Study on the Role of Information, Communication and Technology in Healthcare

By

Swathi Swargam

Dissertation submitted for the partial fulfillment of the

MBA Hospital and Health Management

Academic year, 2016-2018

The IIHMR University, Jaipur

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INSTITUTE OF HEALTH
MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

IIHMR UNIVERSITY

TO WHOMSOEVER MAY CONCERN

This is to certify that **Ms. Swathi Swargam** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **CallHealth Services Pvt Ltd.** from 9th February to 9th May, 2018.

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. Ashok Kaushik
Dean, Academics and Student Affairs
The IIHMR University, Jaipur

Dr. Sandesh Kumar Sharma
Assosiate Professor
The IIHMR University, Jaipur

CallHealth
Everything about health

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CIN No: U85100TG2013PTC091009
Tel: 040 - 4141 5555
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Dated: **11th May 2018**
Place: **Hyderabad**

To Whomsoever It May Concern

This is to confirm that **Ms. Swathi Swargam (Officer ID: 12103)** has been working with us as **Management Trainee** in our **Services Delivery** Business since **07th** of **March 2018** to **till date**.

She comes across as a committed, sincere and diligent person who has a strong drive and zeal for learning and we wish him all the success with continued service with us.

Note: This letter has been issued upon her request for college degree certification purpose and **not** valid for any other purpose.

For CallHealth Services Pvt. Ltd.,

R. Samson Peters,
Business Integrator – Talent Engagement
Human Resources

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled "**A study on the role of ICT in healthcare"** is submitted by **Ms. Swathi Swargam**, Enrollment No. **IIHMR-U/01/2016-18/0509** under the supervision of **Dr. Sandesh Kumar Sharma** for award of MBA in Hospital and Health in Health and Hospitals of the University carried out during the period from 9th February to 9th May, 2018 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.

Signature

ACKNOWLEDGEMENT

I wish to take this opportunity to express my deepest gratitude towards all the people who have shown their willingness to provide their valuable inputs to help me prepare this report.

I am thankful to Prof. Ashok Kaushik, Dean of Academics for granting me the permission to undertake the study. I would like to convey thanks to my project guide Dr. Sandhesh Kumar Sharma, Assistant Professor for ready assistance, keen interest and valuable suggestions.

Last but not least it would be unfair if I don't extend my gratitude to all my faculties, to my parents and all my friends for their active cooperation which was of great help during the course of my training process. Without the support of all the above mentioned people this study would not have been successful. I Once again thank you all for your great interest and support throughout my study.

ABBREVIATIONS

ICT – Information, Communication and Technology

MHO – Mobile Health Officer

PHO – Phlebtomist Health Officer

HHO – Home Health Officer

CCR – Care coordinator

CCO – Call Centre Officer

MFO – Medical Facilitation Officer

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INTRODUCTION

1.1: E-Health in India

The economic pressures of ever-increasing healthcare costs and suboptimal health outcomes are driving the search for new approaches to health management. Policymakers now speak of the National Health Information Network and interoperable electronic health records as necessary elements of health care for the entire population. Based on the need for patient-centered health care, public policy is attaching growing importance to the role of consumers in managing their own health, in partnership with healthcare providers.

Consumer- oriented e-health resources are meant to help consumers manage the heavy demands of health management. Indeed, it may be difficult for consumers to meet some of the demands without e-health tools. "e-Health" is a broad term for the heterogeneous and evolving digital resources and practices that support health and health care. E-Health resources enable consumers, patients, and informal caregivers to gather information, make healthcare decisions, communicate with healthcare providers, manage chronic disease, and engage in other health-related activities. Most, although not all, of these resources are available through the Internet. E-Health tools offer consumers a broad range of integrated, interactive functions including those listed below. Most tools support several of these functions, generally structured around a primary purpose such as disease management.

• **Health information:** Either a spectrum of searchable information or more narrowly defined content.

• **Behavior change/prevention:** Support for a specific behavior change such as smoking cessation.

• **Health self-management:** Tools for achieving and maintaining healthy behavior in lifestyle areas such as diet and exercise.

• **Online communities:** Internet-based communities for interaction among consumers, patients, or informal caregivers about shared health concerns

• **Decision support:** Structured support for making treatment decisions, choosing and evaluating insurance programs or healthcare providers, or managing healthcare benefits

• **Disease management:** Monitoring, recordkeeping, and communication devices for managing a chronic disease, usually in conjunction with healthcare providers

• **Healthcare tools:** Means of maintaining or accessing health records and interacting with healthcare providers. This category includes personal health records. [1]

USING ICTS IN THE HEALTHCARE

According to WHO, the use of ICTs in health is not merely about technology, but a means to reach a series of desired outcomes, such as:

• Health workers making better treatment decisions;

• Hospitals providing higher quality and safer care;

• People making informed choices about their own health;

• Governments becoming more responsive to health needs;

• National and local information systems supporting the development of effective, efficient, and equitable health systems;

• Policymakers and the public becoming more aware of health risks; and

• People having better access to the information and knowledge they need for better health.

The evidence regarding ICTs in health is usefully viewed with reference to the key aspects of the WHO e-health strategy, summarized below:

1.2: Key aspects of the WHO e-health strategy

1.2.1: Policy:

- Ensure public policies support effective and equitable e-health systems.
- Facilitate a collaborative approach to e-health development.
- Monitor internationally accepted goals and targets for e-health.
- Represent the health perspective in international gatherings on major ICT issues.
- Strengthen ICT in health education and training in countries, supporting a multilingual and multicultural approach.

1.2.2: Equitable access:

Commitment by WHO, Member States, and partners to reaching health communities and all populations, including vulnerable groups, with e-health appropriate to their needs.

1.2.3: Best use:

Analyze e-health evolution, impact on health; anticipate emerging challenges and opportunities. - Provide evidence, information and guidance to support policy, best practice, and management of e-health systems and services. - Identify and address needs for e-health norms and standards, innovation, and research.

ICTs have been used in various ways to help achieve outcomes such as these.

Any health system needs to rest on basic pillars. These are four key ones identified by the Disease Control Priorities Project in its latest publication, Priorities in Health (Jamison, 2006):

• Information, surveillance, and research.

• Management of health services.

• Human resources.

• Financing.

Clearly each of these pillars can benefit from the use of ICTs. In practice, the use of ICTs in the health sector has tended to focus on three broad categories that incorporate these pillars:

1. **Improving the functioning of health care systems** by improving the management of information and access to that information, including:
   • Management of logistics of patient care,
   • Administrative systems;
   • Patient records; and
   • Ordering and billing systems.
2. **Improving the delivery of health care** through better diagnosis, better mapping of public health threats, better training and sharing of knowledge among health workers, and supporting health workers in primary health care, particularly rural health care, including:
   • Biomedical literature search and retrieval;
   • Continuing professional development of health workers;
   • Telemedicine and remote diagnostic support;
   • Diagnostic imaging;
   • Critical decision support systems;
   • Quality assurance systems; and
   • Disease surveillance and epidemiology.
3. **Improving communication about health**, including improved information flows among health workers and the general public, better opportunities for health promotion and health communication; and improved feedback on the impact of health services and interventions, including:
   • Patient information,
   • Interactive communication,
   • Media approaches,
   • Health research, and
   • Advocacy to improve services.

Figure 1: Potential uses of ICTs in the health sector and issues that may emerge

What issues currently dominate e-health? What is going on in e-health?			What emerging technologies are likely to impact on health care?	How does research inform e-health?	How do developments in e-health inform research?
Professional Clinical Informatics - Decision aids for practitioners (prompts, reminders, care pathways, guidelines) - Clinical management tools (electronic health records, audit tools) - Educational aids (guidelines, medical teaching) - Electronic clinical communications tools (referral, booking, discharge; correspondence, clinical email/second	**Electronic Patient/Health Records (EPR, EHR)** - Electronic medical records. Record linkage. The Universal Patient Indicator. Databases and population registers. - Achieving multiprofessional access. Technical and ethical issues. - Data protection/ security issues - Patient access and control - Integration with other services	**Consumer Health Informatics** - Decision aids for patients facing difficult choices (genetic screening) - Information on the Web and/or digital TV (public information and educational tools for specific clinical groups) - Clinician-patient communication tools: 1. Remote: Clinical e-mail and Web-based messaging systems for	**New Technologies** - Satellite communications (for remote medicine) - Wireless networks (within hospitals, across geographical areas) - Palmtop technologies (for information, for records) - New mobile telephones - Digital TV (for disseminating health information & communicating with patients) - The WWW and its applications for health (issues: quality control, confidentiality, access) - Virtual reality (remote/	**Research Input** - Development - Need for user involvement in product conception, design and testing. Iterative development. Needs assessment, accessibility and usability research. Multi-faceted expertise required. - Implementation – Understanding people and organizational factors, system acceptability, resistance to change. Use of tailored implementation	**Research Outcomes** - Potential of electronic databases such as population registers for epidemiological research. - Research into the impact or use of informatics tools suggests appropriate and cost-effective priorities for policymakers. - Areas of cross-over (bioinformatics)

What issues currently dominate e-health? What is going on in e-health?			What emerging technologies are likely to impact on health care?	How does research inform e-health?	How do developments in e-health inform research?
opinion, laboratory test requesting/results reporting, e-shared care) - Electronic networks (disease-specific clinical networking systems) -Discipline/disease-specific tools (diabetes informatics) - Telemedicine applications (for interprofessional communication, patient communication and remote consultation) - Subfields (nursing & primary care informatics)	(social work, police) - Clinical coding issues (terminologies) **Healthcare Business Management** - Billing and tracking systems - Audit & quality assessment systems	consultation, disease monitoring, service-oriented tasks (appointment booking, prescription reordering). 2. Proximal: Shared decision making tools, informed consent aids 3. Mixed: On-line screening tools (for depression) and therapeutic interventions (cognitive behaviour therapy) - Access and equity issues (data protection issues, the Digital Divide) - Quality issues for health information on the net - "virtual" health communities	transcontinental surgery) - Nanotechnology - Intersection of bioinformatics and health informatics.	strategies. - Innovative methods for mapping functional and technology needs, place of systems in the organization - Knowledge management, systems approaches, communication networks models, organizational development to map pathways. - Evaluation Formative, as above, also: Outcome assessment to establish impact of new systems on clinical outcomes, processes and costs	

Source: Adapted from Pagliari, et al. 2001.

Figure 2: Potential uses of ICTs in the health sector and issues that may emerge

1.2.4: Improving the functioning of health care systems

Health systems are very complex. So too are the types of processes and information needs that are handled in health care systems. To be useful, information systems must capture and process data with broad diversity, scope, and level of detail.

The nature of health care systems, particularly as regards information, is markedly different from most other sectors. In banking, for example, there are limited terms used, limited transaction possibilities, and simple information needed about customers, and well established standards for data exchange among banks so that most transactions can be performed at automated terminals by the customers themselves.

The options for information systems within health care are much more complex due to the array of data types. For example, the automation of patient records must deal with a variety of data requirements and specification problems found in many health care data types which are exacerbated by the size and complexity of the medical vocabulary, the

codification of biomedical findings, and the classification of health conditions and interventions. Nomenclature issues include concepts such as procedures, diagnoses, natomical topography, diseases, biological agents such as classification of micro-organisms, drugs, causes for health care contact, symptoms and signs, and many others. Possible combinations and detailing represent a staggering number of possible identifying coding requirements.

Information systems within the health care system – patient records, tracking of disease prevalence, monitoring drug supplies, maintaining ordering systems for supplies, billing procedures – all stand to benefit from the use of ICTs. ICTs are the basis for the development and operation of information systems and enable the creation and application of knowledge. Information systems function at many levels of sophistication and complexity — from very specific to very general..

1.2.5: Improving health care delivery

Integrating the use of ICTs into existing health systems has helped to improve the delivery of health care in a number of ways. These include:

• The use of telemedicine to improve diagnosis and enhance patient care;

• Improvements in the continuing professional development of health workers and better sharing of research findings; and

• Efforts to extend the reach and coverage of health care to make an impact on specific conditions.

1.2.6: Telemedicine

Telemedicine is a growing field. Telemedicine is a powerful tool for improving health care delivery that has been successfully implemented in pilot projects in many countries. Many of these pilots clearly demonstrate proof of concept – telemedicine can improve diagnosis and treatment of specific conditions.

Although telemedicine can be highly effective, cost is an issue. “In its high-tech implementations, it is unlikely to be cost-effective or affordable in widespread use.

1.3: Guiding Principles for E-health:

The following vision provides the guiding principles and the yardstick against which current conditions are assessed:

• Consumers with diverse perspectives, circumstances, capacities, and experiences are included in the design of, and have meaningful access to, evidence-based e-health tools with strong privacy and security protections.

• Diverse consumers have the skills and support to evaluate, choose, and use e-health tools to derive benefits for themselves and those they care for.

• Alliances and partnerships facilitate sustained consumer access to and use of e-health tools, consistent with the value propositions and perspectives of each participating stakeholder.

• Appropriate funding and incentives exist in public policy and the market to enable sustainable business models for tools with demonstrated effectiveness.

This report stresses that e-health practices have the potential to be part of the solution to health disparities and other health policy challenges if appropriate and useful e-health resources are made available to a larger proportion of the U.S. population than is now the case. So far, market forces and fragmented public-sector efforts have failed to harness technological innovation to improve population health. Some observers worry that an uneven distribution of high-quality e-health tools or consumers' varying ability to use such tools could worsen health disparities. The report proposes that extending the benefits of these technologies to diverse users requires public leadership, robust public-private partnerships, and consumer-centric research, analysis, and strategies. The entire effort must be connected both to the disease prevention and health promotion objectives for the nation in Healthy People 2010 and to the goals for the emerging National Health Information Network.

The examples in this report show that ICTs have clearly made an impact on health care. They have:

• Improved dissemination of public health information and facilitated public discourse and dialogue around major public health threats;

• Enabled remote consultation, diagnosis and treatment through telemedicine;

• Facilitated collaboration and cooperation among health workers, including sharing of learning and training approaches;

• Supported more effective health research and the dissemination and access to research findings;

• Strengthened the ability to monitor the incidence of public health threats and respond in a more timely and effective manner; and

• Improved the efficiency of administrative systems in health care facilities. **(2)**

2. **Aim** – To study the role of information, communication and technology in healthcare

3.Objectives of the Study

- To understand customer experience towards e-healthcare
- To understand doctors' response towards adoption of technology
- To comprehend the ease in using technology by officers delivering the services
- To analyse impact of demographics on overall experience in delivering e-services

4.Scope of the Study

The study is concerned with E-Health Company named CallHealth Services Pvt Ltd and the topic of the study is Use of ICTs in Healthcare is a multi-dimensional aspect. The customers and employees expect the following needs to be fulfilled.

- Service and cost should be fair and reasonable.
- The organization should help employees to achieve their goals.

5. Research Methodology

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically.

The Research methodology used in this project was to collect the information from the employees through Questionnaire and Personal Interview. The reason behind choosing this methodology is most of the employees and customers does not feel comfortable in discussing their problems openly during personal interaction, so for those a questionnaire format is chosen. And a personal interview method is chosen because doctors do not find enough time to fill the questionnaire, for those personal interactions would give better results.

5.1 Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure

The type of research design used in the project was Descriptive research, because it helps to describe a particular situation prevailing within a company. Careful design of the descriptive studies was necessary to ensure the complete interpretation of the situation and to ensure minimum bias in the collection of data.

5.2 Sampling Technique

Convienent Sampling was applied to this study, since population was not of a homogenous group and the judgment was made about the aggregate or totality, so as to obtain a representative sample.

5.3 Size of the Sample

For a research study to be perfect the sample size selected should be optimal i.e. it should neither be excessively large nor too small. Here the total population was 80 out of which the sample size of 50 was taken into consideration.

5.4 Data Collection Methods

Both the Primary and Secondary data collection method were used in the project. In this research the primary data was collected by means of a Structured Questionnaire. It had both open-end, closed end questions in it. Data which has already gone through the process of analysis or were used by someone else earlier is referred to secondary data. This type of data was collected from the books, journals, company records etc.

5.5 Tools used for Analysis

- Percentage analysis.
- Five point likert scales

5.5.1 Percentage Analysis

The reason behind choosing Percentage analysis is, it is one of the simplest and traditional statistical tools. Through the use of percentage, the data are reduced in the standard form with the base equal to 100, which facilitates comparison.

The formula used to compute Percentage analysis is,

Percentage of the respondents = (No. of respondents / Total No. of respondents)*100

5.5.2 Five Point Likert Scale

In this project, Five point likert scale was used as it is a psychometric scale commonly involved in research that employs questionnaires. It is the most widely used approach to scaling responses in survey research, such that the term is often used interchangeably with rating scale, or more accurately the Likert-type scale. When responding to a Likert questionnaire item, respondents specify their level of agreement or disagreement on a symmetric agree - disagree scale for a series of statements. Thus, the range captures the intensity of their feelings for a given item, while the results of analysis of multiple items (if the items are developed appropriately) reveals a pattern that has scaled properties of the kind Likert identified.

The format of a five point likert used in this project was:

- Excellent
- Good
- Average
- Poor
- Bad

DISCUSSION

1. Customer Survey Report

- E-health service was being used more among 26-50yrs and more than 50 due to lifestyle diseases
- E-health service was being used more by females
- E-health service was being used more among nuclear families
- Most of the customers got to know about Callhealth service from friends and employees
- Customers prefer mode of e-health service by mobile instead of website or call centre
- Customer perception towards officer reaching on time was good
- Customers were able to book appointments easily
- Communication with physician was good as compared to hospitals/clinics

2. Doctor Survey Report

- Customers rendering e-consultation was more among 36-50yrs
- E- consultation for general medicine was being used more by customers
- Doctors felt comfortable using e-health service
- Doctors were able to understand the concept of e-health service
- Doctors were able to deliver good quality of care
- Customer cooperation and response was good during e-consultation
- Doctors were able to connect with customers on call

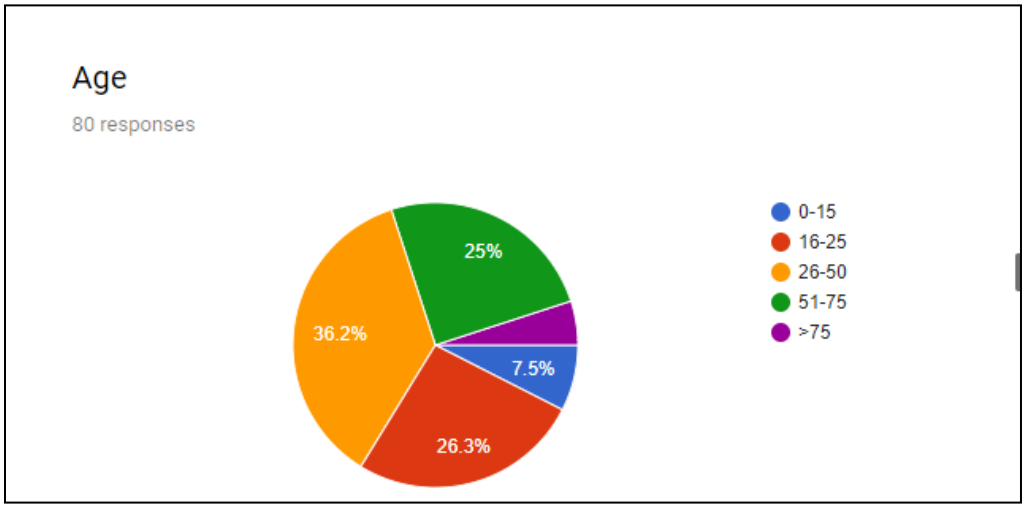
3. Officer Survey Report

- PHO services were more availed by customers
- Officers were comfortable using the app
- Officers were able to understand the process
- Officer behaved nicely with customers
- Officer replies to all queries of customers
- Officer returning change to customers

DATA ANALYSIS AND PRESENTATION

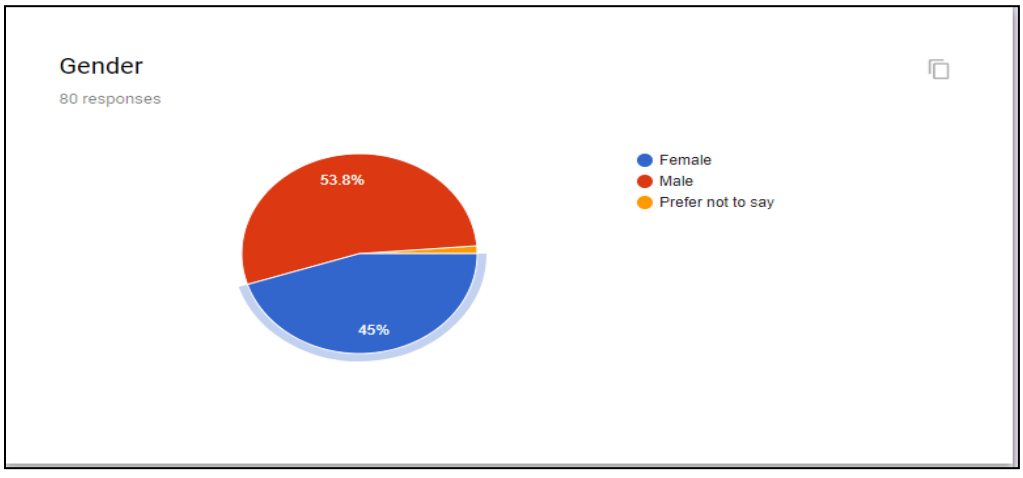
8.1: Customer Survey Report

Graph 1: Demographics affecting E-health service



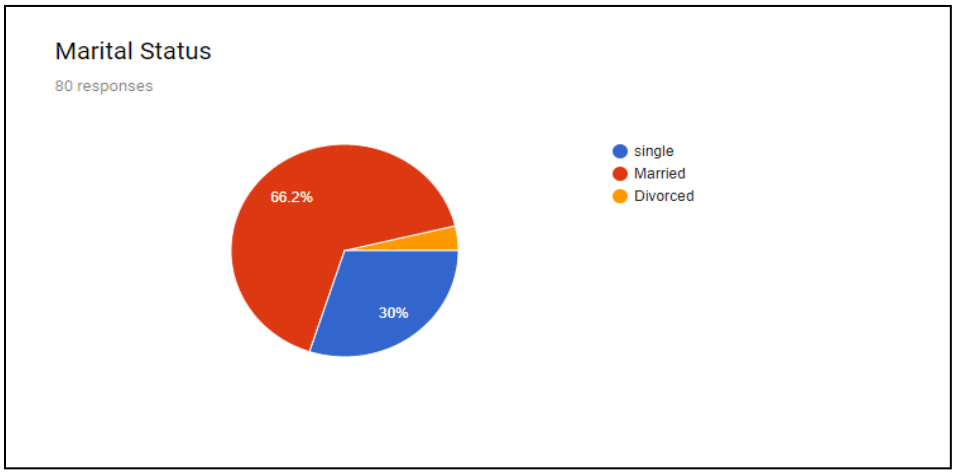
- E-health service affects age group of 0-15yrs around 7.5%
- E-health service affects age group of 16-25yrs around 26.3%
- E-health service affects age group of 26-50yrs around 36.2%
- E-health service affects age group of 51-75yrs around 25%
- E-health service affects age group of more than 75yrs around 5%

Graph 2: Demographics affecting E-health service



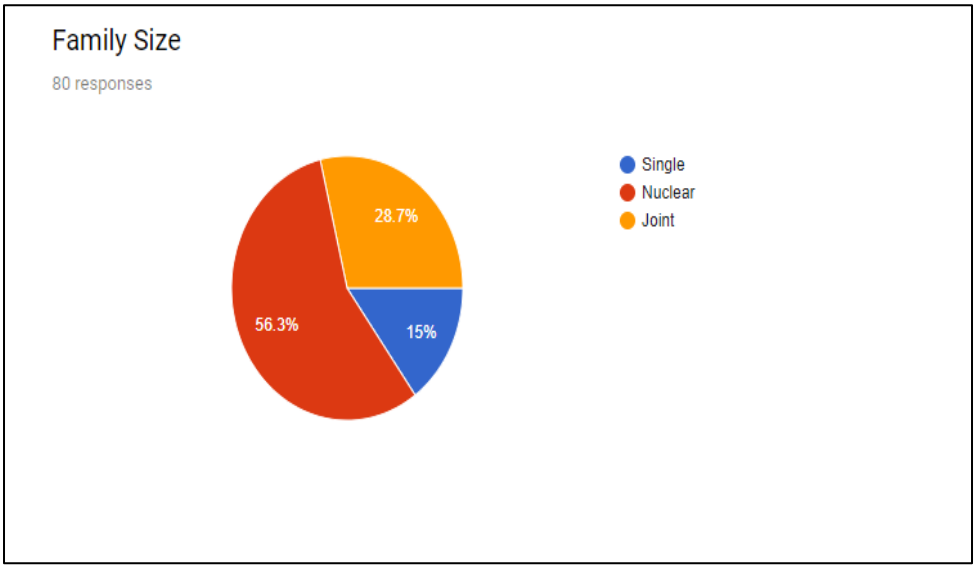
- E-health service affects Females around 53.8%
- E-health service affects Males around 45%
- E-health service affects for others prefer not to say about 1.2%

Graph 3: Demographics of using E-health service



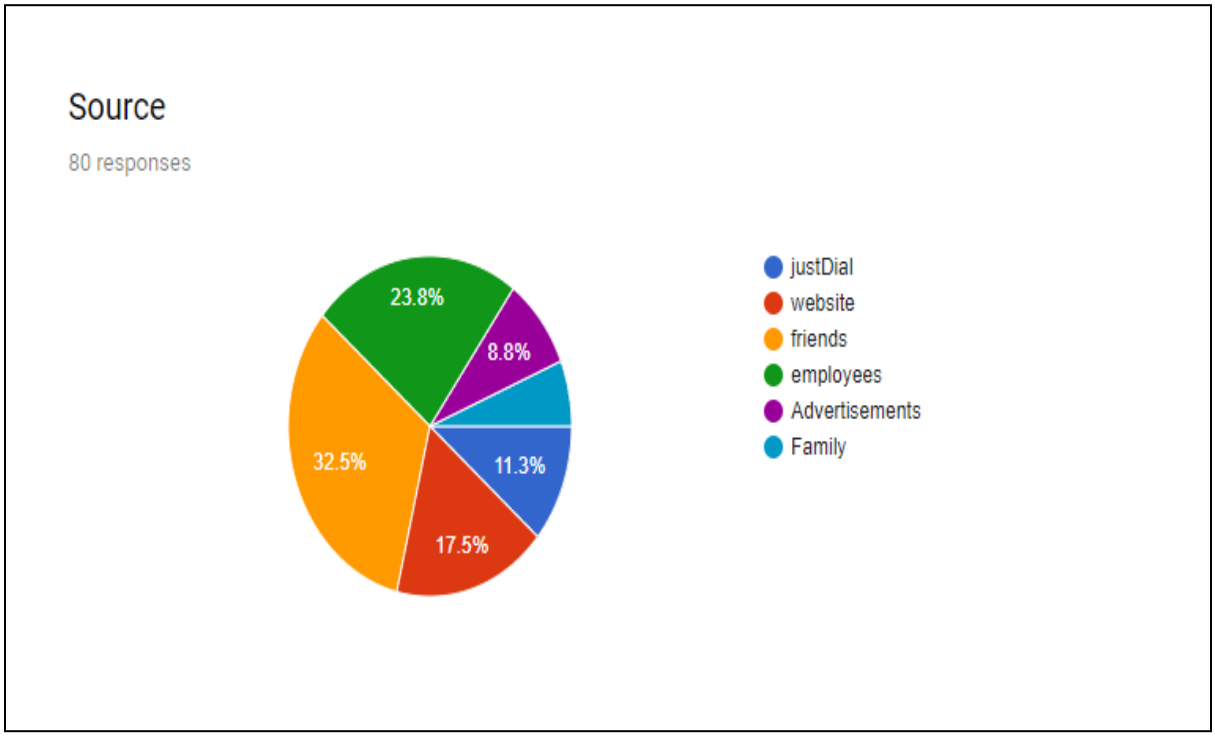
- E-health service being used by single around 30%
- E-health service being used by married couple around 66.2%
- E-health service being used by divorced around 3.8%

Graph 4: Demographics of using E-health service



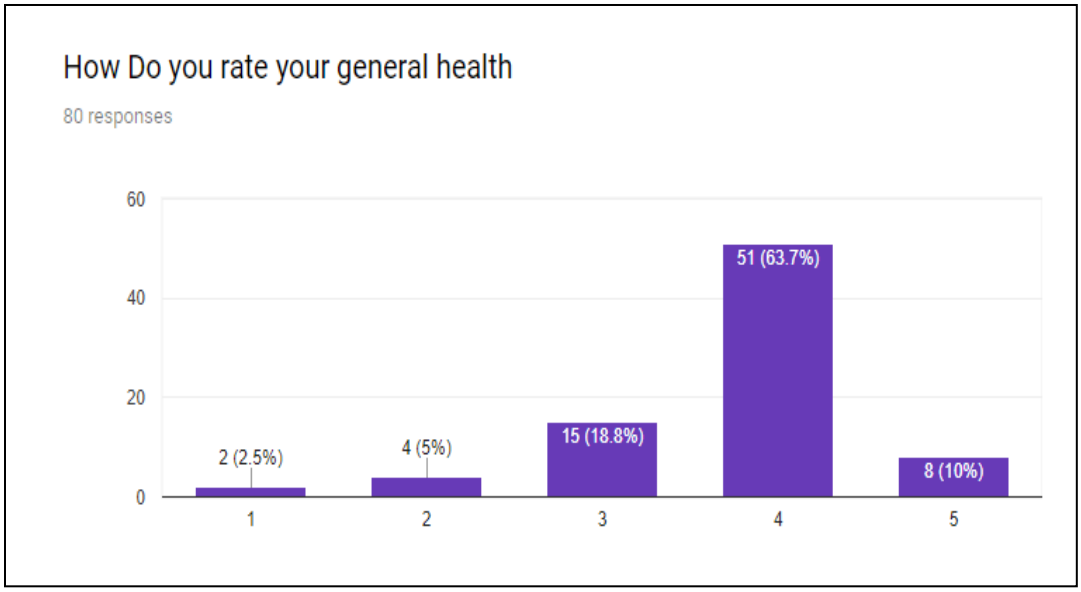
- E-health service being used by single around 15%
- E-health service being used by nuclear families around 56.3%
- E-health service being used by joint families around 28.7%

Graph 5: Source from which customers got to know about the organization



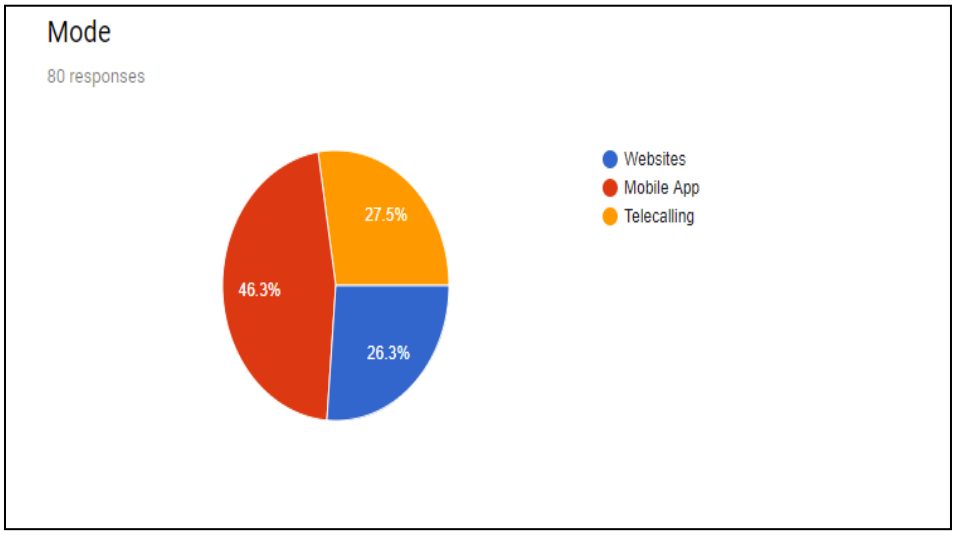
- Customers go to know about Callhealth from justdial around 11.3%
- Customers go to know about Callhealth from website around 17.5%
- Customers go to know about Callhealth from friends around 32.5%
- Customers go to know about Callhealth from employees around 23.8%
- Customers go to know about Callhealth from advertisements around 8.8%
- Customers go to know about Callhealth from family around 6.1%

Graph 6: Customer rating of general health



- Customers rate their health on the scale as 1 range about 2.5%
- Customers rate their health on the scale as 2 range about 5%
- Customers rate their health on the scale as 3 range about 18.8%
- Customers rate their health on the scale as 4 range about 63.7%
- Customers rate their health on the scale as 5 range about 10%

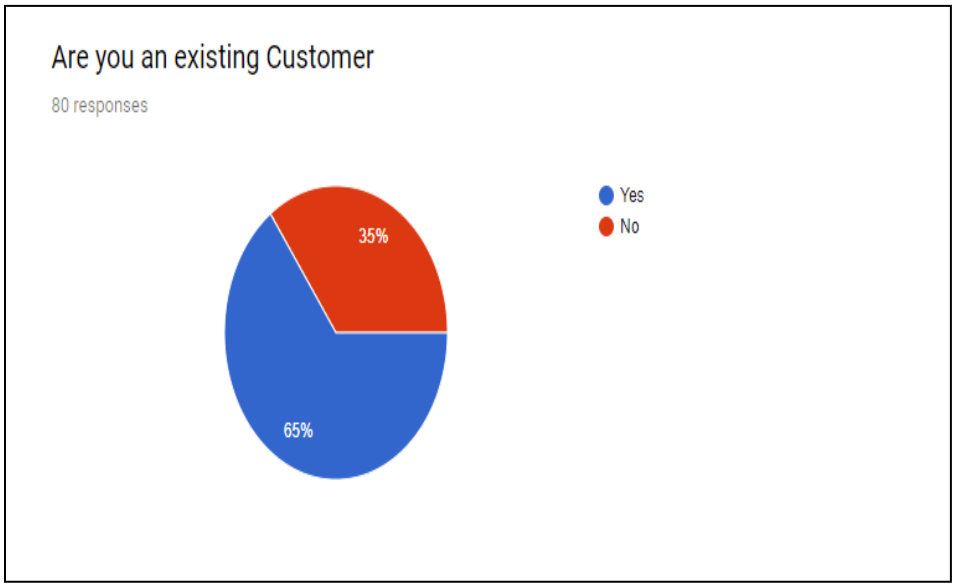
Graph 7: Preferred mode for *using E-health service



- Preferred mode of using e- health service for website range about 26.3%

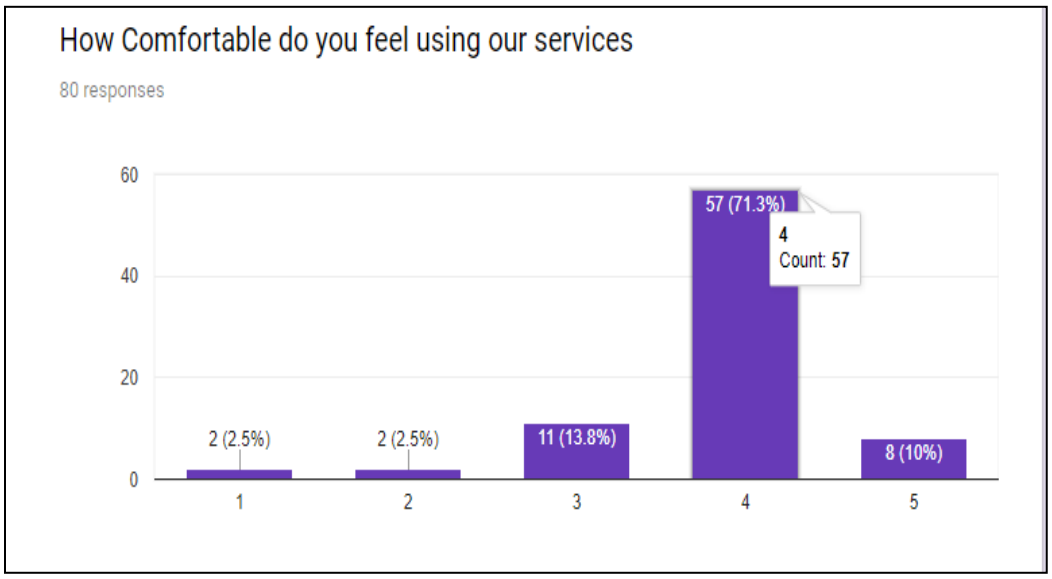
- Preferred mode of using e- health service for mobile app range about 46.3%
- Preferred mode of using e- health service for telecalling range about 27.5%

Graph 8: Percentage of customers revisiting the E-health service



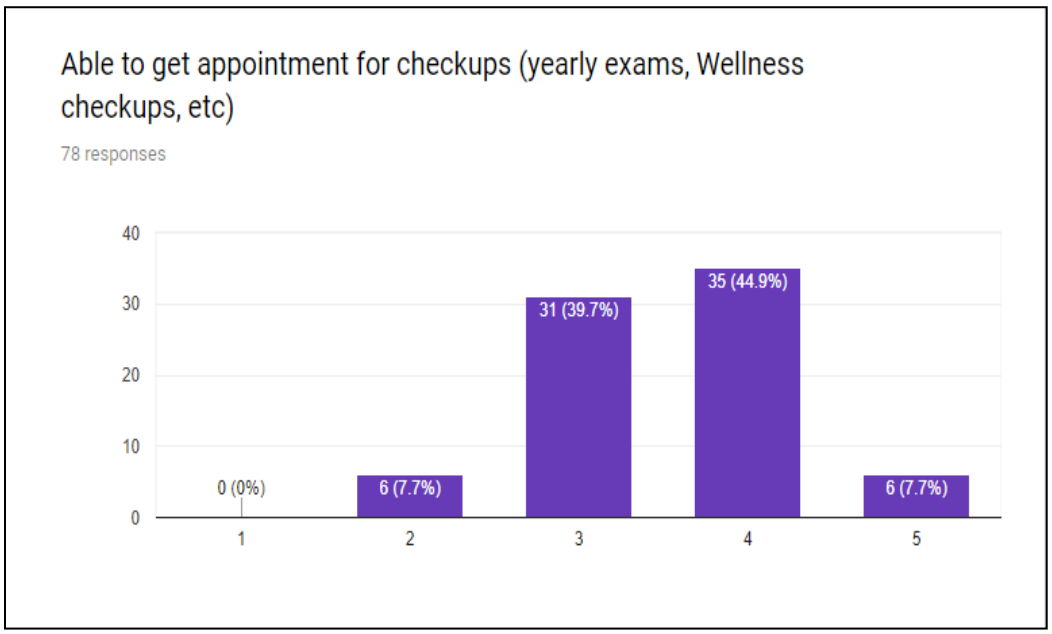
- Customers who are revisiting e-health service range about 65%
- Customers who are not revisiting e-health service range about 35%

Graph 9: Ease of using E-health service



- Customers who feel comfortable using callhealth service at the scale of 1 range about 2.5%
- Customers who feel comfortable using callhealth service at the scale of 2 range about 2.5%
- Customers who feel comfortable using callhealth service at the scale of 3 range about 13.8%
- Customers who feel comfortable using callhealth service at the scale of 4 range about 71.3%
- Customers who feel comfortable using callhealth service at the scale of 5 range about 10%

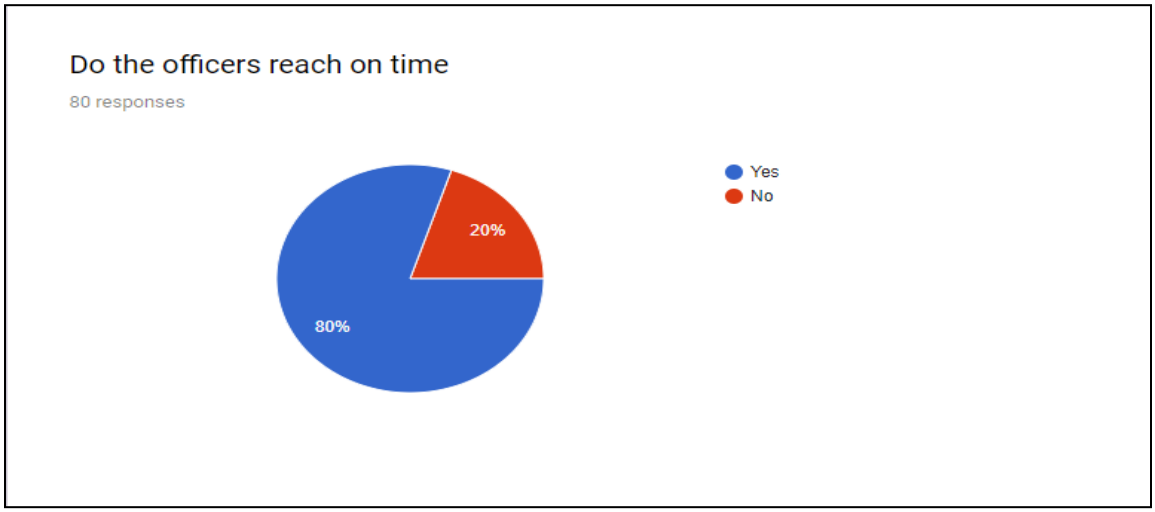
Graph 10: Ease of availing services



- Customers who get appointment easily for checkups on the scale of 1 range about 0%
- Customers who get appointment easily for checkups on the scale of 2 range about 7.7%

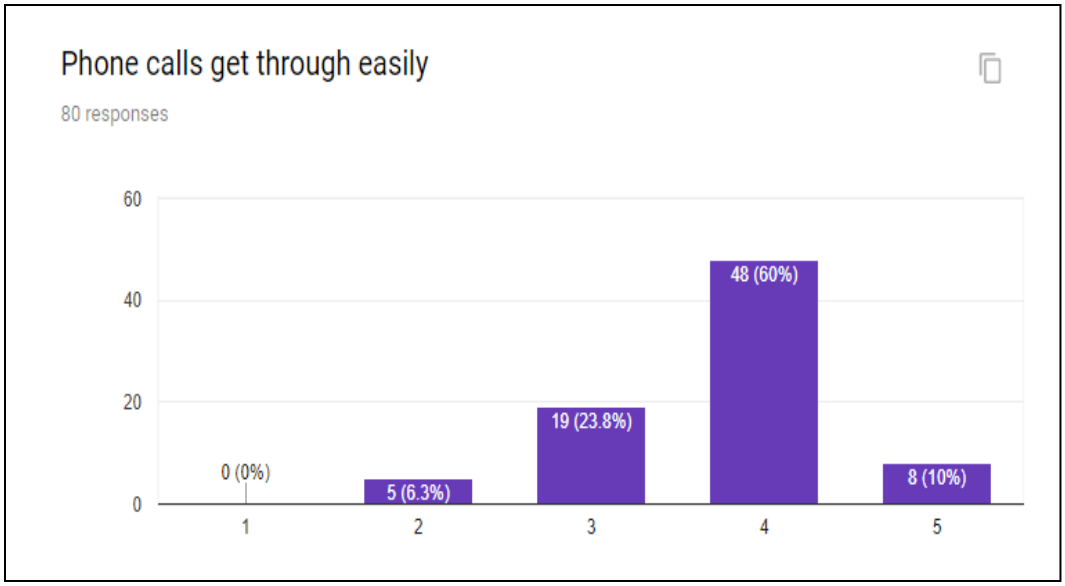
- Customers who get appointment easily for checkups on the scale of 3 range about 39.7%
- Customers who get appointment easily for checkups on the scale of 4 range about 44.9%
- Customers who get appointment easily for checkups on the scale of 5 range about 7.7%

Graph 11: Factors affecting customer perception



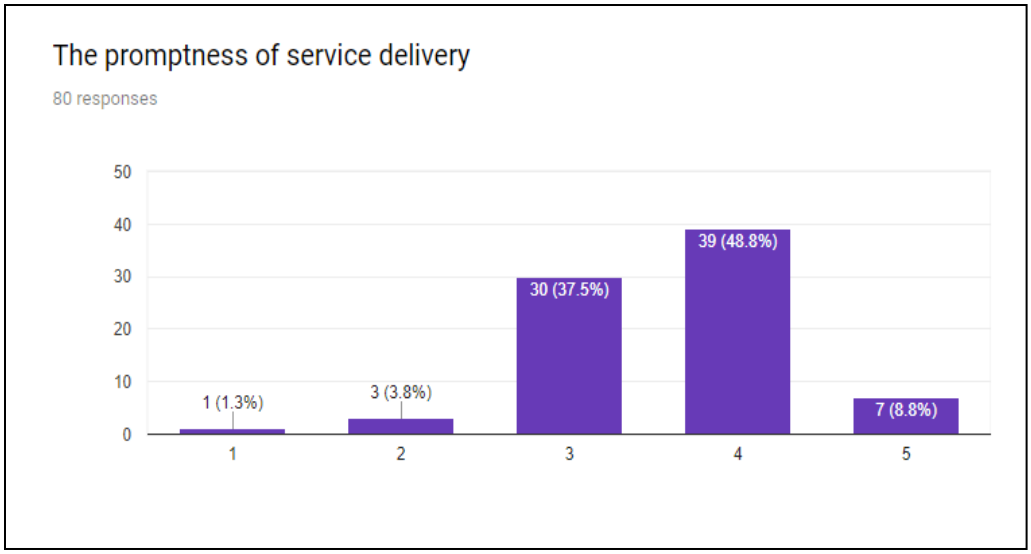
- Customers perception towards officers reaching on time range about 80%
- Customers perception towards officers not reaching on time range about 20%

Graph 12: Factors affecting customer perception



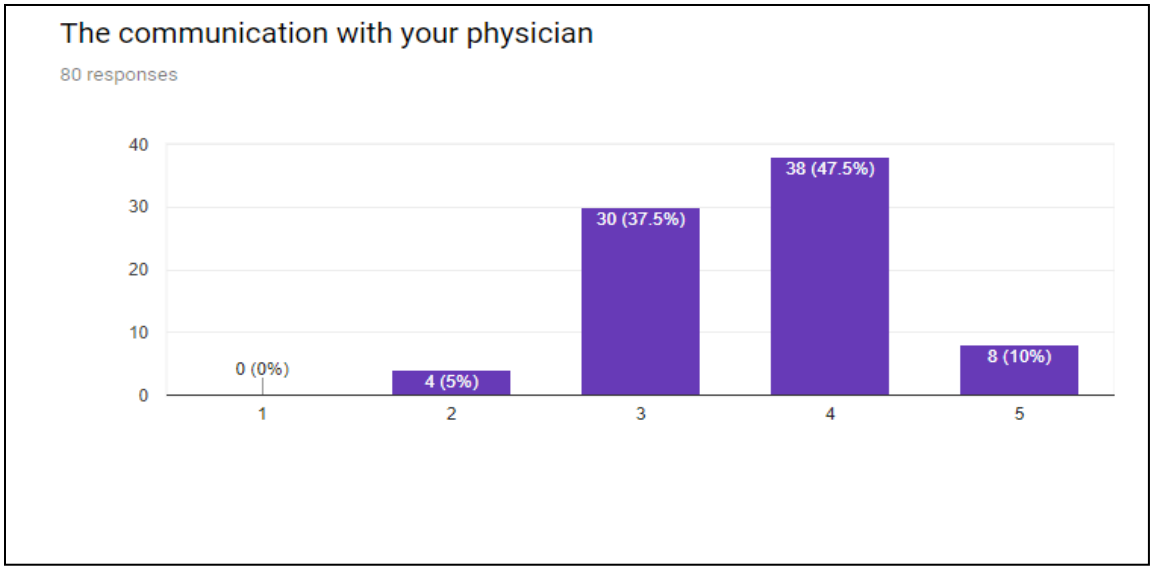
- Customer perception towards phone calls get through easily on scale of 1 range about 0%
- Customer perception towards phone calls get through easily on scale of 2 range about 6.3%
- Customer perception towards phone calls get through easily on scale of 3 range about 23.8%
- Customer perception towards phone calls get through easily on scale of 4 range about 60%
- Customer perception towards phone calls get through easily on scale of 5 range about 10%

Graph 13: Factors affecting customer perception



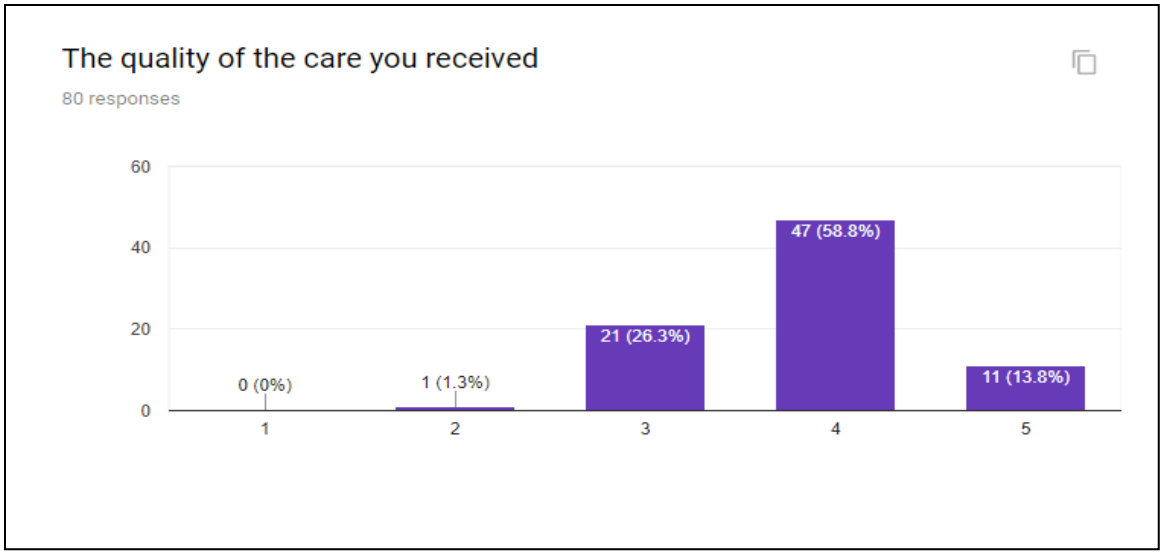
- Customer perception towards promptness of service delivery on the scale of 1 range about 1.3%
- Customer perception towards promptness of service delivery on the scale of 2 range about 3.8%
- Customer perception towards promptness of service delivery on the scale of 3 range about 37.5%
- Customer perception towards promptness of service delivery on the scale of 4 range about 48.8%
- Customer perception towards promptness of service delivery on the scale of 5 range about 8.8%

Graph 14: Factors affecting customer perception



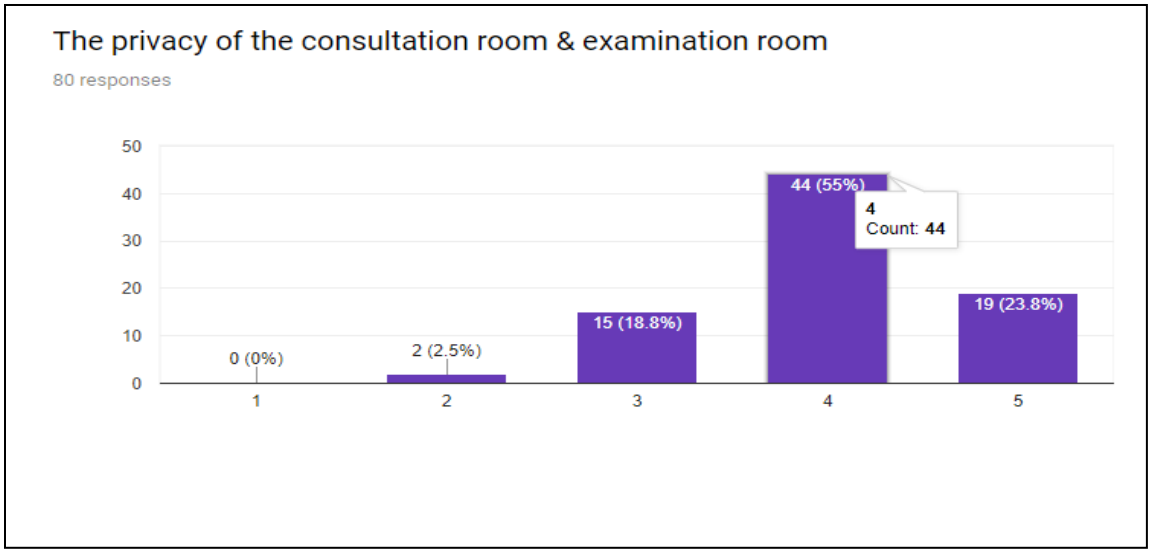
- Customer perception towards communication with physician on the scale of 1 range about 0%
- Customer perception towards communication with physician on the scale of 2 range about 5%
- Customer perception towards communication with physician on the scale of 3 range about 37.5%
- Customer perception towards communication with physician on the scale of 4 range about 47.5%
- Customer perception towards communication with physician on the scale of 5 range about 10%

Graph 15: Factors affecting customer perception



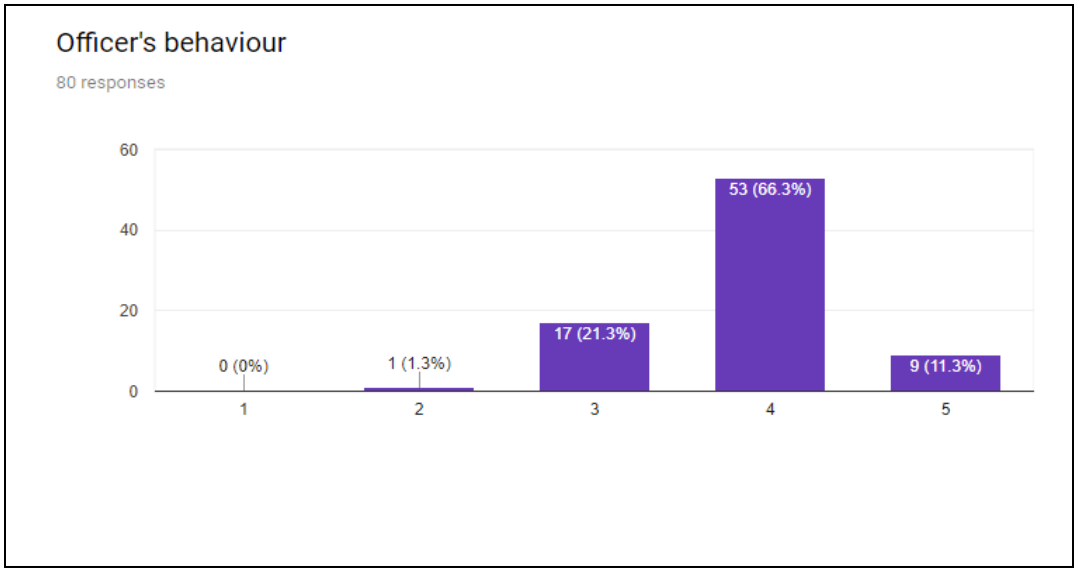
- Customer perception towards quality of care they received on the scale of 1 range about 0%
- Customer perception towards quality of care they received on the scale of 2 range about 1.3%
- Customer perception towards quality of care they received on the scale of 3 range about 26.3%
- Customer perception towards quality of care they received on the scale of 4 range about 58.8%
- Customer perception towards quality of care they received on the scale of 5 range about 13.8%

Graph 16: Factors affecting customer perception



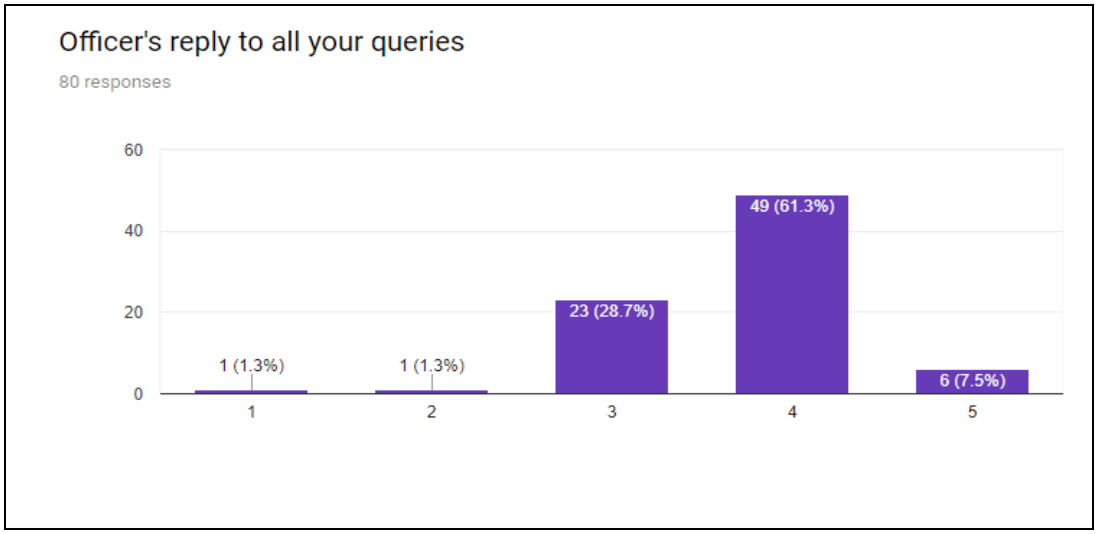
- Customer perception towards privacy of consultation and examination room on the scale of 1 is about 0%
- Customer perception towards privacy of consultation and examination room on the scale of 2 is about 2.5%
- Customer perception towards privacy of consultation and examination room on the scale of 3 is about 18.8%
- Customer perception towards privacy of consultation and examination room on the scale of 4 is about 55%
- Customer perception towards privacy of consultation and examination room on the scale of 5 is about 23.8%

Graph 17: Factors affecting customer perception



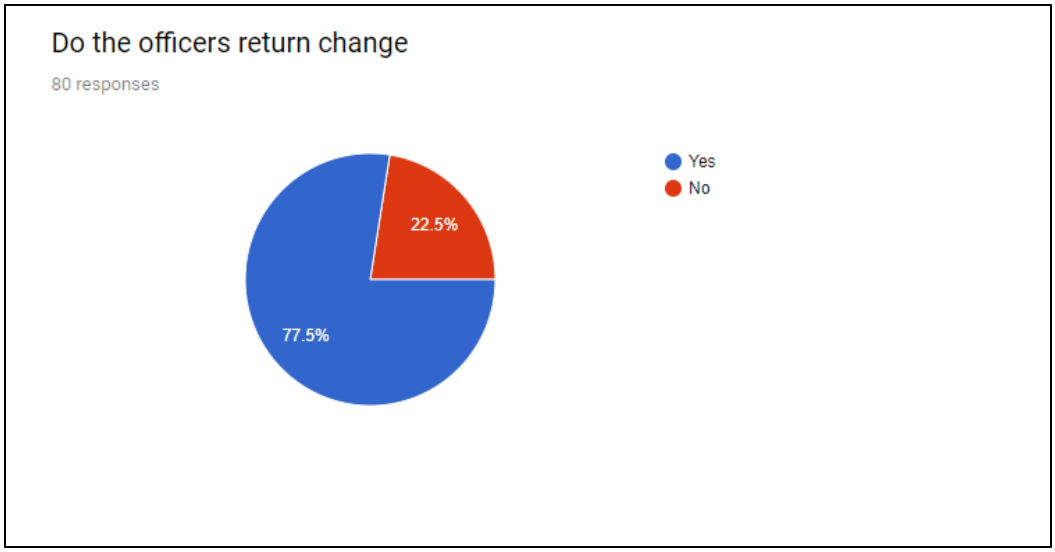
- Customer perception towards officer behavior on the scale of 1 range about 0%
- Customer perception towards officer behavior on the scale of 2 range about 1.3%
- Customer perception towards officer behavior on the scale of 3 range about 21.3%
- Customer perception towards officer behavior on the scale of 4 range about 66.3%
- Customer perception towards officer behavior on the scale of 5 range about 11.3%

Graph 18: Factors affecting customer perception



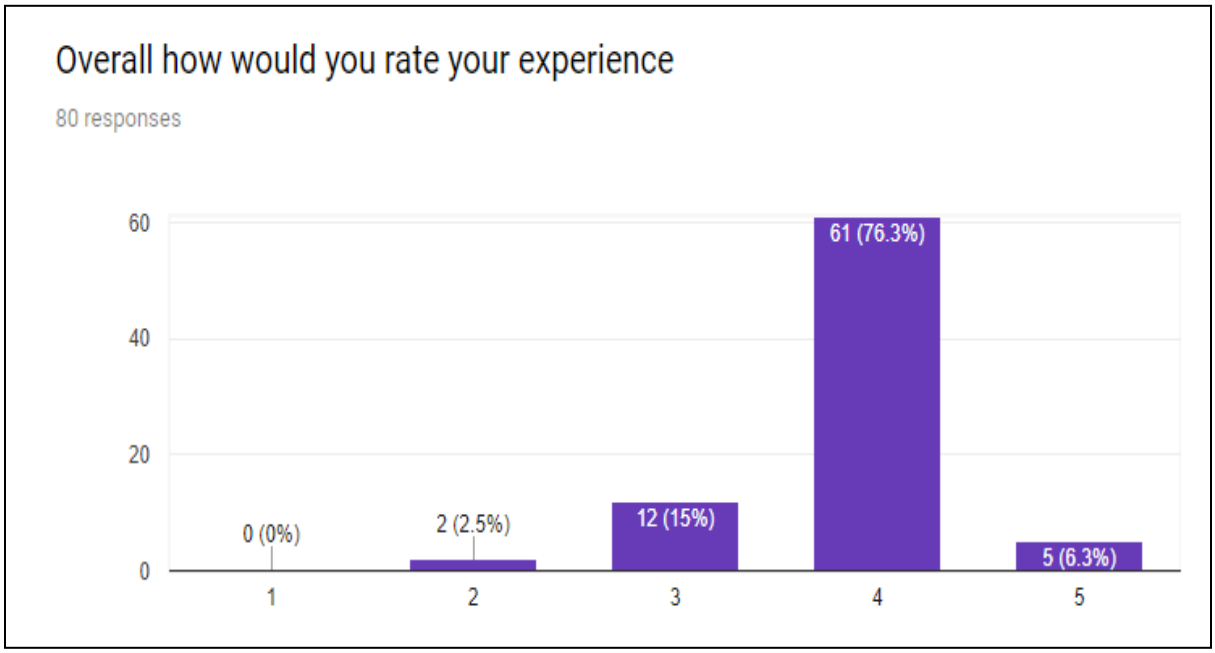
- Customer perception towards officer's reply to their queries on the scale of 1 range about 1.3%
- Customer perception towards officer's reply to their queries on the scale of 2 range about 1.3%
- Customer perception towards officer's reply to their queries on the scale of 3 range about 28.7%
- Customer perception towards officer's reply to their queries on the scale of 4 range about 61.3%
- Customer perception towards officer's reply to their queries on the scale of 5 range about 7.5%

Graph 19: Factors affecting customer perception



- Customer perception towards officer returning change range about 77.5%
- Customer perception towards officer not returning change range about 22.5%

Graph 20: Overall Customer Experience



- Customer experience towards callhealth service on the scale of 1 is about 0%

- Customer experience towards callhealth service on the scale of 2 is about 2.5%
- Customer experience towards callhealth service on the scale of 3 is about 15%
- Customer experience towards callhealth service on the scale of 4 is about 76.3%
- Customer experience towards callhealth service on the scale of 5 is about 6.3%

Table 2 Response of customers towards E-Healthcare Service Delivery.

S. No	Level of Satisfaction	No. of Respondents	Percentage
1	Excellent	5	6.3
2	Good	61	76.3
3	Average	12	15
4	Poor	2	2.5
5	Bad	0	0
	Total	80	100

Source: Field Analysis

Analysis:

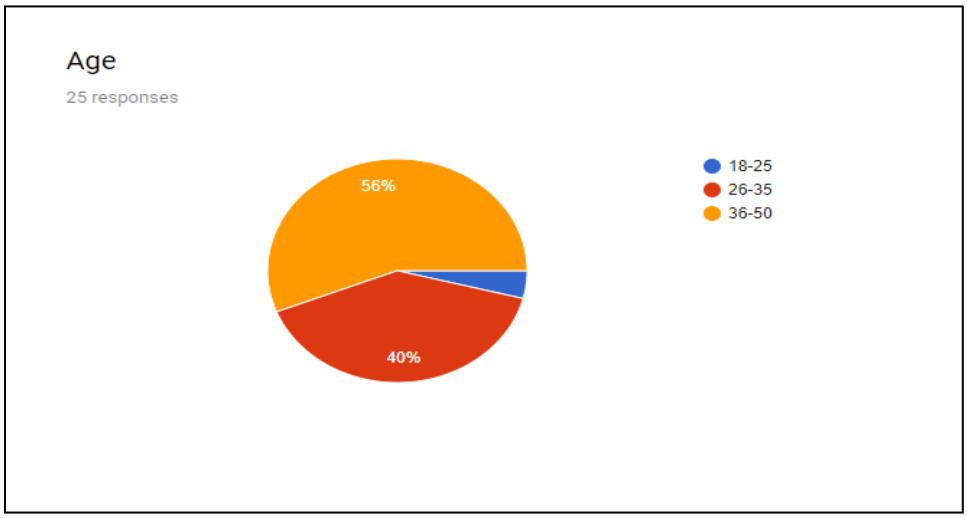
About 76.3 per cent of the customers feel that e-healthcare services are comfortable and convenient while 2.5 per cent feel that it is little cumbersome.

Interpretation:

E-Healthcare services help customers to avail the benefits of diagnostics and consultation at their doorstep and highly motivate and brings a positive change in their behavior towards using such services thereby increasing the productivity of the organization.

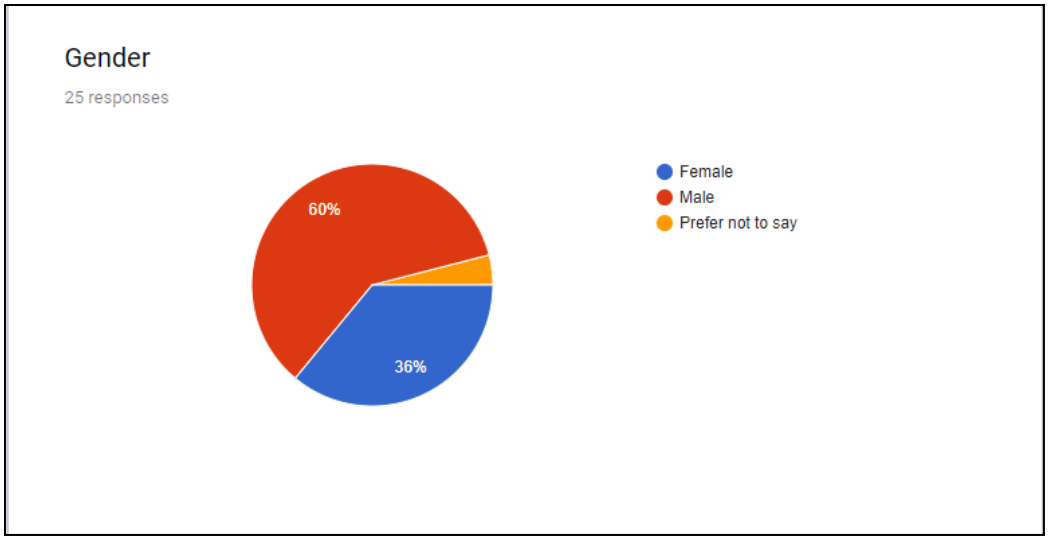
8.2: Doctor Survey Report

Graph 21: Demographics of Doctors rendering services



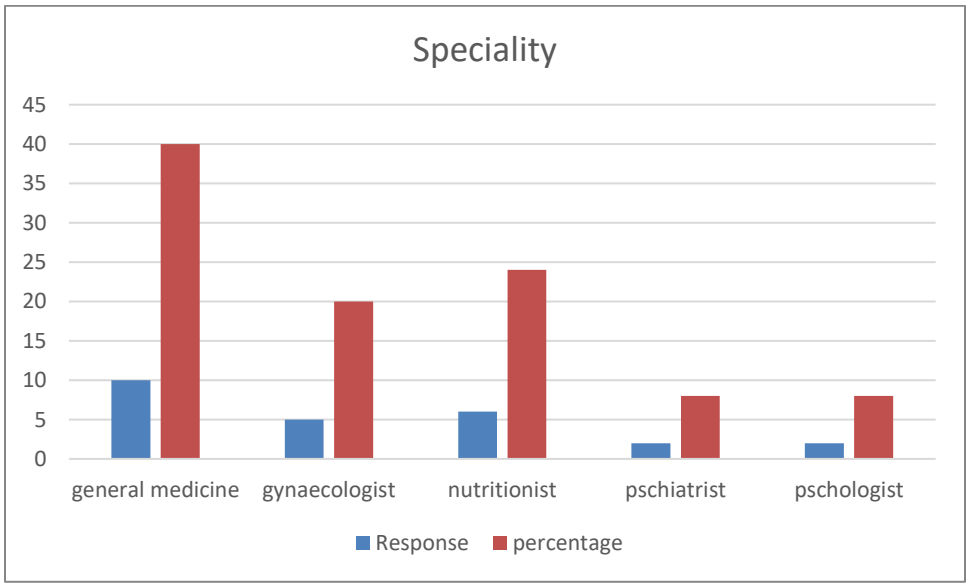
- Doctors rendering service from age group 18-25yrs is about 4%
- Doctors rendering service from age group 26-35yrs is about 40%
- Doctors rendering service from age group 36-50yrs is about 56%

Graph 22: Demographics of Doctors rendering services



- Doctors rendering services to females is about 36%
- Doctors rendering services to males is about 60%
- Doctors rendering services to prefer not to say category is about 4%

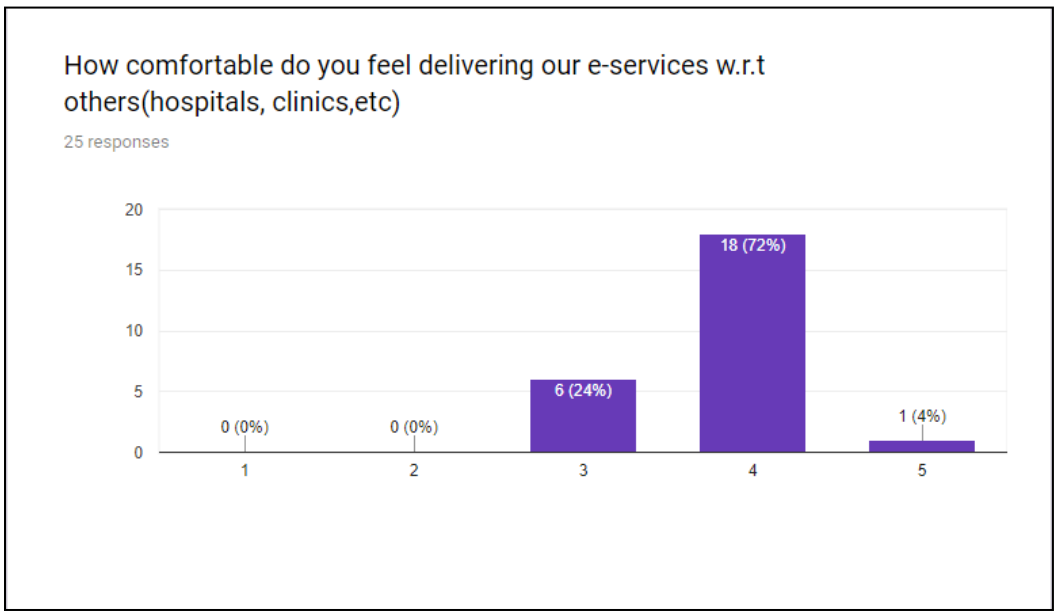
Graph 23: Specialties available for consultation



- General medicine speciality for e- consultation range about 40%
- Gynecologist speciality for e- consultation range about 20%
- Nutritionist speciality for e- consultation range about 24%

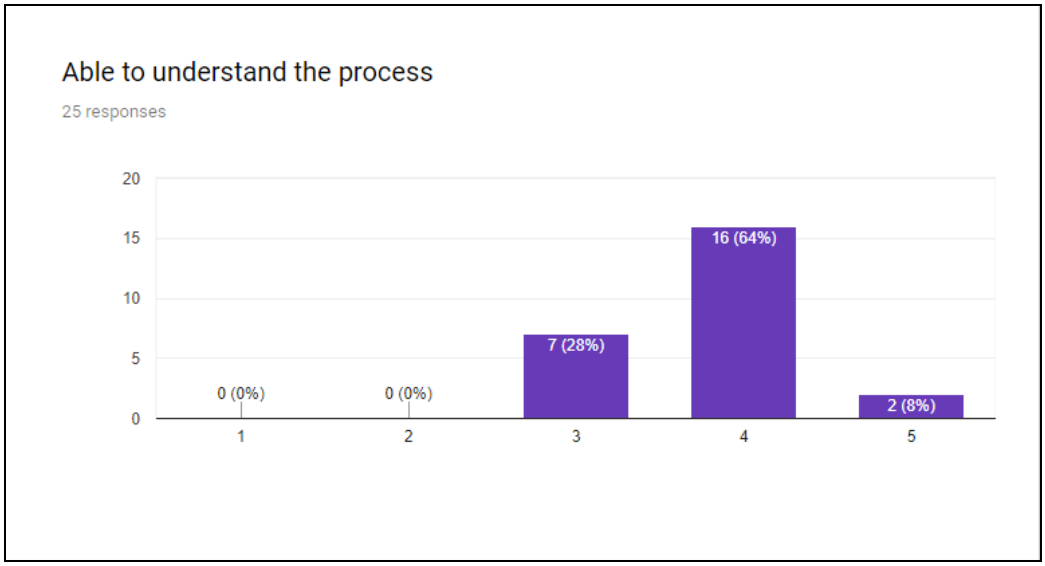
- Psychiatrist speciality for e- consultation range about 8%
- Psychologist speciality for e- consultation range about 8%

Graph 24: Ease of using E-Healthcare



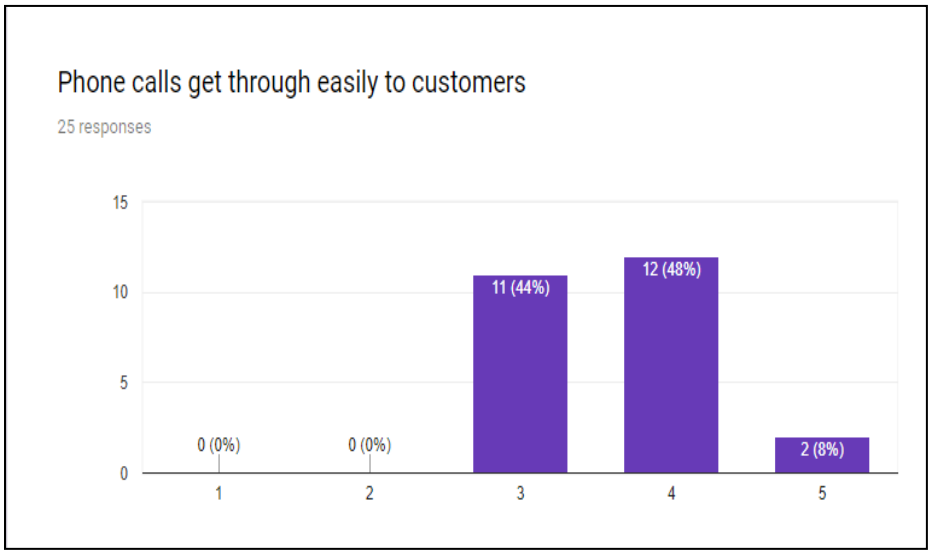
- Doctor feeling comfortable using e- service on a scale of 1 is about 0%
- Doctor feeling comfortable using e- service on a scale of 2 is about 0%
- Doctor feeling comfortable using e- service on a scale of 3 is about 24%
- Doctor feeling comfortable using e- service on a scale of 4 is about 72%
- Doctor feeling comfortable using e- service on a scale of 5 is about 4%

Graph 25: Ease of using E-Healthcare



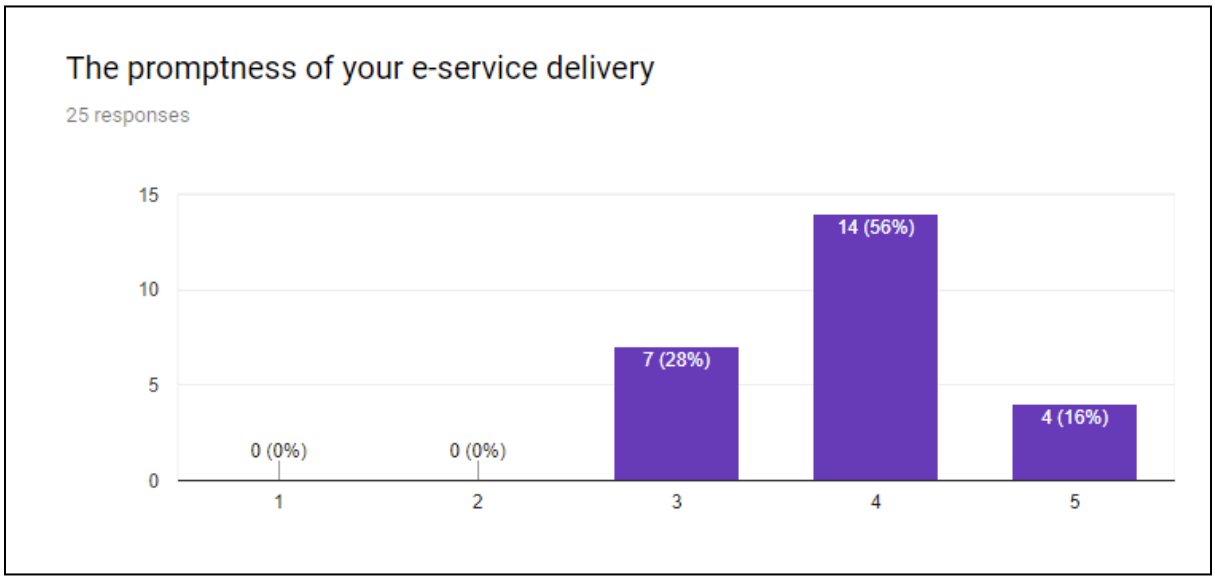
- Doctors able to understand the process on a scale of 1 is about 0%
- Doctors able to understand the process on a scale of 2 is about 0%
- Doctors able to understand the process on a scale of 3 is about 28%
- Doctors able to understand the process on a scale of 4 is about 64%
- Doctors able to understand the process on a scale of 5 is about 8%

Graph 26: Factors affecting service delivery



- Doctors perception towards phone calls get through easily to customers on a scale of 1 is about 0%
- Doctors perception towards phone calls get through easily to customers on a scale of 2 is about 0%
- Doctors perception towards phone calls get through easily to customers on a scale of 3 is about 44%
- Doctors perception towards phone calls get through easily to customers on a scale of 4 is about 48%
- Doctors perception towards phone calls get through easily to customers on a scale of 5 is about 8%

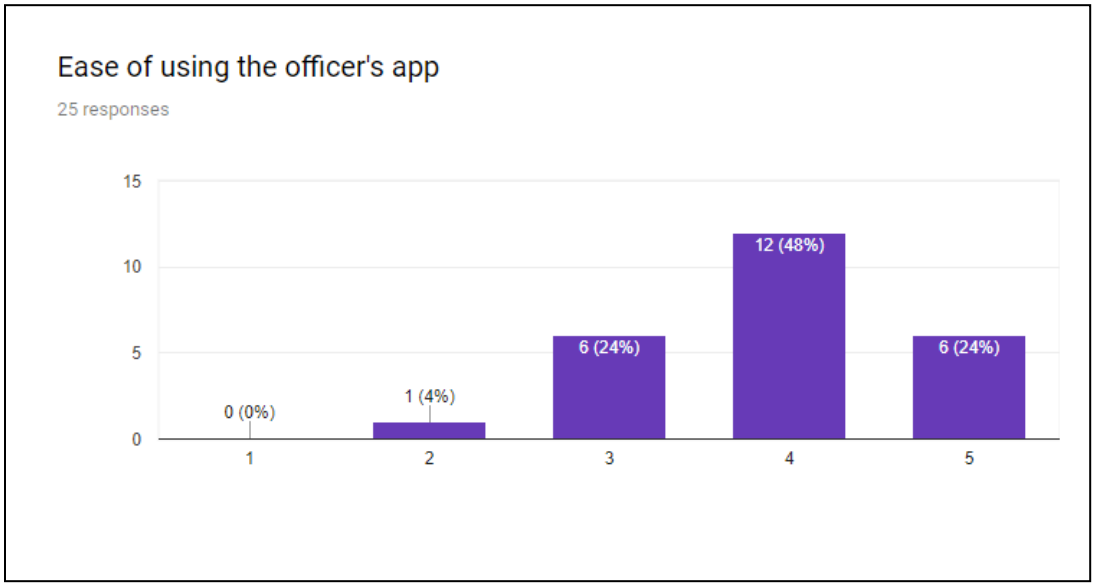
Graph 27: Ease of using E-Healthcare



- Doctor perception towards e- service delivery on a scale of 1 is about 0%
- Doctor perception towards e- service delivery on a scale of 2 is about 0%
- Doctor perception towards e- service delivery on a scale of 3 is about 28%
- Doctor perception towards e- service delivery on a scale of 4 is about 56%

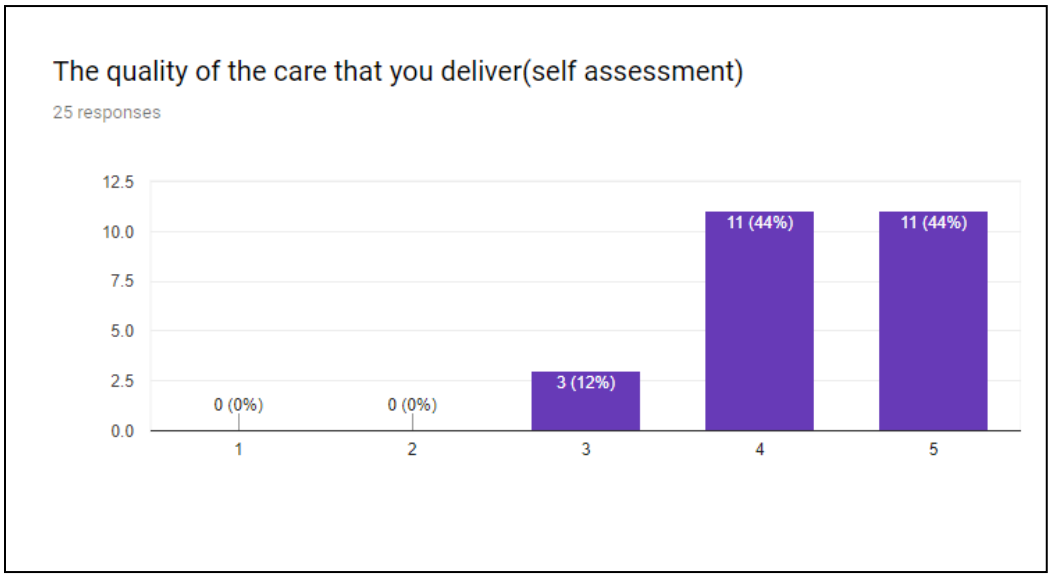
- Doctor perception towards e- service delivery on a scale of 5 is about 16%

Graph 28: Ease of using E-Healthcare



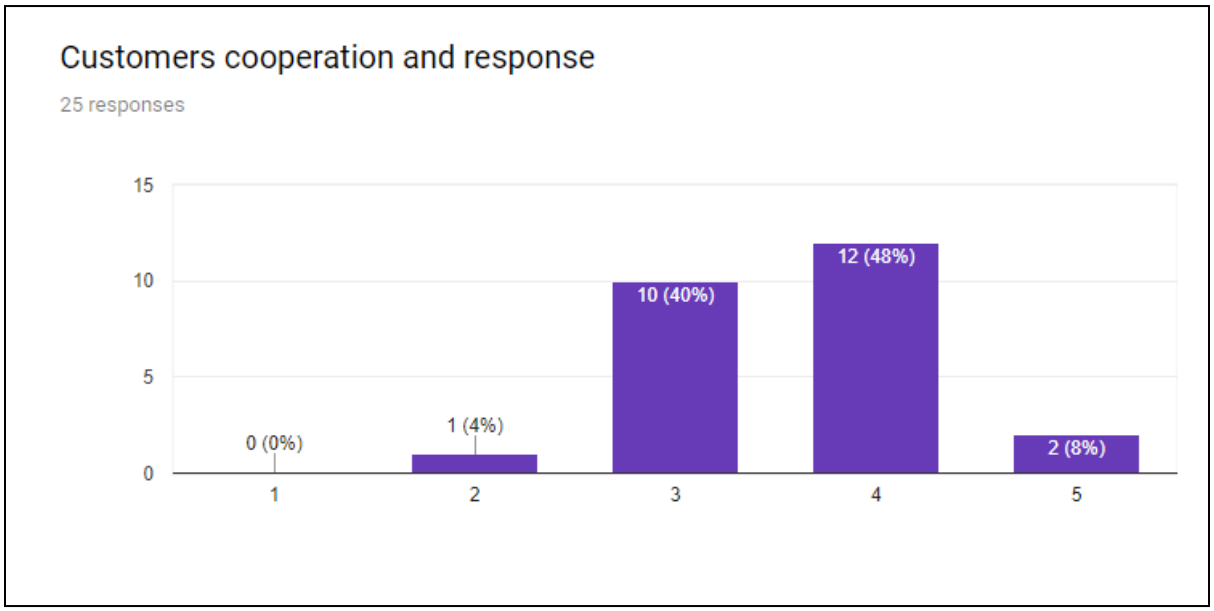
- Ease of using officer's app on a scale of 1 is about 0%
- Ease of using officer's app on a scale of 2 is about 0%
- Ease of using officer's app on a scale of 3 is about 24%
- Ease of using officer's app on a scale of 4 is about 48%
- Ease of using officer's app on a scale of 5 is about 24%

Graph 29: Self-Assessment of respective service delivery



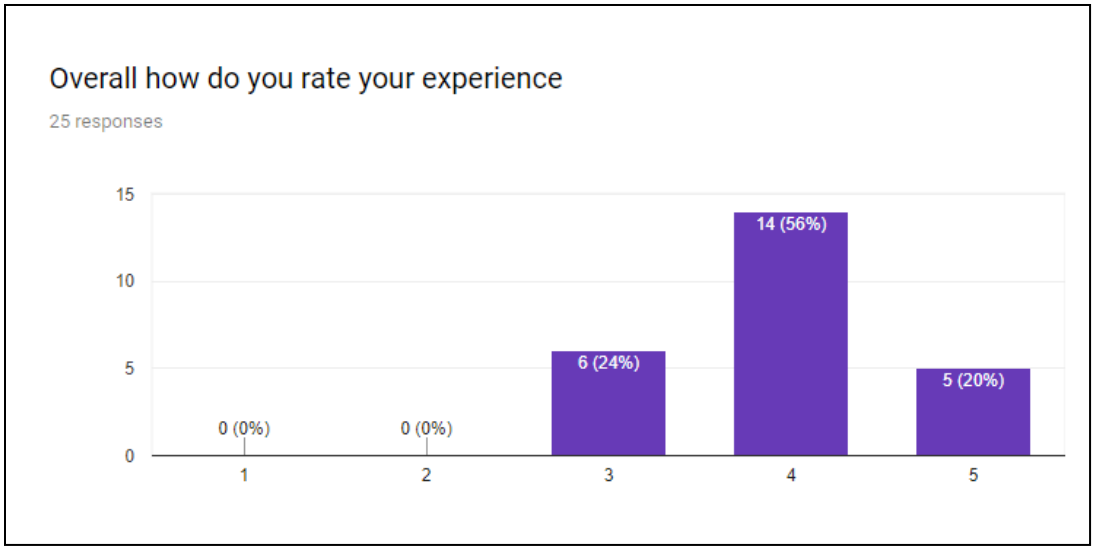
- Doctors who feel quality of care they deliver to customers on a scale of 1 is about 0%
- Doctors who feel quality of care they deliver to customers on a scale of 2 is about 0%
- Doctors who feel quality of care they deliver to customers on a scale of 3 is about 12%
- Doctors who feel quality of care they deliver to customers on a scale of 4 is about 44%
- Doctors who feel quality of care they deliver to customers on a scale of 5 is about 44%

Graph 30: Factors affecting service delivery



- Doctors perception towards customer cooperation and response on a scale of 1 is about 0%
- Doctors perception towards customer cooperation and response on a scale of 2 is about 4%
- Doctors perception towards customer cooperation and response on a scale of 3 is about 40%
- Doctors perception towards customer cooperation and response on a scale of 4 is about 48%
- Doctors perception towards customer cooperation and response on a scale of 5 is about 8%

Graph 31: Overall Experience of Doctors



- Doctor experience on a scale of 1 is about 0%
- Doctor experience on a scale of 2 is about 0%
- Doctor experience on a scale of 3 is about 24%
- Doctor experience on a scale of 4 is about 56%
- Doctor experience on a scale of 5 is about 20%

Table3: Response of Doctors towards E-Healthcare Service Delivery.

S. No	Level of Satisfaction	No. of Respondents	Percentage
1	Excellent	5	20
2	Good	14	56
3	Average	6	24
4	Poor	0	0
5	Bad	0	0
	Total	25	100

Source: Field Analysis

Analysis:

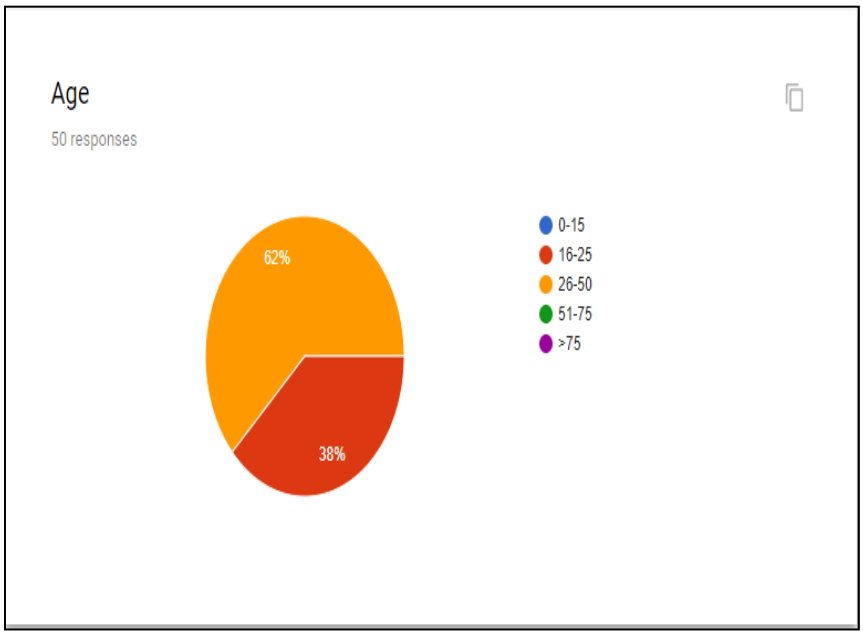
About 56 per cent of the doctors who deliver e-services feel comfortable and convenient while 24 per cent feel them still find it difficult to handle.

Interpretation:

E-Healthcare services help doctors adopt to the new technological advances and avail the benefits of providing consultation to customers across different locations comfortably from a single location.

8.3: Officer Survey Report

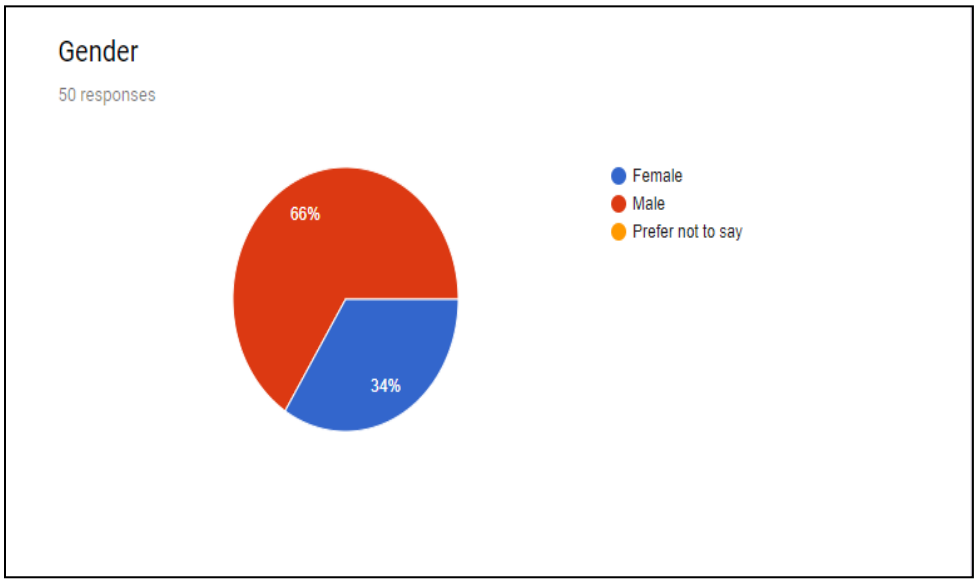
Graph 32: Demographics of Officers rendering services



- Officers rendering service from age group to 0-15yrs is about 0%
- Officers rendering service from age group to 16-25yrs is about 38%

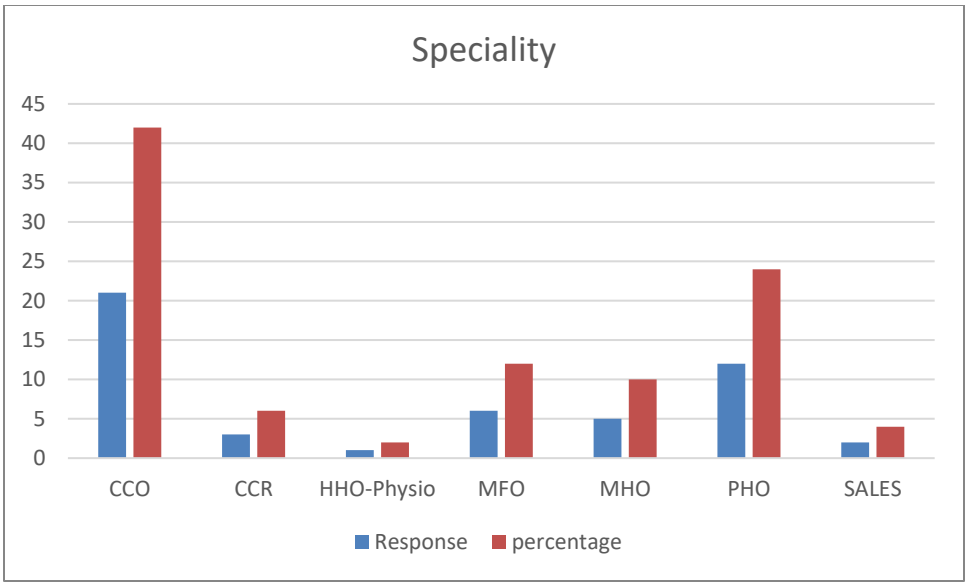
- Officers rendering service from age group to 26-50yrs is about 62%
- Officers rendering service from age group to 51-75yrs is about 0%
- Officers rendering service from age group to more than 75yrs is about 0%

Graph 33: Demographics of Officers rendering services



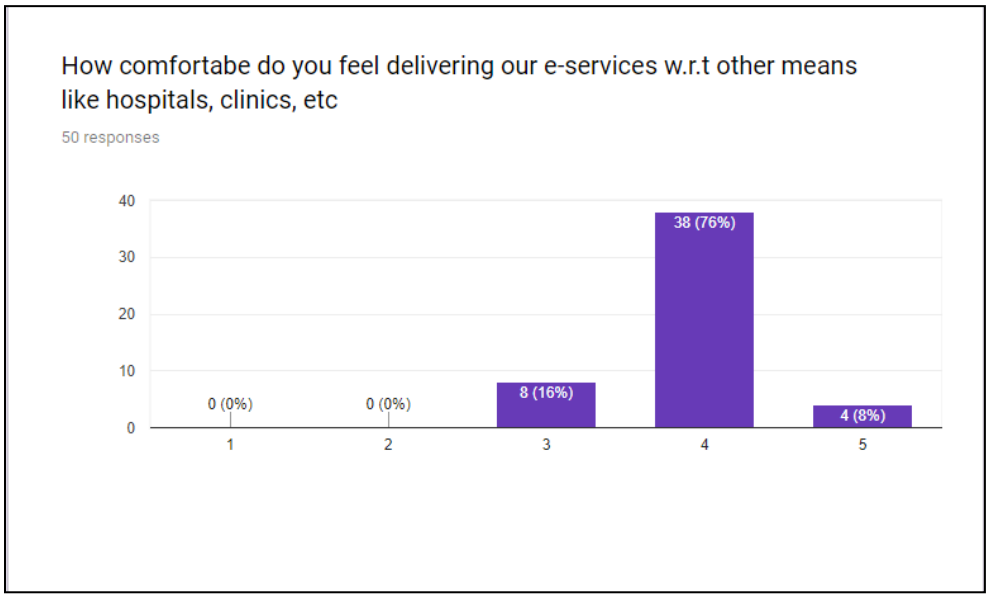
- Officer rendering service to females is about 34%
- Officer rendering service to females is about 65%
- Officer rendering service to prefer not to say category is about 0%

Graph 34: Specialties served by Officers



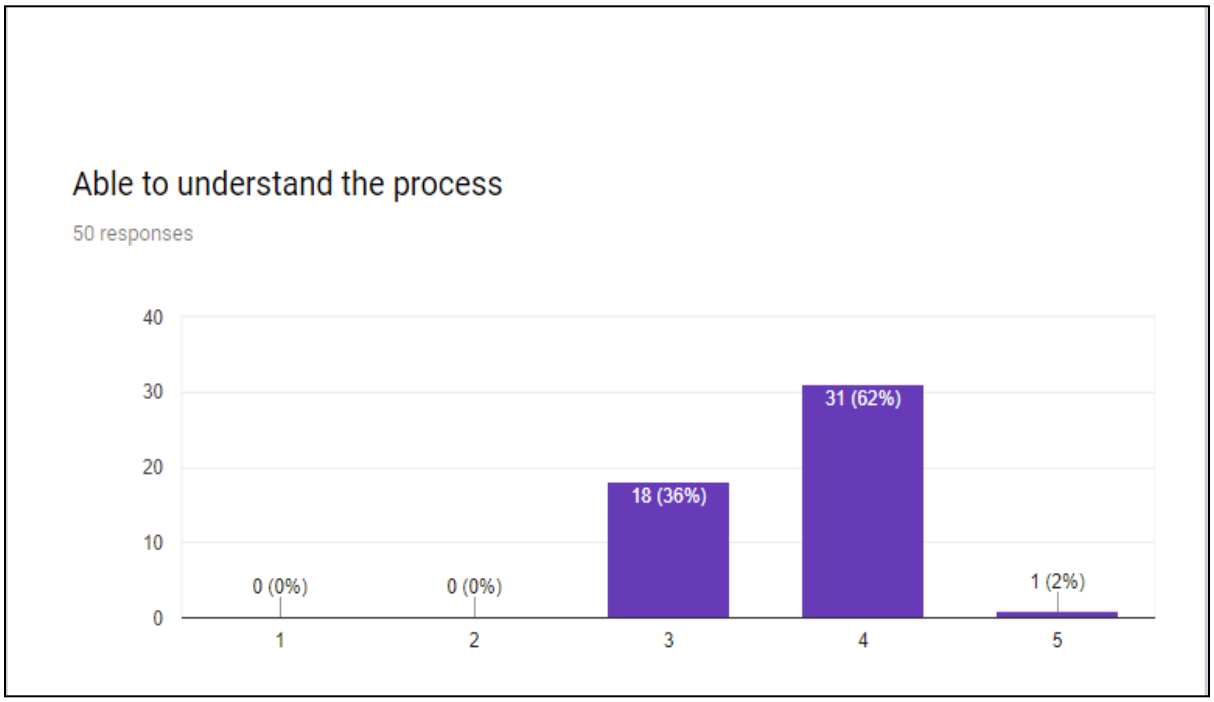
- CCO specialty has percentage about 42%
- CCR specialty has percentage about 6%
- HHO- Physio specialty has percentage about 2%
- MFO specialty has percentage about 12%
- MHO specialty has percentage about 10%
- PHO specialty has percentage about 24%
- Sales has percentage about 4%

Graph 35: Officer Satisfaction



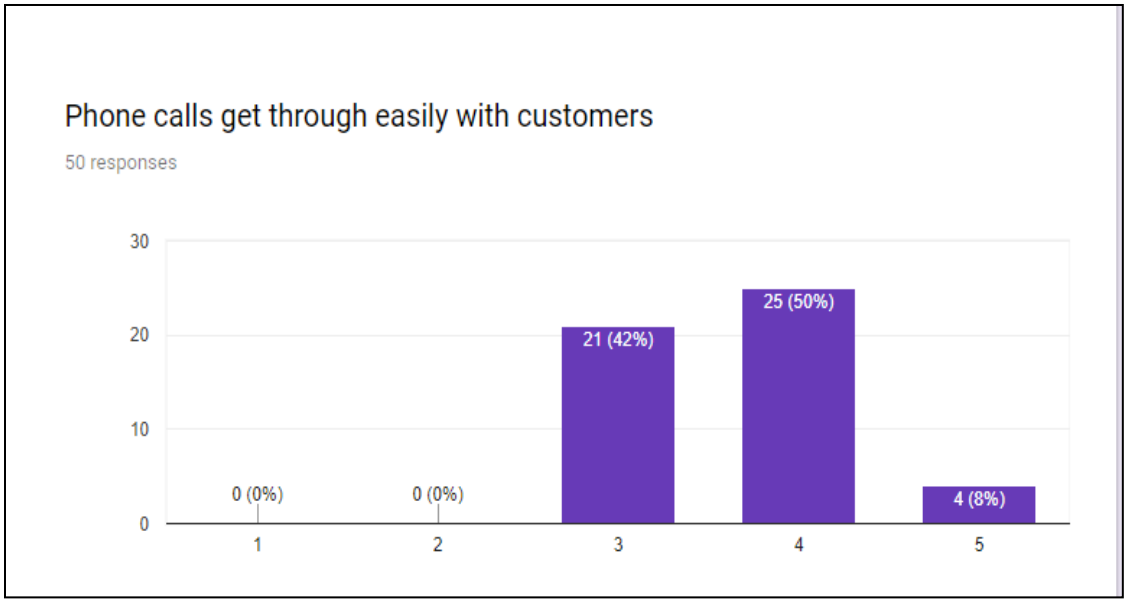
- Officer satisfaction towards delivering e-service on a scale of 1 is about 0%
- Officer satisfaction towards delivering e-service on a scale of 2 is about 0%
- Officer satisfaction towards delivering e-service on a scale of 3 is about 16%
- Officer satisfaction towards delivering e-service on a scale of 4 is about 76%
- Officer satisfaction towards delivering e-service on a scale of 5 is about 8%

Graph 36: Factors affecting service delivery

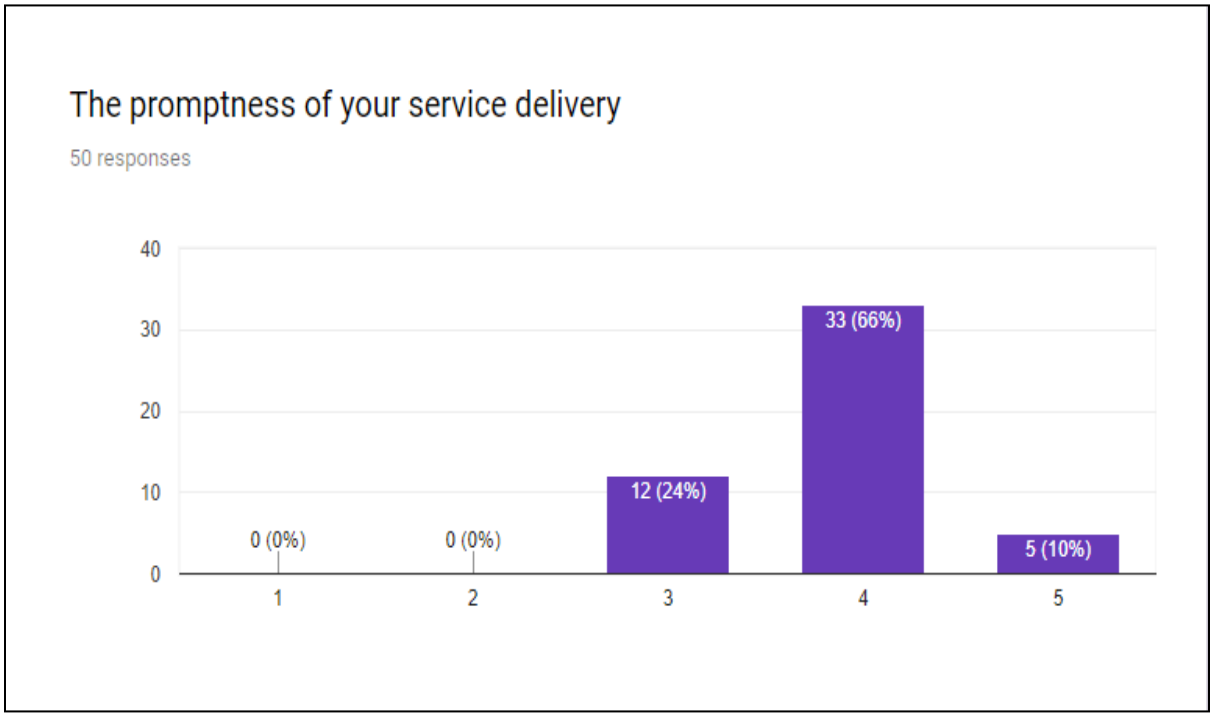


- Officer are able to understand the process on a scale of 1 is about 0%
- Officer are able to understand the process on a scale of 2 is about 0%
- Officer are able to understand the process on a scale of 3 is about 36%
- Officer are able to understand the process on a scale of 4 is about 62%
- Officer are able to understand the process on a scale of 5 is about 2%

Graph 37: Factors affecting service delivery



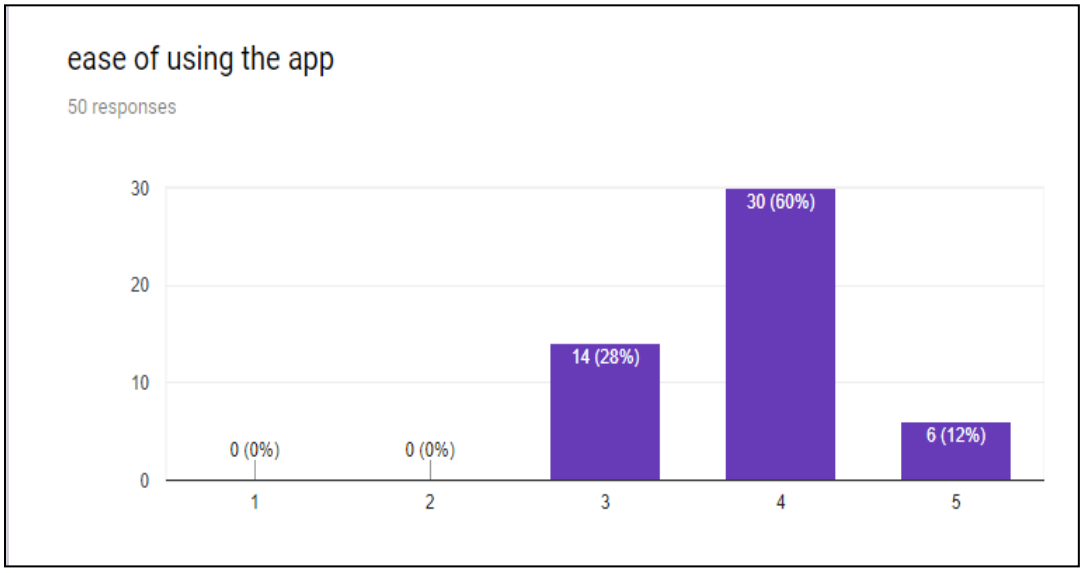
Graph 38: Factors affecting service delivery



- Officer perception towards promptness to service delivery on a scale of 1 is about 0%
- Officer perception towards promptness to service delivery on a scale of 2 is about 0%

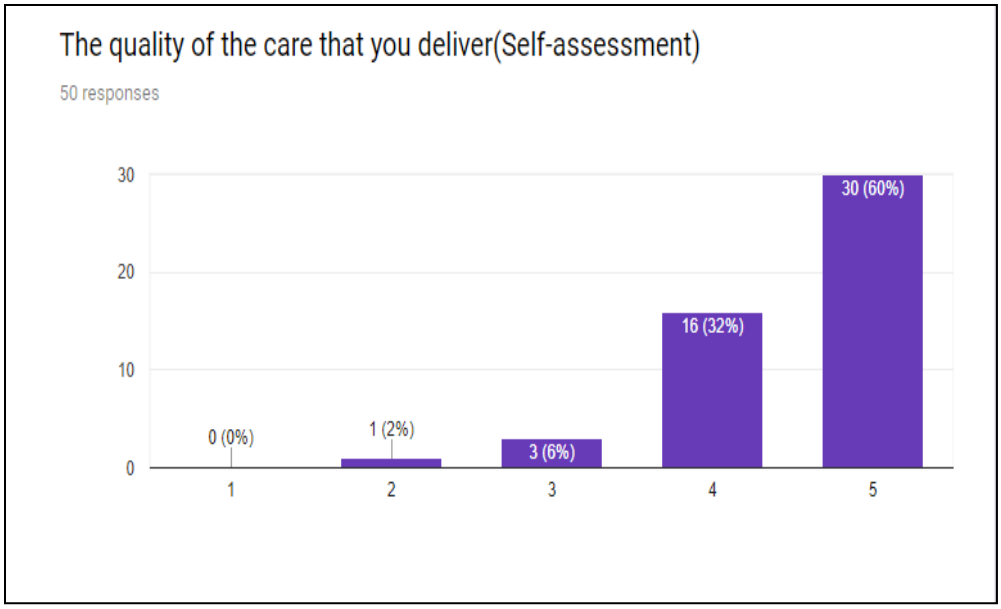
- Officer perception towards promptness to service delivery on a scale of 3 is about 24%
- Officer perception towards promptness to service delivery on a scale of 4 is about 66%
- Officer perception towards promptness to service delivery on a scale of 5 is about 10%

Graph 39: Factors affecting service delivery



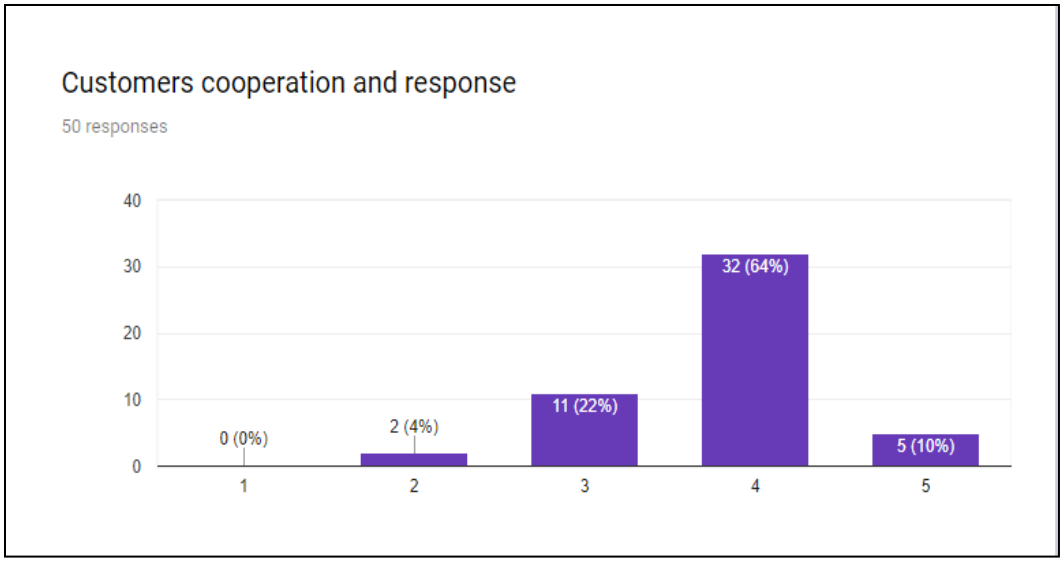
- Officer perception towards ease of using the app on a scale of 1 is about 0%
- Officer perception towards ease of using the app on a scale of 2 is about 0%
- Officer perception towards ease of using the app on a scale of 3 is about 28%
- Officer perception towards ease of using the app on a scale of 4 is about 60%
- Officer perception towards ease of using the app on a scale of 5 is about 12%

Graph 40: Self-Assessment of Officers towards service delivery



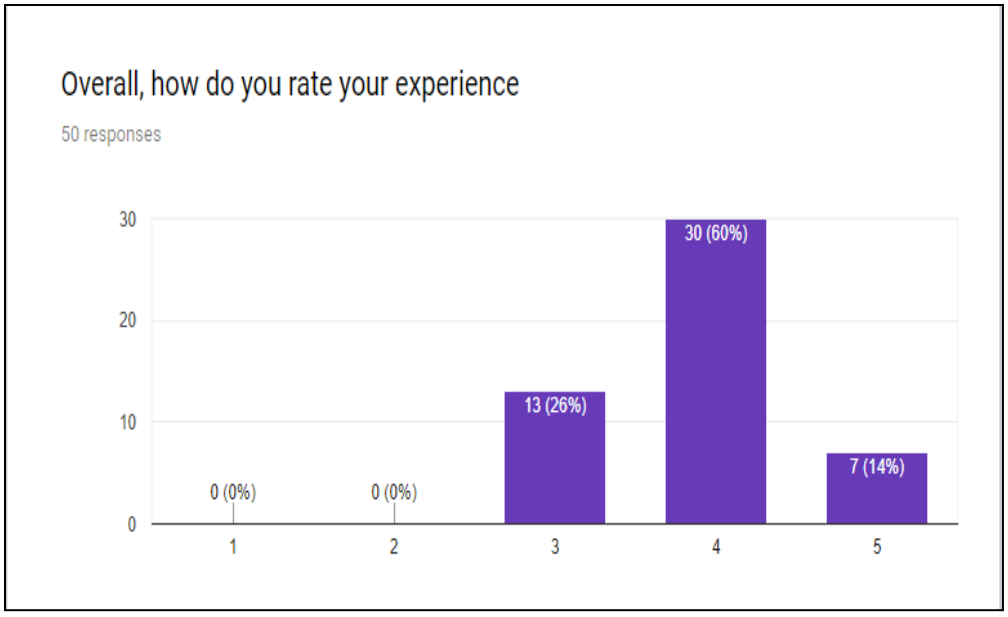
- Officer rate their service delivery on a scale of 1 is about 0%
- Officer rate their service delivery on a scale of 2 is about 2%
- Officer rate their service delivery on a scale of 3 is about 6%
- Officer rate their service delivery on a scale of 4 is about 32%
- Officer rate their service delivery on a scale of 5 is about 60%

Graph 41: Factors affecting service delivery



- Officer perception towards customers cooperation and response on a scale of 1 is about 0%
- Officer perception towards customers cooperation and response on a scale of 2 is about 4%
- Officer perception towards customers cooperation and response on a scale of 3 is about 22%
- Officer perception towards customers cooperation and response on a scale of 4 is about 64%
- Officer perception towards customers cooperation and response on a scale of 5 is about 10%

Graph 42: Overall Customer Experience



- Officer rated their experience on a scale of 1 is about 0%
- Officer rated their experience on a scale of 2 is about 0%
- Officer rated their experience on a scale of 3 is about 26%
- Officer rated their experience on a scale of 4 is about 60%
- Officer rated their experience on a scale of 5 is about 14%

Table 4: Response of Officers towards E-Healthcare Service Delivery.

S. No	Level of Satisfaction	No. of Respondents	Percentage
1	Excellent	7	14
2	Good	30	60
3	Average	13	26
4	Poor	0	0
5	Bad	0	0
	Total	50	100

Source: Field Analysis

Analysis:

About 60 per cent of the officers feel that e-healthcare services are comfortable to deliver and help them earn more working for less time while 26 per cent feel that it is difficult to travel to remote locations and customers do not receive them well.

Interpretation:

E-Healthcare services help officers earn more compared to other means of delivery i.e.; at hospitals and diagnostics centers but the inaccessible locations and hostile nature of the customers is a major hindrance.

Call centre officers find it difficult to explain to customers that Turn-Around-Time will vary as per the service availed and officers are not responsible for it.

SUMMARY OF FINDINGS, SUGGESTIONS

9.1: Findings:

Benefits can be described in the form of 10 e's in "e-Health"

- **Efficiency:** One of the promises of e-Health is to increase efficiency in health care, thereby decreasing costs. One possible way of decreasing costs would be avoiding duplicative or unnecessary diagnostic or therapeutic interventions, through enhanced communication possibilities between health care establishments, and through patient involvement.
- **Enhancing Quality:** Increasing efficiency involves not only reducing costs, but at the same time improving quality. e-Health may enhance the quality of health care by allowing comparisons between different providers, involving consumers as additional power for quality assurance, and directing patient streams to the best quality providers.
- **Evidence based:** e-Health interventions should be evidence based in a sense that their effectiveness and efficiency should not be assumed but proven by rigorous evaluation.
- **Empowerment of consumers and patients:** By making the knowledge bases of medicine and personal electronic records accessible to consumers over the internet, e-Health opens new avenues for patient centered medicine and enables evidence based patient choice.
- **Encouragement:** A new relationship between the patient and health professional, towards a true partnership, where decisions are made in a shared manner is developed.
- **Education:** The physicians are educated through online resources like medical education and consumers like health education, preventive information etc.
- **Enabling** information exchange and communication in a standardized way between health care establishments.
- **Extending:** The scope of health care is extended beyond its conventional boundaries. It means both in geographical and conceptual sense, e-Health enables consumers to easily obtain health services online from global providers.

- **Ethics:** e-Health involves new forms of patient-physician interaction and poses new challenges and threats to ethical issues such as online professional practice, informed consent, privacy and equity issues.
- **Equity:** To make health more equitable is one of the promises of e-Health. People who do not have money, skills, and access to computers and networks cannot use computers effectively. As a result, these patient populations are those who are least likely to benefit from advances in information technology, unless political measures ensure equitable access for all.

9.2: Suggestions:

E-Health is expected to improve various aspects of healthcare (quality, cost-efficiency, access, etc.) by:

- Supporting the delivery of care tailored to individual patients, where ICT enables more informed decision making based both on evidence and patient-specific data;
- Improving transparency and accountability of care processes and facilitating shared care across boundaries;
- Aiding evidence-based practice and error reduction;
- Improving diagnostic accuracy and treatment appropriateness;
- Improving access to effective healthcare by reducing barriers created, for example, by physical location or disability;
- Facilitating patient empowerment for self-care and health decision making;
- Improving cost-efficiency by streamlining processes, reducing waiting times and waste.
- R&D will need to address human and organisational factors affecting implementation, from the perspectives of both health service staff and consumers (patients and citizens). Evaluation studies equally will require a multidisciplinary approach.

6.3: Issues:

- Lack of rigorous and generalisable evidence of the effectiveness and cost-effectiveness of eHealth applications and technologies.

- Implementation and integration of eHealth systems into care processes are constrained by insufficient levels of systems interoperability (though moves to ensure standardisation in many current e-Health implementation programmes will reduce this).
- The legal and ethical implications of using health information technologies and clinical decision support systems which may result in harmful effects in certain cases are not yet clear. (In awareness of this, the USA government in its 10 year Health Information Technology Plan is aiming to clarify the regulatory framework for electronic records and and incentive their use.)System developers need to employ quality and safety assurance methods to avoid clinical risks and legal liability.
- The effects of eHealth tools on patient behaviour and the patient-clinician relationship are unclear.
- Potential health inequalities resulting from the 'digital divide', particularly affecting the disabled and the elderly, need to be minimised.
- The potential roles and influences of different eHealth media and settings (e.g. kiosks, workplace) need to be explored.

CONCLUSION

In this report percentage analysis is implemented to measure the effectiveness of ICTs in Healthcare sector. This program includes following factors like officer engagement and satisfaction, officer productivity, positive impact on behavior towards customers, desired performance levels of the employees. All the factors are considered by taking the opinion of the employees, customers and doctors through questionnaire method. By considering all the factors it can be concluded that at ICT can support improvements in the quality of health care by helping to increase the qualifications and skills of health and medical professionals and thereby improve the delivery of health services. However, access to information may not be sufficient in and of itself. Health professionals need to gain an understanding of how to evaluate, interpret, and apply this information to their specific practice. ICT can also be instrumental in helping the public to become more informed about their health and how to be healthy, though until a greater percentage of the population is on-line and technologically literate, low-tech solutions are likely to be more effective. Finally, Information and Communication Technologies can play a powerful role in improving the efficiency of health services. Through computer-based records and other technological infrastructure-building, health care institutions can better manage and share information, thereby improving the efficiency of the health system as a whole.

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ANNEXURE

QUESTIONNAIRE

CUSTOMER SURVEY FORM

Sl No	Customer Survey Form					
1	Name(optional) :					
2	Age:	0-15	16-25	26-50	51-75	>75
3	Gender	Male	Female			
4	Marital Status	Married	Single	Divorced		
5	Family Size	Single	Nuclear	Joint		
6	How do you rate your general health	Excellent	Good	Average	Poor	Bad
7	Source:	Justdial	Website	Friends	Employees	Others
8	Mode:	Mobile App	Telecall	Website		
9	Are you an existing customer	Yes	No			
10	How comfortable do you feel using our services	Excellent	Good	Average	Poor	Bad
11	Able to get appointment for checkups (yearly exams, well-visits, regular follow-up visits)	Excellent	Good	Average	Poor	Bad
12	Phone calls get through easily	Excellent	Good	Average	Poor	Bad
13	The promptness of service delivery	Excellent	Good	Average	Poor	Bad
14	The communication with your physician	Excellent	Good	Average	Poor	Bad
15	The quality of the care you received	Excellent	Good	Average	Poor	Bad
16	The privacy of consultation room and the examination room	Excellent	Good	Average	Poor	Bad
17	Officers' behaviour	Excellent	Good	Average	Poor	Bad
18	Do the offiers reach on time	Yes	No			
19	Officers' reply to all your queries	Excellent	Good	Average	Poor	Bad
20	Do the officers return change	Yes	No			
21	Overall, how would you rate your experience	Excellent	Good	Average	Poor	Bad

OFFICER SURVEY FORM

Sl No	Officer Survey Form					
1	Name(optional) :					
2	Age:	0-15	16-25	26-50	51-75	>75
3	Gender	Male	Female			
4	Speciality:					
5	How comfortable do you feel delivering our e-services w.r.t other means(hospitals)	Excellent	Good	Average	Poor	Bad
6	Able to understand the process	Excellent	Good	Average	Poor	Bad
7	Phone calls get through easily to customers	Excellent	Good	Average	Poor	Bad
8	The promptness of your service delivery	Excellent	Good	Average	Poor	Bad
9	Ease of using the officers' app	Excellent	Good	Average	Poor	Bad
10	The quality of the care that you deliver(self-assesment)	Excellent	Good	Average	Poor	Bad
11	Customers' cooperation and response	Excellent	Good	Average	Poor	Bad
12	Is the distance feasible	Yes	No	NA		
13	Overall, how would you rate your experience	Excellent	Good	Average	Poor	Bad

DOCTOR SURVEY FORM

Sl No	Doctor Survey Form					
1	Name(optional) :					
2	Age:	0-15	16-25	26-50	51-75	>75
3	Gender	Male	Female			
4	Speciality:					
5	How comfortable do you feel delivering our services w.r.t other means(hospitals)	Excellent	Good	Average	Poor	Bad
6	Able to understand the process	Excellent	Good	Average	Poor	Bad
7	Phone calls get through easily to customers	Excellent	Good	Average	Poor	Bad
8	The promptness of your e-service delivery	Excellent	Good	Average	Poor	Bad
9	Ease of using the officers' app	Excellent	Good	Average	Poor	Bad
10	The quality of the care that you deliver(self-assesment)	Excellent	Good	Average	Poor	Bad
11	Customers' cooperation and response	Excellent	Good	Average	Poor	Bad
12	Overall, how would you rate your experience	Excellent	Good	Average	Poor	Bad