INTERNSHIP TRAINING

AT

NTT DATA, BANGALORE

FUTURE TOWARDS SMART HOSPITALS: PERCEPTION AND ACCEPTANCE OF USING TECHNOLOGY TO ASSIST HEALTHCARE IN THE HOSPITALS OF BANGALORE

BY

Diksha Sharma

PG/15/026

Under the guidance of

Dr. Anandhi Ramachandran

Post Graduate Diploma in Hospital and Health Management

2015-2017

International Institute of Health Management Research, New Delhi

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To whomsoever it may concern

This is to certify that **Dr. Diksha Sharma** of **IIHMR, Delhi** has been working with NTT DATA Services for her summer project.

Project Details:

Project Name	:	Future towards Smart Hospitals: Perception and Acceptance of Using Technology to Assist Healthcare in the Hospitals of Bangalore
Duration	:	90 days
Location	:	Bangalore
Guide Name	:	Dr. Nandini Juneja & Anurag Singh
Sponsor Name	:	Ajay Aiyar

She has successfully completed her project and her performance during the tenure of the internship has been found to be satisfactory.

Her findings in course of the project has been found to be practical and relevant and some of the recommendations will be incorporated on the floor on approval from the business.

Thanking You,

Regards,

Dilipkumar Santhanam
Business Partner Director, Services HRBP Team
NTT DATA Services

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Diksha Sharma**, a student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone internship training at **"NTT Data Services, Bengaluru"** from **6th February, 2017** to **5th May, 2017**.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

Dr. A. K. Agarwal
Dean, Academics and Student Affairs
IIHMR, New Delhi

Dr. Anandhi Ramachandran
Associate Professor
IIHMR, New Delhi

Certificate of Approval

The following dissertation titled **"Future towards smart hospitals: Perception and acceptance of using technology to assist healthcare in the hospitals of Bangalore"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Name	Signature
Dr. Anandhi Ramachandra	
Manav Chaudhary	

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH,
NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled "**Future towards smart hospitals: Perception and acceptance of using technology to assist healthcare in the hospitals of Bangalore**" submitted by **Diksha Sharma** Enrollment No **PG/15/026** under the supervision of **Dr. Anandhi Ramachandran** for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from **6th February, 2017** to **5th May, 2017** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Sharma

Diksha Sharma

PG/15/026

PGDHM (2015-17)-Health IT

SUMMER INTERNSHIP EVALUATION

FINAL EVALUATION FORM TIER – III - During PPT
(To be filled by Review Panel/ Project Sponsor/ Project Guide)

Intern Name: Diksha Sharma
Title : Future towards Smart Hospitals: Perception and Acceptance of Using Technology to Assist Healthcare in the Hospitals of Bangalore

Date : 3rd May, 2017 **Locations** : **Bangalore**

Project Guide: Rituraj Choudhury, Nandini Juneja, Anurag Singh
Project Sponsor : Ajay Aiyar

Competency Evaluation

Rehire Eligibility of the Candidate: Yes

Rating Explanation: 1=Weak 2=Poor 3=Average 4=Good 5=Outstanding

Competency	Rating	Remarks
Are the recommendation proposed in line with the project objectives.	5	
Does the quality of work done during the project meet the quality expectations of the Organization.	5	
Key parameters have been identified influencing the project delivery.	5	
Viability of recommendation implementation.	4	
Risks and mitigation factors identified.	4	
Is able to understand and articulate the important of the project towards achieving NTT Goals.	5	
Utilization of the project experience in one's professional career	4	
Is adept at Handling complexity and is process oriented	4	
Ability to deal with ambiguity	4	

SUMMER INTERNSHIP EVALUATION

Other Salient features

Key Strengths	Areas of Improvement
Great communication and self confidence Strong analytical skills Good presentation skills	Need to learn more on US Healthcare domain

Recommendation:

Evaluate the overall performance based on information documented and discussed during the feedback review process for the review period: 6th Feb to 5th May 2017

Performance	Performance Description
Outstanding	She was very prompt and proactive in all the activities involved in dissertation.

Other Significant Remarks:

_____

_____

SUMMER INTERNSHIP EVALUATION

Project Rating:

Performance Rating	1	2	3	4	5	6	7	8	9	10

* Individual performance should be rated on a scale of 1 – 10 (with 1 being the lowest and 10 being the Best)
* Commendations will be given to the Top 3 projects.

Signature:

Project Guide: Rituraj Choudhury, Nandini Juneja, Anurag Singh

Project Sponsor: Ajay Aiyar

Review Panel Members:

Ajay Aiyar
Avishikta Sarkar

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I express my sincere thanks to the Senior Manager System Integration- NTT Data Services **Mr. Ajay Aiyar**, IT Services Manager II– **Ms. Archika Roy**, IT Services Manager I- **Ms. Avishikta Sarkar**, **Mr. Rituraj Choudhury** and **Mr. Venkateshwarrao M** for giving me an opportunity to undergo training in this prestigious organization and providing me with all the necessary facilities.

I would like to express my special appreciation and thanks to my project guide **Ms. Nandini Juneja,** Business Systems Analyst, NTT Data and **Mr. Anurag Singh,** Business Systems Analyst, NTT Data. I would like to thank you for encouraging my research. Your advice on both research as well as on my career have been priceless.

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ABBREVIATIONS

SH	Smart Hospitals
EHR	Electronic Health Record
EMR	Electronic Medical Record
IT	Information Technology
MRI	Magnetic Resonance Imaging
CVD	Cardiovascular Disease
ICT	Information and Communication Technology
CIS	Clinical Information System
HIS	Hospital Information System
LIS	Laboratory Information System
RIS	Radiology Information System
PACS	Picture Archiving Computing System
TAM	Technology Acceptance Model
PU	Perceived usefulness
PEOU	Perceived Ease OF Use
BI	Behavioral Intention
FC	Facilitating Conditions
ACC	Acceptance
RFID	Radio Frequency Identification
IoT	Internet of Things

Abstract

Introduction: It is the era where the Cities are transforming themselves as Smart Cities. In past few decades, IT based renovation is taking place in the Healthcare industries. Healthcare providers use the information technology to boost the operations efficacy and to ease the workload. The implementation of Information technology in the healthcare industries can help to reach out the remote areas of the countries. The main objective of the Smart hospital vision is to create a facility that unambiguously balances 3 key aspects – brilliance in clinical result, potency within the Supply-chain and improvement of the patient expertise. In country like India, it is important to understand the perception and acceptance of Smart hospitals for the implementation of latest technologies in the Hospitals

Methodology: The study is Descriptive cross-sectional study for three months. The data is collected from primary and secondary sources from various Multispecialty Hospitals of Bangalore. 384 (192 Healthcare Providers and 192 patients) were selected for the study. Survey Method (Questionnaire) was used to collect data using 6 point Likert scale for healthcare providers (Ranging from Strongly Agree-6 to Not Aware-1) and 5 point Likert scale for the patients (Ranging from Strongly Agree-5 to Strongly disagree-1) Based on Technology Acceptance model (TAM). **Pilot Study** was successfully done to check the reliability of the Questionnaires. The Pilot study included 50 healthcare providers and 50 patients.

Conclusion: The Factors of Technology acceptance model i.e. Perceived Usefulness, perceived ease of use, behavioral intention and Facilitating conditions were found to influence Healthcare provider's and Patient's acceptance towards Smart hospitals. The result of this study indicates that Healthcare providers and the patients exhibited a strong Perception towards the acceptance of Smart Hospitals with the Average score of 5.43 out of 6 for healthcare providers and 4.34 for the patients out of 5. Recommendations were given based on the challenges focusing on the Cost of care for the patients, Data security and privacy, Standardization of policies, etc.

Key words – Smart Hospitals, Technology Acceptance model, Perceived usefulness, Perceived ease of use, Behavioral Intention, Facilitating conditions, IoT.

Organization Overview

NTT DATA is a top 10 global business and IT services provider and global innovation partner with 100,000+ professionals in more than 50 countries now with $16B in revenue.

Headquartered in Tokyo, NTT DATA puts emphasis on long-term commitment and combine global reach and local intimacy to provide premier professional services from consulting, system development to business IT outsourcing. Since 1967, NTT DATA has played an instrumental role in establishing and advancing IT infrastructure. Originally part of Nippon Telegraph and Telephone Public Corporation, its heritage contributed to social benefits with a quality-first mindset. A public company since 1995, the company builds on this proven track record of innovation by providing novel IT solutions to bring results in greater quality of life for people, communities and societies around the world.

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- Enterprise applications and SaaS
- Application modernization, development and management
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- Top 10 automotive companies worldwide
- Manufacturing customers in over 40 countries

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- 9,000 SAP professionals
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- 15,000 skilled manufacturing resources
- Trusted U.S. government partner for 50+ years

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NTT Group consists of major companies like Nippon Telegraph and Telephone Corporation, NTT Communications Corporation, Dimension Data plc, NTT DOCOMO, INC. and many subsidiaries all over the world. Taking advantage of this opportunity of this scale, NTT DATA achieved a number of significant successes by collaborating with NTT Group and it provided enormous creative synergy.

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John W. McCain is the Chief Executive Officer of NTT DATA Services headquartered in Dallas, Texas, USA. He is a member of the NTT Holdings Global Strategy Committee and serves as senior vice president of NTT DATA Corporation.

Dan Allison is the President, Global Healthcare and Life Sciences. As head of the company's largest industry segment, Dan is responsible for leading the growth, profitability and transformation of the global healthcare business, which focuses on provider, physician, health plan and life sciences clients. Dan has more than 30 years of leadership experience in IT outsourcing and business process outsourcing services in various verticals, with a strong focus in healthcare.

Americas

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NTT DATA in Healthcare

Healthcare companies are balancing the quality and cost of care while serving a rapidly aging population and rising healthcare costs. At the same time, those firms are facing escalating competition, the feared patent cliff for many blockbuster drugs, and changing regulations and standards.

NTT DATA partners with some of the world's leading healthcare organizations to help them proactively manage their business through the use of information, data, and technology. In fact, its technology-enabled services support over thousands of organizations within the sector, enabling them to rapidly and cost-effectively adjust to dynamic market and regulatory demands.

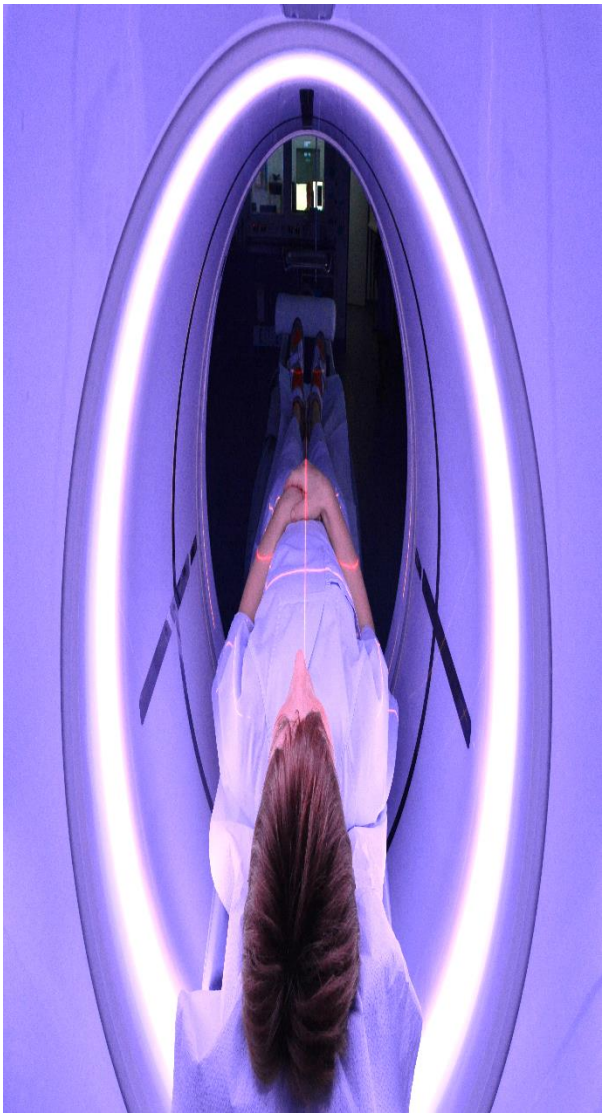
Industry Recognition

- Positioned by Gartner in the “Leaders” quadrant of the Gartner Magic Quadrant for Data Center Outsourcing and Infrastructure Utility Services, North America for the fifth consecutive year.

- Ranked “#1 IT Services Provider to Healthcare Providers,” by Gartner for the sixth straight year.

- Positioned as a leader in Everest Group’s “IT Outsourcing in the Healthcare Provider Industry—Service Provider Landscape with PEAK Matrix Assessment” for a third consecutive year.

CHAPTER-1



INTRODUCTION

Introduction

1.1 Information Technology in Healthcare

It is the era where the Cities are transforming themselves as Smart Cities. In past few decades, IT based renovation is taking place in the Healthcare industries. Healthcare providers use the information technology to boost the operations efficacy and to ease the workload. The implementation of Information technology in the healthcare industries can help to reach out the remote areas of the countries. The healthcare delivery is poor in some of the developing countries as the world population is rising because of the limited access to the health due to reasons like scarcity of healthcare providers, insufficient Healthcare clinics and hospitals, and high cost of health consultation.[1]

Not long past, folks started carrying wristbands so that they can record the amount of steps they took, their heart rates and sleep cycles. however if the now-pervasive bands and associated apps that keep biorhythms kicked off as innovations, they made-up the technique for a brand new generation of gadgets that became serious tools to boost health provisions and outcomes. These new contraptions can improve however and wherever care is delivered and can help the healthcare providers to remain endlessly connected with patients — or connected to the devices that indicate whether or not a patient is following the prescription protocols, and intake frequently. Some of the cases, they'll even give timely warning system for serious chronic conditions like Alzheimer's and Parkinson's sickness. The scope of those rising technologies is incredible.

Soon, High-Technology sensors will perform the home-monitoring of the patient's heart who is suffering from cardiac disease each minute of each day. A brand new sort of chip, embedded inside a pill will be activated at the precise moment it reaches a patient's abdomen, and can ensure for

the medical record that he's taking his medications. They may sound futurist, however several of those devices exist already and, in fact, are being replaced by a brand new generation of product that make it all quicker and enhanced. For example, wearable technology can monitor a person's rate of heart, temperature of the body and vital signs — an enormous leap over monitors that ought to be connected — and their results scan by the patient.

The Benefits of Technological Revolution

Without any doubt, technology in medicine is crucial to people's health and upgraded quality of life. It adds billions of greenbacks to the economy. There are numerous benefits that innovative technology brings to the table when it involves health care.

For example, the wide-spread adoption of electronic health records has causd an important savings in health care prices and improved patient health and safety. In addition of more health care facilities, patient records are stored in the databases which can be retrieved from anyplace within the facility. Diagnostics haven't been easier and reliable, because of the advancements in areas like nuclear medicine. Nowadays, various strategies of imaging let the technicians and general physicians to look at a patient's anatomy without having invasive procedures to reach to a diagnosis. The demand for MRI technologists and radiologists has conjointly raised as a results of fast advances in imaging technology. Insignificantly invasive surgeries, particularly inside the disciplines of CVD and thoracic surgeries, have become a lot of common in recent years. The advanced technologies and latest instruments have allowed surgeons to perform procedures in minimally invasive ways in which simply wasn't doable in the past. In the context of those transformative trends, the main focus on health automation and digitalization has been increasing at a speedy pace. Investments in Healthcare digitalization are expected to have a growth rate of more than 20%. A variety of factors are involved in this growth.[2]

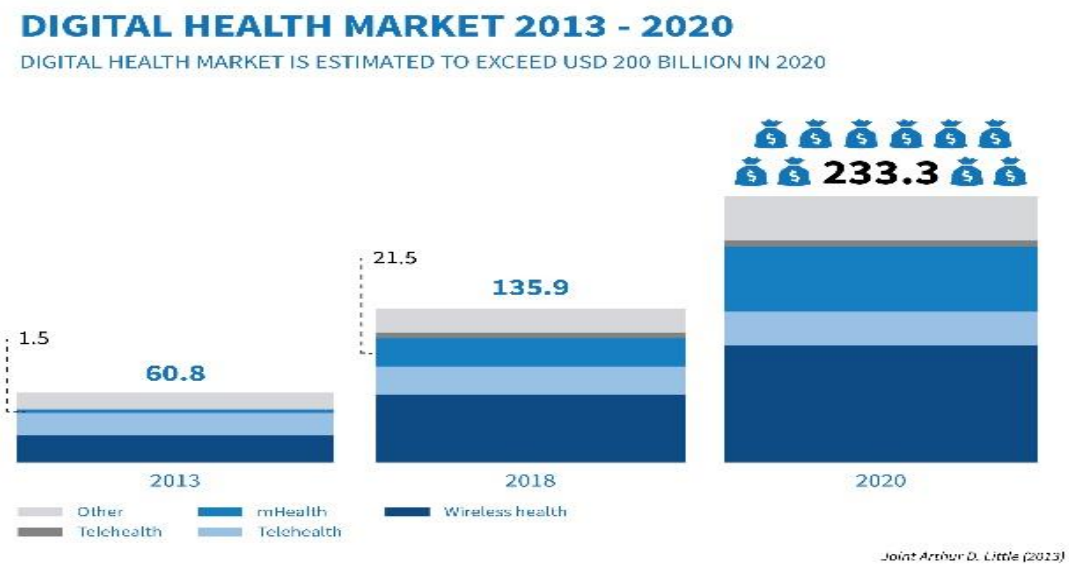


Figure 1.1: Digital Health market 2013 – 2020 (bn. USD)

Telemedicine

Wearable biosensors

Electronic Health record

Remote medicine

Data Analytics

Patient engagement

Figure 1.2: Key Technologies driving Digital Health

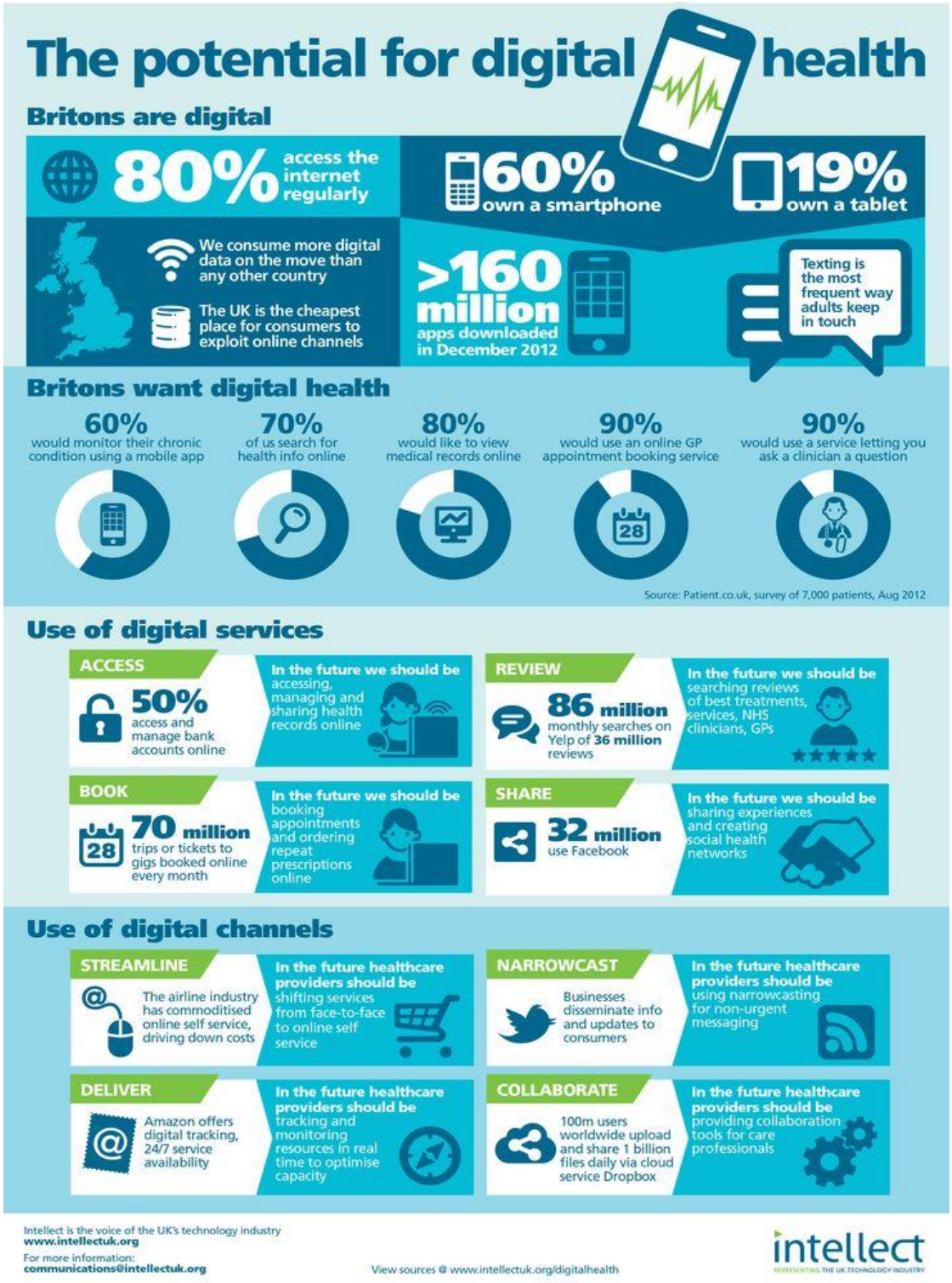


Figure 1.3 : Potential for digital health in UK

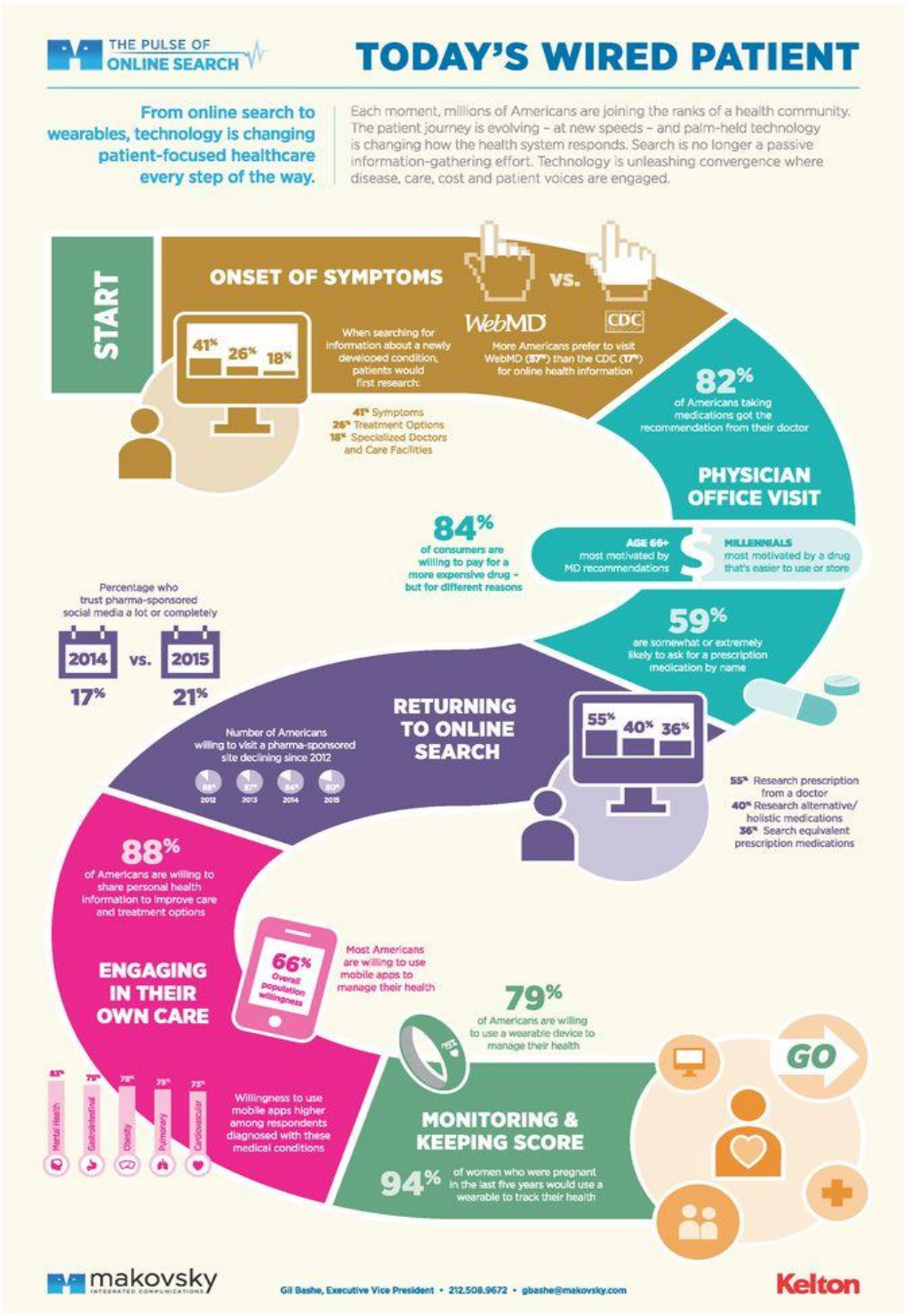


Figure 1.4: Patient's Journey Evolution

1.2 Smart Hospital Concept

In the middle of this wave of innovation and transformation, the last decade has seen hospitals and other healthcare organizations are switching their care-delivery models. Care trails have switched to multi-disciplinary and team-based approaches. From merely treating the patients, hospitals have started focusing a lot of on managing the health of the patients and tracking the continuity of care, instead of merely concentrating on the periodic treatments. Funding models themselves have shifted towards value-based care rather than merely driving potency.

The impact of those changes is critical – in the planning and operations of the hospitals – and has the potential to influence clinical results and patient-safety metrics considerably. And like all transformative trends, these areas of transformation have produced opportunities for the acceptance of technology. Over the last few decade, hospitals worldwide are creating major investments toward adopting Information and Communication Technology (ICT) experiences in numerous areas of operations and management. From the implementation of electronic medical records and patient information management system to a complicated systems like telemedicine integration systems, the main focus has been on automation of present processes and making it efficient. Though, with increasing development in technology acceptance, most of the health care managers are recognizing that the construction of a Smart hospital is related to the hospital capabilities and embracing an integrated approach, administration and procedure of organization.

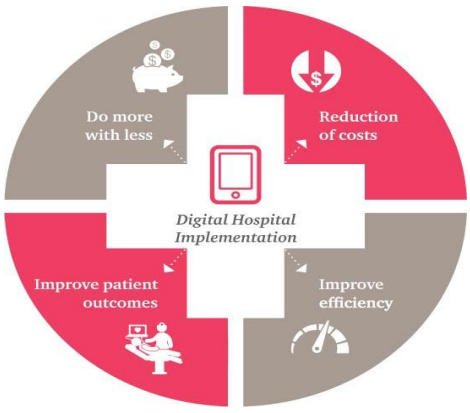


Figure 1.5: Advantages of Smart Hospital implementaion

However, more recently, healthcare institutions around the world have started to drive these three elements, conventionally considered contradictory to each other, simultaneously. There is growing experience and illustrations among hospitals in different markets that show how all three dimensions of patient experience, clinical outcome and supply-chain efficiencies can be driven concurrently and, in many ways, complement each other. The main objective of the Smart hospital vision is to create a facility that unambiguously balances 3 key aspects – brilliance in clinical result, potency within the Supply-chain and improvement of the patient expertise.

Typical Health-care models have usually supported a belief that ideal health service delivery needs finding an optimal equilibrium between the 3 key aspects. Though, Health care organizations round the world have began to drive these 3 elements. There's a growing expertise and pictures among hospitals in several markets that show however all 3 dimensions of patient expertise, clinical outcome and supply-chain efficiencies may be driven at the same time and, in many ways, complement one another. Smart hospital theory is future as more and more health care societies start to boost competences in an cohesive manner through these 3 dimensions of health care delivery brilliance.[2]

Constructing a Smart hospital means that it should be absolutely integrated and should have the digital abilities into day-after-day operations. Procedures are planned to control technology led competences; patient service interfaces control digital tools; and "people capabilities" are even engineered for the hospital workers to manage and operate these digital services. Building a smart-hospital is merely bringing the connected devices together on a high speed of networking set-up. It's regarding to rethink the care procedures, organizaktion systems and physical amenities to drive a brand new approach of providing care.

Internet's existing revolution, mobile and machine-to-machine (M2M) tools and technologies are often seen as the 1st phase of the IoT. The IoT is predicted to bridge various technologies to modify new applications by connecting physical objects along in support of making the intelligent decisions, in the coming years .[3] Facing the future, the Health care organizations should do much more than merely updating the current hospitals. The future hospital will be having a lot of difference from the current hospital. It'll be a creative health delivery system that needs a synchronized determination to serve individuals with efficiency, with higher outcomes, at lower prices, and with standards of the advanced quality.

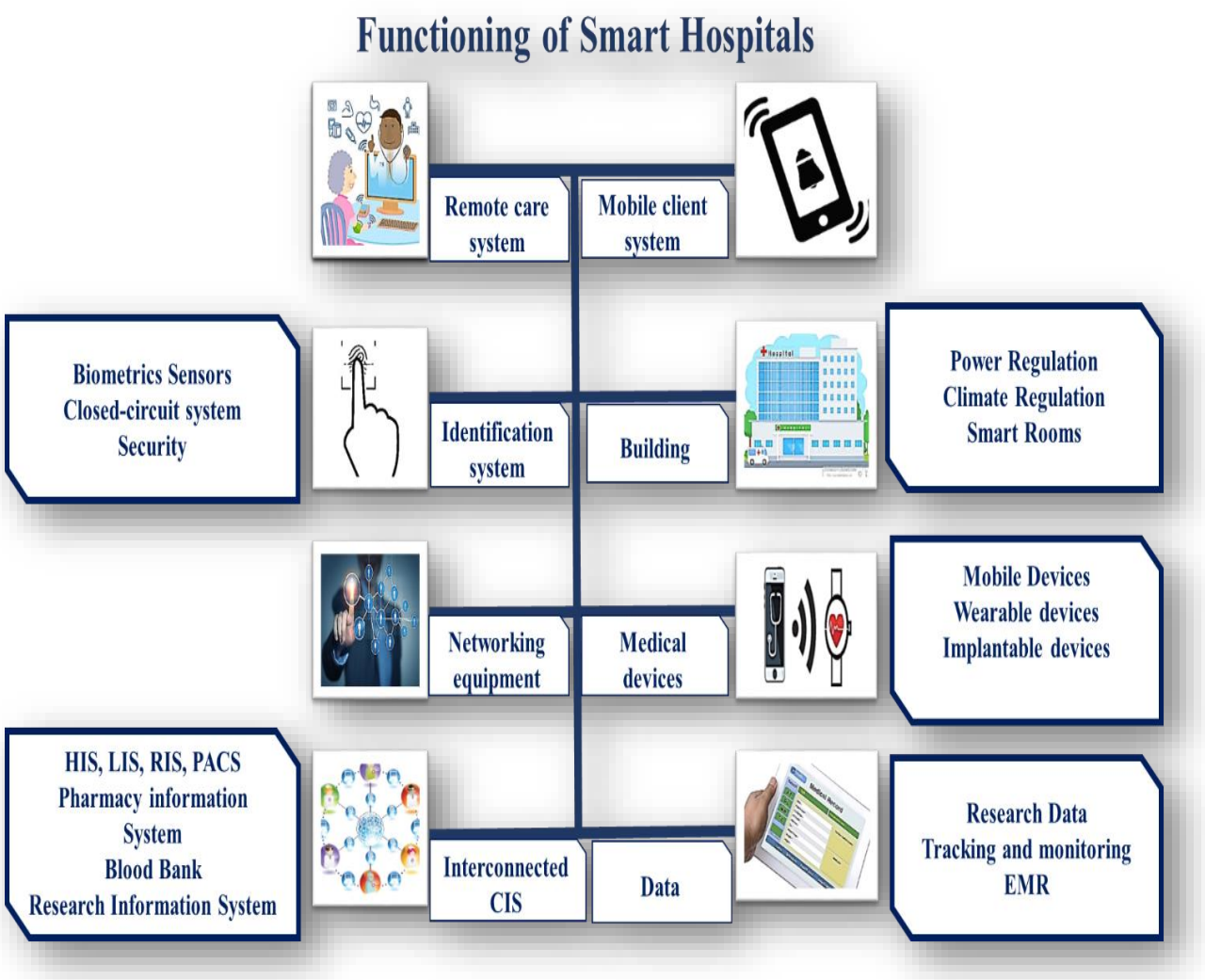


Figure 1.6: Functioning of Smart Hospitals

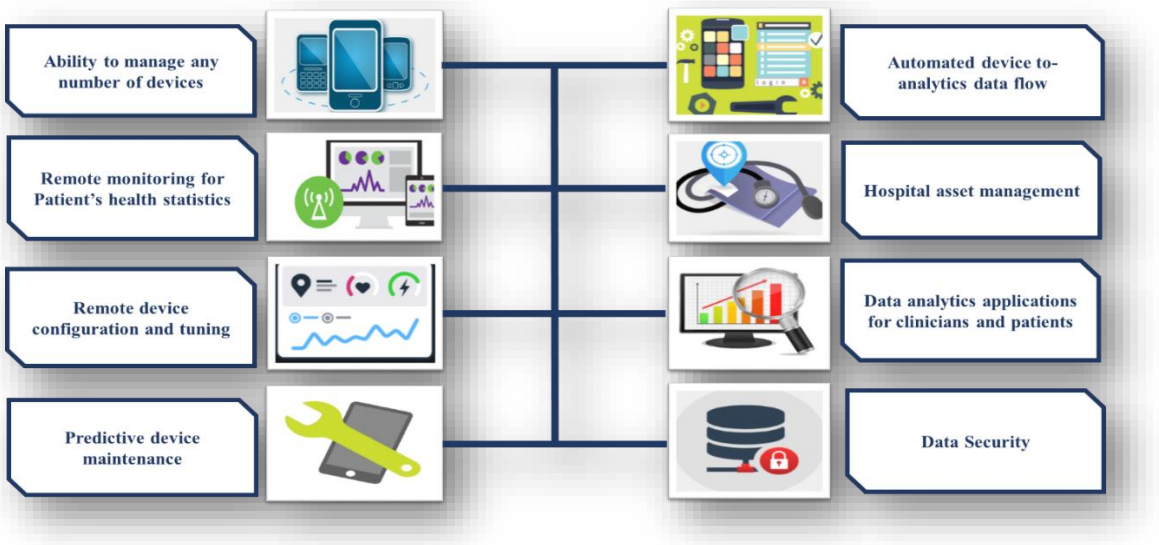


Figure 1.7: Role of IoT in Smart Hospitals

Integrated Hospitals- The integrated hospital could be a vision of the longer term wherever hospitals focus on delivering the simplest quality of care to their patients, whereas at the same time providing an effective environment for the health care providers and other staff of the hosiptal . Integration of the hospital system permits patients and employees to access the system from anyplace, at any time- Only an authorised person can access to the information. [4]

Patient engagement- With a growing shift towards additional value-based systems, patient engagement is currently a serious indicator of hospital achievements. Easy and Quick access to appropriate health care information and Awareness materials for education is essential to make the patients feel sceptered and concerned in their treatment methods. Data concerning health situations, care strategies, and pre- and post-discharge directions will support a better recovery. [5].

1.3 Technology Acceptance Model (TAM)

TAM (Technology Acceptance Model) by David offers a sound and reliable measure that forecasts the adoption of new technologies by users.[6,7] The model is usually used to measure the acceptance of technology.[8]

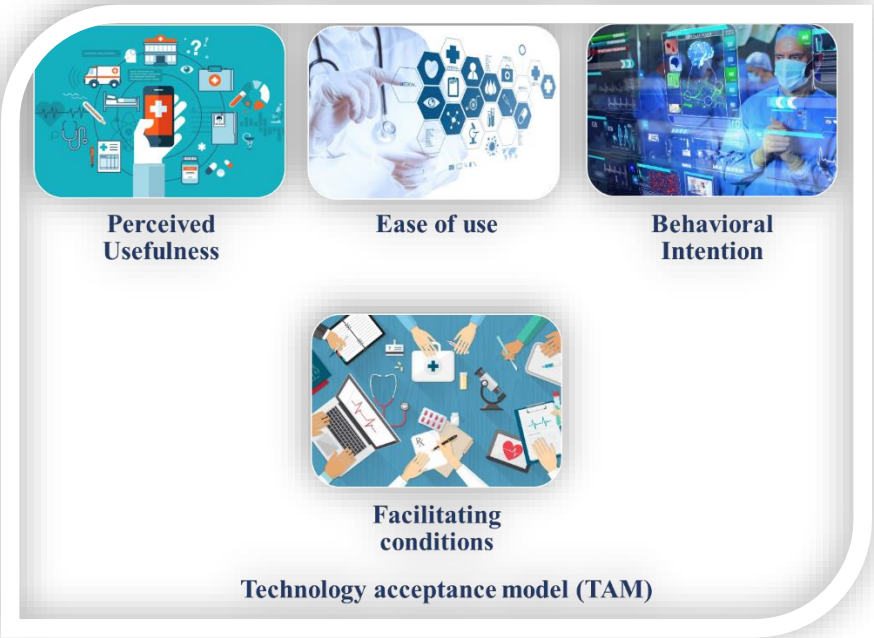


Figure 8: Factors of Technology acceptance model (TAM)

TAM (Technology acceptance model) [6,7] is probably the foremost oftentimes used among all different models.[9] Technology acceptance model theory is predicated on ideologies adopted from Fishbein and Ajzen (1975) [10] attitude model from psychological science, that specifies a way to scale the behavior relevant parts of attitude, it differentiates amongst beliefs and attitudes and identifies how the stimuli (external) are associated to the beliefs, attitudes and behavior. The TAM (Technology Acceptance Model) regulates the acceptance of technology by the users with PU(Perceived usefulness) and PEOU(Perceived ease of use) factors. Perceived usefulness describes as the amount to which an individual trusts that employing a definite system can improve the performance of the job. Perceived ease of use describes as the amount to which an indidual trusts that employing a definite system is freed from physical and mental struggle. [6,7]

OBJECTIVES

General Objective: To assess the perception and acceptance of using technology to assist healthcare in the hospitals of bangalore

Specific Objective:

- To understand the functioning of Smart Hospitals.
- To Assess the healthcare provider's (i.e. Doctors, Nurses, Physiotherapists, Pharmacists, Lab Technicians and Dentists) perception towards Smart Hospitals and use of IT in the hospitals.
- To determine the patient's perception towards Smart Hospitals.
- To understand the challenges and barriers in adoption of latest technology in Hospitals.

CHAPTER-2

REVIEW OF LITERATURE

Review of Literature

The conception of wireless technology in the health care industries is mentioned in several studies (Dyer, 2003 [11]; Hu et al., 2002 [12]; Sausser, 2003 [13]; Simpson, 2003 [14]; Wisnicki, 2002 [15]). For instance, Wisnicki (2002) [15] delivered facts of how the broadband technology, an important element of wireless technology, can be exploited in healthcare. Whereas previous studies agree that wireless applications have the potential to handle the endemic issues of Health care, An inadequate data and information can be found regarding the determinants of such applications (Gururajan, Raj et al., 2005 [16]; Gururajan et al., 2004 [17]). In common, the bulk of the works reviewed are descriptive regarding the advantages of wireless hand-held devices in health care generally, and medicine especially. There's solely a little range of studies that offer evidence-based information regarding these devices in health care (Fischer et al. 2003 [18]; Sax et al. 2005 [19]).

Moreover, 5 major researches in the health care (assessed by (Spil & Schuring, 2006) [20]analyzing the TAM (Technology Acceptance Model) drew conclusions that were inconsistent with the body of information in non-healthcare settings. With 'PEOU (Perceived ease of Use)' and 'PU (Perceived Usefulness)' because the major Technology Acceptance Model characteristics, these studies found that within the health setting, 'Perceived Usefulness' is an essential attribute in the adoption of technology, whereas 'Perceived ease of Use' was found to possess no impact (Spil & Schuring, 2006) [20].

The study of Perception and acceptance of using technology in the hospitals is a topic of wide interest to both people who work in organizations and people who study them. Perception and acceptance of using technology in the hospitals has been closely related with many factors such as perceived usefulness, perceived ease of use, behavioral intention, facilitating conditions and attitude towards using the technology. Researchers have attempted to identify the various components of Perception and acceptance of using technology in the hospitals, measure the relative importance of each component of Perception and acceptance of using technology in the hospitals and examine the effects of these components.

Knowledge in Medicine is dynamic in nature and it keeps on changing time to time. It's tough for the physicians to keep themselves updated to assist in their patient's care and patient management with efficiency and also to sustain their skilled competency (Jousimaa, 2001 [21]). Chamliss and Conley (1996) [22] claimed that physicians typically had important queries throughout patient care. The market on clinical literature can solve the queries, but this process consumes lots of time and also it is very costly. Therefore, it had been necessary to offer resourceful ways in order to assist physicians obtain and retrieve medical data. With the help of organized review of physicians' data requirements (Smith 1996, [23]) and their data seeking behavior (Dawes and Sampson 2003, [24]), it had been found that physicians' table references were the foremost common sources of written data, however electronic data resources supported by laptop and computer systems had to be developed to satisfy the physicians' data requirements and facilitate them decrease the burden of knowledge overload.

They conjointly argued that the simplest info sources for physicians ought to give relevant, valid material that may be retrieved hastily and with minimum exertion. Similarly, the sources allowed the physicians to keep themselves updated and improve information transmission. Lastly, they observed the foremost vital options that require to be taken into the picture when a brand new info tool is designed. These should be electronic, portable, fast, simple to use, connected to an oversized valid info of medical information and records of the patients and serve each patients and Health care providers. Verhoeven et al (2000) [25] conjointly stressed these options in their empirical study wherever they examined that the study retrieval technique was only for the general practitioners (GP's) from 1994 to 1997. They ended that the use of sources that are printed will be the foremost effective medical literature retrieval technique, however electronic sources appeared to be the foremost economical. It's clear that physicians have to be inspired to use electronic sources.

In spite of the benefits of medical Information system, they ought to be tailored to suit physicians' practical operating designs and therefore the context of the work done by them. Berg (1999) [26] demanded that with the usage of IT tools in health care "is obsessed with the thorough interrelationship of the system's functioning with the masterful and practically directed work of health care professionals". As Jayasuriya (1998) [27] indicated, health care providers were eager to use the information technology in their jobs after they alleged it to be helpful for his or her performance. Ridderikhoff and van Herk (1999) [28] observed the attitude of

the physicians towards a structure supporting clinical diagnosing. Their outcomes indicated that the physicians were unwilling to use the system as a result of the criticizing operate didn't match the physicians' information seeking behavior.

The authors recommended that the people who designs the system ought to watch out for not manufacturing one thing that seems eventually unnecessary. Physicians, on the opposite hand, would possibly modify their behavior to welcome disapproval and criticism. Yong et al. (2001) [29] conveyed that the utility of various varieties of technology for nurse's knowledge entry made up our minds by the match between the utility and potency of knowledge input technology (keyboard or pen based) and clinical tasks (structured or matter data). Rousseau et al. (2003) [30] conjointly found a computerised call web for chronic sickness to be useless normally observe since it didn't match well into general observe consultation. Another necessary issue is that associate degree IT tool may facilitate users to look for and retrieve info effectively from its right location and it ought to store data that is dynamic and updated instead of static (Alavi and Leidner, 2001) [31].

Technology acceptance model (TAM) is customized specially to review user acceptance towards technology (e.g., [32, 33]). On the basis of TAM model, intention of the behavior (BI) could be a major determinant of usage behavior; behavior may be foretold by Behavior intention. Behavior intention is determined by however someone considers the PU (Peceived usefulness) and PEOU (Perceived Ease of Use) of the systems studied. "PU and EU are assumed a priority, and are intended to be impartially universal factors of acceptance of the users" ([34], p.988). Technology acceptance model stresses the importance of exterior variables have an effect on the individual decision making. Recently, Venkatesh, Morris, Davis and Davis [34] planned a unified model, the UTAUT (Unified Theory of Acceptance and Use of Technology), supported studies of eight outstanding models (in explicit TAM) in IS adoption analysis. UTAUT is developed with 4 essential factors of intentions and usage: performance expectation, effort expectation, social influence and also facilitating conditions, along with 4 mediators of crucial associations: gender, age, expertise and voluntariness of use. The model was through empirical observation examined and located to outmatch the 8 individual models regulate R^2 = zero.69),

From the past few years, several researches, supported completely different theoretical approaches, are created so as to predict, justify and increase acceptance of the users of knowledge structures at effort (e.g. Venkatesh et al., 2003 [35]). Amongst these models, the Diffusion of Innovation Theory has been wide to study client behavior, organization acceptance and dispersal

performance in an exceedingly social organisation and within the IS analysis field (e.g. Mahajan et al., 1990; Cooper and Zmud, 1990; Roger 1995; Robertson and Gatignon 1986; Gopalakrishnan and Damanpour, 1997) [36-40]. Of the factors planned by Rogers (1995) [39], relative benefit (corresponding to usefulness), quality (ease of use) and compatibility are systematically associated with the selections created by people with respect to the technology adoption. The TAM is ready-made to check user acceptance of technology. In line with Technology acceptance model, behavior intention (BI) could be a major factor of usage behavior; behavior are often foreseen by behavioral intention. Usefulness is viewed as being determined by the perceived usefulness (PU) and perceived ease of use (PEOU) of the systems below examination. "PU and EU assumed a priority, and are destined to be fairly general factors of user acceptance" (Davis et al., 1989 [41]). EU effects behavior through 2 mechanisms: self efficacy and instrumentality. This suggests the better the system is to use, the larger are the efficaciousness felt by the user relating to his or her capability to use the system. tammy emphases the importance of however external variables, e.g. varied individual variations, situational constraints, structure characteristics and system characteristics etc. have an effect on the individual's internal decision making and behavior intentions.

Communication technology of mobile is reworking the communication between folks. It's a philosophical result on social group and business deviations round the world. It's clear that though mobile communication innovations in the technology has not been able to fulfil all its hopes to vary the essential nature of business and our way of life, it's a lucrative innovation that parades new business opportunities and offers supplemental worth for each the client and also the company [42, 43]. Health care is that the largest industry within the world. Latest years have seen communication technology of mobiles beginning to be accepted by the attention business. It's the possible to slowly develop associate integral a part of attention apply, management and processes. Goldberg and Wickramasinghe [44,45] have argued powerfully that mobile e-health services provide a "panacea" for attention issues within the twenty first century. Their opinions direct our consideration to new phenomena, e.g. style and use of mobile communication technology in health care settings. Current mobile facilities forhealthcare providers offered on the market vary from straightforward medical vocabularies to classy patient information systems capable

of handling digital pictures and laboratory check results. A latest review by [46] has shown that mobile services became valuable in varied arenas of medication.

CHAPTER-3

METHODOLOGY

STUDY AREA: Various Multispecialty Hospitals of Bangalore*

STUDY DESIGN: The study is Descriptive cross-sectional study

STUDY POPULATION AND SAMPLE: Healthcare providers and Patients from various Multispecialty hospitals in Bangalore.

DATA COLLECTON: The data is collected from primary sources and secondary sources.

SAMPLING TECHNIQUE: Purposive Sampling for healthcare Providers and Convenient sampling for the patients.

SELECTION CRITERIA -

- **Inclusion Criteria: -**
  - Males and Females
  - 20-60 years of Age
  - General Population is considered as patients those who have visited Hospital once in Life.
  - Health Care Providers Includes Doctors, Nurses, Physiotherapists, Pharmacists, Lab Technicians and Dentists
- **Exclusion Criteria: -**
  - Administrative Staff of the Hospitals
  - Patients with Mental Illness and severe Injuries

SAMPLE SIZE was calculated using the formula:

Necessary Sample Size = $(Z\text{-score})^2$ * Std. Dev*(1-StdDev) / $(\text{margin of error})^2$

SAMPLE SIZE: 384 (192 Healthcare providers and 192 Patients)

- 192 → **Doctors, Nurses, Physiotherapists, Pharmacists, Lab Technicians and Dentists** (32 each).

*Sakra World Hospital, Santosh Hospital, Columbia Asia, Cloud nine, Manipal Hospital and Sparsh Hospital

STATISTICAL TOOLS USED: The collected data has been analyzed by using SPSS and Excel. The statistical tools used were descriptive statistics (Frequency, percentage and mean), One Sample T-Test.

INSTRUMENT DESIGN AND DATA COLLECTION: Survey Method (Questionnaire) was used to collect data using 6 point Likert scale for healthcare providers (Ranging from Strongly Agree-6 to Not Aware-1) and 5 point Likert scale for the patients (Ranging from Strongly Agree-5 to Strongly disagree-1) Based on Technology Acceptance model (TAM). The instrument had 2 sections, the first section was regarding the perception of respondents. The second section dealt with factors related to job Satisfaction. It had questions based on 6-point and 5-point Likert Scale

PILOT STUDY

- **Pilot Study** was successfully done to check the reliability of the Questionnaires. The Pilot study included 50 healthcare providers and 50 patients.
- **Cronbach's Alpha** test was done to check the reliability of the Questionnaires.
- **Results of the pilot study are as below:**
  - Cronbach's Alpha for Patient = 0.716 (Reliable)
  - Cronbach's Alpha for Healthcare providers = 0.727 (Reliable)

TIMELINE: Three months (Feb'17 to April'17)

ETHICAL CONSIDERATION

During the study, Ethical Consideration was kept in mind which included Voluntary Participation, Confidentiality and Anonymity.

LIMITATIONS OF THE STUDY: The study was limited to Multispecialty Hospitals of Bangalore only and therefore; the findings of the study cannot be extended to other areas. All the findings and observations made in the study were purely based on the respondents' answers which may be biased.

CHAPTER-4

RESULTS

Data Analysis for Patients

Sociodemographic Characteristics	No. of Patients	Percentage
GENDER		
Male	115	59.9%
Female	77	40.1%
Total	192	100%
AGE		
20-30	115	59.89%
30-40	53	27.60%
40-50	12	6.25%
50-60	12	6.25%

Table 4.1: Patient's Sociodemographic details

CONSTRUCTS	VARIABLE ITEMS	CRONBACH'S ALPHA
Perceived Usefulness (PU)	PU1 PU2 PU3 PU4	0.79
Perceived Ease of use (PEOU)	PEOU1 PEOU2 PEOU3 PEOU4	0.76
Behavioral Intention (BI)	BI1 BI2	0.75
Facilitating Conditions (FC)	FC1 FC2	0.81
Acceptance (ACC)	ACC1 ACC2 ACC3 ACC4	0.91

Table 4.2: Reliability of Constructs for patients

CONSTRUCTS	VARIABLE ITEMS	Mean	Avg. Mean	Std. dev	T-Value	df	Sig (2-tailed)
Perceived Usefulness (PU)	PU1 PU2 PU3 PU4	4.4263 4.3298 4.1823 4.2775	4.2975	0.7175	25.342	189 190 191 190	.000
Perceived Ease of use (PEOU)	PEOU1 PEOU2 PEOU3 PEOU4	4.3455 4.0588 4.3854 4.1780	4.2350	0.7700	22.642	190 187 191 190	.000
Behavioral Intention (BI)	BI1 BI2	4.0157 4.1885	4.0950	0.7950	19.650	190 190	.000
Facilitating Conditions (FC)	FC1 FC2	4.1832 4.1765	4.1750	0.7550	21.410	190 186	.000
Acceptance (ACC)	ACC1 ACC2 ACC3 ACC4	4.5079 4.4607 4.3085 4.3351	4.3975	0.6975	27.723	191 190 187 187	.000

Table 4.3: One-sample T-test value for patients

The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

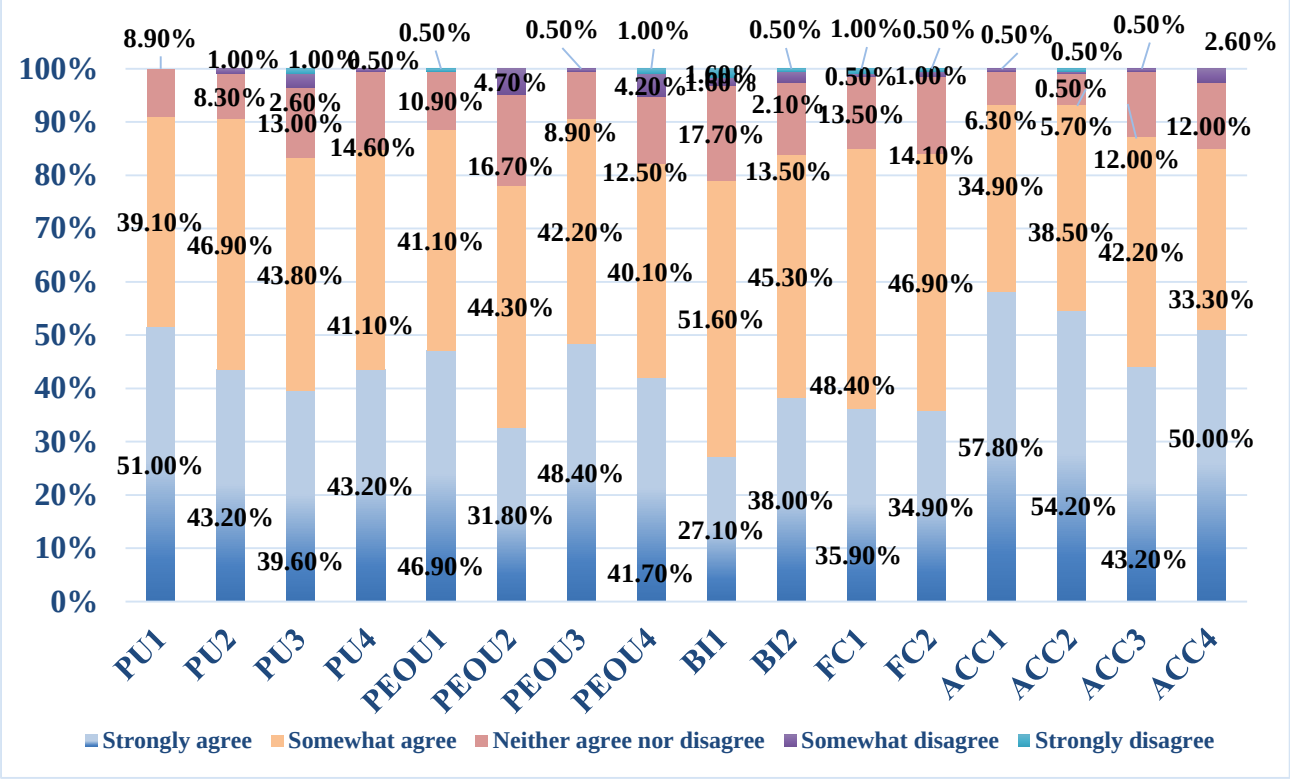


Figure 4.1: Patient's responses

Figure 4.1 is showing the percentage of patient's results on the various Parameters i.e. Perceived Usefulness, Perceived ease of use, Behavioural intention, Facilitating conditions and total acceptance. It is inferred that the maximum resposes from the patients include strongly agree and somewhat agree on each questions.

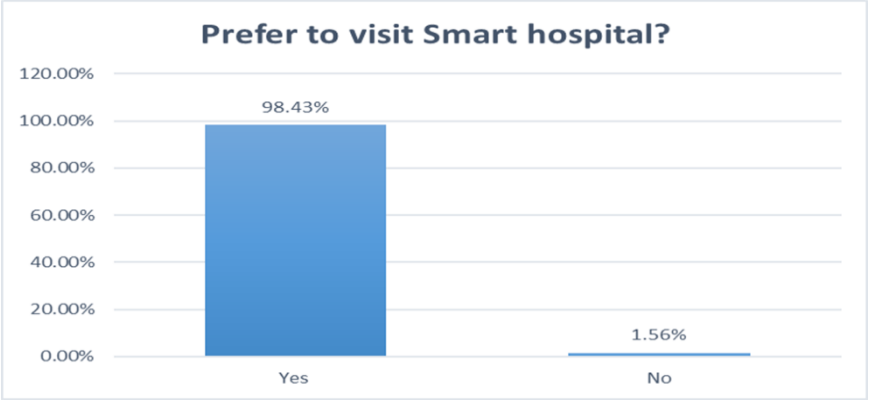


Figure 4.2: Patient's preference to visit a Smart hospital than a normal hospital

Figure 4.2. is showing that 98.43% of the patient will prefer to visit a Smart hospital than a normal hospital whereas 1.56% responded as No to visit a smart hospital because they think that technology is not that reliable

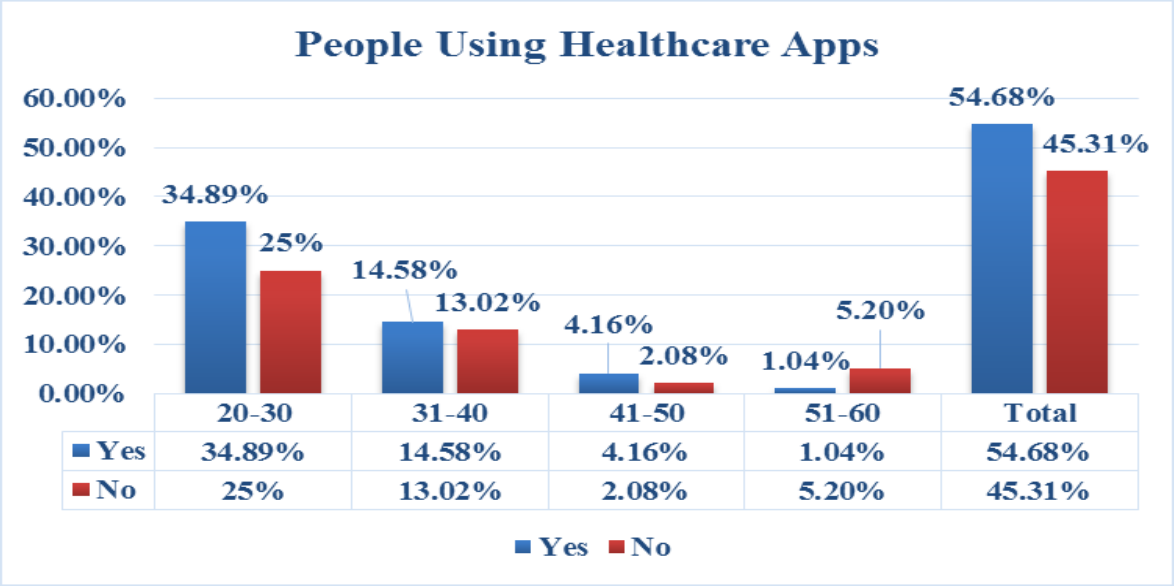


Figure 4.3: Patients are the user of any healthcare App or devices

Figure 4.3 is the Percentage of Patients using healthcare Apps (Age-group wise bifurcation), 54.68% of the patients are using various healthcare apps such as Samsung Health, apple health and also the healthcare devices such as fitbit

Basic understanding of Smart Hospitals

Basic understanding		No. of Patients	Percentage
	Strongly disagree	1	.5%
	Somewhat disagree	2	1.0%
	Neither agree nor disagree	21	10.9%
	Somewhat agree	87	45.3%
	Strongly agree	79	41.1%
	Total	190	99.0%

Table 4.4: Patient's Basic understanding of Smart Hospitals

From the table 4.4, it is inferred that out of 192 patients 79 of the patients **strongly agree** to the question that they have the basic understanding of the functionality of a Smart hospital , 87 of the patients **somewhat Agree**, 21 of the patients have **neutral** opinion, 2 of the patients **somewhat disagree** and 1 of the patients **strongly disagree**.

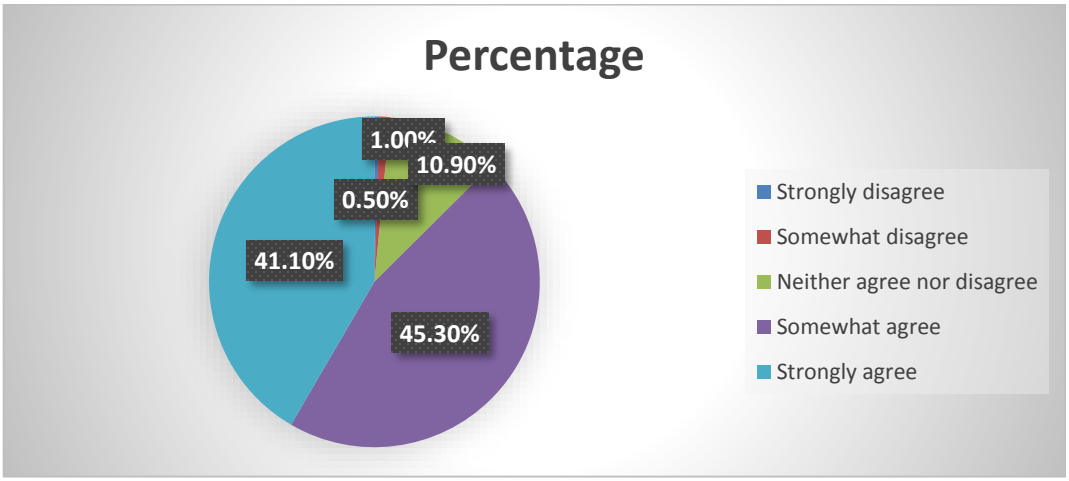


Figure 4.4: Percentage showing Patient's Basic understanding of Smart Hospitals

The Above Figure is showing the percentage of patient's Basic understanding of Smart Hospitals. From the Figure 4.4, it is inferred 41.10% of the patients **strongly agree** to the question that they have the basic understanding of the functionality of a Smart hospital , 45.30% of the patients **somewhat Agree**, 10.9% of the patients have **neutral** opinion, 1% of the patients **somewhat disagree** and 0.5% of the patients **strongly disagree**.

FACTOR 1: PERCEIVED USEFULNESS (PU1-PU4)

Perceived Usefulness	t	df	Sig. (2-tailed)
Efficiency	30.131	189	.000
Quality of my care	27.283	190	.000
Reduction of waiting time	19.660	191	.000
Greater control to monitor health	24.300	190	.000

Table 4.5: One sample T-test for Perceived Usefulness for patients

The output produced by SPSS for the sample is shown in Table **[4.5]**. The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

PU1: I believe that the technology (EMR, PHR, RFIDs, bedside sensors, etc.) will help my health to be efficient in the hospitals.

Efficiency		No. of Patients	Percentage
	Neither agree nor disagree	17	8.9%
	Somewhat agree	75	39.1%
	Strongly agree	98	51.0%
	Total	190	99.0%

Table 4.6: Patient's perception on the efficiency of the technology

From the table 4.6, it is inferred that out of 192 patients 97 of the patients **strongly agree** to the question that technology (EMR, PHR, RFIDs, bedside sensors, etc.) will help their health to be efficient in the hospitals , 77 of the patients **somewhat Agree**, 16 of the patients have **neutral** opinion, none of the patients **somewhat disagree** and none of the patients **strongly disagree**.

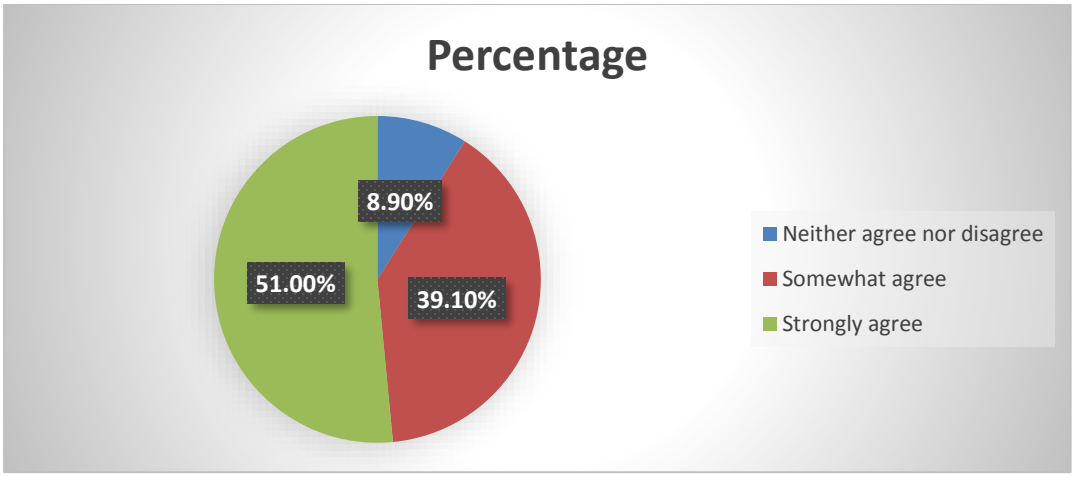


Figure 4.5: Percentage showing Patient's perception on the efficiency of the technology

The Above Figure is showing the **Percentage showing Patient's perception on the efficiency**

of the technology. From the Figure 4.5, it is inferred 50.05% of the patients **strongly agree** to the question that technology (EMR, PHR, RFIDs, bedside sensors, etc.) will help their health to be efficient in the hospitals, 40.10% of the patients **somewhat Agree** and 8.3% of the patients have **neutral** opinion.

PU2: I think quality of services provided to me is better in the hospitals using latest technologies.

Quality_of_care		No. of Patients	Percentage
	Somewhat disagree	2	1.0%
	Neither agree nor disagree	16	8.3%
	Somewhat agree	90	46.9%
	Strongly agree	83	43.2%
	Total	191	99.5%

Table 4.7: Patient's perception on the Quality of care

From the table 4.7, it is inferred that out of 192 patients 83 of the patients **strongly agree** to the question that quality of services provided to them is better in the hospitals using latest technologies, 90 of the patients **somewhat Agree**, 16 of the patients have **neutral** opinion, 2 of the patients **somewhat disagree** and none of the patients **strongly disagree**.

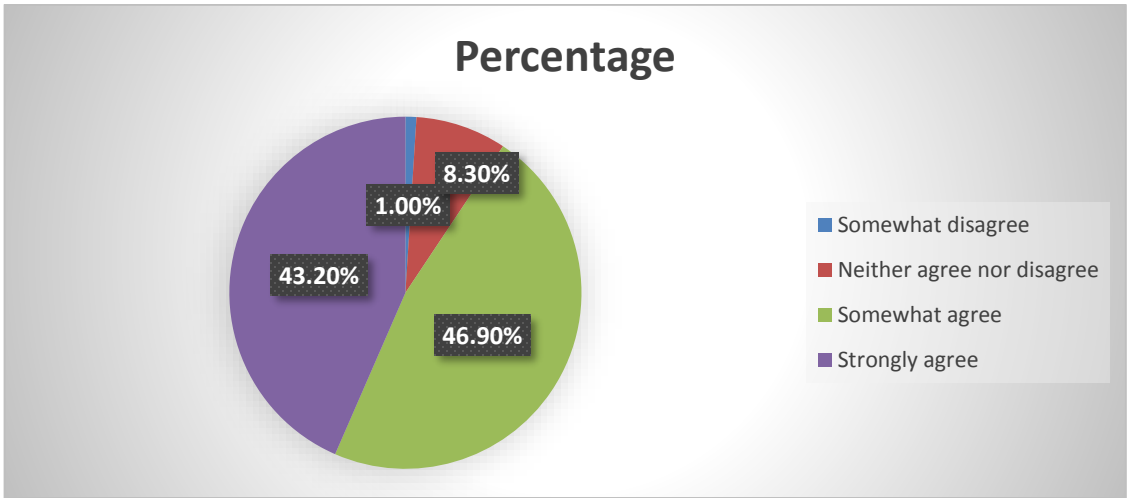


Figure 4.6: Percentage showing Patient's perception on the quality of care

The Above Figure is showing the **Percentage showing Patient's perception on the quality of care**. From the Figure 4.6, it is inferred 43.2% of the patients **strongly agree** to the question that quality of services provided to them is better in the hospitals using latest technologies, 46.9% of the patients **somewhat Agree** and 8.3% of the patients have **neutral** opinion.

PU3: **I think the waiting time for me is reduced in the hospitals using latest technologies.**

Waiting_time		No. of Patients	Percentage
	Strongly disagree	2	1.0%
	Somewhat disagree	5	2.6%
	Neither agree nor disagree	25	13.0%
	Somewhat agree	84	43.8%
	Strongly agree	76	39.6%
	Total	192	100.0%

Table 4.8: Patient's perception on the reduction of waiting time

From the table 4.8, it is inferred that out of 192 patients 77 of the patients **strongly agree** to the question that the waiting time for the patients is reduced in the hospitals using latest technologies, 83 of the patients **somewhat Agree**, 25 of the patients have **neutral** opinion, 5 of the patients **somewhat disagree** and 2 of the patients **strongly disagree**.

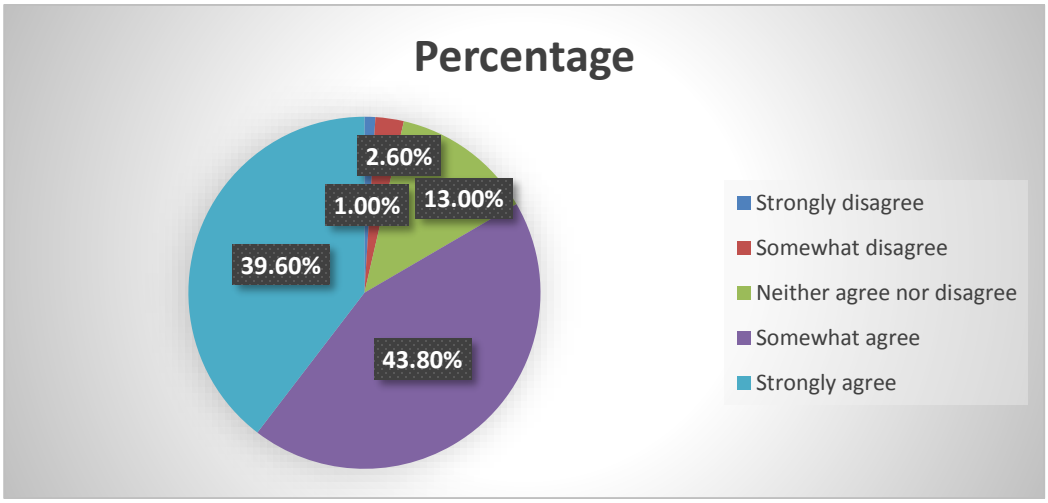


Figure 4.7: Percentage showing Patient's perception on the reduction of waiting time

The Above Figure is showing the **Percentage showing Patient's perception on the reduction of waiting time**. From the Figure 4.7, it is inferred 40.1% of the patients **strongly agree** to the question that the waiting time for the patients is reduced in the hospitals using latest technologies, 43.2% of

the patients **somewhat Agree**, 13% of the patients have **neutral** opinion, 13% of the patients somewhat disagree and 1% of the patients strongly disagree.

PU4: I believe using the technologies will give me a greater control to monitor my health.

Control_to_moniter		No. of Patients	Percentage
	Somewhat disagree	1	.5%
	Neither agree nor disagree	28	14.6%
	Somewhat agree	79	41.1%
	Strongly agree	83	43.2%
	Total	191	99.5%

Table 4.9: Patient's perception on the greater control to monitor health

From the table 4.9, it is inferred that out of 192 patients 82 of the patients **strongly agree** to the question that using the technologies will give them a greater control to monitor the health, 79 of the patients **somewhat Agree**, 29 of the patients have **neutral** opinion, 1 of the patients **somewhat disagree** and none of the patients **strongly disagree**.

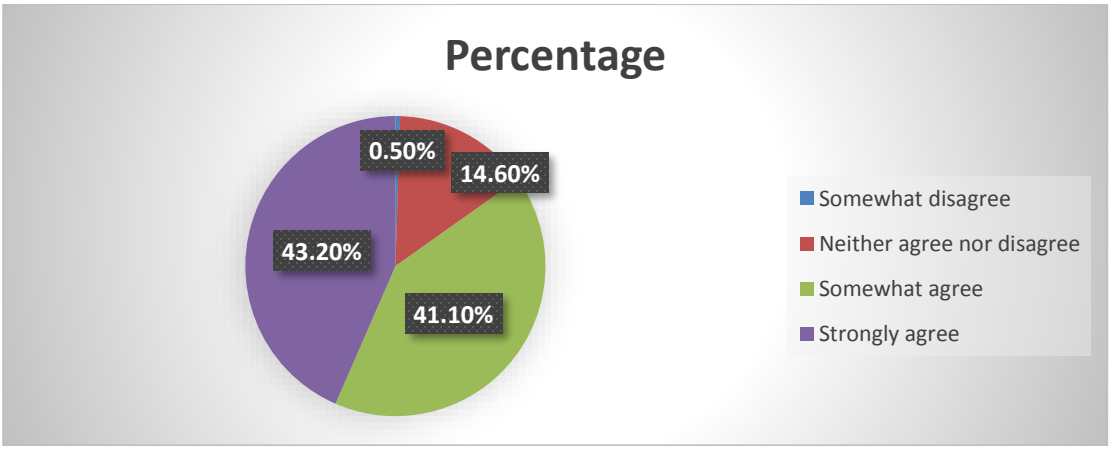


Figure 4.8: Percentage showing Patient's perception on the greater control to monitor health

The Above Figure is showing the **Percentage showing Patient's perception on the greater control to monitor health**. From the Figure 4.8, it is inferred 42.7% of the patients **strongly agree** to the question that using the technologies will give them a greater control to monitor the health, 41.1% of

the patients **somewhat Agree**, 15.1% of the patients have **neutral** opinion, 0.5% of the patients somewhat disagree and none of the patients strongly disagree.

FACTOR 2: PERCEIVED EASE OF USE (PEOU1-PEOU4)

PERCEIVED EASE OF USE	t	df	Sig. (2-tailed)
Make health easier to avail	26.000	190	.000
Can be learnt easily	17.430	186	.000
Accessibility	28.696	191	.000
Flexible to interact	18.450	190	.000

Table 4.10: One sample T-test for Perceived ease of use

The output produced by SPSS for the sample is shown in Table **[4.10]**. The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

PEOU1: Smart hospitals equipped with latest wireless technologies can make me to avail the health services easily

Easier_to_avail_health		No. of Patients	Percentage
	Strongly disagree	1	.5%
	Neither agree nor disagree	21	10.9%
	Somewhat agree	79	41.1%
	Strongly agree	90	46.9%
	Total	191	99.5%

Table 4.11: Patient's perception on availing the health services easily

From the table 4.11, it is inferred that out of 192 patients 90 of the patients **strongly agree** to the question that **Smart hospitals equipped with latest wireless technologies can make patients to avail the health services easily**, 79 of the patients **somewhat Agree**, 21 of the patients have **neutral** opinion, 1 of the patients **somewhat disagree** and 1 of the patients **strongly disagree**.

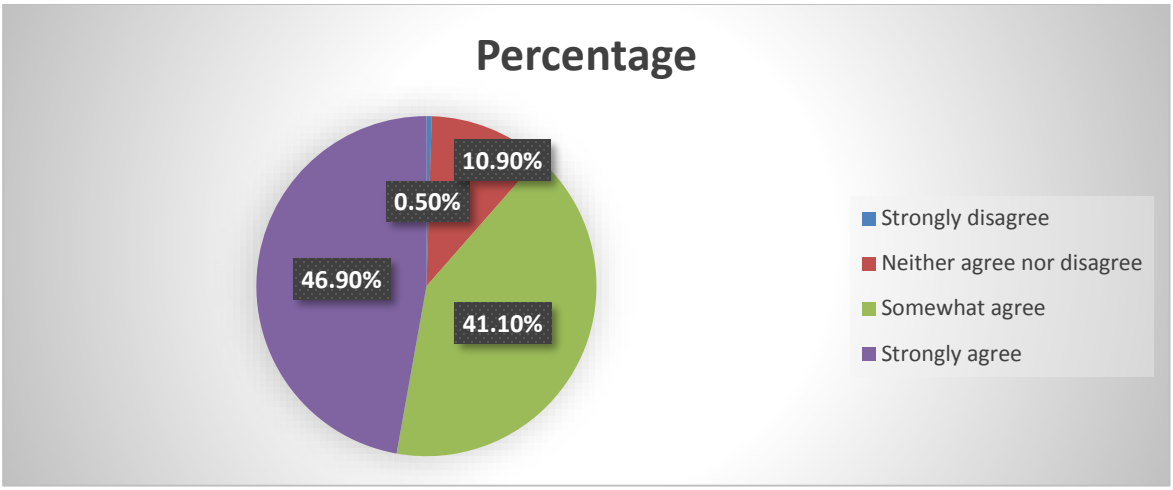


Figure 4.9: Percentage showing Patient's perception on availing the health services easily

The Above Figure is showing the **Percentage showing Patient's perception on availing the health services easily**. From the Figure 4.9, it is inferred 46.9% of the patients **strongly agree** to the question that **Smart hospitals equipped with latest wireless technologies can make patients to avail the health services easily**, 41.1% of the patients **somewhat Agree**, 10.9% of the patients have **neutral** opinion, none of the patients somewhat disagree and 0.5% of the patients strongly disagree.

PEOU2: I think wireless technologies like PHR, mHealth etc. can be learnt easily.

Can_be_learnt		No. of Patients	Percentage
	Somewhat disagree	9	4.7%
	Neither agree nor disagree	32	16.7%
	Somewhat agree	85	44.3%
	Strongly agree	61	31.8%
	Total	187	97.4%

Table 4.12: Patient's perception on the technology can be learnt easily

From the table 4.12, it is inferred that out of 192 patients 61 of the patients **strongly agree** to the question that **wireless technologies like PHR, mHealth etc. can be learnt easily**, 85 of the patients **somewhat Agree**, 32 of the patients have **neutral** opinion, 9 of the patients **somewhat disagree** and none of the patients **strongly disagree**.

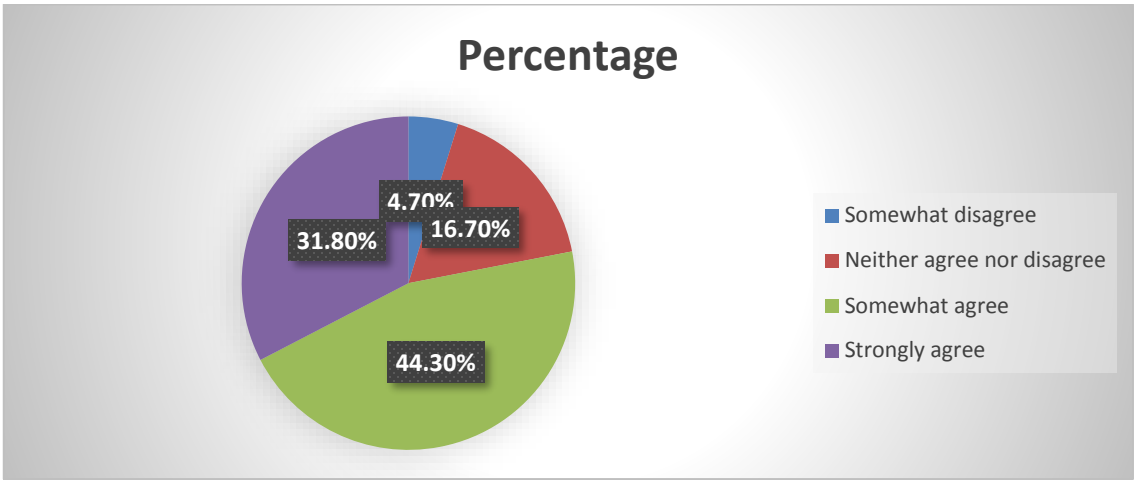


Figure 4.10: Percentage showing Patient's perception on wireless technologies like PHR, mHealth etc. can be learnt easily

The Above Figure is showing the **Percentage showing Patient's perception on wireless technologies like PHR, mHealth etc. can be learnt easily**. From the Figure 4.10, it is inferred 31.8% of the patients **strongly agree** to the question that **wireless technologies like PHR, mHealth etc. can be learnt easily**, 44.3% of the patients **somewhat Agree**, 16.7% of the patients have **neutral** opinion, 4.7% of the patients **somewhat disagree** and none of the patients strongly disagree.

PEOU3: With the help of technologies, I can access to my information anytime and anywhere whenever it is needed.

ACCESSIBILITY		No. of Patients	Percentage
	Somewhat Disagree	1	.5%
	Neither agree nor disagree	17	8.9%
	Somewhat agree	81	42.2%
	Strongly agree	93	48.4%
	Total	192	100.0%

Table 4.13: Patient's perception on the accessibility of the information anytime and anywhere

From the table 4.13, it is inferred that out of 192 patients 93 of the patients **strongly agree** to the question that **With the help of technologies, patients can access to my information anytime and anywhere whenever it is needed**, 81 of the patients **somewhat Agree**, 17 of the patients have **neutral** opinion, 1 of the patients **somewhat disagree** and none of the patients **strongly disagree**.

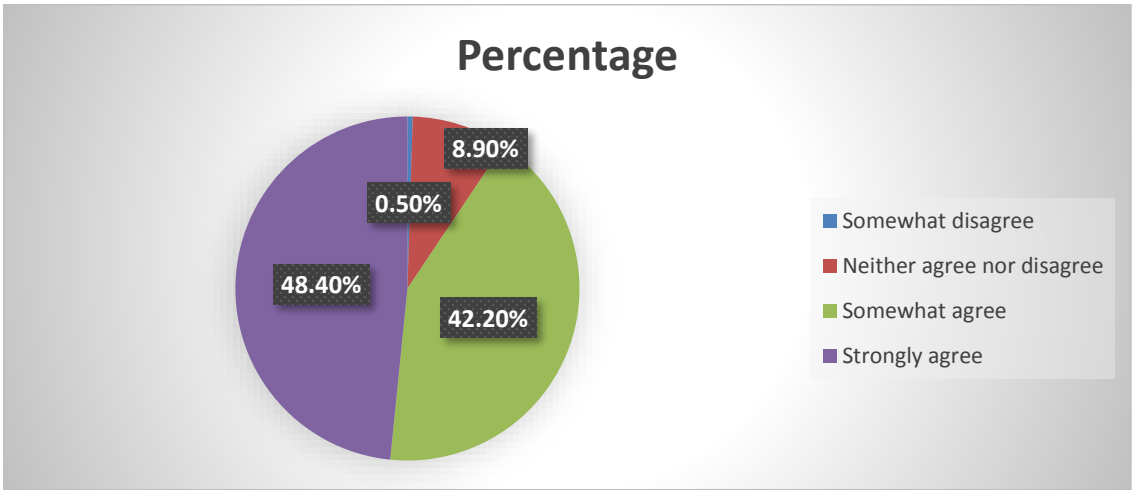


Figure 4.11: Percentage showing Patient's perception on the accessibility of the information anytime and anywhere

The Above Figure is showing the **Percentage showing Patient's perception on the accessibility of the information anytime and anywhere**. From the Figure 4.11, it is inferred 48.4% of the patients **strongly agree** to the question that **With the help of technologies, patients can access to my information anytime and anywhere whenever it is needed**, 42.2% of the patients **somewhat Agree**, 8.9% of the patients have **neutral** opinion, 0.5% of the patients **somewhat disagree** and none of the patients strongly disagree.

PEOU4: I feel wireless technologies are flexible to interact with.

Flexible_to_interact		No. of Patients	Percentage
	Strongly disagree	2	1.0%
	Somewhat disagree	8	4.2%
	Neither agree nor disagree	24	12.5%
	Somewhat agree	77	40.1%
	Strongly agree	80	41.7%
	Total	191	99.5%

Table 4.14: Patient's perception on the wireless technologies are flexible to interact with

From the table 4.14, it is inferred that out of 192 patients 81 of the patients **strongly agree** to the question that **wireless technologies are flexible to interact with**, 76 of the patients **somewhat**

Agree, 24 of the patients have **neutral** opinion, 8 of the patients **somewhat disagree** and 2 of the patients **strongly disagree**.

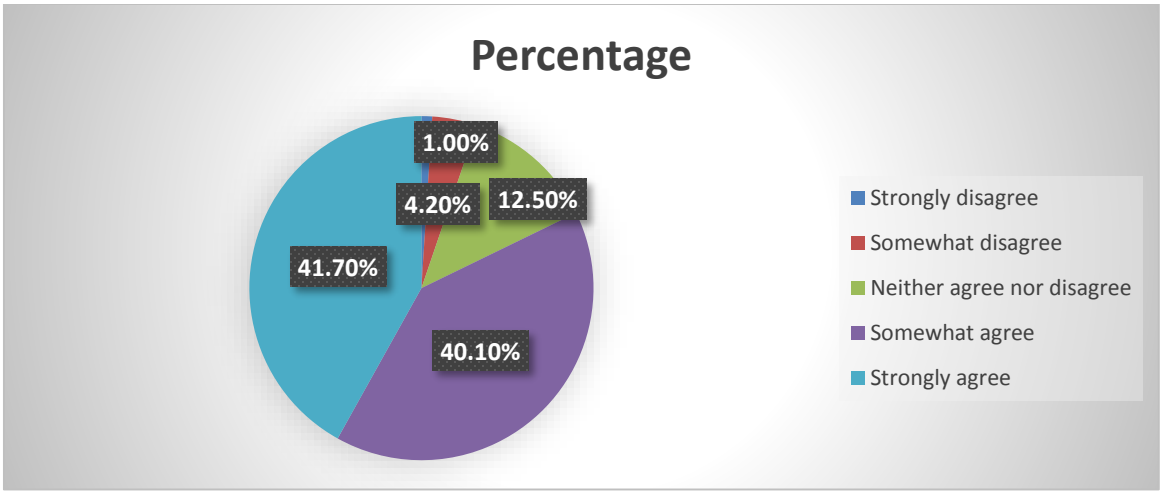


Figure 4.12: Percentage showing Patient's perception on the wireless technologies are flexible to interact with

The Above Figure is showing the **Percentage showing Patient's perception on the wireless technologies are flexible to interact with**. From the Figure 4.12, it is inferred 42.2% of the patients **strongly agree** to the question that **Patients feel wireless technologies are flexible to interact with.**, 39.6% of the patients **somewhat Agree**, 12.5% of the patients have **neutral** opinion, 4.2% of the patients **somewhat disagree**, 1% of the patients strongly disagree.

FACTOR 3: Behavioural intension (BI1-BI2)

Behavioural intension	**t**	**df**	**Sig. (2-tailed)**
Reliability	17.310	190	.000
Intention	20.912	190	.000

Table 4.15: One sample T-test for behaviour intention

The output produced by SPSS for the sample is shown in Table **[4.15]**. The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

BI1: I feel wireless technologies are reliable.

Reliability		No. of Patients	Percentage
	Strongly disagree	3	1.6%
	Somewhat disagree	3	1.6%
	Neither agree nor disagree	34	17.7%
	Somewhat agree	99	51.6%
	Strongly agree	52	27.1%
	Total	191	99.5%

Table 4.16: Patient's perception on reliability of wireless technologies

From the table 4.16, it is inferred that out of 192 patients 52 of the patients **strongly agree** to the question that **wireless technologies are reliable**, 99 of the patients **somewhat Agree**, 34 of the patients have **neutral** opinion, 3 of the patients **somewhat disagree** and 3 of the patients **strongly disagree**.

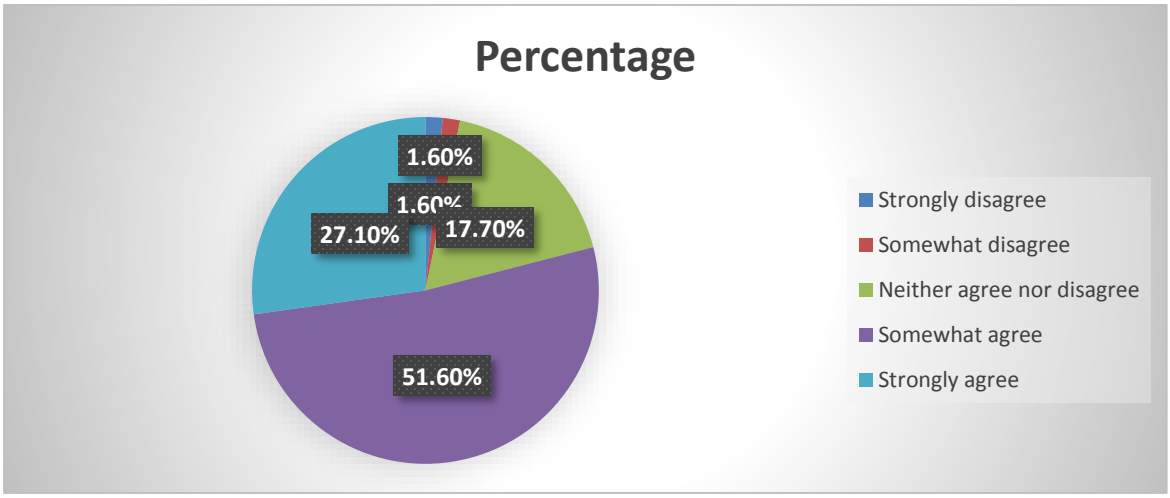


Figure 4.13: Percentage showing Patient's perception on the wireless technologies are reliable

The Above Figure is showing the **Percentage showing Patient's perception on the wireless technologies are reliable**. From the Figure 4.13, it is inferred 27.1% of the patients **strongly agree** to the question that **Patients feel wireless technologies are reliable.**, 51.6% of the patients **somewhat**

Agree, 17.7% of the patients have **neutral** opinion, 1.6% of the patients **somewhat disagree** and 1.6% of the patients strongly disagree.

BI2: I intend to use technology to maintain my health (such as PHR, fitbit etc.).

Intention		No. of Patients	Percentage
	Strongly disagree	1	.5%
	Somewhat disagree	4	2.1%
	Neither agree nor disagree	26	13.5%
	Somewhat agree	87	45.3%
	Strongly agree	73	38.0%
	Total	191	99.5%

Table 4.17: Patient's perception on intend to use technologies to maintain health

From the table 4.17, it is inferred that out of 192 patients 74 of the patients **strongly agree** to the question that **patient intend to use technologies to maintain health**, 86 of the patients **somewhat Agree**, 26 of the patients have **neutral** opinion, 4 of the patients **somewhat disagree** and 1 of the patients **strongly disagree**.

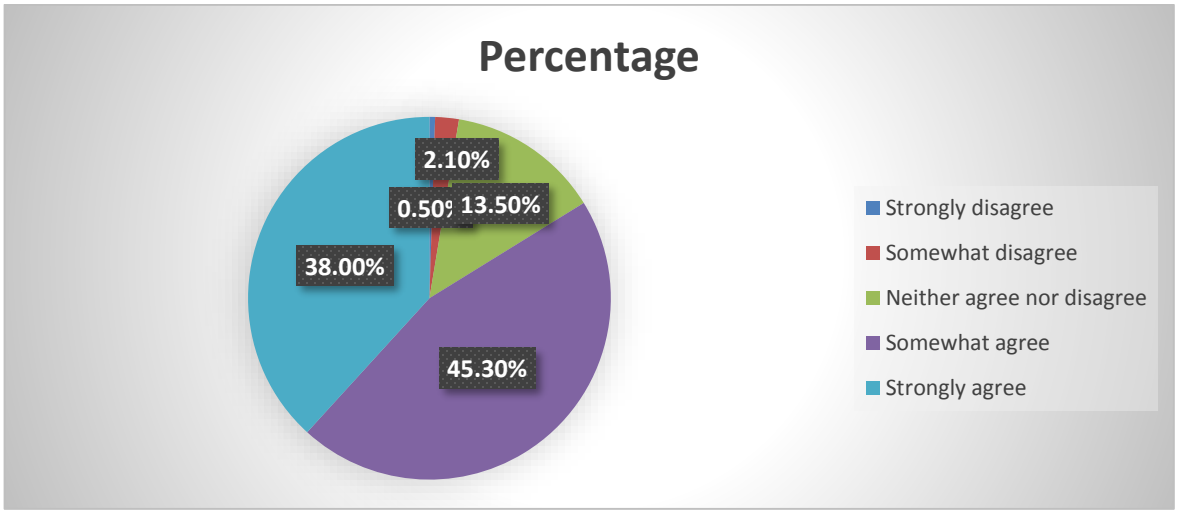


Figure 4.14: Percentage showing Patient's perception on intend to use technologies to maintain health

The Above Figure is showing the **Percentage showing Patient's perception intend to use technologies to maintain health**. From the Figure 4.14, it is inferred 38.5% of the patients **strongly agree** to the question that **Patients intend to use technologies to maintain health.**, 44.8% of the

patients **somewhat Agree**, 13.5% of the patients have **neutral** opinion, 2.1% of the patients **somewhat disagree** and 0.5% of the patients strongly disagree.

FACTOR 4: Facilitating Conditions (FC1-FC2)

Facilitating Conditions	t	df	Sig. (2-tailed)
Has Enough resources to use Health Apps	21.435	190	.000
Social Influence	21.394	186	.000

Table 4.18: One sample T-test for Facilitating Conditions

The output produced by SPSS for the sample is shown in Table **[4.18]**. The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

FC1: I have the resources necessary to use the Healthcare Apps and Technologies.

Has_enough_resources		No. of Patients	Percentage
	Strongly disagree	2	1.0%
	Somewhat disagree	1	.5%
	Neither agree nor disagree	26	13.5%
	Somewhat agree	93	48.4%
	Strongly agree	69	35.9%
	Total	191	99.5%

Table 4.19: Patient's perception on enough resources to use healthcare apps

From the table 4.19, it is inferred that out of 192 patients 68 of the patients **strongly agree** to the question that **patient has enough resouces to use healthcare apps**, 94 of the patients **somewhat Agree**, 26 of the patients have **neutral** opinion, 1 of the patients **somewhat disagree** and 2 of the patients **strongly disagree**.

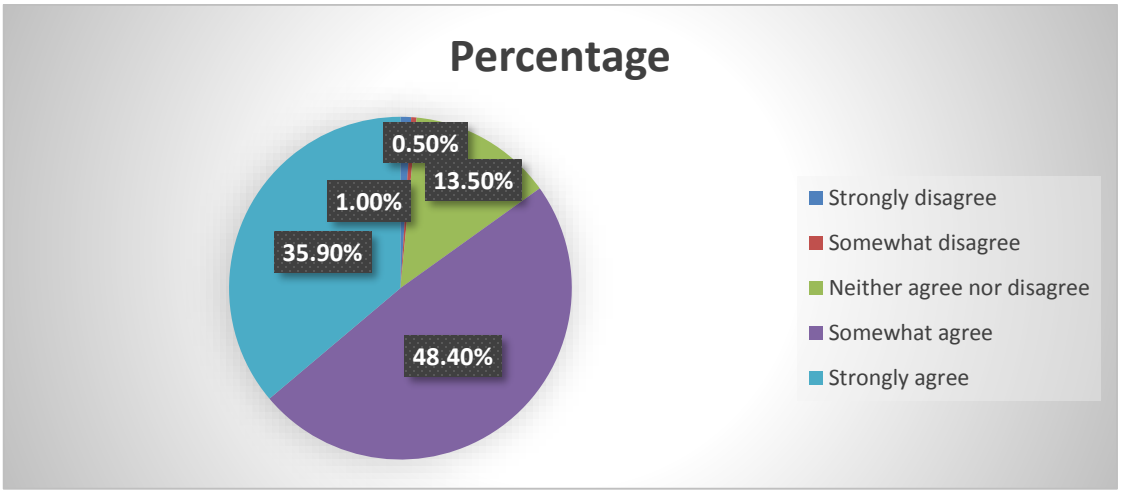


Figure 4.15: Percentage showing Patient's perception on enough resouces to use healthcare apps

The Above Figure is showing the **Percentage showing Patient's perception on enough resouces to use healthcare apps**. From the Figure 4.15, it is inferred 35.4% of the patients **strongly agree** to the question that **Patients intend to use technologies to maintain health.**, 49% of the patients **somewhat Agree**, 13.5% of the patients have **neutral** opinion, 0.5% of the patients **somewhat disagree** and 1% of the patients strongly disagree.

FC2: People who are important to me think I should use the Healthcare Apps and Technologies.

Social_influence		No. of Patients	Percentage
	Strongly agree	1	.5%
	Somewhat disagree	2	1.0%
	Neither agree nor disagree	27	14.1%
	Somewhat agree	90	46.9%
	Strongly agree	67	34.9%
	Total	187	97.4%

Table 4.20: Patient's perception on Social influence

From the table 4.20, it is inferred that out of 192 patients 67 of the patients **strongly agree** to the question on the **Social influence**, 90 of the patients **somewhat Agree**, 27 of the patients have **neutral** opinion, 2 of the patients **somewhat disagree** and 1 of the patients **strongly disagree**.

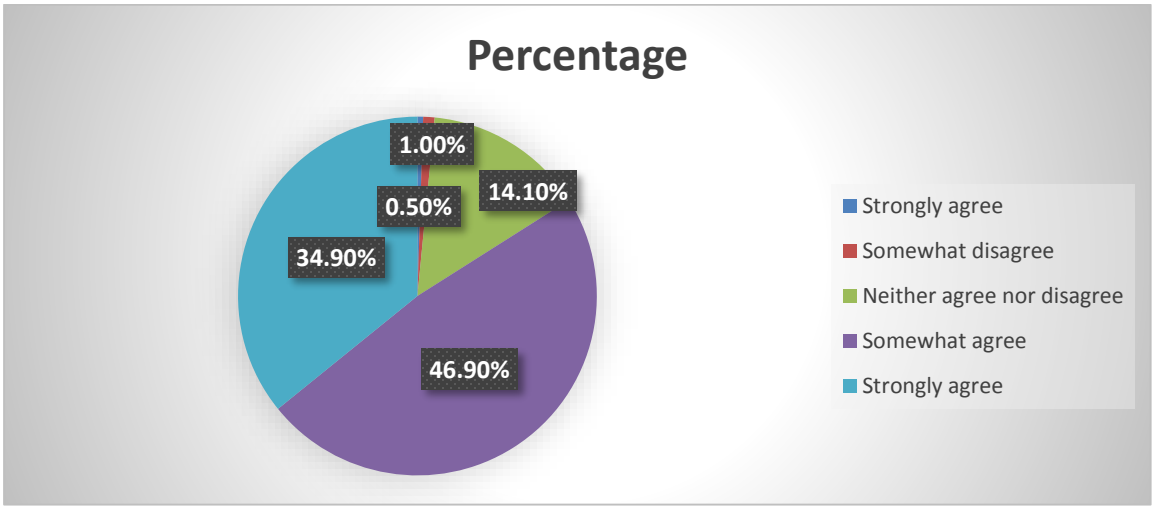


Figure 4.16: Percentage showing Patient's social influence

The Above Figure is showing the **Percentage showing Patient's social influence**. From the Figure 4.16, it is inferred 34.9% of the patients **strongly agree** to the question on **social influence**, 46.9% of the patients **somewhat Agree**, 14.1% of the patients have **neutral** opinion, 1% of the patients **somewhat disagree**, 0.5% of the patients strongly disagree.

OVERALL ACCEPTANCE

OVERALL ACCEPTANCE	t	df	Sig. (2-tailed)
Prefer using electronic media	106.117	191	.000
Enhance accessibility and communication	100.587	191	.000
Intention can affect acceptance	77.846	191	.000
Privacy is maintained	72.606	191	.000

Table 4.21: One sample T-test for Overall Acceptance

The output produced by SPSS for the sample is shown in Table **[4.21]**. The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value

for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

ACC1: I prefer electronic media rather than paper based system in availing the health care facilities.

Preference		No. of Patients	Percentage
	Somewhat disagree	1	.5%
	Neither agree nor disagree	12	6.3%
	Somewhat agree	67	34.9%
	Strongly agree	111	57.8%
	Total	191	99.5%

Table 4.22: Patient's perception on using electronic media

From the table 4.22, it is inferred that out of 192 patients 111 of the patients **strongly agree** to the question on **perception on using electronic media**, 67 of the patients **somewhat Agree**, 12 of the patients have **neutral** opinion, 1 of the patients **somewhat disagree** and none of the patients **strongly disagree**.

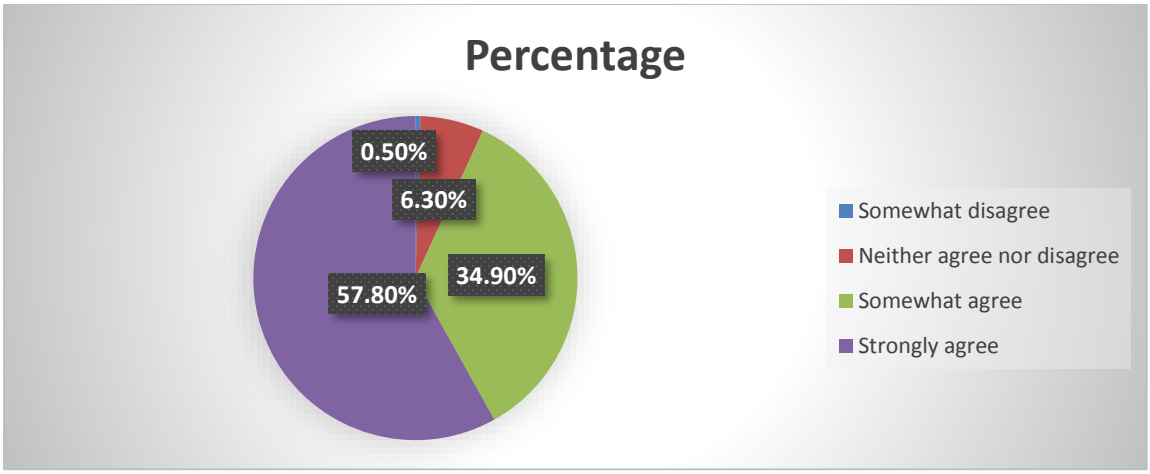


Figure 4.17: Percentage showing Patient's preference of using electronic media

The Above Figure is showing the **Percentage showing Patient's preference of using electronic media**. From the Figure 4.17, it is inferred 57.8% of the patients **strongly agree** to the question on

preference of using electronic media, 34.9% of the patients **somewhat Agree**, 6.3% of the patients have **neutral** opinion, 0.5% of the patients **somewhat disagree**, none of the patients strongly disagree.

ACC2: I believe smart Hospitals can enhance my accessibility and communication with healthcare providers.

Enhance_accessibility		No. of Patients	Percentage
	Strongly disagree	1	.5%
	Somewhat disagree	1	.5%
	Neither agree nor disagree	11	5.7%
	Somewhat agree	74	38.5%
	Strongly agree	104	54.2%
	Total	191	99.5%

Table 4.23: Patient's perception on enhance accessibility and communication

From the table 4.23, it is inferred that out of 192 patients 105 of the patients **strongly agree** to the question on **perception on enhance accessibility and communication**, 73 of the patients **somewhat Agree**, 11 of the patients have **neutral** opinion, 1 of the patients **somewhat disagree** and 1 of the patients **strongly disagree**.

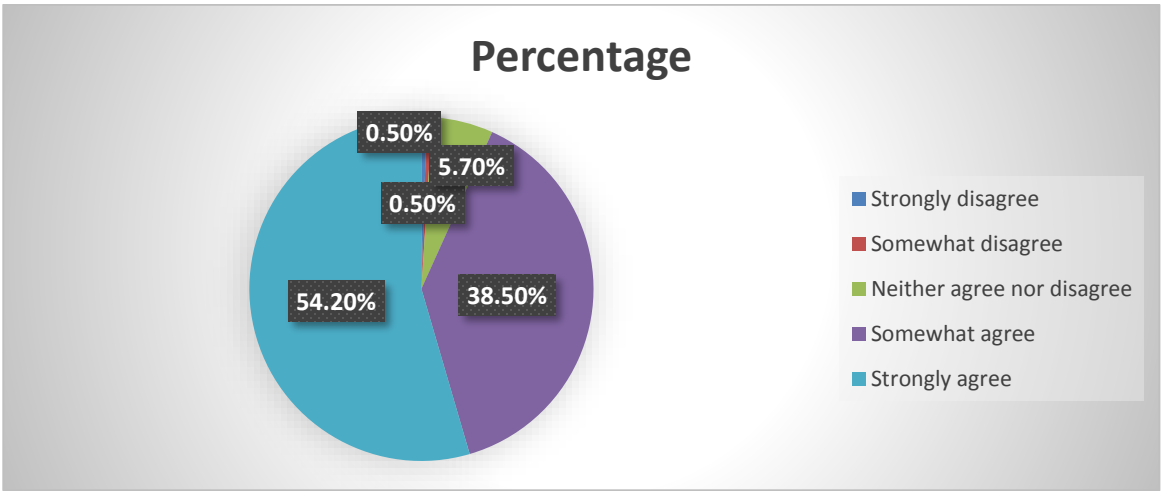


Figure 4.18: Percentage showing Patient's perception on enhance accessibility and communication

The Above Figure is showing the **Percentage showing Patient's perception on enhance accessibility and communication**. From the Figure 4.18, it is inferred 54.7% of the patients **strongly agree** to the question on **enhance accessibility and communication**, 38% of the patients **somewhat Agree**, 5.7% of the patients have **neutral** opinion, 0.5% of the patients **somewhat disagree**, 0.5% of the patients strongly disagree.

ACC3: My intention of using wireless technologies can affect my acceptance towards smart hospitals.

Intention_can_affect_acceptance		No. of Patients	Percentage
	Somewhat disagree	1	.5%
	Neither agree nor disagree	23	12.0%
	Somewhat agree	81	42.2%
	Strongly agree	83	43.2%
	Total	188	97.9%

Table 4.24: Patient's perception on intention can affect acceptance

From the table 4.24, it is inferred that out of 192 patients 83 of the patients **strongly agree** to the question on **perception on intention can affect acceptance**, 81 of the patients **somewhat Agree**, 23 of the patients have **neutral** opinion, 1 of the patients **somewhat disagree** and none of the patients **strongly disagree**.

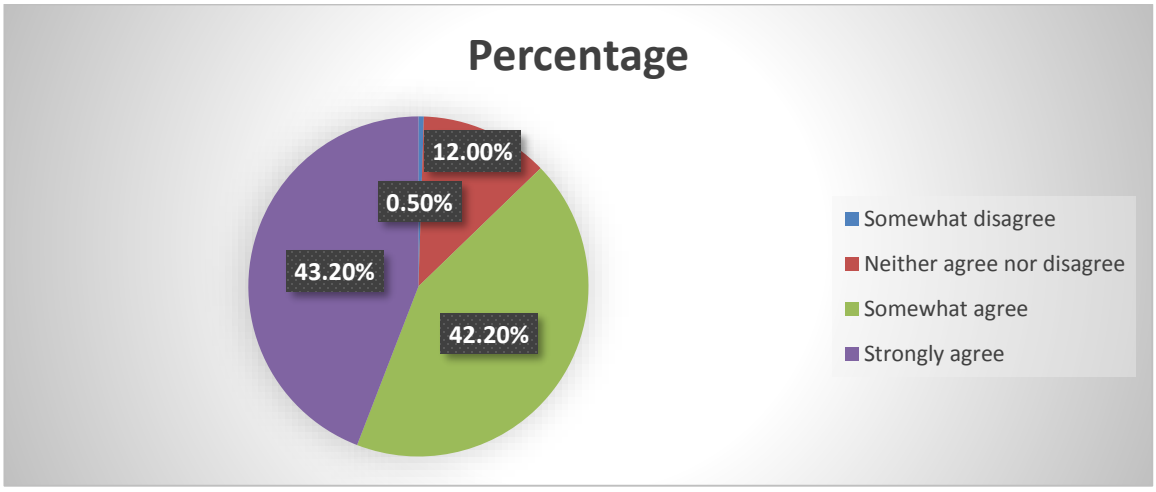


Figure 4.19: Percentage showing Patient's perception on intention can affect acceptance

The Above Figure is showing the **Percentage showing Patient's perception on intention can affect acceptance**. From the Figure 4.19, it is inferred 43.2% of the patients **strongly agree** to the question on **intention can affect acceptance**, 42.2% of the patients **somewhat Agree**, 12% of the patients have **neutral** opinion, 0.5% of the patients **somewhat disagree**, none of the patients strongly disagree.

ACC4: I believe the privacy of my health records is maintained better in the Smart hospitals.

Privacy		No. of Patients	Percentage
	Somewhat disagree	5	2.6%
	Neither agree nor disagree	23	12.0%
	Somewhat agree	64	33.3%
	Strongly agree	96	50.0%
	Total	188	97.9%

Table 4.25: Patient's perception on privacy is maintained

From the table 4.25, it is inferred that out of 192 patients 95 of the patients **strongly agree** to the question on **perception on privacy is maintained**, 65 of the patients **somewhat Agree**, 23 of the patients have **neutral** opinion, 5 of the patients **somewhat disagree** and none of the patients **strongly disagree**.

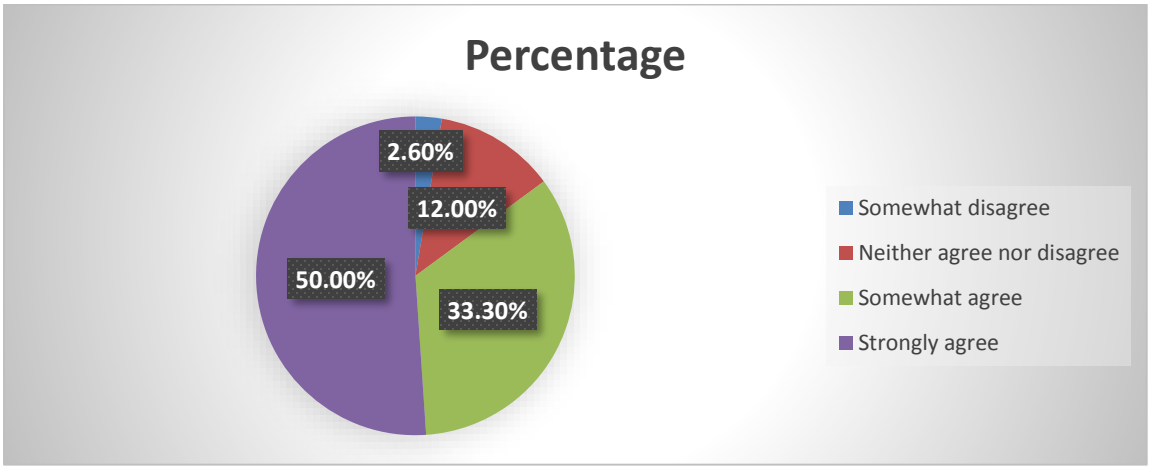


Figure 4.20: Percentage showing Patient's perception on privacy is maintained

The Above Figure is showing the **Percentage showing Patient's perception on privacy is maintained e**. From the Figure 4.20, it is inferred 49.5% of the patients **strongly agree** to the question on **privacy is maintained**, 33.9% of the patients **somewhat Agree**, 12% of the patients have **neutral** opinion, 2.6% of the patients **somewhat disagree** and none of the patients strongly disagree.

Data Analysis for Healthcare providers

Sociodemographic Characteristics	No. of Healthcare providers	Percentage
GENDER		
Male	111	57.8%
Female	81	42.2%
Total	192	100%
AGE		
20-30	67	34.9%
30-40	105	54.7%
40-50	20	10.4%
SPECIALTY (Doctors)		
Urologist	1	3.12%
Orthopedics	6	18.75%
Cardiologist	4	12.5%
Neurosurgeon	2	6.25%
Gynecologist	5	15.62
General Medicine	4	12.5%
Biochemistry (Associate Consultant)	1	3.12%
Microbiologist	4	12.5%
Pediatrician	4	12.5%
Neonatologist	1	3.12%

Table 4.26: Healthcare provider's Sociodemographic details

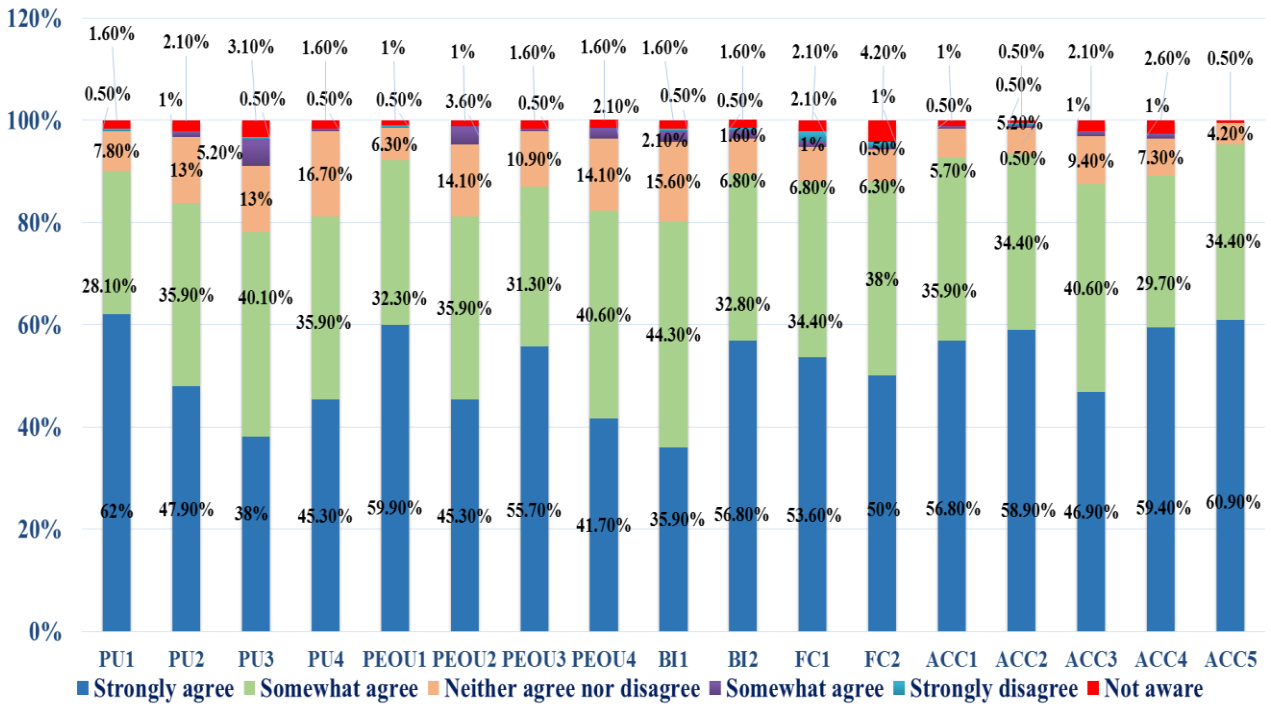


Figure 4.21: Healthcare provider's responses

Figure 4.21 is showing the percentage of healthcare provider's results on the various Parameters i.e. Perceived Usefulness, Perceived ease of use, Behavioural intention, Facilitating conditions and total acceptance. It is inferred that the maximum resposes from the patients include strongly agree and somewhat agree on each questions.

CONSTRUCTS	VARIABLE ITEMS	CRONBACH'S ALPHA
Perceived Usefulness (PU)	PU1 PU2 PU3 PU4	0.81
Perceived Ease of use (PEOU)	PEOU1 PEOU2 PEOU3 PEOU4	0.82
Behavioral Intention (BI)	BI1 BI2	0.92

Facilitating Conditions (FC)	FC1 FC2	0.79
Acceptance (ACC)	ACC1 ACC2 ACC3 ACC4 ACC5	0.85

Table 4.27: Reliability of Constructs

CONSTRUCTS	VARIABLE ITEMS	Mean	Std. dev	T-Value	df	Sig (2-tailed)
Perceived Usefulness (PU)	PU1 PU2 PU3 PU4	5.23	0.9747	75.189	191	.000
Perceived Ease of use (PEOU)	PEOU1 PEOU2 PEOU3 PEOU4	5.30	0.8911	82.911	191	.000
Behavioral Intention (BI)	BI1 BI2	5.23	0.9326	77.847	191	.000
Facilitating Conditions (FC)	FC1 FC2	5.26	1.0895	67.129	191	.000
Acceptance (ACC)	ACC1 ACC2 ACC3 ACC4 ACC5	5.43	0.8206	93.928	191	.000

Table 4.28:One-sample T-test value for healthcare providers

The output produced by SPSS for the sample is shown in Table **[4.28]**. The reliability of constructs of various factors are checked with the help on Cronbach's alpha. The Cronbach's alpha for each factor is above 0.7 that means the questions asked in each factors are reliable. The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value

for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

Basic understanding of Smart Hospitals

Understanding of the basic functioning		**No. of providers**	**Percentage**
	Not aware	4	2.1%
	Somewhat disagree	4	2.1%
	Neither agree nor disagree	27	14.1%
	Somewhat agree	79	41.1%
	Strongly agree	78	40.6%
	Total	192	100.0%

Table 4.29: Healthcare provider's Basic understanding of Smart Hospitals

From the table 4.29, it is inferred that out of 192 **healthcare providers** 78 of the healthcare providers **strongly agree** to the question that they have the basic understanding of the functionality of a Smart hospital , 79 of the healthcare providers **somewhat Agree**, 27 of the healthcare providers have **neutral** opinion, 4 of the healthcare providers **somewhat disagree** and none of the healthcare providers **strongly disagree** and 4 of the healthcare providers are **not aware**.

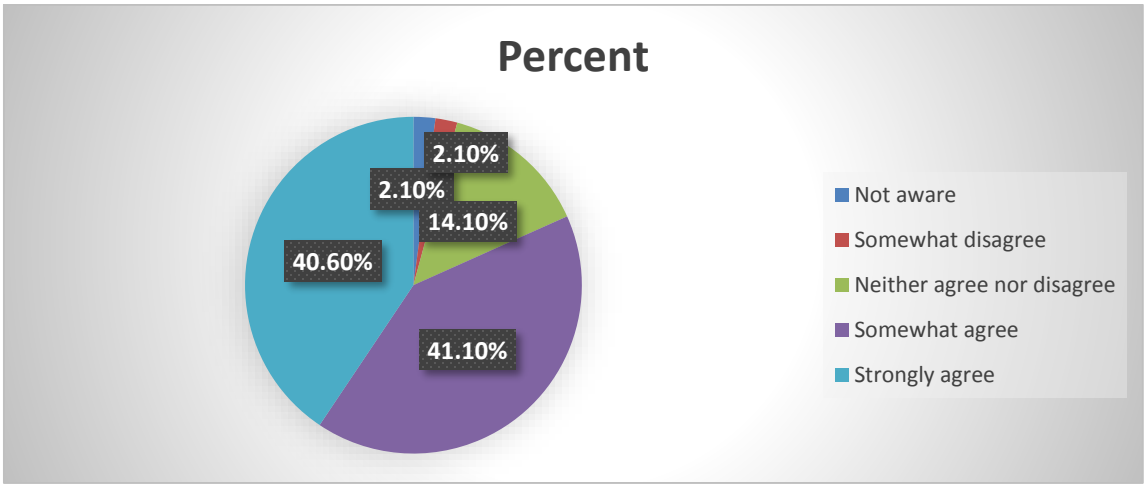


Figure 4.22: Percentage showing Healthcare provider's Basic understanding of Smart Hospitals

The Above Figure is showing the percentage of Healthcare provider's Basic understanding of Smart Hospitals. From the Figure 4.22, it is inferred 40.6% of the Healthcare providers **strongly agree** to the question that they have the basic understanding of the functionality of a Smart hospital , 41.10% of the Healthcare providers **somewhat Agree**, 14.1% of the Healthcare providers have **neutral** opinion, 2.1% of the Healthcare providers **somewhat disagree** and none of the Healthcare providers **strongly disagree** and 2.1% of the Healthcare providers are **not aware**.

FACTOR 1: PERCEIVED USEFULNESS (PU1-PU4)

PERCEIVED USEFULNESS	t	df	Sig. (2-tailed)
Efficiency	85.500	191	.000
Quality of patient care	75.388	191	.000
Reduction of waiting time	61.488	191	.000
Greater control over the work	78.382	191	.000

Table 4.30: One sample T-test for Perceived Usefulness for healthcare providers

The output produced by SPSS for the sample is shown in Table **[4.30]**. The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

PU1: I believe that the technology (EMR, RFIDs, bedside sensors, Smart Ambulance, eMAR, etc.) will help the hospitals beefficient.

Efficient		No. of Providers	Percentage
	Not aware	3	1.6%
	Strongly disgree	1	.5%
	Neither agree nor disagree	15	7.8%
	Somewhat agree	54	28.1%
	Strongly agree	119	62.0%
	Total	192	100.0%

Table 4.31: Healthcare provider's perception on the efficiency of the technology

From the table 4.31, it is inferred that out of 192 healthcare providers 119 of the healthcare providers **strongly agree** to the question that **technology (EMR, RFIDs, bedside sensors, Smart Ambulance, eMAR, etc.) will help the hospitals beefficient**, 54 of the healthcare providers **somewhat Agree**, 15 of the healthcare providers have **neutral** opinion, none of the healthcare providers **somewhat disagree** and 1 of the healthcare providers **strongly disagree** and 3 of the healthcare providers are **not aware**.

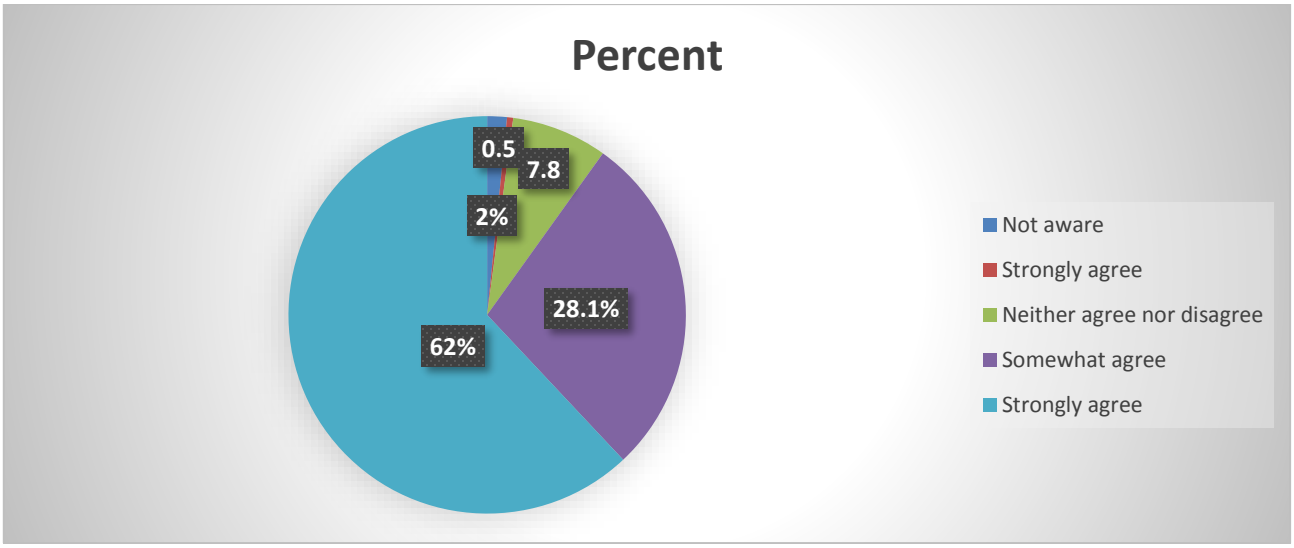


Figure 4.23: Percentage showing Healthcare provider's perception on the efficiency of the technology

The Above Figure is showing the percentage of Healthcare provider's Basic understanding of Smart Hospitals. From the Figure 4.23, it is inferred 62% of the Healthcare providers **strongly agree** to the question that **technology (EMR, RFIDs, bedside sensors, Smart Ambulance, eMAR, etc.) will help the hospitals beefficient**, 28.10% of the Healthcare providers **somewhat Agree**, 7.8% of the Healthcare providers have **neutral** opinion, none of the Healthcare providers **somewhat disagree** and 0.5% of the Healthcare providers **strongly disagree** and 2% of the Healthcare providers are **not aware**.

PU2: I believe that the technologies (wireless technologies) will help to ensure the quality of patient care

QUALITY OF PATIENT CARE		No. of Providers	Percentage
	Not aware	4	2.1%
	Somewhat disagree	2	1.0%
	Neither agree nor disagree	25	13.0%
	Somewhat agree	69	35.9%
	Strongly agree	92	47.9%
	Total	192	100.0

Table 4.32: Healthcare provider's perception on the quality of patient care

From the table 4.32, it is inferred that out of 192 healthcare providers 92 of the healthcare providers **strongly agree** to the question that **technologies ensure quality of patient care**, 69 of the healthcare providers **somewhat Agree**, 25 of the healthcare providers have **neutral** opinion, 2 of the healthcare providers **somewhat disagree** and none of the healthcare providers **strongly disagree** and 4 of the healthcare providers are **not aware**.

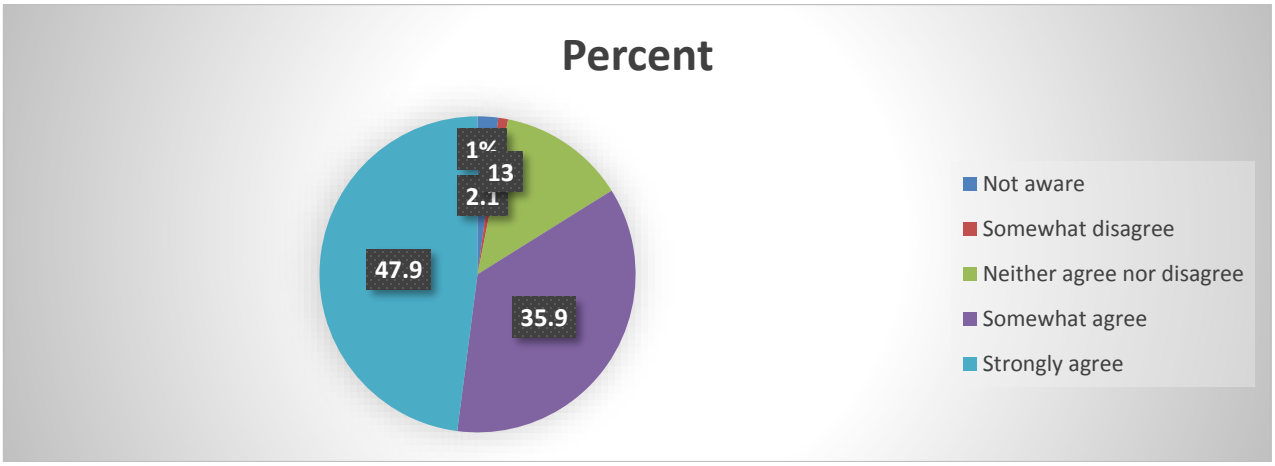


Figure 4.24: Percentage showing Healthcare provider's perception on quality of patient care

The Above Figure is showing the percentage of **Healthcare provider's perception on qualityof patient care**. From the Figure 4.24, it is inferred 47.9% of the Healthcare providers **strongly agree** to the question that **technologies ensure quality of patient care**, 35.9% of the Healthcare providers **somewhat Agree**, 13% of the Healthcare providers have **neutral** opinion,1% of the Healthcare

providers **somewhat disagree** and none of the Healthcare providers **strongly disagree** and 2.1% of the Healthcare providers are **not aware**.

PU3: I think waiting time for the patient is reduced in the hospitals using latest technologies.

REDUCTION OF WAITING TIME		No. of Providers	Percentage
	Not aware	6	3.1
	Strongly disagree	1	.5
	Somewhat disagree	10	5.2
	Neither agree nor disagree	25	13.0
	Somewhat agree	77	40.1
	Strongly agree	73	38.0
	Total	192	100.0

Table 4.33: Healthcare provider's perception on the reduction of waiting time for patients

From the table 4.33, it is inferred that out of 192 healthcare providers 73 of the healthcare providers **strongly agree** to the question that **technologies ensure reduction of waiting time for patients**, 77 of the healthcare providers **somewhat Agree**, 25 of the healthcare providers have **neutral** opinion, 10 of the healthcare providers **somewhat disagree** and 1 of the healthcare providers **strongly disagree** and 6 of the healthcare providers are **not aware**.

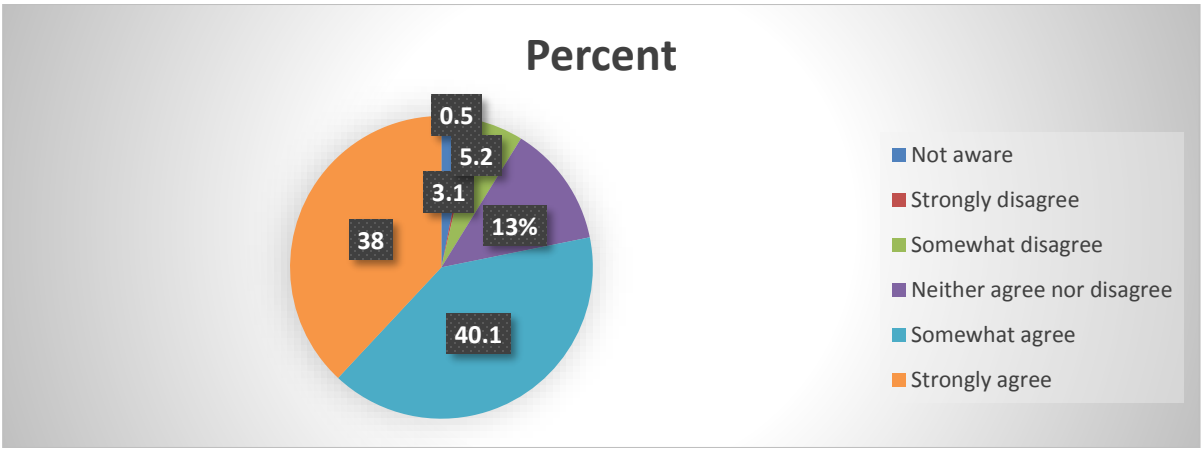


Figure 4.25: Percentage showing Healthcare provider's perception on reduction of waiting time for patients

The Above Figure is showing the percentage of **Healthcare provider's perception on reduction of waiting time for patients**. From the Figure 4.25, it is inferred 38% of the Healthcare providers **strongly agree** to the question that **technologies ensure reduction of waiting time for patients**, 40.1% of the Healthcare providers **somewhat Agree**, 13% of the Healthcare providers have **neutral** opinion, 5.2% of the Healthcare providers **somewhat disagree** and 0.5%of the Healthcare providers **strongly disagree** and 3.1% of the Healthcare providers are **not aware**.

PU4: I believe using the technologies will give me a greater control over my work.

GREATER CONTROL OVER WORK		No. of Providers	Percentage
	Not aware	3	1.6
	Somewhat disagree	1	.5
	Neither agree nor disagree	32	16.7
	Somewhat agree	69	35.9
	Strongly agree	87	45.3
	Total	192	100.0

Table 4.34: Healthcare provider's perception on the greater control over work

From the table 4.34, it is inferred that out of 192 healthcare providers 87 of the healthcare providers **strongly agree** to the question that **technologies ensure greater control over work**, 69 of the healthcare providers **somewhat Agree**, 32 of the healthcare providers have **neutral** opinion, 1 of the healthcare providers **somewhat disagree** and none of the healthcare providers **strongly disagree** and 3 of the healthcare providers are **not aware**.

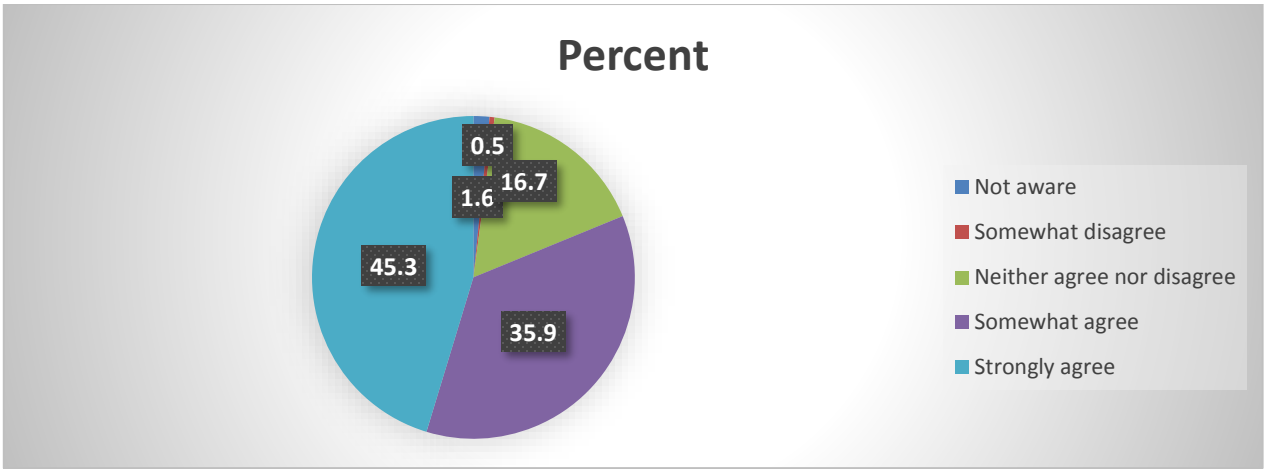


Figure 4.26: Percentage showing Healthcare provider's perception on greater control over work

The Above Figure is showing the percentage of **Healthcare provider's perception on greater control over work**. From the Figure 4.26, it is inferred 45.3% of the Healthcare providers **strongly agree** to the question that **technologies ensure greater control over work**, 35.9% of the Healthcare providers **somewhat Agree**, 16.7% of the Healthcare providers have **neutral** opinion, 0.5% of the Healthcare providers **somewhat disagree** and none of the Healthcare providers **strongly disagree** and 1.6% of the Healthcare providers are **not aware**.

FACTOR 2 – EASE OF USE

EASE OF USE	t	df	Sig. (2-tailed)
Make job easier to perform	94.258	191	.000
Can be learnt easily	77.147	191	.000
Accessibility	83.215	191	.000
Flexible to interact	77.027	191	.000

Table 4.35: One sample T-test for Perceived Ease of use for healthcare providers

The output produced by SPSS for the sample is shown in Table **[4.35]**. The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

PEOU1: Smart hospitals equipped with latest wireless technologies can make my job easier to perform.

MAKE JOB EASIER TO PERFORM		No. of Providers	Percentage
	Not aware	2	1.0
	Strongly disagree	1	.5
	Neither agree nor disagree	12	6.3
	Somewhat agree	62	32.3
	Strongly agree	115	59.9
	Total	192	100.0

Table 4.36: Healthcare provider's perception to make job easier to perform

From the table 4.36, it is inferred that out of 192 healthcare providers 115 of the healthcare providers **strongly agree** to the question that **technologies make job easier to perform**, 62 of the healthcare providers **somewhat Agree**, 12 of the healthcare providers have **neutral** opinion, none of the healthcare providers **somewhat disagree** and 1 of the healthcare providers **strongly disagree** and 2 of the healthcare providers are **not aware**.

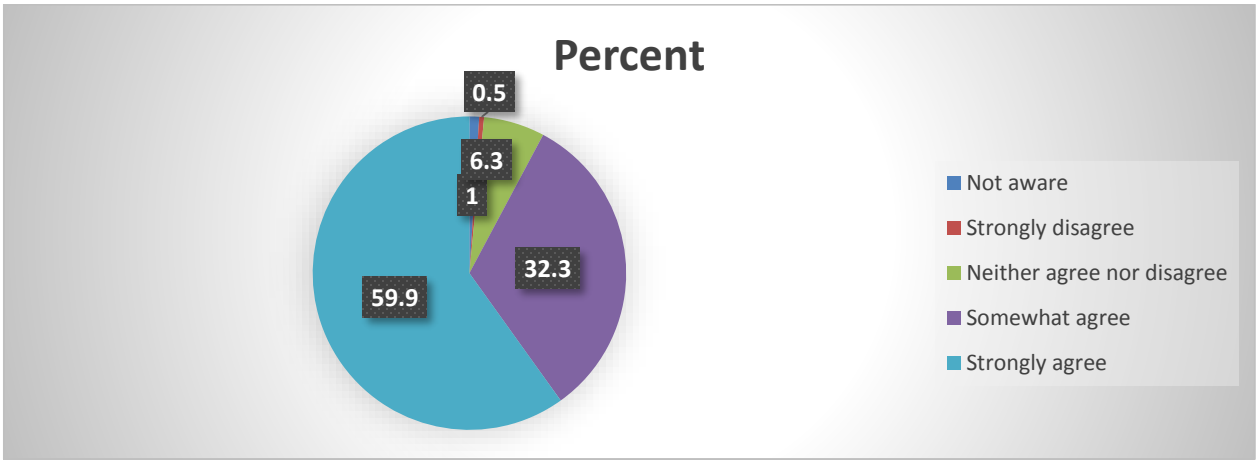


Figure 4.27: Percentage showing Healthcare provider's perception to make job easier to perform

The Above Figure is showing the percentage of **Healthcare provider's perception to make job easier to perform**. From the Figure 4.27, it is inferred 59.9% of the Healthcare providers **strongly agree** to the question that **technologies make job easier to perform**, 32.2% of the Healthcare providers **somewhat Agree**, 6.3% of the Healthcare providers have **neutral** opinion, none of the Healthcare providers **somewhat disagree** and 0.5% of the Healthcare providers **strongly disagree** and 1% of the Healthcare providers are **not aware**.

PEOU2: I think wireless technologies used in smart hospitals can be learnt easily.

CAN BE LEARNT EASILY		No. of Providers	Percentage
	Not aware	2	1.0
	Somewhat disagree	7	3.6
	Neither agree nor disagree	27	14.1
	Somewhat agree	69	35.9
	Strongly agree	87	45.3
	Total	192	100.0

Table 4.37: Healthcare provider's perception on technology easy to learn

From the table 4.37, it is inferred that out of 192 healthcare providers 87 of the healthcare providers **strongly agree** to the question that **technologies easy to learn**, 69 of the healthcare providers

somewhat Agree, 27 of the healthcare providers have **neutral** opinion, 7 of the healthcare providers **somewhat disagree** and none of the healthcare providers **strongly disagree** and 2 of the healthcare providers are **not aware**.

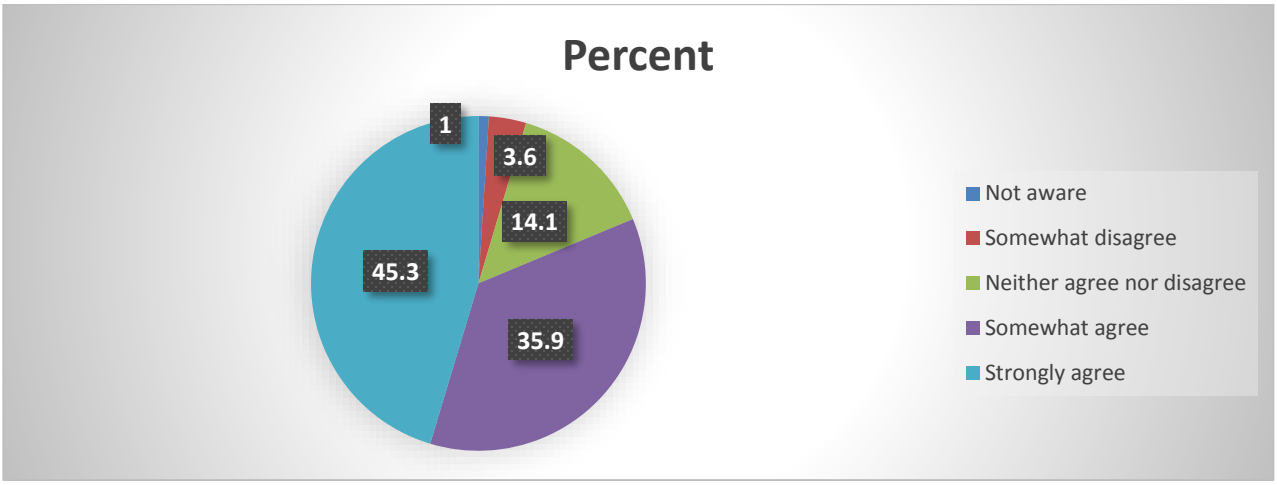


Figure 4.28: Percentage showing Healthcare provider's perception on technology easy to learn

The Above Figure is showing the percentage of **Healthcare provider's perception on technology easy to learn**. From the Figure 4.28, it is inferred 45.3% of the Healthcare providers **strongly agree** to the question that **technologiesare easy to learn**, 35.9% of the Healthcare providers **somewhat Agree**, 14.1% of the Healthcare providers have **neutral** opinion, 3.6% of the Healthcare providers **somewhat disagree** and none of the Healthcare providers **strongly disagree** and 1% of the Healthcare providers are **not aware**.

PEOU3: With the help of technologies, I can access to the patients information anytime and anywhere whenever it is needed.

ACCESSIBILITY		No. of Providers	Percentage
	Not aware	3	1.6
	Somewhat disagree	1	.5
	Neither agree nor disagree	21	10.9
	Somewhat agree	60	31.3
	Strongly agree	107	55.7
	Total	192	100.0

Table 4.38: Healthcare provider's perception on Accessibility through technology

From the table 4.38, it is inferred that out of 192 healthcare providers 107 of the healthcare providers **strongly agree** to the question **on Accessibility through technology**, 60 of the healthcare providers **somewhat Agree**, 21 of the healthcare providers have **neutral** opinion, 1 of the healthcare providers **somewhat disagree** and none of the healthcare providers **strongly disagree** and 3 of the healthcare providers are **not aware**.

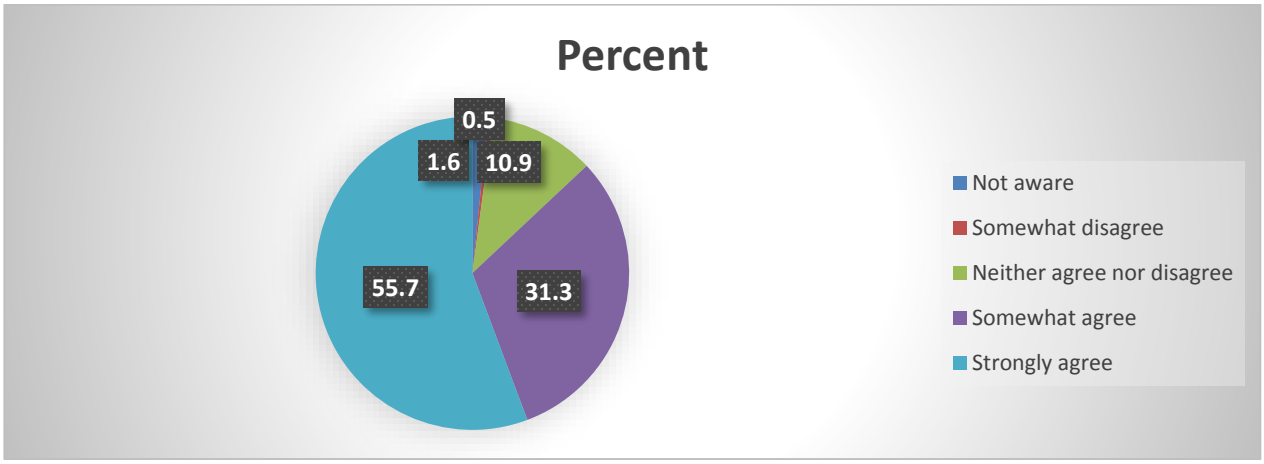


Figure 4.29: Percentage showing Healthcare provider's perception on Accessibility through technology

The Above Figure is showing the percentage of **Healthcare provider's perception on on Accessibility through technology**. From the Figure 4.29, it is inferred 55.7% of the Healthcare providers **strongly agree** to the question **on Accessibility through technology**, 31.3% of the Healthcare providers **somewhat Agree**, 10.9% of the Healthcare providers have **neutral** opinion, 0.5% of the Healthcare providers **somewhat disagree** and none of the Healthcare providers **strongly disagree** and 1.6% of the Healthcare providers are **not aware**.

PEOU4: I feel wireless technologies are flexible to interact with.

FLEXIBLE TO INTERACT		No. of providers	Percentage
	Not aware	3	1.6
	Somewhat disagree	4	2.1
	Neither agree nor disagree	27	14.1
	Somewhat agree	78	40.6
	Strongly agree	80	41.7
	Total	192	100.0

Table 4.39: Healthcare provider's perception on technology are flexible to interact with

From the table 4.39, it is inferred that out of 192 healthcare providers 80 of the healthcare providers **strongly agree** to the question **technology are flexible to interact with**, 78 of the healthcare providers **somewhat Agree**, 27 of the healthcare providers have **neutral** opinion, 4 of the healthcare providers **somewhat disagree** and none of the healthcare providers **strongly disagree** and 3 of the healthcare providers are **not aware**.

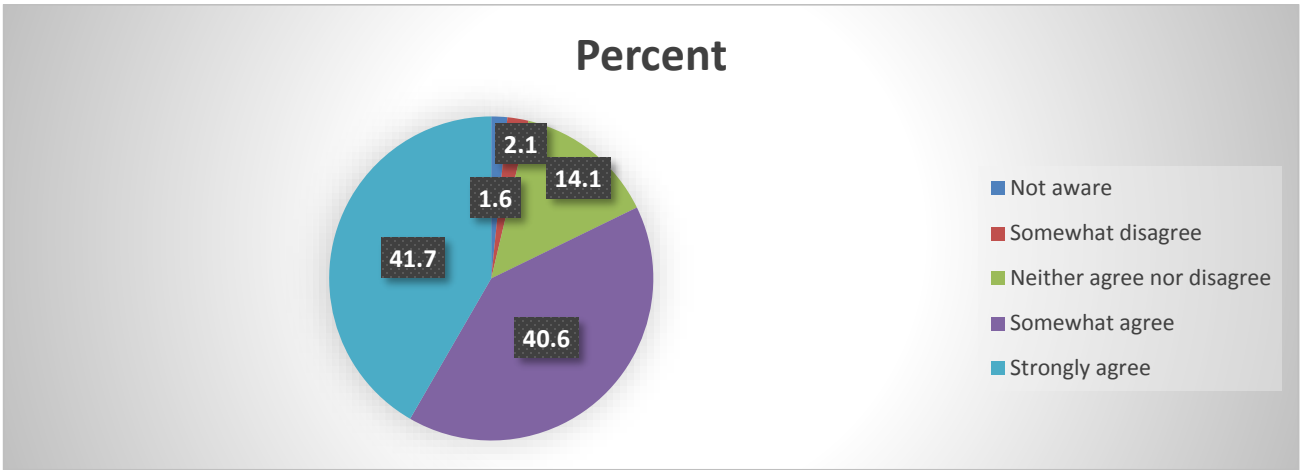


Figure 4.30: Percentage showing Healthcare provider's perception on technology are flexible to interact with

The Above Figure is showing the percentage of **Healthcare provider's perception on technology are flexible to interact with**. From the Figure 4.30, it is inferred 41.7% of the Healthcare providers **strongly agree** to the question **on technology are flexible to interact with**, 40.6% of the Healthcare providers **somewhat Agree**, 14.1% of the Healthcare providers have **neutral** opinion, 2.1% of the Healthcare providers **somewhat disagree** and none of the Healthcare providers **strongly disagree** and 1.6% of the Healthcare providers are **not aware**.

FACTOR 3 – Behavioral Intention

Behavioral Intention	t	df	Sig. (2-tailed)
Reliability	74.515	191	.000
Intention	81.180	191	.000

Table 4.40: One sample T-test for Behavioural intention for healthcare providers

The output produced by SPSS for the sample is shown in Table **[4.40]**. The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

BU1: I feel wireless technologies are reliable.

RELIABILITY		No. of providers	Percentage
	Not aware	3	1.6
	Strongly disagree	1	.5
	Somewhat disagree	4	2.1
	Neither agree nor disagree	30	15.6
	Somewhat agree	85	44.3
	Strongly agree	69	35.9
	Total	192	100.0

Table 4.41: Healthcare provider's perception on technology are reliable

From the table 4.41, it is inferred that out of 192 healthcare providers 69 of the healthcare providers **strongly agree** to the question **technology are reliable**, 85 of the healthcare providers **somewhat Agree**, 30 of the healthcare providers have **neutral** opinion, 4 of the healthcare providers **somewhat disagree** and 1 of the healthcare providers **strongly disagree** and 3 of the healthcare providers are **not aware**.

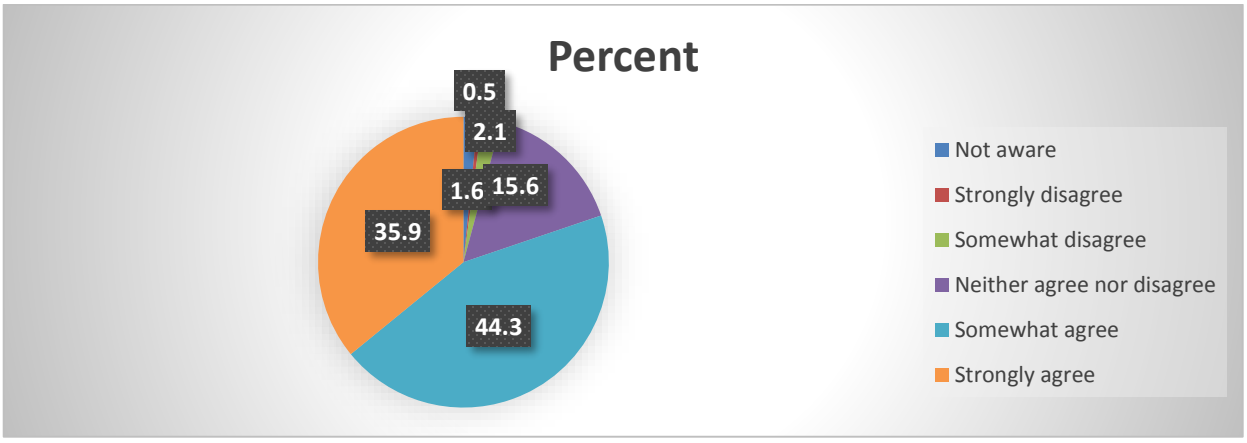


Figure 4.31: Percentage showing Healthcare provider's perception on technology are reliable

The Above Figure is showing the percentage of **Healthcare provider's perception on technology are reliable**. From the Figure 4.31, it is inferred 35.9% of the Healthcare providers **strongly agree** to

the question **on technology are reliable**, 44.3% of the Healthcare providers **somewhat Agree**, 15.6% of the Healthcare providers have **neutral** opinion, 2.1% of the Healthcare providers **somewhat disagree** and 0.5% of the Healthcare providers **strongly disagree** and 1.6% of the Healthcare providers are **not aware**.

BU2: I intend to use the technology to maintain my patient's health.

INTENTION		No. of providers	Percentage
	Not aware	3	1.6
	Strongly disagree	1	.5
	Somewhat disagree	3	1.6
	Neither agree nor disagree	13	6.8
	Somewhat agree	63	32.8
	Strongly agree	109	56.8
	Total	192	100.0

Table 4.42: Healthcare provider's perception on intention to use technology

From the table 4.42, it is inferred that out of 192 healthcare providers 109 of the healthcare providers **strongly agree** to the question on **intention to use technology**, 63 of the healthcare providers **somewhat Agree**, 13 of the healthcare providers have **neutral** opinion, 3 of the healthcare providers **somewhat disagree** and 1 of the healthcare providers **strongly disagree** and 3 of the healthcare providers are **not aware**.

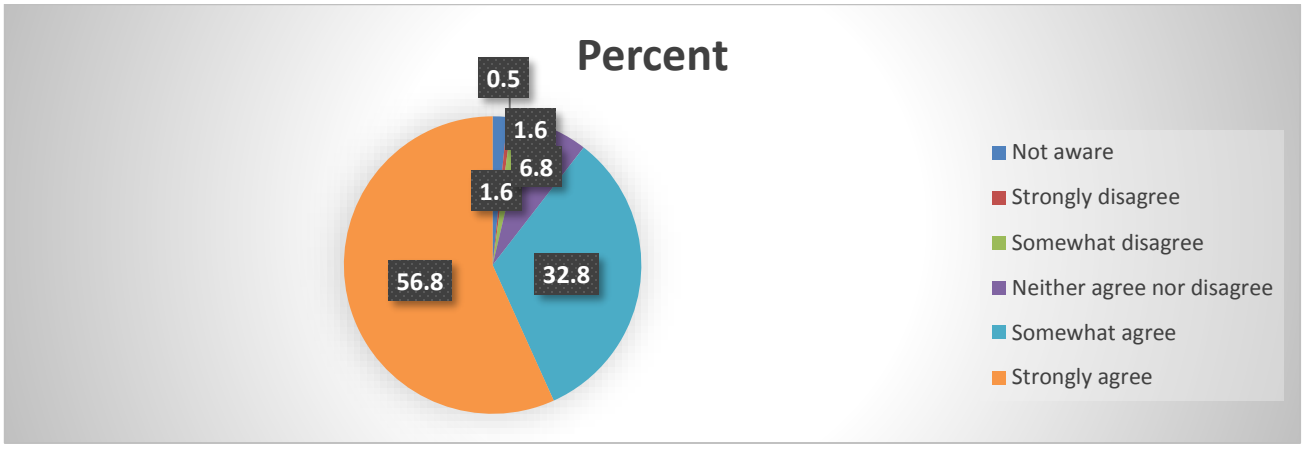


Figure 4.32: Percentage showing Healthcare provider's perception on intention to use technology

The Above Figure is showing the percentage of **Healthcare provider's perception on intention to use technology**. From the Figure 4.32, it is inferred 56.8% of the Healthcare providers **strongly agree** to the question **on intention to use technology**, 32.8% of the Healthcare providers **somewhat Agree**, 6.8% of the Healthcare providers have **neutral** opinion, 1.6% of the Healthcare providers **somewhat disagree** and 0.5% of the Healthcare providers **strongly disagree** and 1.6% of the Healthcare providers are **not aware**.

FACTOR 4 – Facilitating Conditions

Facilitating Conditions	t	df	Sig. (2-tailed)
Hospital pays attention to bring new technology	70.660	191	.000
Hospital sets a trial for new tech.	63.599	191	.000

Table 4.43: One sample T-test for Facilitating Conditions for healthcare providers

The output produced by SPSS for the sample is shown in Table **[4.43]**. The test value is **(3)**. The results of the t-test shown in the table, with (N – 1) degrees of freedom ("df"). The two-tailed p-value for this result is shown in the table. The result is considered statistically significant if the p-value is less than the chosen alpha level **(.05).**

In this case, p is definitely less than .05, so the result is considered statistically significant

FC1: My hospital pays attention to bring in new technology

HOSPITAL PAYS ATTENTION TO BRING NEW TECHNOLOGY		No. of providers	Percentage
	Not aware	4	2.1
	Strongly disagree	4	2.1
	Somewhat disagree	2	1.0
	Neither agree nor disagree	13	6.8
	Somewhat agree	66	34.4
	Strongly agree	103	53.6
	Total	192	100.0

Table 4.44: Healthcare provider's perception on hospital pays attention to bring new technology

From the table 4.44., it is inferred that out of 192 healthcare providers 103 of the healthcare providers **strongly agree** to the question on **hospital pays attention to bring new technology,** 66 of the

healthcare providers **somewhat Agree**, 13 of the healthcare providers have **neutral** opinion, 2 of the healthcare providers **somewhat disagree** and 4 of the healthcare providers **strongly disagree** and 4 of the healthcare providers are **not aware**.

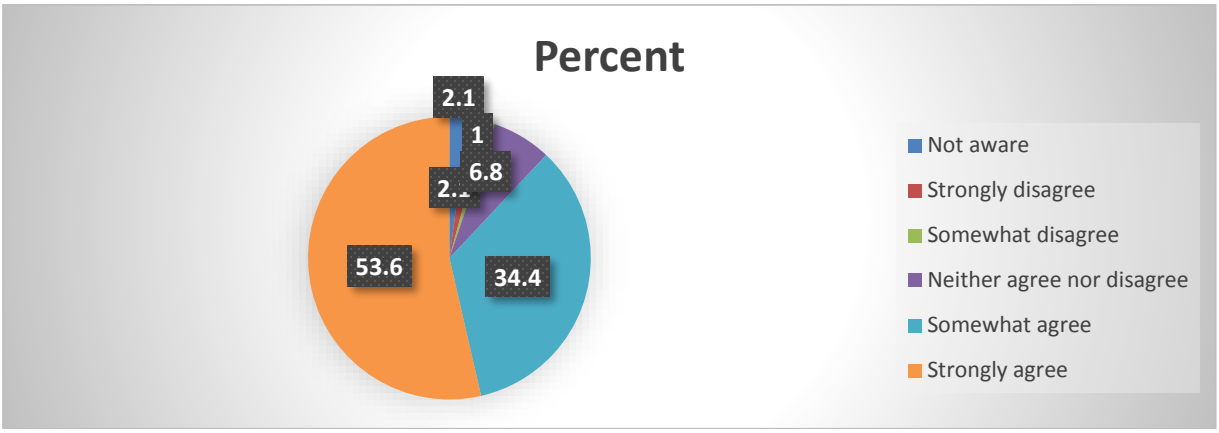


Figure 4.33: Percentage showing Healthcare provider's perception on hospital pays attention to bring new technology

The Above Figure is showing the percentage of **Healthcare provider's perception on hospital pays attention to bring new technology**. From the Figure 4.33, it is inferred 53.6% of the Healthcare providers **strongly agree** to the question **on hospital pays attention to bring new technology**, 34.4% of the Healthcare providers **somewhat Agree**, 6.8% of the Healthcare providers have **neutral** opinion, 1% of the Healthcare providers **somewhat disagree** and 2.1% of the Healthcare providers **strongly disagree** and 2.1% of the Healthcare providers are **not aware**.

FC2: When there is a new technology, my hospital always set up a trial of the new technology before any Purchase decision.

HOSPITAL SETS A TRIAL FOR NEW TECH.		No. of providers	Percentage
	Not aware	8	4.2
	Strongly disagree	2	1.0
	Somewhat disagree	1	.5
	Neither agree nor disagree	12	6.3
	Somewhat agree	73	38.0
	Strongly agree	96	50.0
	Total	192	100.0

Table 4.45: Healthcare provider's perception on hospital sets a trial for new technology

From the table 4.45, it is inferred that out of 192 healthcare providers 96 of the healthcare providers **strongly agree** to the question on **hospital sets a trial for new technology**, 73 of the healthcare providers **somewhat Agree**, 12 of the healthcare providers have **neutral** opinion, 1 of the healthcare providers **somewhat disagree** and 2 of the healthcare providers **strongly disagree** and 8 of the healthcare providers are **not aware**.

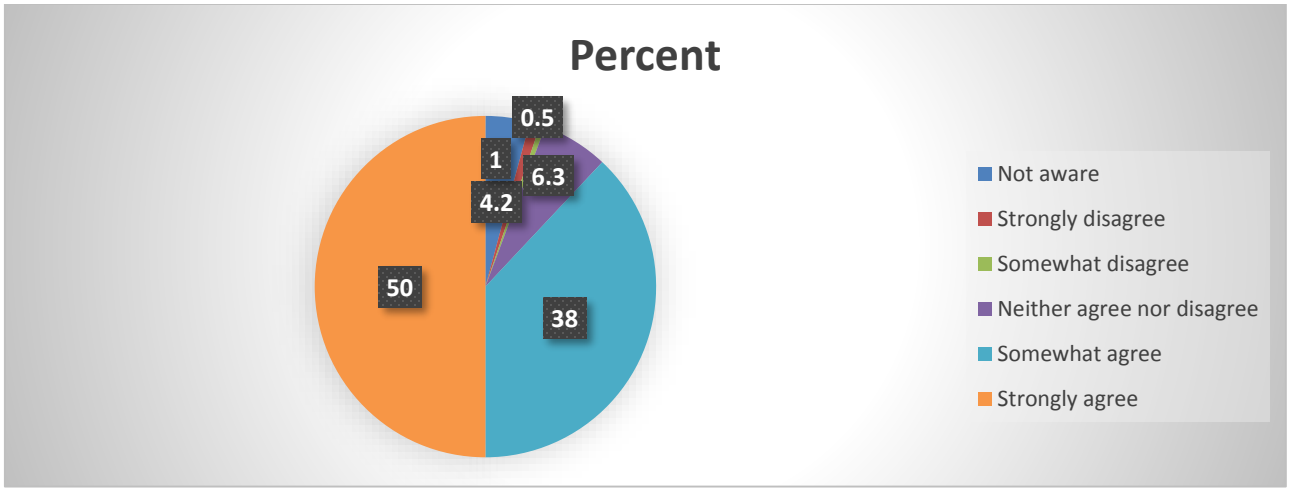


Figure 4.34: Percentage showing Healthcare provider's perception on hospital sets a trial for new technology

The Above Figure is showing the percentage of **Healthcare provider's perception on hospital sets a trial for new technology**. From the Figure 4.34, it is inferred 50% of the Healthcare providers **strongly agree** to the question **on hospital sets a trial for new technology**, 38% of the Healthcare providers **somewhat Agree**, 6.3% of the Healthcare providers have **neutral** opinion, 0.5% of the Healthcare providers **somewhat disagree** and 1% of the Healthcare providers **strongly disagree** and 4.2% of the Healthcare providers are **not aware**.

CHAPTER-5

DISCUSSION

Discussion

The study included a sample of 384 (192 Healthcare providers and 192 patients). The data is collected from primary and secondary sources. The selection of samples was done by using Purposive Sampling for healthcare Providers and Convenient sampling for the patients.The collected data has been analyzed by using SPSS and Microsoft excel. The statistical tools used were descriptive statistics(Frequency, percentage and mean) and one sample T test. Method (Questionnaire) was used to collect data. The instrument had 2 sections, the first section (Section A) was regarding the factors of technology acceptance model. The second section dealt withtotal acceptance towards Smart hospitals. It had questions based on 6-point Likert Scale (Ranging from Strongly Agree-6 to Not aware-1). The study provided empirical support for five of the Hypotheses. The Factors of Technology acceptance model i.e. Perceived Usefulness, Perceived ease of use, behavioral intention and Facilitating conditions were found to influence Healthcare provider's and Patient's acceptance towards Smart hospitals. The result of this study indicates that Healthcare providers and the patients exhibited a strong Perception towards the acceptance of Smart Hospitals with the Average score of 5.43 for healthcare providers out of 6 and 4.34 for the patients out of 5.

6.1 Perceived Usefulness for Patients

The outcomes of this factor indicate that patients has shown a moderately strong perception towards the usefulness of technologies in the hospitals with the mean score of 5.27. The reliability test has been carried out for the Questions of Perceived usefulness and the reliability of the factor turned out to be more than 0.7 (i.e. 0.79) that makes the factor reliable. [37] Within the field of Health care, several Technology acceptance studies have verified that an individual’s temperament to use an IS (Information system) is set by the system’s quality provided to them [38]. This outcomes are supported by Jian’s study [39] on consumers’ adoption of USB-based Personal Health Record and with previous different studies of patients’ technology acceptance [40,41]. Perceived Usefulness was found to be the foremost important.

6.2 Perceived ease of use for Patients

The outcomes of this factor indicate that patients has shown a moderately strong perception towards the ease of use of technologies in the hospitals with the mean score of 5.20. The reliability test has been carried out for the Questions of Perceived ease of use and the reliability of the factor turned out to be more than 0.7 (i.e. 0.76) that makes the factor reliable.

6.3 Behavioral Intention for Patients

The outcomes of this factor indicate that patients has shown a moderately strong perception towards the behavioral intention to use the technologies in the hospitals with the mean score of 5.08. The reliability test has been carried out for the Questions of Behavioral Intention and the reliability of the factor turned out to be more than 0.7 (i.e. 0.75) that makes the factor reliable.

6.4 Facilitating conditions for Patients

The outcomes of this factor indicate that patients has shown a moderately strong perception towards the facilitating conditions of technologies in the hospitals with the mean score of 5.11. The reliability test has been carried out for the Questions of Facilitating conditions and the reliability of the factor turned out to be more than 0.7 (i.e. 0.81) that makes the factor reliable.

6.5 Total Acceptance of Technology by the Patients in the hospitals

The outcomes of this factor indicate that patients has shown a moderately strong perception towards the total acceptance of technologies by the patients in the hospitals with the mean score of 5.34. The reliability test has been carried out for the Questions of total acceptance of the technology and the reliability of the factor turned out to be more than 0.7 (i.e. 0.91) that makes the factor reliable.

6.6 Perceived Usefulness for Healthcare providers

The outcomes of this factor indicate that Healthcare providers has shown a moderately strong perception towards the usefulness of technologies in the hospitals with the mean score of 5.23. The reliability test has been carried out for the Questions of Perceived usefulness and the reliability of the factor turned out to be more than 0.7 (i.e. 0.81) that makes the factor reliable.

6.7 Perceived ease of use for Healthcare providers

The outcomes of this factor indicate that Healthcare providers has shown a moderately strong perception towards the ease of use of technologies in the hospitals with the mean score of 5.30. The reliability test has been carried out for the Questions of Perceived ease of use and the reliability of the factor turned out to be more than 0.7 (i.e. 0.82) that makes the factor reliable.

6.8 Behavioral Intention for Healthcare providers

The outcomes of this factor indicate that Healthcare providers has shown a moderately strong perception towards the behavioral intention to use the technologies in the hospitals with the mean score of 5.23. The reliability test has been carried out for the Questions of Behavioral Intention and the reliability of the factor turned out to be more than 0.7 (i.e. 0.92) that makes the factor reliable.

6.9 Facilitating conditions for Healthcare providers

The outcomes of this factor indicate that Healthcare providers has shown a moderately strong perception towards the facilitating conditions of technologies in the hospitals with the mean score of 5.26. The reliability test has been carried out for the Questions of Facilitating conditions and the reliability of the factor turned out to be more than 0.7 (i.e. 0.79) that makes the factor reliable.

6.10 Total Acceptance of Technology by the Healthcare providers in the hospitals

The outcomes of this factor indicate that Healthcare providers has shown a moderately strong perception towards the total acceptance of technologies by the Healthcare providers in the hospitals with the mean score of 5.43. The reliability test has been carried out for the Questions of total acceptance of the technology and the reliability of the factor turned out to be more than 0.7 (i.e. 0.85) that makes the factor reliable.

CHAPTER-6

CONCLUSION

Conclusion

The study provided empirical support for five of the Hypotheses. The Factors of Technology acceptance model i.e. Perceived Usefulness, Perceived ease of use, behavioral intention and Facilitating conditions were found to influence Healthcare provider's and Patient's acceptance towards Smart hospitals.

The result of this study indicates that Healthcare providers and the patients exhibited a strong Perception towards the acceptance of Smart Hospitals with the Average score of 5.43 for healthcare providers out of 6 and 4.34 for the patients out of 5.

Challenges and Recommendations

- **Cost of care** needs to be reduced for mass adoption of the technologies in the hospitals by the patients. Healthcare nowadays is not only about visiting hospitals and more about holistic healthcare. Therefore cheaper devices should be developed which can help in the continuous monitoring of even healthy persons and recommend or alert if anything amiss is detected. The devices should also be able to suit everyone's individual needs.
- **Data Security and Privacy:** Following are some security measures which needs to be taken in the smart hospitals-

  a) Access Control: Access control is a security technique which restricts the access to the data on database and its information except for the authorized users.

  There are two main types of access control:

  1) Physical access control limits access to rooms, buildings and physical IT assets.
  2) Logical access control limits connections to data, system files and computer networks.

  b) Steganography: Steganography is process of encrypt sensitive information in any type of media.

  c) Cryptography: Cryptography is the practice and study of techniques for secure communication in which the ordinary text is converted to cipher text by encryption.

- To build confidence and trust in use of technology in the hospitals and to address IoT privacy concerns clear policy and guidelines should be developed for access to, consent and use of private data. This should align with current policies on open data and data sharing.
- **Role of Government :** Government should also encourage and fund for the widespread development and adoption of Smart Hospitals.
- Technology in the hospitals should not overwhelm doctors and medical staff with immense data. The business applications should be simple and can be cognitive, enough to provide the medical personnel clear indicators of patient's health and can also suggest some measures. Ease of use should be kept in mind.

CHAPTER-7 (a)

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CHAPTER-7 (b)

APPENDICES

QUESTIONNAIRE FOR PATIENTS

NAME: _____

AGE* : _____

GENDER* : _____

ADDRESS : _____

(*Mandatory)

INSTRUCTIONS: **Answer all the questions by choosing one out of six alternatives. The information provided by you will be kept confidential.**

5=Strongly agree 4=Somewhat agree 3=Neither agree nor disagree 2=Somewhat disagree 1=Strongly disagree

SECTION A	5	4	3	2	1
1. I have the clear understanding of the basic functioning of the Smart hospitals.					
2. I believe that the technology (EMR, PHR, RFIDs, bedside sensors, etc.) will help my health to be efficient in the hospitals.					
3. I think quality of services provided to me is better in the hospitals using latest technologies.					
4. I think the waiting time for me is reduced in the hospitals using latest technologies.					
5. I believe using the technologies will give me a greater control to monitor my health.					
6. Smart hospitals equipped with latest wireless technologies can make me to avail the health services easily.					
7. I think wireless technologies like PHR, mHealth etc. can be learnt easily.					
8. With the help of technologies, I can access to my information anytime and anywhere whenever it is needed.					
9. I feel wireless technologies are flexible to interact with.					
10. I feel wireless technologies are reliable.					
11. I intend to use technology to maintain my health (such as PHR, fitbit etc.).					
12. I have the resources necessary to use the Healthcare Apps and Technologies.					

13. People who are important to me think I should use the Healthcare Apps and Technologies.					

SECTION B	5	4	3	2	1
1. I prefer electronic media rather than paper based system in availing the health care facilities.					
2. I believe smart Hospitals can enhance my accessibility and communication with healthcare providers.					
3. My intention of using wireless technologies can affect my acceptance towards smart hospitals.					
4. I believe the privacy of my health records is maintained better in the Smart hospitals.					

I would prefer to visit a smart hospital rather than a normal hospital.

Yes ○ No ○

Are you currently a user of any mobile App or any other healthcare technology such as Fitbit, Samsung Health, Google Fit etc.?

Yes ○ No ○

Any Suggestions for Smart Hospitals

_____

_____

_____

_____

_____

QUESTIONNAIRE FOR HEALTHCARE PROVIDERS

NAME: _____

AGE* : _____

GENDER* : _____

DESIGNATION* : _____

SPECIALITY*_____

ADDRESS : _____

(*Mandatory)

INSTRUCTIONS: **Answer all the questions by choosing one out of six alternatives. The information provided by you will be kept confidential.**

6=Strongly agree 5=Somewhat agree 4=Neither agree nor disagree 3=Somewhat disagree 2=Strongly disagree 1=Not aware

SECTION A	6	5	4	3	2	1
1. I have the clear understanding of the basic functioning of the Smart hospitals.						
2. I believe that the technology (EMR, RFIDs, bedside sensors, Smart Ambulance, eMAR, etc.) will help the hospitals be efficient.						
3. I believe that the technologies (wireless technologies) will help to ensure the quality of patient care.						
4. I think waiting time for the patient is reduced in the hospitals using latest technologies.						
5. I believe using the technologies will give me a greater control over my work.						
6. Smart hospitals equipped with latest wireless technologies can make my job easier to perform.						
7. I think wireless technologies used in smart hospitals can be learnt easily.						
8. With the help of technologies, I can access to the patients information anytime and anywhere whenever it is needed.						
9. I feel wireless technologies are flexible to interact with.						

10. I feel wireless technologies are reliable.						
11. I intend to use the technology to maintain my patient's health.						
12. My hospital pays attention to bring in new technology.						
13. When there is a new technology, my hospital always set up a trial of the new technology before any Purchase decision.						

SECTION B	**6**	**5**	**4**	**3**	**2**	**1**
1. I prefer using electronic media rather than using paper based system in healthcare delivery.						
2. Smart Hospitals can enhance accessibility and communication with my patient/customer.						
3. My intention of using wireless technologies can affect my acceptance towards smart hospitals.						
4. I believe the privacy of the patients is maintained better in the Smart hospitals.						
5. I would recommend the implementation of the latest technologies in the hospitals.						

Would you prefer to work with the hospital using advanced technologies?

Yes ○ No ○

Any Suggestions for Smart Hospitals

_____

_____

_____

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