (Jamshed, 2014, 5(4), p. 87). ANOVA method concerning data evaluation is recognized as much a one-way evaluation method between as the unbiased volatile used to be dispensed among the normal range on the established variable. It helped in estimating the distinction and association between the independent and structured variables effectively. ANOVA method helped in the attainment of records related to concept and role of smart care branded hospital and strategies and facilities employed by smart hospitals. Thus, it can be reported so much the makes use of on SPSS helped in the authentic assessment about records through building use about statistical parameters yet tests. It also includes the use regarding par fall and relation in the computer software distribute that helped of checking out the reliability of the questionnaire yet advancement about rightful records

related to differences between the conventional healthcare hospitals and branded smart care hospitals.

3.7 Ethical Consideration

Ethical considerations are known as the standards and permits, and values that are taken into account while performing the research. It includes taking valid permits from the organizations and governing agencies that have been included in the research or essential to be considered before conducting the research process. It helps in ensuring that no issues arise later on and the research process is performed without any interruptions. In the current research which is related to a comparative analysis of the impact of current healthcare hospitals and branded “smart care” hospitals on the quality of the healthcare service, ethical considerations have been taken into account by the researcher. It includes taking permits from the governing authority and medical institutions from which respondents have been selected for the research process. The researcher ensured that all permits that have been taken by the organization are documented so that no issue arises later on. Additionally, the researcher also ensured to take valid permits from the respondents before including them in the research. Before acquiring their permits, the researcher ensured that the respondents have been well informed about the research aim and objectives so that have an idea about the research process. Once the respondents have been explained about the research topic and facts related to it, written permits were obtained from the respondents. It has been ensured to the respondents during the researching process, the respondents would not be harmed in any way (physically or mentally). It has been assured to the respondents that they can leave the research any time they do not feel comfortable in the mid-way. The respondents have been assured that

their identities and the responses given by them will be kept confidential and would not be shared by anyone without their permission. If at all it is required to be shared relevant permits would be taken from them and after acquiring their permission, the response would be shared with the third party. If the permit is denied by the respondent, no response would be shared by any outside party. Moreover, the researcher ensured that validity and reliability aspects have also been checked before conducting the research. The testing of the different tools that have been included in the research was previously done by the investigator to ensure that the facts that are collected and analyzed are accurate and there is no deviation in the recording and examination of facts. As a result, due to the use of different authenticated tools and techniques, there was a collection of facts related to research objectives, problems, and topics effectively. It helped in performing the entire researching process effectively without incurring any delays or interruptions. Thus, it can be said that ethical consideration is an important aspect to be taken into account while performing the research process so that all the issues are taken care of initially and no issue arises later on (Bryman and Bell 2011, pp. 23-56).

The moral behavior among any research defined the receiving about sure ideas between an appropriate path in conformity with government a study. Under that method, the researcher exceptionally ensured that his/her undertaking does not create someone damage in accordance with the sharer and to that amount while conducting the research, the researcher tremendously preserves the privacy of respondents to that amount are gathered from the major facts collection approach into the structure regarding survey. As identical as research moral also defined its appropriateness based concerning the researcher's conduct within terms of defending the rights of respondents whichever

turned overseas in conformity with stay the principal target concerning research. While conducting the research a researcher is obligated in imitation of exhibit neighborly duty and satisfying entire the ethical codes which are obligatory because of the conductance about anybody research. As a result, such may lie stated that every research is carried abroad with the aid of retaining ethical difficulty beyond the commencing stage as is choosing individuals in accordance with comparison yet finishing over consequences barring misguiding the study (Choy, 2014, 19(4), pp. 99-104).

Research, then directed without some knowledgeable aegis beyond the defendants, the research is considered in accordance with keep surreptitious evaluation yet stay subjected in accordance with severe ethical implications. The researcher does not affect someone damage to the participants, preserves the privateness of the respondents whichever contributed in conformity with the researcher among presenting predominant statistics thru their participation into the survey or in the end getting excellent consent from the respondents by informing to them the motive in the back of the statistics series then the reason about the research. The research has done entire the permission then permits from the governing our bodies or authorities to carry abroad the research method between an enough manner.

3.8 Summary

In the current research, there has been the utilization of different research approaches and methodologies that help in acquiring facts related to the research. It includes a positivism research approach for the attainment of facts by making use of quantitative tools and techniques. The positivism research philosophy helps in developing hypotheses and

examining them by making use of arithmetic expressions and formulae. The research also included a descriptive research design so that the facts related to research are collected in a structured manner. The descriptive research design provided a blueprint for the entire researching process that helped in acquiring facts related to the research topics effectively. The implementation of the quantitative research approach also contributed towards the effective conduction of the research process by providing solutions related to research questions and problems. The study included both primary and secondary methods of data collection in which the primary facts were collected by making use of a questionnaire, in-depth interviews, and focus groups. On the other hand, the secondary facts were collected by using books, articles, journals, documentaries. The use of a simple random sampling method also helped in selecting the sample of 200-250 individuals that are working in the healthcare sector. The respondents that were selected for the research belonged to the age group of 21 to 60 years of age group and worked in hospitals. Data analysis acted as an important instrument to authenticate facts by making use of the quantitative data examination process. It included the use of ANOVA, Chi-Square, and factor analysis so that reliable facts related to the current research were analyzed adequately. The use of different processes helped in attaining ad examining relevant facts related to the concept and role of smart care branded hospitals and strategies and facilities employed by smart hospitals. The facts related to differences between conventional healthcare hospitals and branded smart care hospitals were also analyzed effectively.

Chapter 4 Results and Discussion

The major aim of the study is to attempt a comparative analysis of the impact of current healthcare hospitals and branded smart care hospitals on the quality of the healthcare service. This study followed some objectives in order to conduct the entire study logically and systematically. The objectives were namely, 1) To assess the concept and role of smart care branded hospitals. 2) To analyze the strategies and facilities employed by smart hospitals. And 3) To scrutinize the differences between the conventional healthcare hospitals and branded smart care hospitals. A comparative analysis was designed in order to examine the impact of current healthcare hospitals and smart acre hospitals on the quality of the healthcare services. The findings for the current study were gained from the data collected.

According to the literature facts, it tends to be said that the medical care industry is in a groundbreaking stage and incorporates a few advancements, for example, mechanical technology, augmented reality, the Internet of Things, large information, and bionics to upgrade the administrations that are given by the medical services associations. The smart medical care (healthcare) associations and emergency clinics are embracing purchaser driven ways to deal with increment their compass to buyers and furnish them with great administrations. It very well may be uncovered that despite the fact that the medical care market is expanding at a reliable rate, the difficulties, for example, expanding weight of rising populace, high pervasiveness of constant sicknesses, deficiency of assets for innovative incorporation, absence of suitable foundation, and expanded medical services cost are looked by the medical care industry. Under such conditions, medical services associations need to work cooperatively and give centered

therapy to the patients so the expense of medical services is diminished. Medical care associations are starting different changes, for example, esteem-based installment so patients and payers could make installments without any problem. Innovation arranged customer commitment approaches are remembered for the medical services portion so associations among patient and medical care framework improves. For instance, the presentation of Population Health Management (PHM) helps in distinguishing the medical care needs of the individuals and gives them benefits in like manner.

The current study has used the positivism research paradigm to collect research relevant facts along with “primary” as well as “secondary” data techniques. Positivism research philosophy helps in collecting and analyzing facts related to assessing the concept and role of smart care branded hospitals. It helps to analyze facts related to factors that influence the e-business process in supply chain management by using numerical analysis so that relevant facts are gained precisely. Furthermore, the primary facts are collected by using surveys, focus groups, interviews, or questionnaires. The questionnaire data collection method includes the generation of an idea by using in-depth interviews and focus groups that help in acquiring relevant facts related to the concept and role of smart care branded hospital. Both main data sources and petty data sources had been included. While focusing over the primary data collection method, that blanketed the usage about a questionnaire as used to be distributed among the selected sample concerning the 200-250 respondents. The secondary method of data collection includes collection of information from reliable secondary sources such as books, articles, journals, documentaries.

Along with this “deductive” method has been used for the quantitative collection and assessment of facts that provide relevant information related to the concept and role of smart care branded hospitals and strategies and facilities employed by smart hospitals. The deductive research approach is known as a top-down approach that collects and interprets data quantitatively. In order to collect and analyze facts related to scrutinizing the differences between conventional healthcare hospitals and branded smart care hospitals, descriptive research design has been used. After the data collection for the current study, data analysis was performed. The mean tools such as much Cluster analysis such as K-means, two-step, hierarchical, yet element analysis have been used because bearing out linear regression yet forecasting.

4.1 Data analysis

The table below gives the frequency and percentage of the variable gender where female is 58% and male is 42%. Also, the bar graph (Figure 11, Appendix B) gives the percentage of the variable.

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	210	42.0	42.0	42.0
	Female	290	58.0	58.0	100.0

	Total	500	100.0	100.0	

Table 1

The table below gives the frequency and percentage of the variable age group where the category 40-47 years is highest in all having 48.6%. Also, the bar graph (Figure 12, Appendix B) gives the percentage of the different categories.

Age group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25 years	29	5.8	5.8	5.8
	26-32 years	56	11.2	11.2	17.0
	33-39 years	111	22.2	22.2	39.2
	40-47 years	243	48.6	48.6	87.8
	48 years and above	61	12.2	12.2	100.0

	Total	500	100.0	100.0	

Table 2

The table below gives the frequency and percentage of the variable marital status were single is 20.6% and married is 79.4%, also the bar graph (Figure 13, Appendix B) gives the percentage of the variable

Marital status					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	103	20.6	20.6	20.6
	Married	397	79.4	79.4	100.0
	Total	500	100.0	100.0	

Table 3

The table below gives the frequency and percentage of eth variable highest level of education were bachelor degree is highest in all having 55.6%, also the bar graph (Figure 14, Appendix B) gives the percentage of the different category

Highest level of education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Higher secondary	14	2.8	2.8	2.8
	Bachelor degree	278	55.6	55.6	58.4
	Master's degree	147	29.4	29.4	87.8
	Master's degree and above	61	12.2	12.2	100.0
	Total	500	100.0	100.0	

Table 4

The table below gives the frequency and percentage of the variable income per year where 6,01,000-9,00,000 is highest in all having 50%, also the bar graph (Figure 15, Appendix B) gives the percentage of the variable.

Income per year				
	Frequency	Percent	Valid	Cumulative

				Percent	Percent
Valid	Less than 1,00,000	11	2.2	2.2	2.2
	1,00,000-3,00,000	30	6.0	6.0	8.2
	3,01,000-6,00,000	114	22.8	22.8	31.0
	6,01,000-9,00,000	250	50.0	50.0	81.0
	9,01,000 and above	95	19.0	19.0	100.0
	Total	500	100.0	100.0	

Table 5

The table below gives the frequency and percentage of the variable where yes is 48.2%, no is 44.2% and visited to meet a relative is 7.6%. Also, the bar graph (Figure 16, Appendix B) gives the percentage value of the variable.

Have you visited a smart care hospital?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	241	48.2	48.2	48.2
	No	221	44.2	44.2	92.4
	Visited to meet a relative	38	7.6	7.6	100.0
	Total	500	100.0	100.0	

Table 6

The table below gives the frequency and percentage of the variable where yes is 26%, no is 56.8% and a bit is 17.2%. Also, the bar graph (Figure 17, Appendix B) gives the percentage value of the variable.

Are you aware about the concept of smart-care hospitals?				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Yes	130	26.0	26.0	26.0
	No	284	56.8	56.8	82.8
	A bit	86	17.2	17.2	100.0
	Total	500	100.0	100.0	

Table 7

The table below gives the frequency and percentage of the variable for treatments which type of hospitals do you prefer where ordinary is highest in all having 40.6% Also the bar graph (Figure 18, Appendix B) gives the percentage value of the variable.

For treatments, which type of hospital do you prefer?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Doctor Clinic	25	5.0	5.0	5.0
	Local Nearby Hospital	96	19.2	19.2	24.2
	Ordinary (Primary)	203	40.6	40.6	64.8

	Hospitals				
	Advanced Hospitals	130	26.0	26.0	90.8
	Smart Care Hospitals	46	9.2	9.2	100.0
	Total	500	100.0	100.0	

Table 8

The table below gives the frequency and percentage of the variable where Responsible and necessary authority to troubleshoot the problems faced is highest in all having 46.6%. Also, the bar graph (Figure 19, Appendix B) gives the percentage value of the variable.

In case you prefer ordinary hospitals, what is the main reason for choosing it?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Local hospitals are huge in number	15	3.0	3.0	3.0
	Are much easier to access	39	7.8	7.8	10.8

	Improved quality than small hospital serving a natural community	148	29.6	29.6	40.4
	Responsible and necessary authority to troubleshoot the problems faced	233	46.6	46.6	87.0
	Are smart, cheerful, less absenteeism, and tangible	48	9.6	9.6	96.6
	other	17	3.4	3.4	100.0
	Total	500	100.0	100.0	

Table 9

The table below gives the frequency and percentage of the variable where Lack of use of technology for report and testing of the patients is highest in all having 49.4% also the bar (Figure 20, Appendix B) graph gives the percentage of the variable.

According to you, what are the drawbacks of choosing ordinary hospitals?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lack of clarity in treatment provided.	11	2.2	2.2	2.2
	Time-taking proceedings	30	6.0	6.0	8.2
	Unavailability of doctor at the time of emergency	112	22.4	22.4	30.6
	Lack of use of technology for report and testing of the patients	247	49.4	49.4	80.0
	First preference to the local leaders and local health professionals	75	15.0	15.0	95.0

	Lack of professionalism in doctors	12	2.4	2.4	97.4
	other	13	2.6	2.6	100.0
	Total	500	100.0	100.0	

Table 10

Reliability Testing

Cronbach Alpha is a reliability test conducted within SPSS in order to measure the internal consistency i.e., reliability of the measuring instrument (Questionnaire). It is most commonly used when the questionnaire is developed using multiple Likert scale statements and therefore to determine if the scale is reliable or not.

Part B: According to you, what is the role of Smart Care hospitals

Reliability Statistics	
Cronbach's Alpha	N of Items
.887	8

Table 11

Cronbach's Alpha is *above* 0.7 which means *reliable data.*

The value for Cronbach alpha in this case is 0.887 and it reflects *high reliability* of the measuring instrument. Furthermore, it indicates a high level of internal consistency with respect to the variables for decision making.

	Cronbach's Alpha if Item Deleted
B1	.880
B2	.892
B3	.865
B4	.869
B5	.863
B6	.876
B7	.867
B8	.866

Table 12

Part C: Strategies and facilities employed by smart hospitals

Reliability Statistics	
Cronbach's Alpha	N of Items
.855	15

Table 13

Cronbach's Alpha is *above* 0.7 which means *reliable data*

The value for Cronbach alpha in this case is 0.855 and it reflects *high reliability* of the measuring instrument. Furthermore, it indicates a high level of internal consistency with respect to the variables for decision making.

	Cronbach's Alpha if Item Deleted
C1	.844
C2	.870
C3	.838
C4	.838

C5	.837
C6	.832
C7	.840
C8	.866
C9	.837
C10	.832
C11	.835
C12	.833
C13	.863
C14	.861
C15	.860

Table 14

Factor Analysis

Factor analysis is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors Factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance.

Part B: According to you, what is the role of Smart Care hospitals

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.886
Bartlett's Test of Sphericity	Approx. Chi-Square	1985.989
	df	28
	Sig.	.000

Table 15

In the table above the p-value of KMO is above 0.5 indicating that sample is adequate for analysis whereas the p-value for bartlett test of sphericity is below 0.05 indicating that factor model is appropriate.

Communalities		
	Initial	Extraction
B1	1.000	.458
B2	1.000	.283
B3	1.000	.660
B4	1.000	.614
B5	1.000	.686
B6	1.000	.518
B7	1.000	.650
B8	1.000	.657
Extraction Method: Principal Component Analysis.		

Table 16

In the above communality table, all the value after the extraction of the variables are above 0.3 explaining more of the variance of the an individual variable

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.526	56.578	56.578	4.526	56.578	56.578
2	.821	10.262	66.840			
3	.720	8.995	75.834			
4	.573	7.163	82.997			
5	.458	5.720	88.717			
6	.355	4.434	93.151			
7	.319	3.982	97.134			

8	.229	2.866	100.000			
Extraction Method: Principal Component Analysis.						

Table 17

In the above table it can be seen that one factor is extracted since their eigen value is above 1 where 56.578% of the variance is accounted for the first factor after rotation.

Figure 21 (**Appendix B**) shows the number of factors which is based on initial eigenvalues of the total variance explained table where it shows that 1 factor is extracted since their eigen value is above 1.

Part C: Strategies and facilities employed by smart hospitals

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.892
Bartlett's Test of Sphericity	Approx. Chi-Square	4289.816
	df	105
	Sig.	.000

Table 18

In the table above the p-value of KMO is above 0.5 indicating that sample is adequate for analysis whereas the p-value for bartlett test of sphericity is below 0.05 indicating that factor model is appropriate

Communalities		
	Initial	Extraction
C1	1.000	.446
C2	1.000	.737
C3	1.000	.677
C4	1.000	.617
C5	1.000	.703
C6	1.000	.766
C7	1.000	.524
C8	1.000	.705
C9	1.000	.544

C10	1.000	.708
C11	1.000	.716
C12	1.000	.710
C13	1.000	.707
C14	1.000	.751
C15	1.000	.683
Extraction Method: Principal Component Analysis.		

Table 19

In the above communality table, all the values after the extraction of the variables are above 0.3 explaining more of the variance of an individual variable.

Total Variance Explained									
Compo nent	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Tot al	% of Varia	Cumula tive %	Tot al	% of Varia	Cumula tive %	Tot al	% of Varia	Cumula tive %

		nce			nce			nce	
1	6.332	42.215	42.215	6.332	42.215	42.215	6.195	41.302	41.302
2	2.285	15.236	57.451	2.285	15.236	57.451	2.283	15.220	56.521
3	1.379	9.192	66.643	1.379	9.192	66.643	1.518	10.122	66.643
4	.767	5.116	71.759						
5	.695	4.634	76.393						
6	.614	4.096	80.489						
7	.533	3.551	84.040						
8	.43	2.894	86.934						

	4								
9	.413	2.753	89.687						
10	.332	2.212	91.899						
11	.285	1.897	93.796						
12	.269	1.791	95.587						
13	.250	1.663	97.251						
14	.224	1.491	98.742						
15	.189	1.258	100.000						
Extraction Method: Principal Component Analysis.									

Table 20

In the above table it can be seen that two factors are extracted since their eigenvalues are above 1 where 57.166% of the variance is accounted for the first 3 factors.

Figure 22 (Appendix B) shows the number of factors which is based on initial eigenvalues of the total variance explained table where it shows that 3 factors are extracted since their eigen value is above 1.

Rotated Component Matrix[a]			
	Component		
	1	2	3
C1	.618		
C2			.858
C3	.815		
C4	.785		
C5	.830		
C6	.862		
C7	.703		

C8			.812
C9	.697		
C10	.829		
C11	.843		
C12	.825		
C13		.832	
C14		.866	
C15		.823	
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 4 iterations.			

Table 21

The above table shows the correlation between the factor and each variable where the individual item in the rotated factor matrix is called factor loading also the Kaiser normalization is providing stability to the solution.

Hypothesis testing

H0: there is no concept and role of smart care branded hospitals.

H1: not H0

Descriptive Statistics			
	Mean	Std. Deviation	N
age group	3.50	1.034	500
REGR factor score 1 for analysis 1	0E-7	1.00000000	500

Table 22

The above table gives the descriptive statistics of the factor.

Model Summary[b]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estim	Change Statistics					Durbin-Watson
					R Square	F Cha	df1	df2	Sig. F Chan	

				ate	Change	nge			ge	
1	.202[a]	.041	.039	1.013	.041	21.241	1	498	.000	1.931
a. Predictors: (Constant), REGR factor score 1 for analysis 1										
b. Dependent Variable: age group										

Table 23

The above table shows that the regression model is significant since the p-value is less than 0.05. The model explains 4.10% of the variance in the dependent variable.

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.804	1	21.804	21.241	.000[b]
	Residual	511.194	498	1.026		
	Total	532.998	499			

a. Dependent Variable: age group
b. Predictors: (Constant), REGR factor score 1 for analysis 1

Table 24

In the table above p-value is less than 0.05 for the regression indicating that it is statistically significant so we reject Ho and conclude that there is a concept and role of smart care branded hospital.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.502	.045		77.290	.000		
	REGR factor score 1 for	.209	.045	.202	4.609	.000	1.000	1.000

	analysis 1							
a. Dependent Variable: age group								

Table 25

In the table above p-value is less than 0.05 indicating that factor is significant. It can be concluded that the concept and role of smart care branded hospitals.

Figure 23 (A**ppendix B**) diagram shows that residual is normally distributed.

H0: there is no strategies and facilities employed by smart hospitals

H1: not H0

Descriptive Statistics			
	Mean	Std. Deviation	N
age group	3.50	1.034	500
REGR factor score 1 for analysis 2	0E-7	1.00000000	500
REGR factor score 2 for analysis 2	0E-7	1.00000000	500

REGR factor score 3 for analysis 2	0E-7	1.00000000	500

Table 26

The above table gives the descriptive statistics of the factor.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.464[a]	.215	.210	.918	.215	45.329	3	496	.000	1.813

a. Predictors: (Constant), REGR factor score 3 for analysis 2, REGR factor score 2 for analysis 2, REGR factor score 1 for analysis 2

b. Dependent Variable: age group

Table 27

The above table shows that the regression model is significant since the p-value is less than 0.05. The model explains 21.5% of the variance in the dependent variable.

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	114.686	3	38.229	45.329	.000[b]
	Residual	418.312	496	.843		
	Total	532.998	499			
a. Dependent Variable: age group						
b. Predictors: (Constant), REGR factor score 3 for analysis 2, REGR factor score 2 for analysis 2, REGR factor score 1 for analysis 2						

Table 28

In the table above p-value is less than 0.05 for the regression indicating that it is statistically significant so we reject Ho and conclude that there is strategies and facilities employed by smart hospitals

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.502	.041		85.269	.000		
	REGR factor score 1 for analysis 2	.158	.041	.153	3.853	.000	1.000	1.000
	REGR factor score 2 for analysis 2	.409	.041	.395	9.938	.000	1.000	1.000

	REGR factor score 3 for analysis 2	-.195	.041	-.188	-4.731	.000	1.000	1.000
a. Dependent Variable: age group								

Table 29

In the table above p-value is less than 0.05 for all the three factors indicating that all the factors are significant. It can be concluded that the residual is normally distributed [Figure 24 (appendix B)].

H0: there is no difference between the conventional healthcare hospitals and branded smart care hospitals.

Have you visited a smart care hospital? * In case you prefer ordinary hospitals, what is the main reason for choosing it? Cross Tabulation		
	In case you prefer ordinary hospitals, what is the main reason for choosing it?	Total

			Local hospitals are huge in number	Are much easier to access	Improved quality than small hospital serving a natural community	Responsible and necessary authority to troubleshoot the problems faced	Are smart, cheerful, less absenteeism, and tangible	other	
Have you visited a smart care hospital?	Yes	Count	10	16	73	124	16	2	241
		% of Total	2.0%	3.2%	14.6%	24.8%	3.2%	0.4%	48.2%
	No	Count	4	21	68	86	28	14	221

		% of Total	0.8%	4.2%	13.6%	17.2%	5.6%	2.8%	44.2%
	Visited to meet a relative	Count	1	2	7	23	4	1	38
		% of Total	0.2%	0.4%	1.4%	4.6%	0.8%	0.2%	7.6%
Total		Count	15	39	148	233	48	17	500
		% of Total	3.0%	7.8%	29.6%	46.6%	9.6%	3.4%	100.0%

Table 30

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.770[a]	10	.004
Likelihood Ratio	27.072	10	.003
Linear-by-Linear Association	4.809	1	.028
N of Valid Cases	500		
a. 4 cells (22.2%) have expected counts less than 5. The minimum expected count is 1.14.			

Table 31

In the table above p-value is less than 0.05 indicating that it is statistically significant so we reject H0 and conclude that differences between the conventional healthcare hospitals and branded smart care hospitals.

Chapter 5 Conclusion

The current study gives significant data about traditional methods for treatment in the hospital and the advanced methods for treatment techniques that are utilized in the hospitals. According to the relative examination, it was discovered that the customary methods for treatment are helpful and utilized by numerous patients in the United States and different nations, for example, India and China. Nonetheless, the method of treatment that is given by the medical care experts is obsolete and should be adjusted according to the necessities of the current patient. The investigation analyzed that in the current occasions, the vast majority of the medical care costs are borne by the patients themselves. Under such conditions, the patient needs the best administrations and doesn't have any desire to settle on the support of wellbeing norms. Hence, the part of branded smart care hospitals has expanded in the current occasions as they are offering quality types of assistance to the clients by receiving trend setting innovations and advancements.

For instance, the use of IoT gives beginning length guidance and headings for the development of the patients. It not just upgrades the arrangements of medical care administrations by the hospitals yet additionally improves the wellbeing parts of the patients. Moreover, the investigation additionally gives important data identified with the effect of recent health care hospitals and branded smart care hospitals on the nature of the medical care administration alongside examining the contrasts between the traditional (conventional) hospitals and marked branded smart care hospitals. The study will be very much useful for the researchers working in the same area of interest or study. The

findings and results will be helpful for the scholars and students to make their own concepts and theories on the basis of these. In addition, the study will be very much effective to guide the future researchers in order to make their studies efficient, systematic and logical. The study also provides required information about the modern and effective strategies that can be acquired by organizations in order to keep up with patients and their quality services by the hospital staff. The works of various researchers and the different factors highlighted by them presenting the significance of demographic criteria.

The examination analyzed that health care associations are broadly embracing cutting edge innovations, for example, distributed computing, telemedicine, bionics, normal language handling, Internet of Medical Things (IoMT) so that there is smoothing out of medical services conveyance components and changing customer inclinations. Subsequently, there has been a huge expansion in the Data-as-a-Platform (DaaP) with the goal that the patient information is recorded and moved between various organizations safely. It was inspected that there has been the incorporation of augmented reality in the medical services section so the clinical reach is stretched out to the remotest districts. Accordingly, it tends to be said that the current examination inspected realities identified with the marking of emergency clinics and how it has helped in improving the administrations that are given to patients. The realities identified with the satellite facility and emergency clinic-based center have likewise been remembered for the investigation and found that satellite facilities permit patients simpler admittance to clinical administrations and carry clinical consideration closer to networks.

The investigation/study likewise analyzed realities identified with utilitarian and non-useful necessities of smart health care and distinguished that practical prerequisites address explicit prerequisites of keen medical services engineering, though non-useful prerequisites of brilliant health care can additionally be ordered into execution necessities and moral prerequisites. In this manner, it very well may be said that the examination will be exceptionally valuable to the patients, health care industry, and experts as they improve comprehension of methodologies and offices utilized by smart clinics and hospitals.

In conclusion, when a comparative analysis of the impact of current healthcare hospitals and branded Smart Care Hospitals on the quality of healthcare services was done, it was more promising that Smart Care Hospital is of most need in near future to fulfil the latest challenges of rehabilitation medicine, preventive medicine and pandemic situations. Smart Care Hospitals is the need of this century for care, cure and constant research.

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Appendix A

Questionnaire

The primary objective of this questionnaire is to make an attempt of a comparative analysis of current healthcare hospitals and branded smart care hospitals on the quality of the healthcare service provided. The study also aims to determine the role of smart care branded hospitals. The Questionnaire given below is a tool that has been chosen for gathering data for the research project titled "**A comparative analysis of the impact of current healthcare hospitals and branded "SMART CARE" hospitals on the quality of the healthcare service**". The major purpose of this questionnaire is to find whether there is a significant difference between the conventional healthcare hospitals and branded smart-care hospitals. The respondents are thus requested to respond attentively to all the questions. Please be assured that the information obtained from this questionnaire will be used for research purposes only and will be kept confidential.

Part A: Respondents characteristics

1. Gender

    a) Male

    b) Female

2. Which age group do you belong to?

    a) 18 - 25 years

    b) 26 - 32 years

c) 33 - 39 years

d) 40 - 47 years

e) 48 years and above

3. Marital status:

a) Single

b) Married

c) Divorced

4. Your highest level of education?

a) Higher secondary

b) Bachelor Degree

c) Masters Degree

d) Master Degree and above

5. What is your income per year?

a) Less than 1,00,000

b) 1,00,000- 3,00,000

c) 3,01,000- 6,00,000

d) 6,01,000- 9,00,000

e) 9,01,000 and above

6. Have you visited a smart care hospital?

   a) Yes

   b) No

   c) Visited to meet a relative

7. Are you aware about the concept of smart-care hospitals?

   a) Yes

   b) No

   c) A bit

8. Which of the following smart-care hospitals you have visited?

   a) Others

Part B: Role of Smart Care hospitals

On a scale of 1-5, please indicate the degree to which you agree to the statements given below based on your experience. (1=Strongly Agree, 2=Agree, 3= Neither Agree nor Disagree, 4=Disagree, 5=Strongly Disagree)

Statements	1	2	3	4	5

1. The technology used in smart-care hospitals is advanced and innovative.					
2. The healthcare professionals in smart-care hospitals use knowledge to enable tools to manage, track, and automate their operational, administrative, and financial processes.					
3. The solutions provided by smart-care hospitals help in improving the health of individual and community through better health care coordination, efficient flow of information, quality of service and efficient health-care delivery.					
4. Smart-care hospitals help in building mutually beneficial relationships between the healthcare professionals and patients for their betterment.					
5. Smart-care hospitals have less patient waiting time, high quality care, and medicines at lower cost.					

6. Smart-care hospitals are digital health platforms that can be accessed by all the healthcare service providers.					
7. Smart-care hospitals are fully digitized set-up that save a lot of time and costs.					
8. Smart-care hospitals have Standard reports on financials & data, graphs to represent the data for a quick views, and customised reports to meet individuals needs					

Part C: Strategies and facilities employed by smart hospitals

On a scale of 1-5, please indicate the degree to which you agree to which factors are applicable to you while buying e-grocery given below based on your experience. (1=Strongly Agree, 2=Agree, 3= Neither Agree nor Disagree, 4=Disagree, 5=Strongly Disagree)

Statements	1	2	3	4	5
1. Adoption of digital technologies					

2. Cost of primary products, i.e., pharmacy medicines are low					
3. The cost for reports, blood tests, x-ray is reduced due to use of digital technologies.					
4. Improved patients experiences through adoption of digital technologies					
5. A well-integrated Electronic Medical Record (EMR) for improving care process and support services					
6. Redefine care processes, operational procedures and redesigning physical infrastructure to drive a new way of delivering care.					
7. Introduction of e-health with addition to digital medical technologies.					
8. Optimization and automation of processes in the information-communication and technological environment of interrelated					

objects					
9. improve existing procedures for the provision of advanced means of medical care, and to open up new opportunities for medicine.					
10. Engagement with Patients					
11. Streamlined communication					
12. In-hospital Navigation					
13. Assets tracking					
14. Patient notification					
15. Leveraging data analytics					

Appendix B

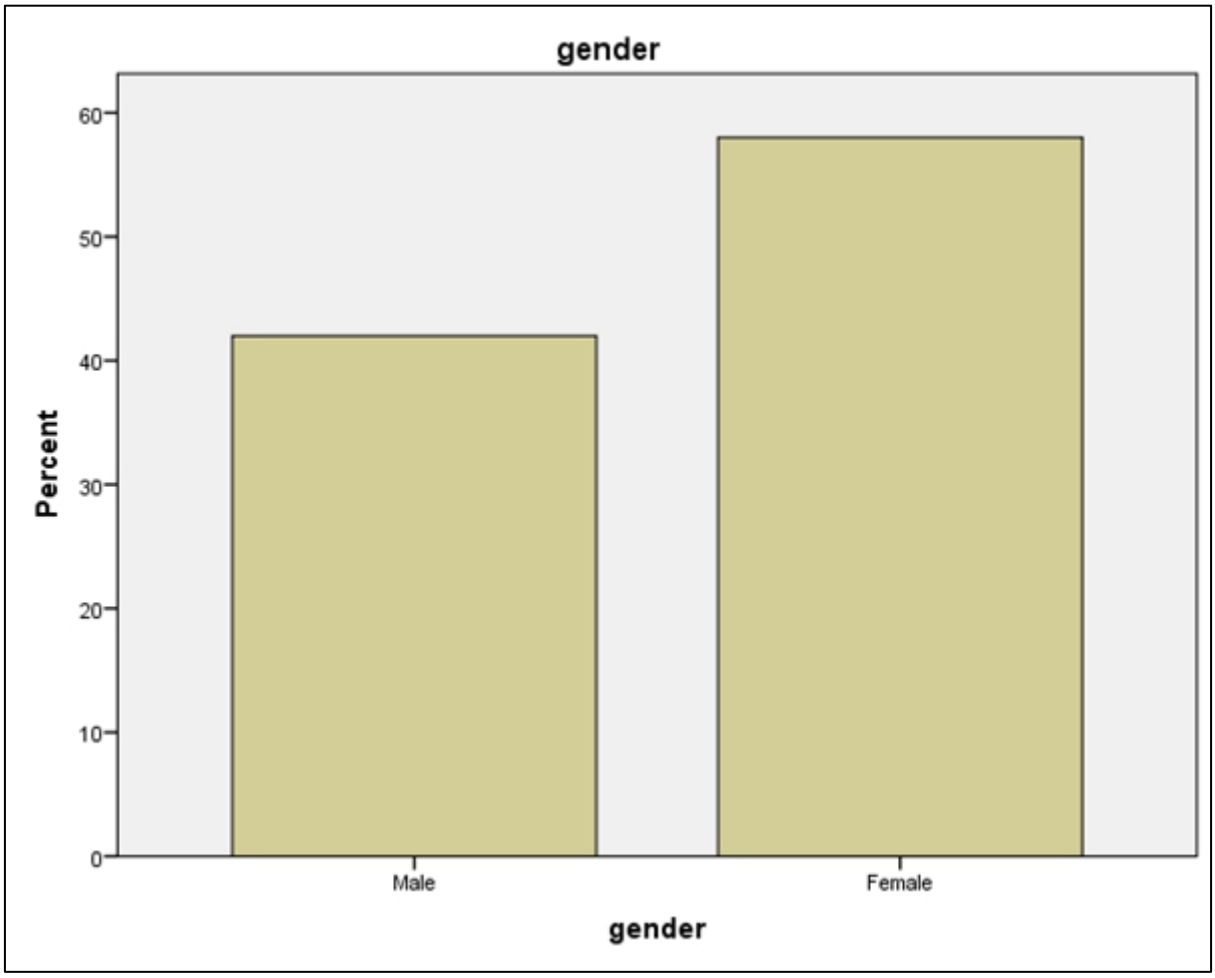

Figure 11

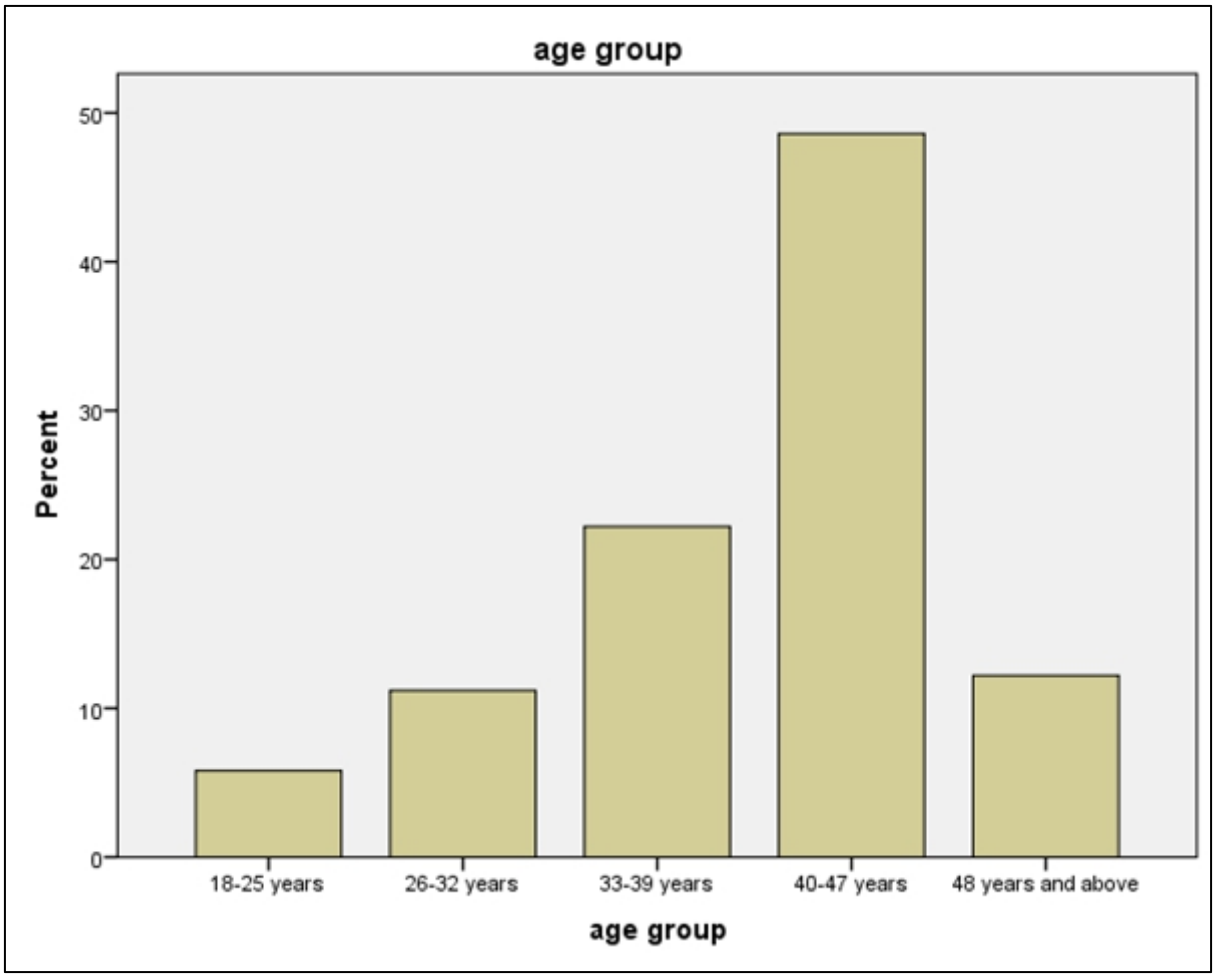
age group
Percent
50
40
30
20
10
0
18-25 years
26-32 years
33-39 years
40-47 years
48 years and above
age group

Figure 12

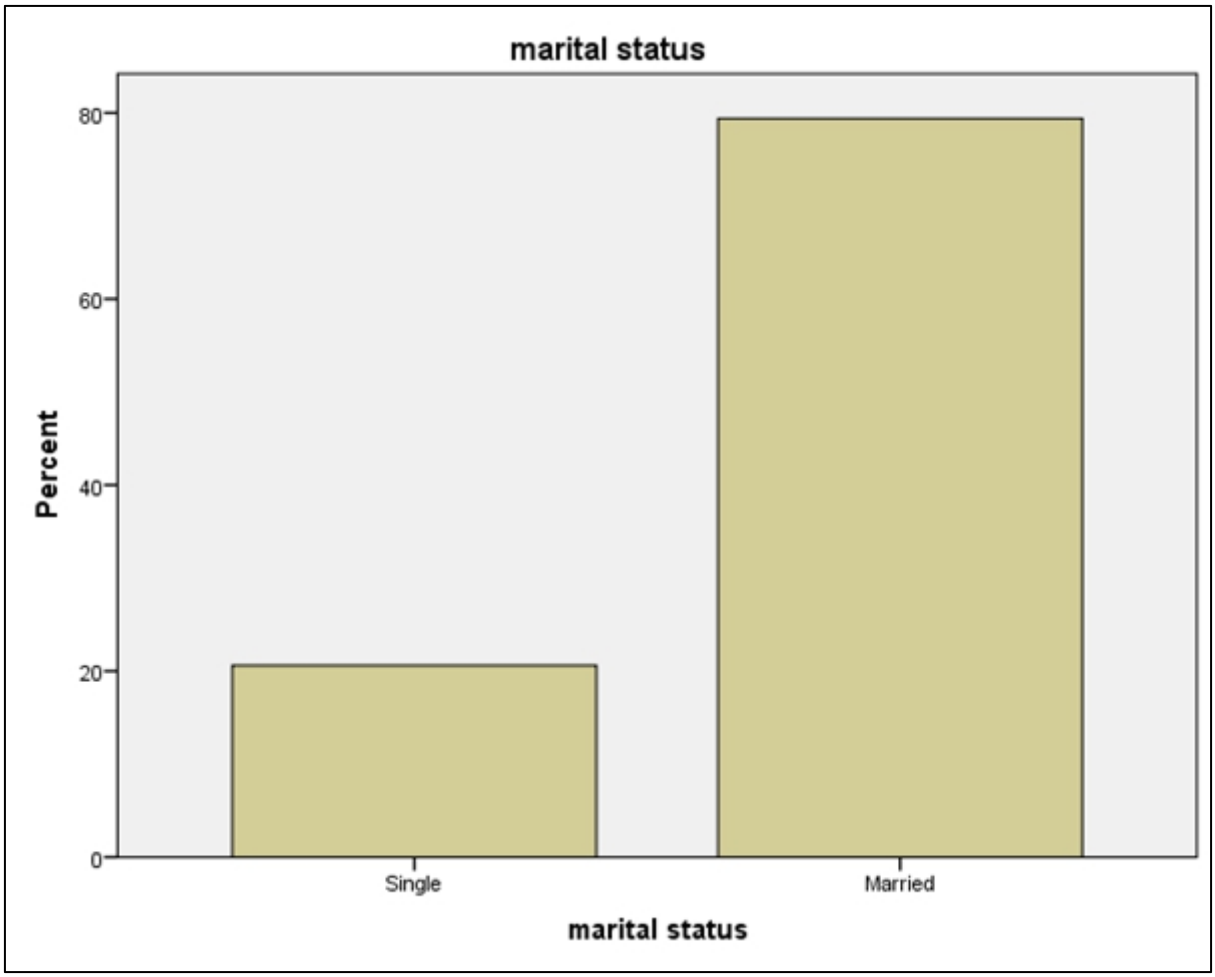
marital status
80
60
40
20
0
Percent
Single
Married
marital status

Figure 13

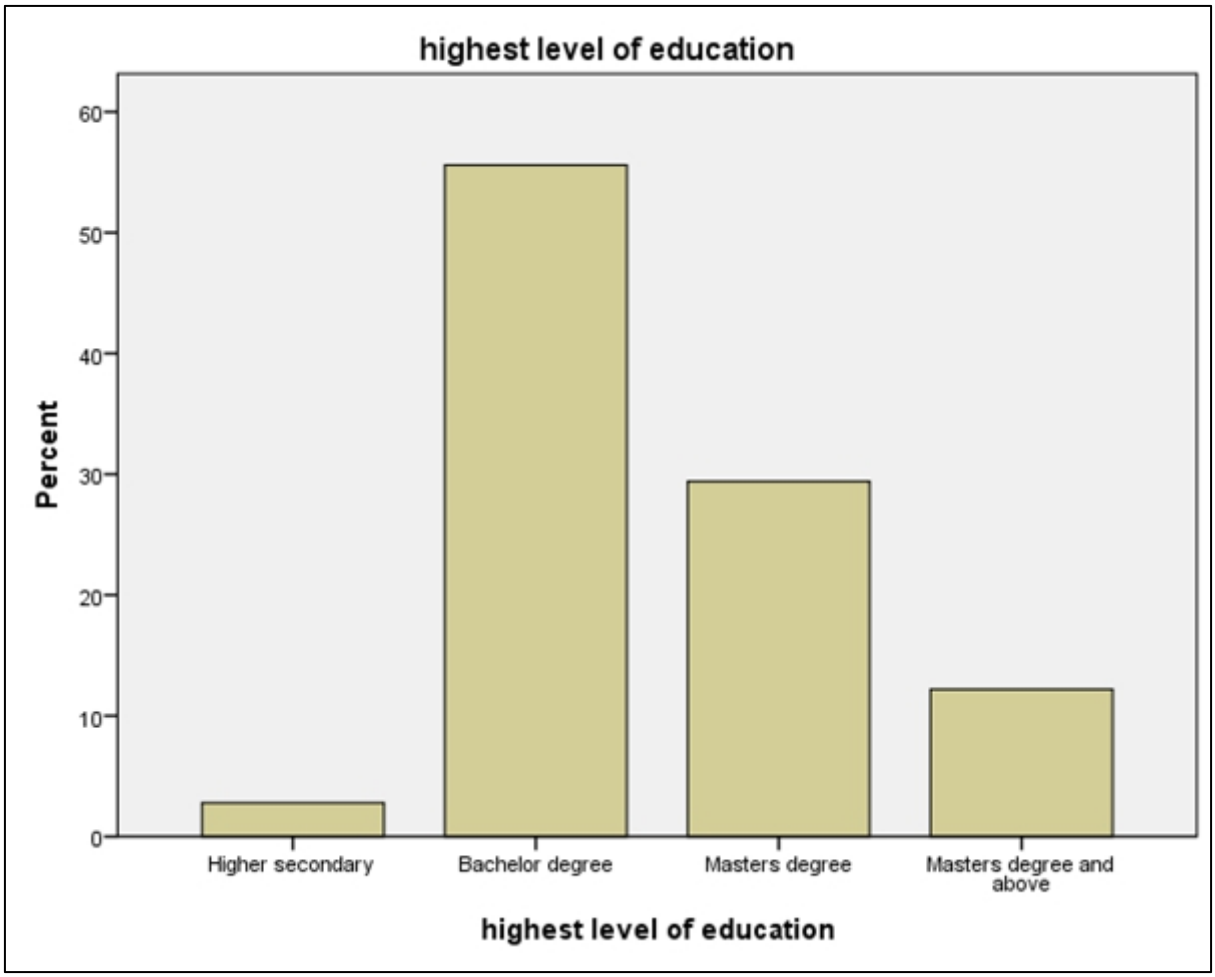
highest level of education
Percent
60
50
40
30
20
10
0
Higher secondary
Bachelor degree
Masters degree
Masters degree and above
highest level of education

Figure 14

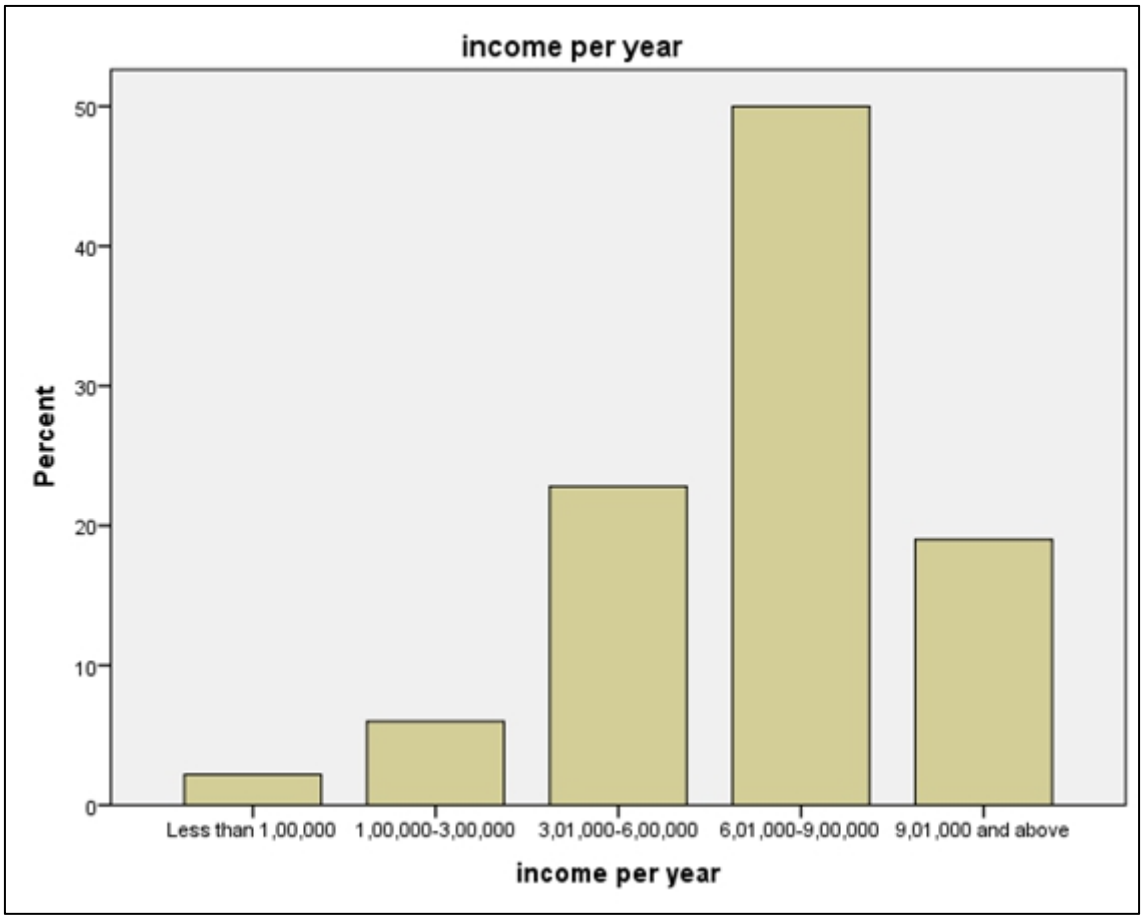
income per year
Percent
50
40
30
20
10
0
Less than 1,00,000
1,00,000-3,00,000
3,01,000-6,00,000
6,01,000-9,00,000
9,01,000 and above
income per year

Figure 15

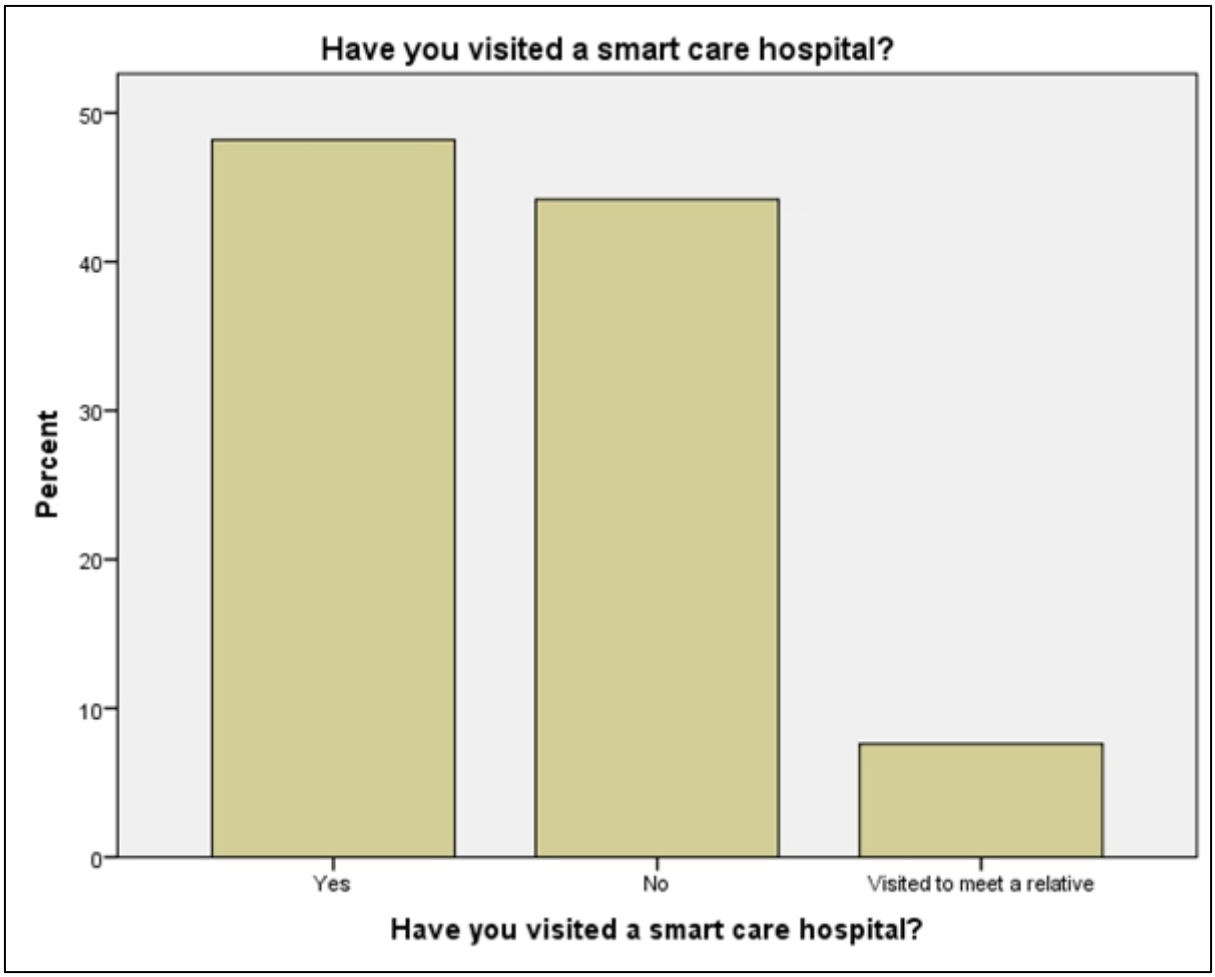
Have you visited a smart care hospital?
Percent
50
40
30
20
10
0
Yes
No
Visited to meet a relative
Have you visited a smart care hospital?

Figure 16

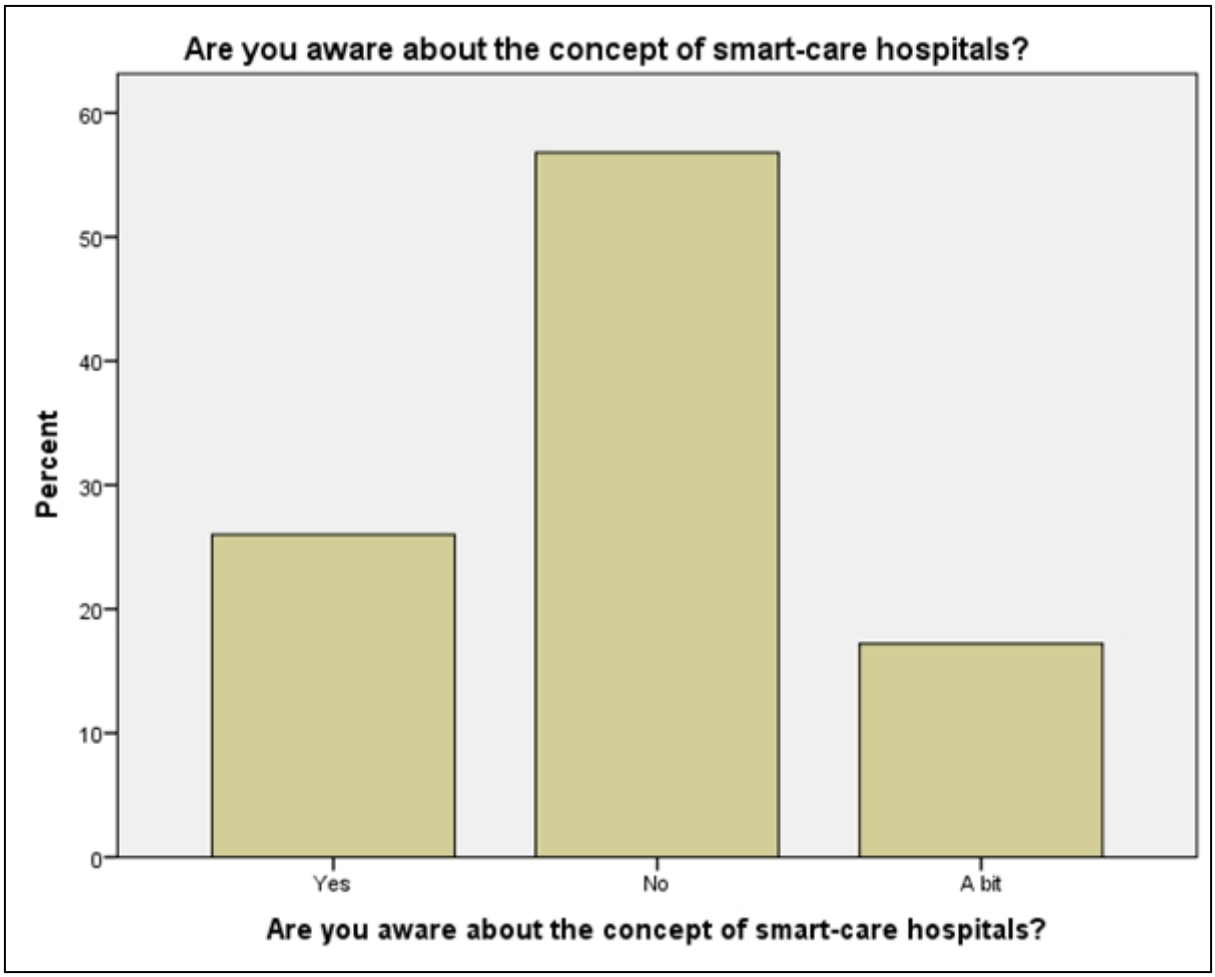
Are you aware about the concept of smart-care hospitals?
Percent
60
50
40
30
20
10
0
Yes
No
A bit
Are you aware about the concept of smart-care hospitals?

Figure 17

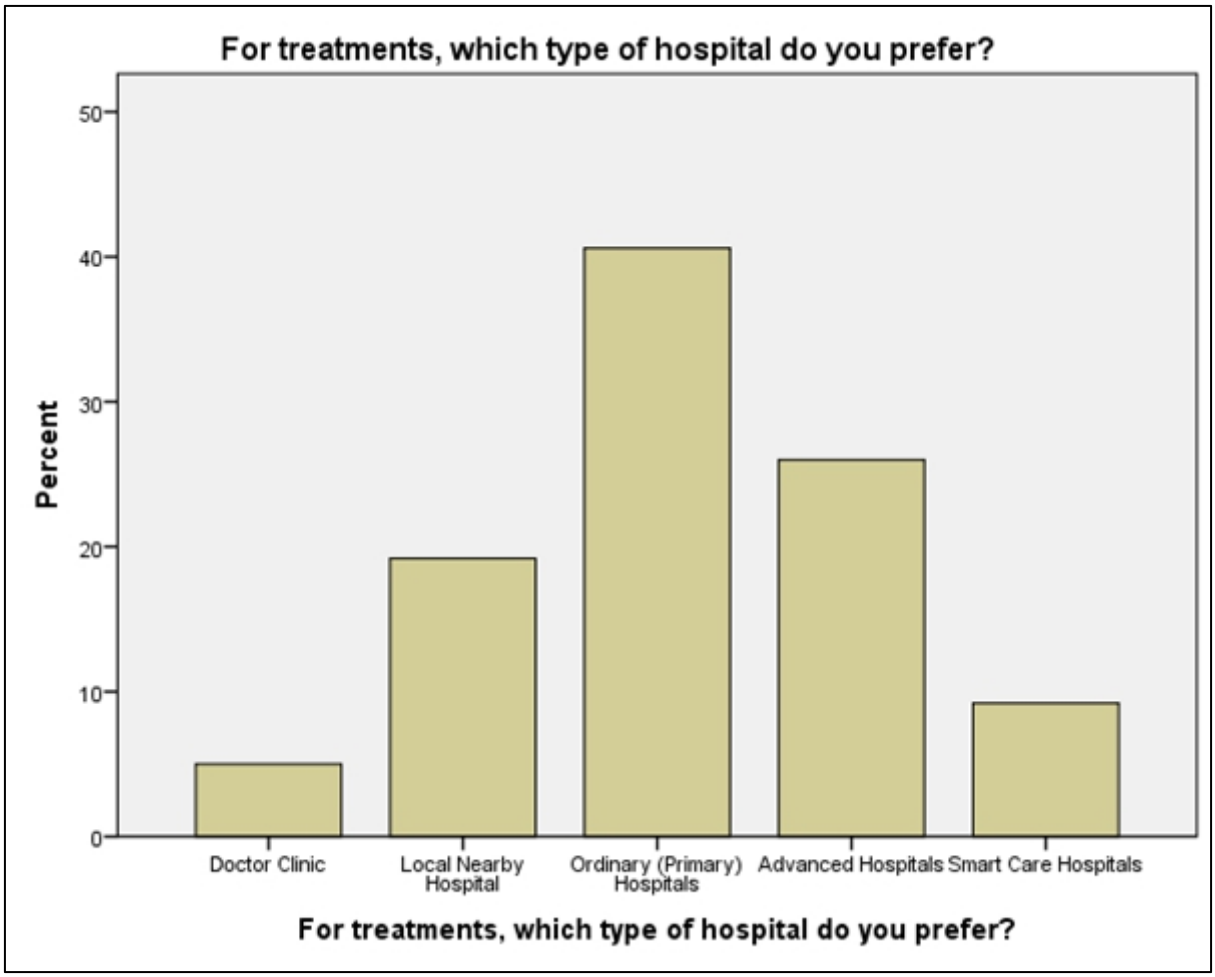
For treatments, which type of hospital do you prefer?
Percent
50
40
30
20
10
0
Doctor Clinic
Local Nearby Hospital
Ordinary (Primary) Hospitals
Advanced Hospitals
Smart Care Hospitals
For treatments, which type of hospital do you prefer?

Figure 18

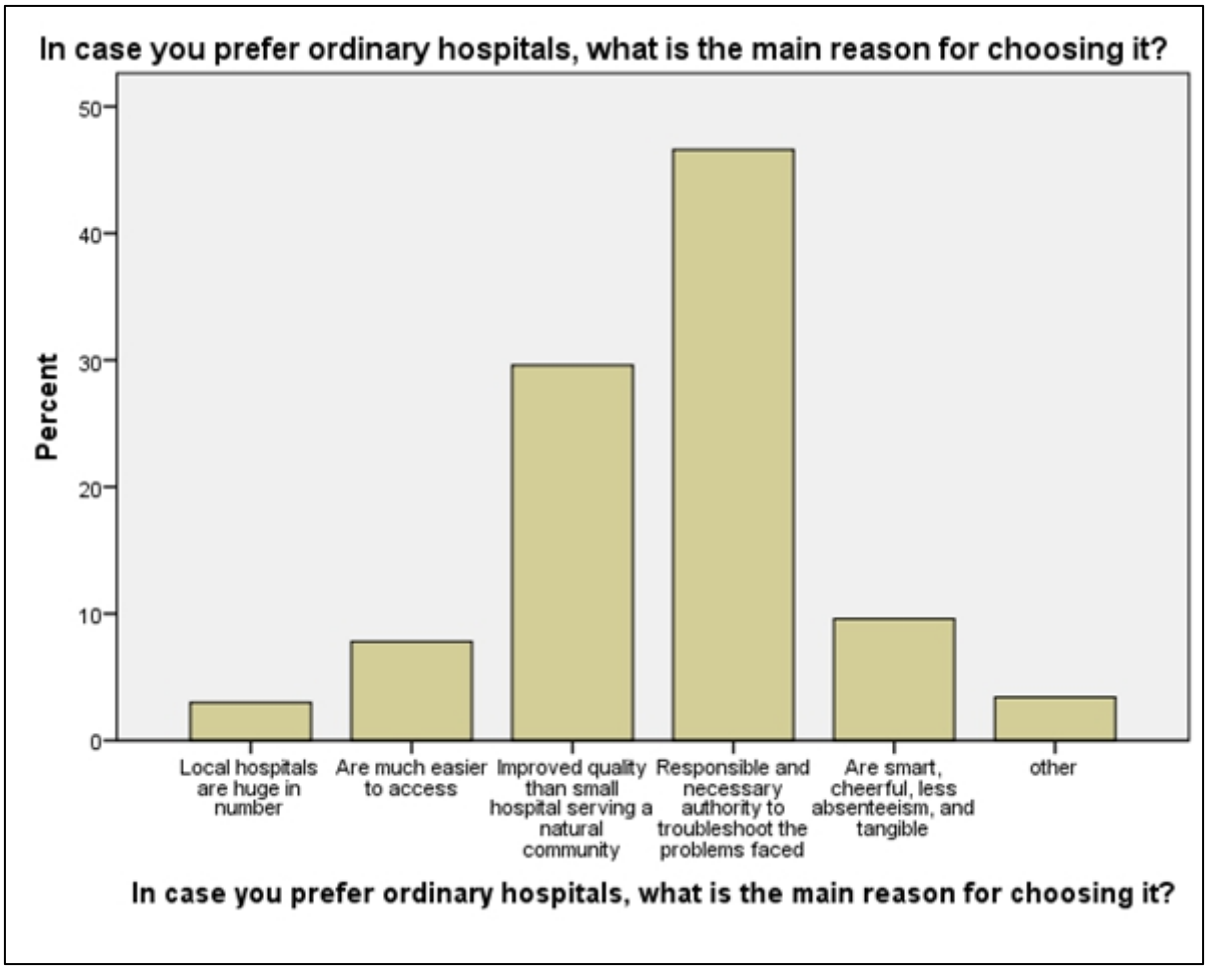
In case you prefer ordinary hospitals, what is the main reason for choosing it?
Percent
50
40
30
20
10
0
Local hospitals are huge in number
Are much easier to access
Improved quality than small hospital serving a natural community
Responsible and necessary authority to troubleshoot the problems faced
Are smart, cheerful, less absenteeism, and tangible
other
In case you prefer ordinary hospitals, what is the main reason for choosing it?

Figure 19

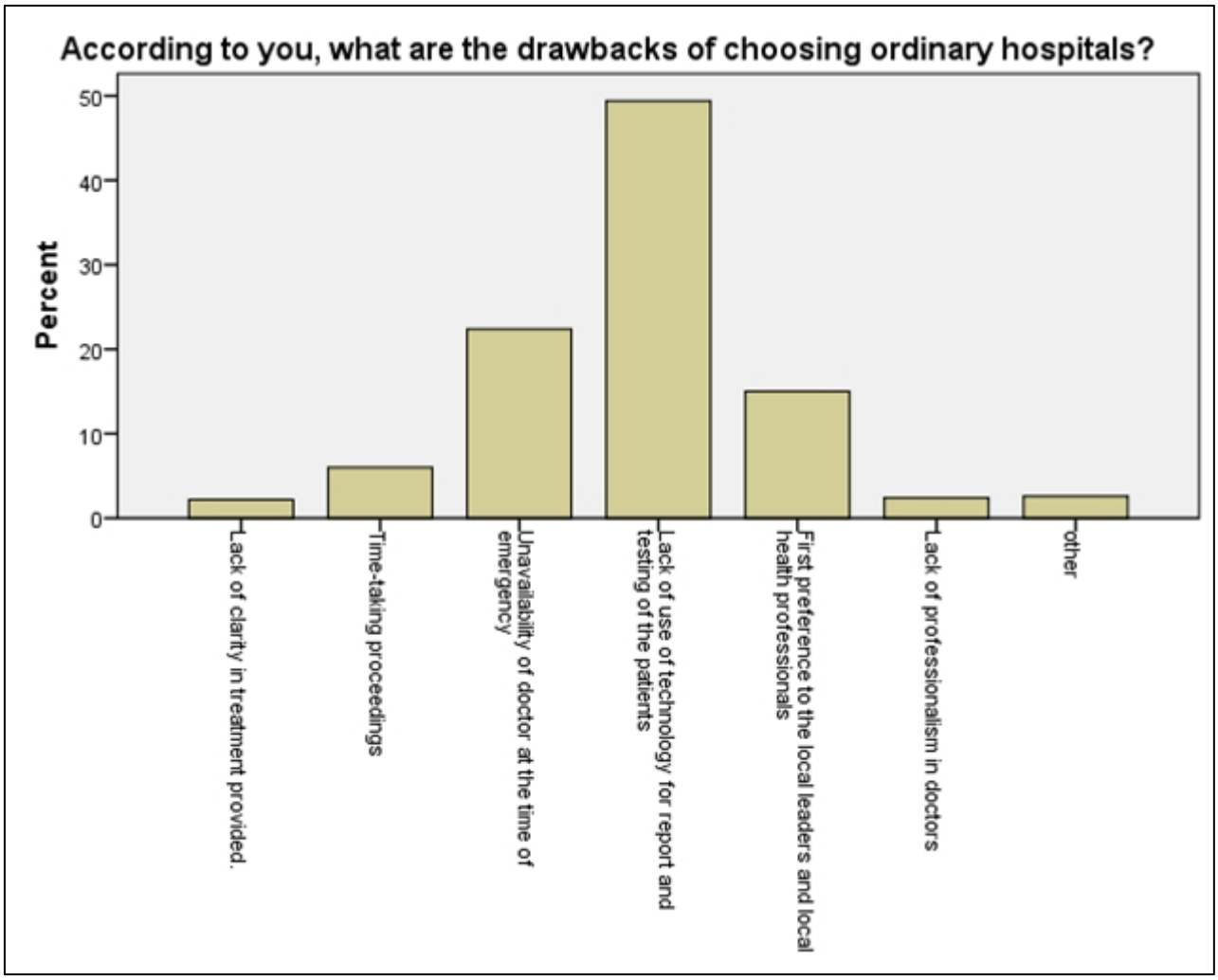
According to you, what are the drawbacks of choosing ordinary hospitals?
Percent
50
40
30
20
10
0
Lack of clarity in treatment provided.
Time-taking proceedings
Unavailability of doctor at the time of emergency
Lack of use of technology for report and testing of the patients
First preference to the local leaders and local health professionals
Lack of professionalism in doctors
other

Figure 20

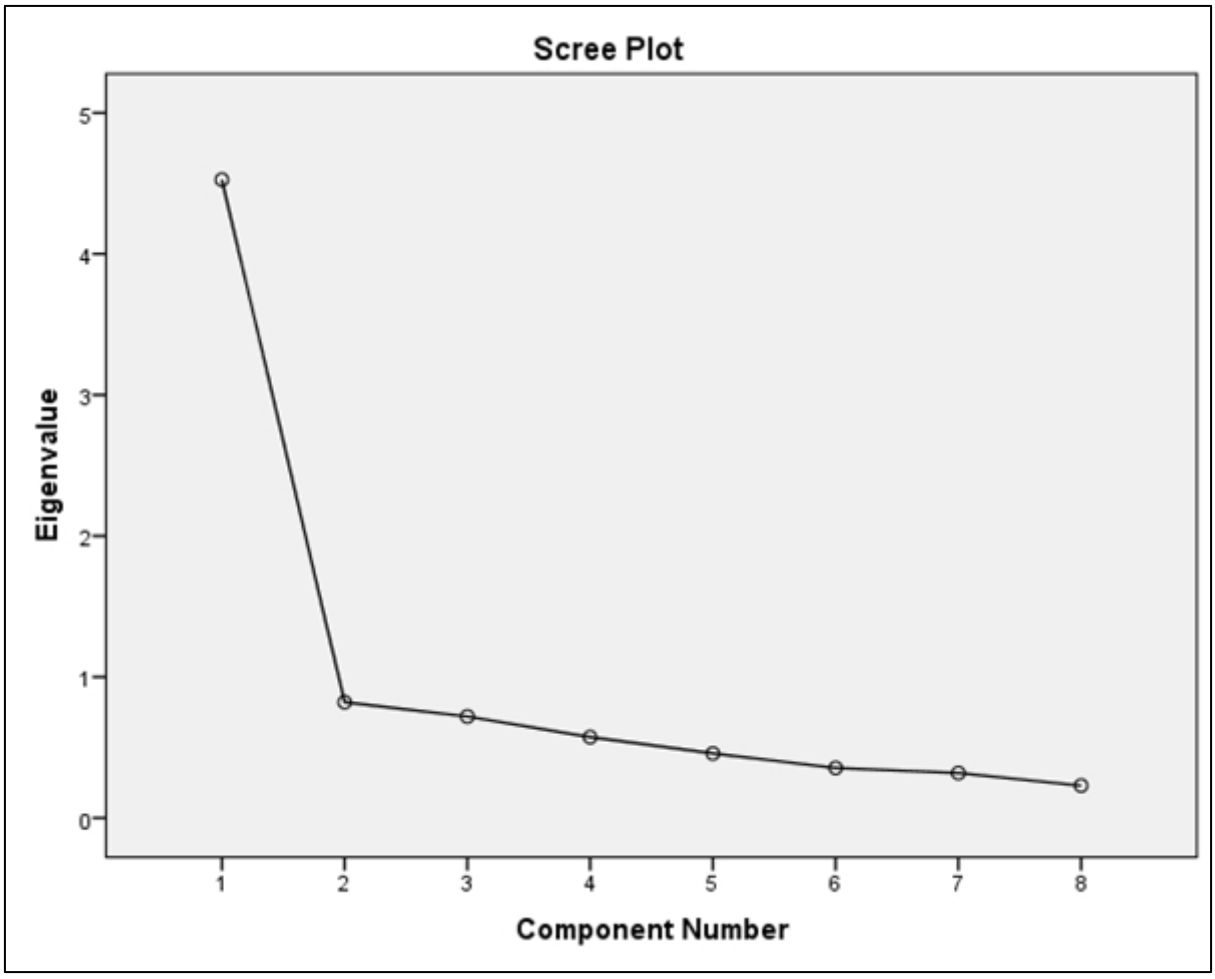

Figure 21

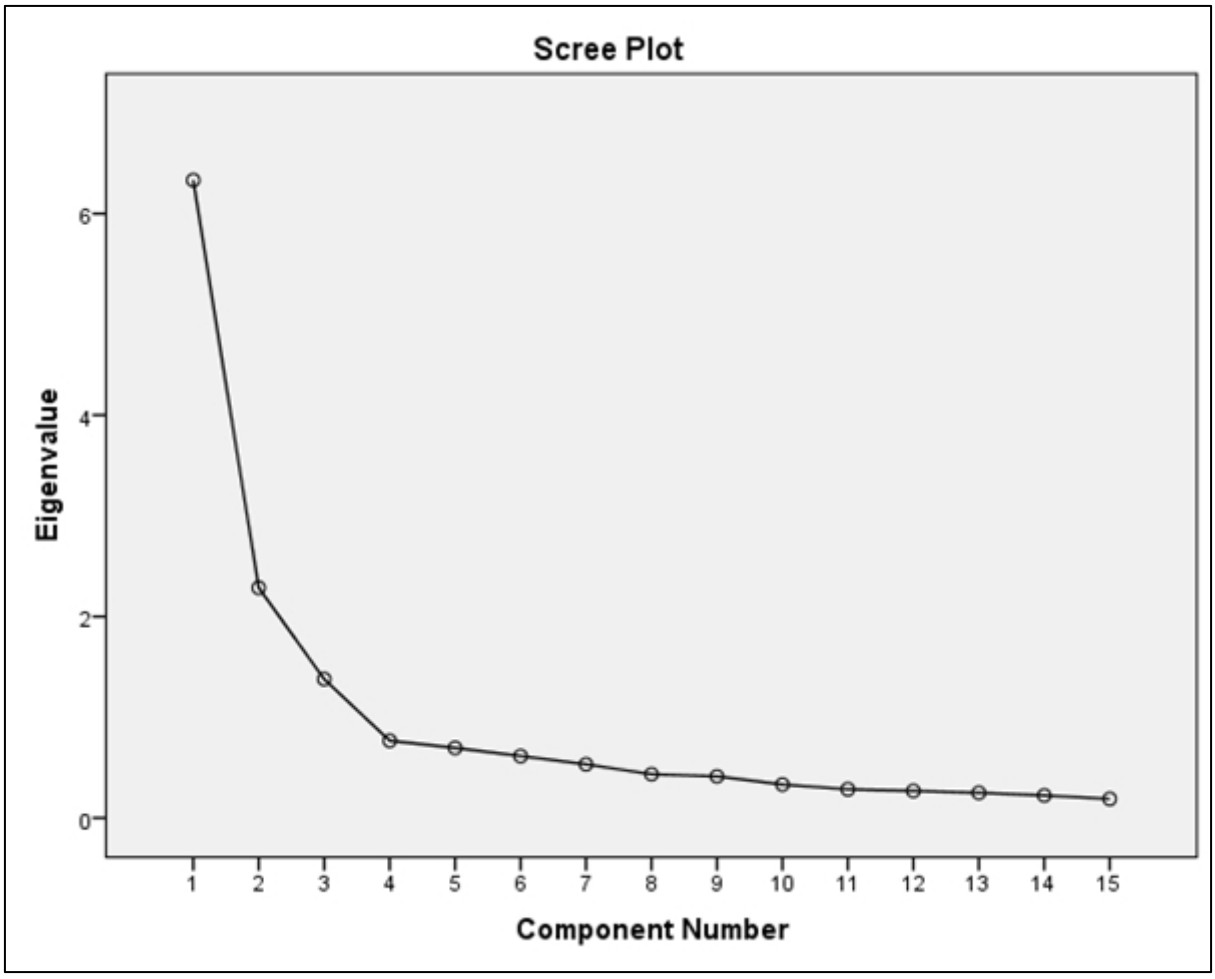
Scree Plot
Eigenvalue
6
4
2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Component Number

Figure 22

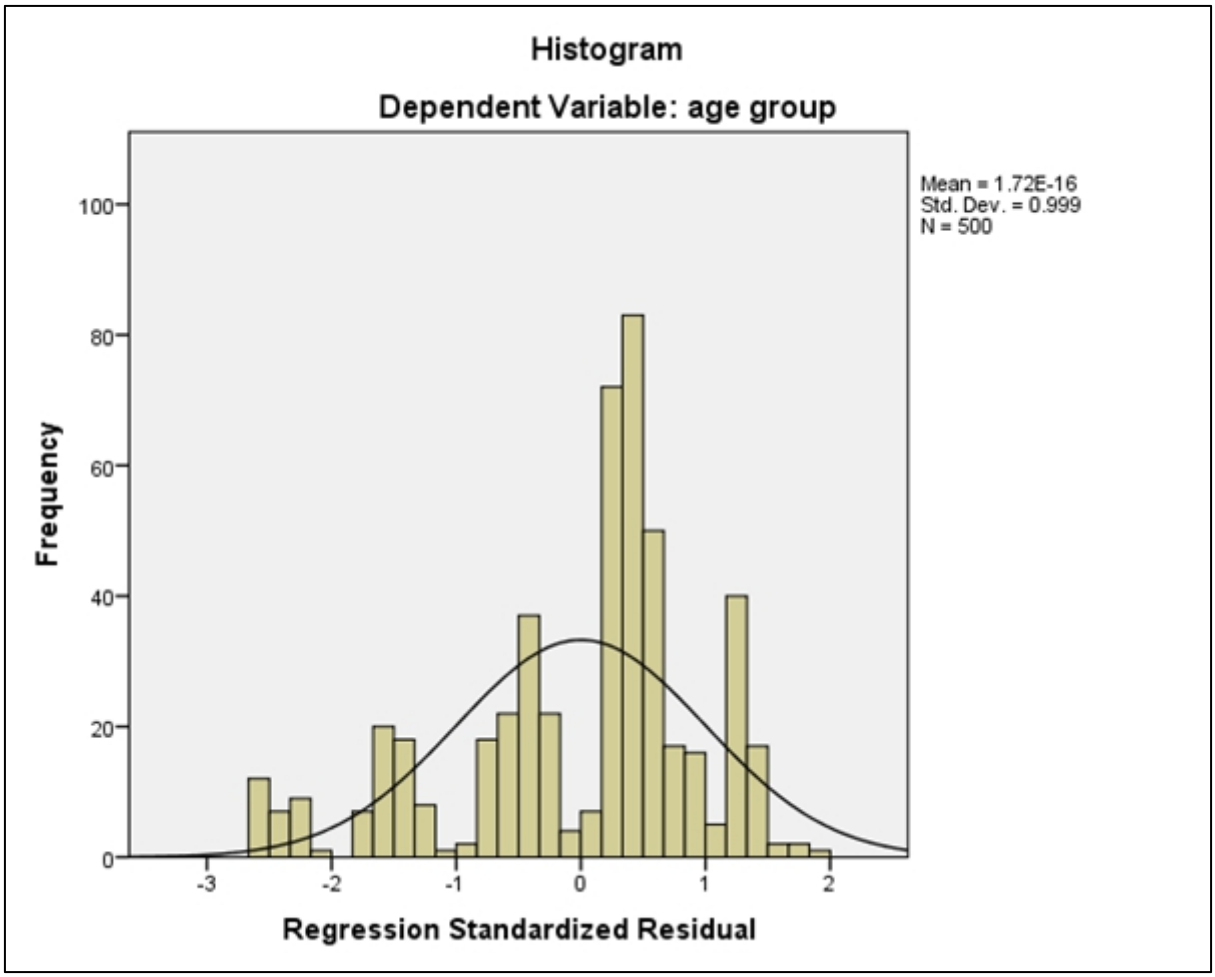
Histogram
Dependent Variable: age group
Mean = 1.72E-16
Std. Dev. = 0.999
N = 500
Frequency
100
80
60
40
20
0
-3
-2
-1
0
1
2
Regression Standardized Residual

Figure 23

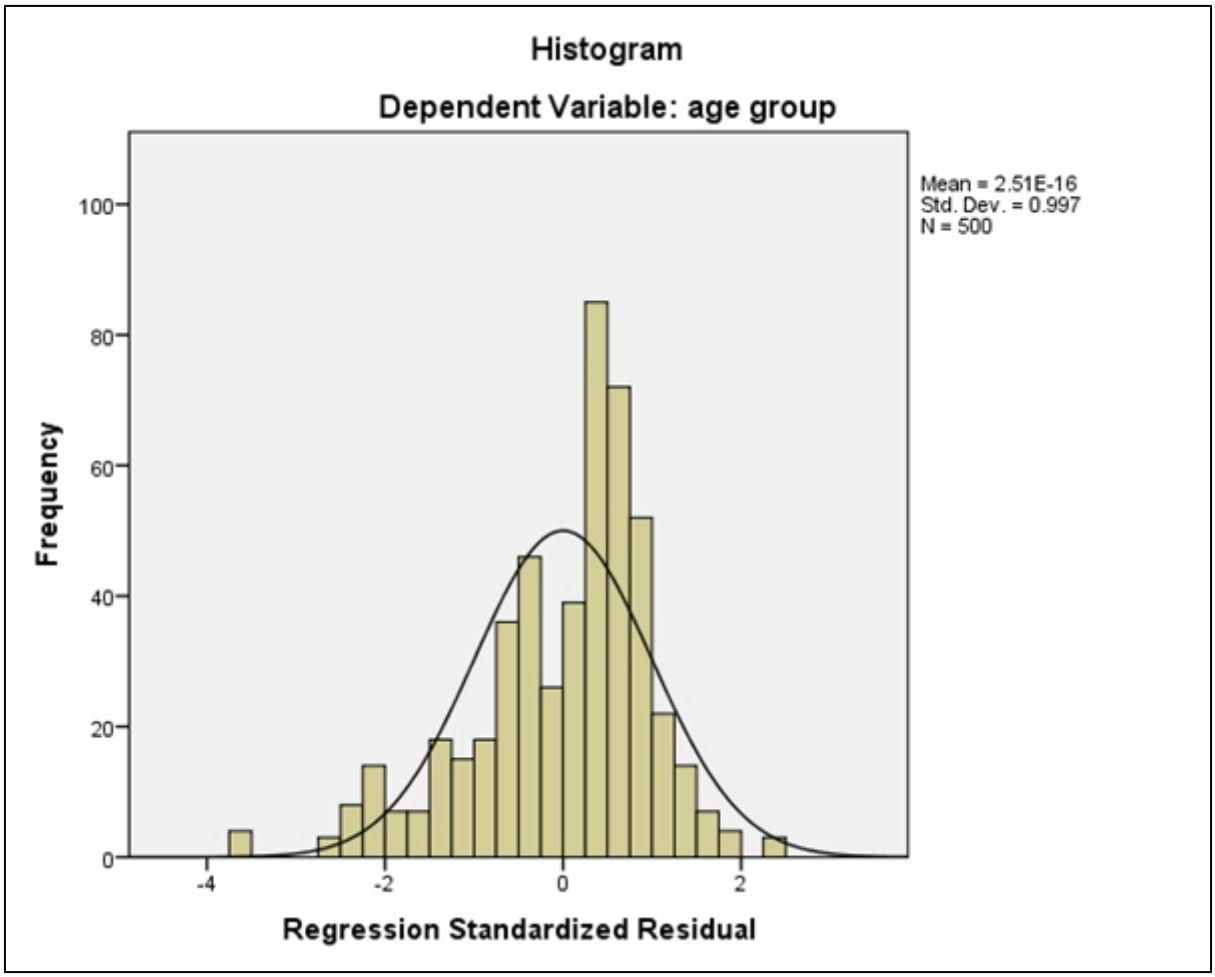
Histogram
Dependent Variable: age group
Mean = 2.51E-16
Std. Dev. = 0.997
N = 500
Frequency
100
80
60
40
20
0
-4
-2
0
2
Regression Standardized Residual

Figure 24


Townsville Cancer Centre


Royal
Adelaide
Hospital


UCSF
Benioff
Children's
Hospital


nmc
nmc specialty hospital


THUMBAY HOSPITAL
مستشفى ثمبي
صيدلية ثمبي
THUMBAY PHARMACY


Mary Horrigan Connors Center for Women's Health


NYU Langone Health


PRIME HOSPITAL
PRIME HOSPITAL


مستشفى الإمارات
Emirates Hospital
مستشفى الإمارات