Summer Internship

(March 25 to May 24th, 2019)

A Report by

Dr. Kuncharam.Sravani.Reddy

Post-graduate Diploma in Hospital and Health Management

2019-2021

International Institute of Health Management Research, New Delhi

ACKNOWLEDGEMENT

Foremost, I would like to express my sincere gratitude to my mentor **Dr. Sumesh Kumar,**for the continuous support on my summer internship study and research, for his patience, motivation, enthusiasm, and immense knowledge. His guidance helped me in all the time of research and writing of this report. I could not have imagined having a better advisor and mentor for my summer internship.

I would like to express my gratitude towards **my parents& faculty of IIHMR, DELHI** for their kind co-operation and encouragement which help me in completion of this project. I would like to express my special gratitude and thanks to institute persons for giving me such attention and time. My thanks and appreciations also go to **my batchmates** in developing the project and people who have willingly helped me out with their abilities.

Table of Contents

Acronyms/Abbreviations

KMCH - Kovai Medical Centre and Hospital

TNCMCHI -

CVAD - Central Venous Access devices

AI – Artificial Intelligence

PET CT -

STEMI System - ST-Elevation Myocardial Infarction

Section 1: Case study on Kovai Medical Centre and Hospital Coimbatore

About KMCH

KMCH is a leader in providing quality healthcare in south India since 1990.

KMCH is the one of the leading providers of quality healthcare with wwestern Practice andwith an Indian Touch. With over **29 years of experience**. The Institute was founded by Dr. Nalla G Palani swami Chairman, joined by NRIs from the United Kingdom, USA and joined by pioneers from the Middle East and India, founded KMCH and began operating on June 24, 1990. It was initially started with 200 beds and has now emerged as 894 beds, 20 operation theaters and about 124 doctors and consultants under one roof to cater complete medical needs.

It is a medical and scientific institute and the most respected multispeciality in the Southern Indian City of Coimbatore, leading tertiary care hospital, and serves patients from the urban and rural population via peripheral centres. They believe in advanced technology, and offer high-standard medical care.

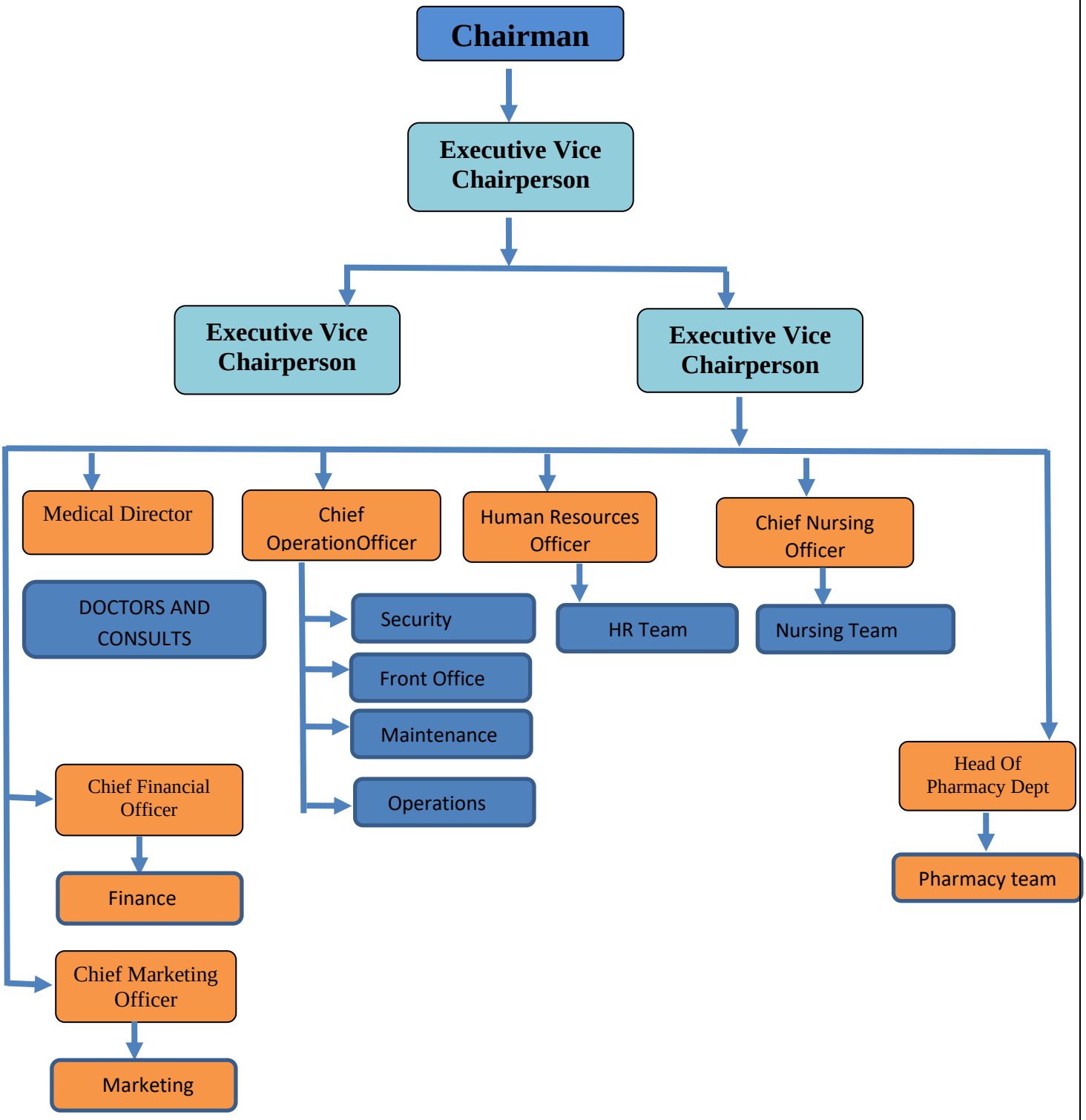
Today KMCH is one of the largest corporate hospitals in the state of Tamil Nadu, employing around 4000 workforces with state-of-the-art infrastructure and contemporary medical equipment making it one of India's most advanced technology. KMCH 's motto has always been to match health standards, whether it is technology & medical equipment or renowned specialists, this enthusiasm and drive for medical advances can be deduced from KMCH 's following unique and admirable achievements:

1.The cardiac surgery department under the leadership of Dr. Prashant Vaijyanath has performed a first of its kind in Asia under 3-D laparoscopy, minimally invasive cardiac surgery.

2.The first mobile CT stroke unit introduced by KMCH is an ambulance worth 4cr which is like an intensive care unit with a CT in it. KMCH will be the first hospital in a developing country to undertake such an ambitious programme.

3.KMCH has also developed a speciality for steroid-free transplants, which reduces the side effects of organ transplantation.

ORGANOGRAM:


Chairman
Executive Vice Chairperson
Executive Vice Chairperson
Executive Vice Chairperson
Medical Director
Chief OperationOfficer
Human Resources Officer
Chief Nursing Officer
DOCTORS AND CONSULTS
Security
Front Office
Maintenance
Operations
HR Team
Nursing Team
Chief Financial Officer
Finance
Chief Marketing Officer
Marketing
Head Of Pharmacy Dept
Pharmacy team

OPERATIONAL ASPECTS OF THE ORGANIZATION:

- OPD (outpatient department)
- IPD (Inpatient department)
- Pharmacy
- Critical care Medicine
- Comprehensive cancer center
- Day care unit
- Ayurvedic center
- KMCH heart/liver and kidney transplant institute
- 24/7 Trauma center
- Dental
- Nuclear Medicine
- Specialty Departments

- The Department of Community Medicine and Public Health School is committed to 'Public Health Development through education of public health professionals, discovery of new knowledge and advocacy in the adoption of new ideas in health care and collaboration to strengthen the ability of health organizations.
- KMCH joined the Government of India's DIGITAL INDIA PROGRAMME by providing all services through the computer and paperless networks.
- They empower patients by providing touch-screen facilities at different locations in hospital premises that provide various details such as general tariff inquiry, and patient information and medical details can also be viewed with their unique identification number.
- Comprehensive training in safe use of radioisotopes is offered by the Department of Biophysics to educate researchers and technical staff on methodologies aimed at safeguarding the use of radio isotopic hazards by patients, technical staff and the public.
- They have emerged as one of the leading centers in interventional radiology that perform single laparoscopic incision surgery.
- It provides monthly Ayurvedic health camps describing KMCH as a modern Indian-touch hospital.
- In a comprehensive cancer Centre, they are highly specialized in the latest treatment techniques such as brachytherapy, the scalp cooling system for chemotherapy helps tremendously to avoid hair loss. They have an exclusive day care center that allows

treatment without admission and offers high quality care with minimal waiting time and maximum performance.

- A wide range of Central Venous Access devices(CVAD) e.g. Peripherally inserted central catheters, provides long duration of chemotherapy and also enables patients to continue chemotherapy at home and reduces costs of admission.
- In the Department of Interventional Radiology and Imaging Sciences, highly modern equipment was developed. Ex - MAGNETOM Skyra 3T MRI such a scanner is first used in Tamilnadu and completes whole body scanning in just 10 minutes.
- They provide excellent management of premature and sick babies in the neonatology department with well-trained staff and highly specialized equipment. They provide manikins to educate all junior doctors working in the NICU.
- The Department of Nuclear Medicine and PET CT provides a one-stop imaging solution in various medical fields. KMCH is known for various government insurance schemes, state insurance undertakings, extensive health insurance undertaking chief ministers and TNCMCHI schemes.
- The Department of Community Medicine and School of Public Health have arranged a CME workshop in conjunction with the World NCD Federation for Digital Health Training and NCDs.
- KMCH provides medical tourism as their transplant surgery success rate.

RESEARCH AND EDUCATION:

- Facilitates strong emphasis on research and education, and various training programs are available, and national research papers are published in the international department.
- Funded by various agencies such as DST, DRDO, AICTE, DST SERB, the research project example is the design and development and anti-arthritic assessment of the novel topical herb gel used in traditional practice.
- Non-neonatal infant and adolescent health services; micronutrients, peer-based sexual well-being support. Communicable diseases-Controls, HIV interventions, behavioural and biological surveys, group A Strep. Epidemiology, the burden of disease caused by Hib, rota.

PATH BREAKING INITIATIVES:

- The first kidney transplant was performed by KMCH in March 1991, and the patient was 20 years old. Since 2001 Dr. Vivek Pathak has begun steroid-free kidney transplantation. More than 1050 live donors and 42 high-success cadaver transplants were conducted.

- More than 1050 live donors and 42 high-success cadaver transplants were conducted. Nation in instances of brain loss via various campaigns.
- They have begun to exchange transplants and teach people further about organ do nation.
- One crore and 10 lakhs were contributed to the corona virus recovery fund by KMCH.
- An independent 24-hour fever (corona) facility is devoted and has been a landmark in medical treatment.
- KMCH hospital doctor's staff completed a rare successful kidney transplant on a 12-year-old child with both hemophilia and Alport syndrome. Before today, there is no kidney transplant globally where the donor and the recipient have been transplanted.
- KMCH carried out a successful liver transplant on time from Madurai to Coimbatore.
- India's first automatic true Hyperarc beam for pinpoint accuracy and accuracy in cancer treatment has been launched.
- It conducts basic life support mock hospital drills to educate people and make them aware of it in order to save people's lives.
- Most modern cytotoxic chemotherapy preparation unit was developed in India by KMCH.Protection, reduced duplication and consistency with quality requirements are assured.
- STEMI System (ST-Elevation Myocardial Infarction) was introduced in India for the first time.
- As the increase in technology and the productivity of physicians conducting cutting-edge robotic procedures, they tend to heal rapidly.
-

ROLES AND RESPONSIBILITIES:

- Board of directors, organizational heads and other personnel shall stick to KMCH's corporate governance rules.
- The managing director is responsible for ensuring that the code is adhered to by all independent managers on the board.
- Effective standard in corporate governance is a requirement that requires Gender-friendly workplace shall be provided to improve equal opportunities, and a separate internal complaint committee shall be established to investigate complaints.
- Securing the values and ethics of the KMCH organization with people in the organization.
- KMCH believes that a key component is commitment to sustainable development.

MILESTONES:

- Inauguration of kovai medical center and hospital in 1992.
- Inauguration and commission of whole-body PET scanner to diagnose in précised time in 2011.
- NABH Accreditation for KMCH for the first time in 2012.
- Best hospital Award in Non metro south Indian category in 2012
- Stem cell Transplantation for Thalassemia was done for the first time in 2012.
- Won healthcare excellence award in Nursing in 2015.
- FICCIs best hospital Award in Tamilnadu for the year 2016.
- Dr.Nalla G.Palaniswami received best entrepreneur award 2020 which was organized by CMA(Coimbatore Management Association).
- KMCH received best performance Award 2019 in comprehensive health insurance scheme.
- According to The Week-Hansa research Survey 2019 KMCH ranked as no.1 hospital in Coimbatore.

COMMUNICATION CHANNELS AND STRATEGIES :

● SOCIAL MEDIA (Facebook, Twitter, Linked In, YouTube.)

● 24*7 helpline number

● Newspapers

● Press releases

● Chat box

● Blogs

- Public was made aware on important dates like World Health Day, worlds stroke day
- AIDS Day, World Blood Donor Day for blood donation, organ donation and various diseases, crisis and emergency through press conferences and press releases. It also conducts Marathons. Queries were also answered as and when required.
- Over the previous five years, the business has been investing on ads and promotions with a gross promotional cost of 12.3cr, but as a percentage of sales this corresponds to just 0.7 percent

Corporate Social Responsibility:

- The company organizes many free medical camps, awareness programs and public sanitary facilities as a part of its CSR activities, which also help in publicizing the name of KMCH.

Educational Institutes and Trusts:

The participation in various educational trusts and institutes lead to immense popularity in the medical field amongst prospective medical staff.

VALUE PROPOSITION OF KMCH:

- As I described before, KMCH believes in providing its client with the most innovative and specialized medical care they might reasonably imagine having in Coimbatore.
- The hospital has accreditation for all of its services through NABH (National Accreditation Board of Hospitals).
- KMCH specializes in the most complicated and scarce surgeries performed in the medical space, e.g. cardiac transplantation that has been around for four decades, formerly only practiced in two Indian cities.
- KMCH is a specialist in interventional radiology, and has emerged as one of the country's three centers conducting the most complicated type of aortic surgery. A kidney transplant and the expansive cancer center and steroid-free transplants are the most recent addition to this range of upper-end therapies.
- In a sense, through conducting complex procedures, transplants and operations, KMCH has created a position for itself.
- This push for creativity is holding KMCH on its toes.

Section 2- Role of KMCH programmes in communicable and non communicable diseases:

Why KMCH HOSPITALS?

Now a days the health care is evolving and revolving around latest technological innovation which help the health care workforce to save time and increase sharing and analytics of data.

KMCH Hospital Interventional Radiology department perspective to their programs?

- It is providing new solution through its dedication which addresses current challenges with sum up of speed, image clarity, connectivity and data availability.
- Thus, to benefit the workforce and community they have dedicated by providing ultra-modern state of the art equipment's which deliver precise information while minimizing patient discomfort.
- The Department of Radiology is vital for delivering patient information to enable accurate diagnosis and effective treatment. which integrate themselves with national health programs by GOI ,smart training and start-ups to provide quality to patients.

Various programmes related to communicable and non-communicable disease are as follow:

1. Training programmes for staff under Skill India Mission

2. Doctors: echocardiography, Doppler CT guided biopsy, genomics, heart failure and gynaecological disorders etc.

3. Nurses: acid –base balance, arrhythmia and adequacy of anaesthesia testing etc.

4. Technologist: anaesthesia testing, CT imaging, stroke imaging etc.

These all E-learning are done under flagship of KMCH Hospitals for providing quality and services for patient by giving stannous training to the workforce. :

Associate work on research, development and shaping of a platform for early detection of cancerous lesions. provide healthcare delivery to community in screening related to NCD and communicable disease with cost effective, accurate testing.

Declared as 24*7 fever hospital and fighting with COVID19 by rendering its services to combat this communicable disease.

Advanced visualization technology:

- Being a healthcare delivery organization any disease whatever the type be screening is compulsory with accurate testing, scanning and accuracy thus KMCH has setup their mission to provide advanced solution to imaging sector in health care as its backbone for health care industry where it help to provide speedy and accurate result within a defined time frame for any kind of disease to diagnose through advanced software e.g. MAGNETOM Skyra 3T MRI.

- Under advanced visualization programme, I am going to discuss MAGNETOM Skyra 3T MRI.

MAGNETOM Skyra 3T MRI: SOFTWARE FOR RAPID IMAGING OF WHOLE BODY

Roles and responsibility of organization related to it:

Been the responsible organization they have put forward their step under the lens of National Program for prevention and control of cancer diabetes, CVD and Stroke (NPCDCS) been a market leader in advanced visualization and imaging tool, that would help in diagnostic speed and confidence, thus organization has decided

to contribute by early screening of patient and helping them to diagnose through this latest software technique where lesion segmentation can be done to detect stages related to cancer, cirrhosis and hepatitis , been successfully implemented software in developed nations like France , USA it has contributed in bring down their mortality rate.

In India the GOI is running this national programme because mortality rate of cancer is 6%in India and survival low survival rate in case breast cancer. 1.6%of our population every year falls under cirrhosis ,all though this programme is with good vision but certain gaps are their like less grass root level reach, less resource ,equipment and training , and if screened then stage left undiagnosed or if diagnosed it may be at the end of his life or may have cause morbidity.

Thus, these challenges can be address by KMCH through magneton skyra3T MRI which provides platform for advanced training, screening, segmentation and visualization of each section related to any lesion in body and can bring down mortality and morbidity rate.

Objective:

It helps in rapid imaging and assessment of any lesion or tumor which help in speedy and effective workflow.

Methodology:

Interventional Radiology Department in KMCH follow a common method of designing for installing a imaging machine.

Process flow:

1. Select site of system that include guides, input of ground requirement
2. Select team for construction and designing
3. Preliminary plan
4. Final installation drawing
5. Construction drawing
6. Plan review and permits
7. Preconstruction meeting & finalize project

8. Construction

9. System delivery

10. Installation

Overview:

MAGNETOM Skyra 3T MRI provides you with a complete reading solution for detecting any lesions with flexibility and high performance unlike any other lesion analysis package, can visualize and measure body lesions with pin point accuracy with an ease to health care professionals and to patient than conventional imaging.

Key feature of MAGNETOM Skyra 3T MRI:

• Automated detection of lesions, Attract different patients with the MAGNETOM Skyra's 70 cm Open-Bore and Short-System design.

• Offers exceptional image quality at 3 Tesla by enabling a homogenous B1 field

• Guided intelligent lesion segmentation &built-in lesions to prevent overlap detection and avoidance.

• It facilitates faster studies with automated workflows, increase productivity and throughput.

• Efficient way of managing lesions and tumor for longitudinal exams.

• Editing tools for quick and easy refinements.

• Now all your radiographers can conduct cardiac exams with Siemens Cardiac Dot Engine - , perform cardiac exams with an ease.

Use:

It is a software package designed to help radiologists and other clinicians in the detection, diagnosis, treatment planning, and monitoring of lesion /defects related disease.

Implementation:

- For this software they have a unique strategy to implement it.

AT HOSPITAL LEVEL:

1. Training: advanced training to work force and data-based problem analysis related software input& output and how to deal it.
2. Mentoring & leadership provide to workforce for proper execution

3. The focused approach includes three techniques:

a. Show me the money- to crush all workplace defects and improve productivity and quality of software.

b. Everybody plays-they get their supplier under strict quality lens like six sigmas so that they can ensure it effectiveness for patient use as they provide its spare parts.

c. Specific technique – where they have ranked their programme and merge it with their organization goals, in our case they have ranked it in top priority for prevented liver disease under advanced visualization category due to which its in high demand across globe.

AT MARKETING LEVEL:

They have use user guide, detail case study on use of this software among patients ,videos of how segmentation and analysis is done on their web portal, blogs , seminar, collaboration with production companies are the ways of making this product deliverable from one end to another.

AT GOVERNMENT AND COMMUNITY LEVEL:

They have taken detail licensing and certification from respective authorities for marketing and implementing for public health in USA and European Union, in case of India it is on early level, where as in community reach it has stated in southern parts of India with help of NGO.

Outcomes:

Highlights of software:

1. Robust image quality.

2. Acquire whole body scan in a single and continuous.

3. easy to examine and personalized.

4. Low operational cost.

5. increases productivity to 50%.

6. Noninvasive liver evaluation.

7. Energy efficient.

8. Tim 4G delivers benefits in both research and clinical.

9. 95.7% reduction in sound compared to conventional.

10.Accuracy- 81.4 %

11.Timing 10 minutes.

12.The success rate of this software is 84% (ratio of successful cases to the number of all cases) is successful when following things are showed:

conventional Scanning	Automated Magnetom skyra 3T MRI
30 – 40 minutes	10 minutes

Lead to increase in 36% examination and reduce 4% waiting time in diagnostic Centre.

SECTION 3: COMPARATIVE STUDY AND ANALYSIS ON HEALTHCARE SYSTEMS BETWEEN INDIA, CANADA, USA AND GERMANY.

INTRODUCTION:

The paper 's key aim is to analyze the health-care system, delivery system of developed nations like Canada, USA, Germany among themselves and with India. It compares different inputs of health care of all four countries and analyse, evaluate and compare the equity and effectiveness of health care of respective countries. On several policy fronts, they are very different including how health care services are funded, organized, and delivered. The most notable variations between the four countries are the involvement of private health care and the patterns of expenditure.

In the first part of the research paper the focus will be on describing health care systems in the countries mentioned above.In the second part the focus will be on comparing the structure of health care among the above mentioned countries.Lastly, comprehensive review and contrast of the health care system framework in India, Canada , Germany and the USA.

OVERVIEW OF HEALTH CARE SYSTEM IN CANADA:

Canadians provide equal access to government provided hospital programs, which are called informally Medicare. Universal access is given on a need-based basis, rather than payable.

EVOLUTION OF CANADA'S HEALTHCARE:

Before WW-II, healthcare in most parts are privately delivered and funded. In 1947 , the government of Saskatchewan introduced province wide , universal hospital care plan, is an initiative for reforms in healthcare later on lot of reforms took place .Now healthcare is delivered through provincial and territorial systems of publicly funded.70 Percent of Canadians healthcare needs are covered by Medicare . Healthcards are issued by provinces to the individuals who enroll for programme and receives equal level of care and remaining 30 percent is paid through private sector. Most Canadians buy supplemental private insurance through their jobs to cover the cost of things not covered by their Medicare.

HEALTH CARE FINANCING:

It is through tax system, and also funded by charitable contributions.

ROLES AND RESPONSIBILITIES OF GOVERNMENT:

Roles and responsibilities of health care are divided between federal, provincial and territorial. provincial and territorial governments have most of responsibility of delivering healthcare services, spending decisions are made at province level. Most of the hospitals are publicly funded and they are required to operate under a fixed budget one of the way Canada controls its health care spending.

OVERVIEW OF UNITED STATES HEALTH CARE SYSTEM:

It is a mixture of both private and public and multiplayer system. Most of the care is given by private sector. USA spending for medical research accounts for a vast majority of R&D spending in the world. There is no single system of health insurance.74% is covered by private health insurance provided by employers to employees and dependents .and public health insurance programs like Medicaid and Medicare. Medicare is for elderly people and for disabled and provides long term nursing home care. which is funded by government as well by coinsurance and deductibles from patients.

MEDICARE is divided into part A and part B. part A is can be used if they are hospitalized. part B covers outpatient services and sometimes deferred by people who are still getting insurance from their jobs so it is not complete free

MEDICAID is a health insurance programme by for certain group of poor people provide preventive acute and long-term care services which is funded both by federal and state governments.

ROLES AND RESPONSIBILITIES OF GOVERNMENT: Roles and responsibilities of healthcare are divided between federal, state and local government.

FINANCING OF UNITED STATES OF HEALTHCARE SYSTEM:

- Private insurance
- Government insurance programs
- Out of pocket expenditure

OVERVIEW OF GERMANY HEALTH C ARE SYSTEM:

The universal health care in Germany is based on the principles of Bismarck which say that the state should provide only for those unable to provide for themselves. The universal health is multi payer paid by combination of public and private insurance system. Public health insurance system named as (SHI) (Gesetzliche Krankenversicherung) and private health insurance system as Krankenversicherung (PHI).

Since 2009 health insurance was made mandatory for every citizen of Germany .74% of health expenditure is contributed by public and remaining 26% is contributed privately. Either voluntarily or mandatory 85% of population are covered by SHI and remaining is covered by PHI which is mandatory for certain professional group. (e.g. Doctors, Civil servants).

ROLES AND RESPONSIBILITIES: They are shared between national and state levels, and power is delegated to self-governing bodies.

FINANCING OF HEALTH CARE SYSTEM:

- Tax revenue surplus also contributes
- Private health insurance
- Health care is mainly financed by the insured employees and their employers' premiums

OVERVIEW OF INDIAS HEALTH CARE SYSTEM:

It is mixture of both public and private, multiplayer system. Most of the health care is provided by private sector and public sector.

EVOLUTION OF INDIAS HEALTHCARE AFTER1947:

It has occurred in three phases

PHASE1: 1947-1983

PHASE2: 1983-2000

PHASE3: post 2000

ROLES AND RESPONSIBILITIES: Even if health is a matter of state responsibility shared between state and Centre, states are given major authority where the center assumes responsibilities on topics that are listed as unions, focusing on formulating comprehensive health policies and plans within the Ministry of Health and Family Welfare.

STATE :80% Funding for health care comes from the State.

FINANCING OF HEALTHCARE SYSTEM IN INDIA: Five primary financing methods of health care systems.

- General Revenue
- Direct out of pocket expenditure
- Donations or community health insurance
- Social health insurance
- Donations or community health insurance.

OBJECTIVE: To study the similarities and differences in healthcare system structure at global level

METHODOLOGY:

Research Design: Literature review-based study

Search strategy: ProQuest, ResearchGate, google scholar, journal**s.**

Keywords: healthcare system, India, USA, Germany, Canada

Result: The five articles are selected based on the basis of the geographical distribution across the globe.

The parameters which are selected on the basis of which the differences in healthcare systems was made are as follows:

- Objective of the study
- Research methods
- Origin of country
- To analyse and evaluate based on equity and efficiency/compare the health care structure

POINT OF DIFFERENCE IN HEALTH CARE STRUCTURE (2019 DATA)

	CANADA	GERMANY	USA	INDIA

POPULATION	3.76 CRORES	8.3 CRORES	32.82 CRORES	1.366 BILLION
GDP PERCAPTIA	$46,290	$46,334	$65,112	$2,199
HEALTH CARE SPENDING PER CAPTIA	84668 USD	4,351USD		
HEALTHCARE SPEND % GDP	11.5%GDP	11.7%GDP	17.9%GDP	1.17%GDP
NO.OF PHYSICIANS PER 1000(POPULATION)	2.4 DOCTORS PER 1000 POPULATION	4.1 DOCTORS PER 1000 POPULATION	2.5 DOCTORS PER 1000 POPULATION	1.34 DOCTORS PER 1000 POPULATION
OUT OF POCKET EXPENDITURE	9.9% of expenses are out of pocket			70% of expenses are out of pocket
LIFE EXPECTANCY	84 YEARS	81.10 YEARS	78.87 YEARS	68.7 YEARS
INFANT MORTALITY RATE	4.3 DEATHS PER 1000 LIVE BIRTHS	2.7 DEATHS PER 1000 LIVE BIRTHS	5.7 DEATHS PER 1000 LIVE BIRTHS	30.92 DEATHS PER 1000 LIVE BIRTHS
THE WAY SYSTEM PAID AND FUNDED	SINGLE PAYER 70% of Healthcare spending is financed by govt	MULTI-PAYER health care system paid for by a combination of statutory health insurance.77% is govt funded	MULTI PAYER 46% of Health care is funded by govt	MULTI PAYER 30% of health care funding is financed by govt.
COVERAGE AND ACCESS	Every citizen covered in National Health Care system (MEDICARE)	Every citizen is covered under (SHI/PHI) (Gesetzliche Krankenversicherung/ Krankenversicherung))	MEDICARE (For elderly people) MEDICAID(For people below poverty and disability	1.NOT EVERY citizen is included. 2.NRHM in 2005 for rural and disadvantaged societies mainly in 18 states. 3.NUHM in 2013for urban poor. 4.PRADANMANTRI JAN AAROGYA YOJANA particularly for weaker sections.

WAITING PERIOD	3- 6 weeks for specialist visit			
QUALITY SCORE OF HEALTH CARE		75.64 Ranked 10th	69.03 Ranked 23RD	145 ranked
COVID 19 UPDATES AND MANAGEMENT STRATEGIES	NO. OF PEOPLE TESTED:1,236,746 CONFIRMED CASES: 74,602 DEATHS:5,562 FATALITY:7.5%	NO. OF PEOPLE TESTED: CONFIRMED CASES: 175,233 DEATHS:7897 FATALITY:4.5%	NO. OF PEOPLE TESTED: CONFIRMED CASES: 1,476,199 DEATHS:88,372 FATALITY:6%	NO. OF PEOPLE TESTED: CONFIRMED CASES: 85784 DEATHS:2753 FATALITY:3.2%

SIMILARITY:

- US spends more on health care, Canada and Germany spends almost similar % GDP on health care but out of pocket expenditures are high, life expectancy is low in US compared to Germany and Canada.
- All the four countries are not prepared with pandemic situation and the health care system has no relation in management of pandemic (COVID19).
- US, INDIA, GERMANY and CANADA have to improve in access and quality of health care.
- United states and India have fewer waiting times as most of health care is private.
- Germany and Canada provide universal health care to every citizen in country.
- Except Canada all the three countries are following Multi payer system.

CONCLUSION: In this research paper I examined different types of health care systems in Canada, united states, Germany and India. They all differ in terms of financing, access, quality, provider payment mechanisms, decentralized powers. The United states health expenditure is highest among all four countries. On the other hand, the countries like Canada and Germany health care systems provide care through government provision and government insurance incur lower per-captia costs.

SECTION 3

A Study on Perceptions of Doctors Regarding use Artificial Intelligence in Clinical Management

Abstract

Background

It is expected that artificial intelligence (AI) will be used extensively in the medical field in the future.

Objective:

- To find role of Artificial Intelligence in health care.
- To Asses doctors' perceptions and acceptance towards medical application of AI.

Material and Methods:

A cross sectional survey was conducted out among Indian medical doctors through online mode made by a google form. Total of 176 participants took part in the study. A pre verified and tested self-administered questionnaire was used for the survey to analyse awareness and attitudes towards artificial intelligence, the development direction of AI in medicine, and the possible risks of using AI in the medical field. The questionnaire were mailed through online link and was analysed by using package SPSS version 25.

Results:

A total of 176 people surveyed. Only (48%) replied that they were well familiar with AI. Most participants however found AI to be useful in the medical sector (85.3%) agreed. The advantage of using AI was seen as AI can speed up the processing of healthcare Respondents agreed that the field of medicine where AI would be most useful in is providing medical assistance in underserved areas One potential concern was that AI is not flexible enough to applied to every patient .AI would not be able to assist in unforeseen circumstances (29.3%).Less than half of the participants (43.9%) accepted that AI is equivalent in diagnosis to human physicians. Only (23.8%) responded that they agreed that AI could replace their jobs.

Conclusions:

This study suggests that there are favourable acceptance of Indian doctors and medical students in the medical field towards AI. The majority of doctors surveyed believed that AI would not replace their roles in future.

Keywords: Artificial intelligence, AI, awareness, physicians.

INTRODUCTION:

In most developing countries insufficient medical professionals has raised the mortality rate of patients suffering from different diseases. The inadequate number of medical experts is never going to be resolved within a short period of time. Contemporary medical treatment practice required that patients consult with specialists for further diagnosis and treatment. Other medical practitioners may However, it normally takes a few days, weeks or even months to wait for treatments. By the time that patients see the doctor diseases may already have spread. since most of the high-risk disease could only be cured early, the patients might have to suffer for the rest of their lives. have inadequate expertise to handle certain high-risk diseases. Computer technology could be used to reduce the number of fatalities and reduce the waiting time for the specialist to see. Computer program or software designed by emulating human intelligence may be used to help the doctors to make decisions without direct contact with the specialists.

Artificial intelligence and advanced innovations are beginning to be adapted to healthcare. These developments are capable of changing certain areas of medical treatment, as well as functional processes in the healthcare sector.

Software was not intended replace a specialist or doctor, but it was developed to assist general practitioners and specialists in the diagnosis and prediction of the condition of patients under certain rules or "experience." Patients with high-risk factors or symptoms, or predicted to be highly affected by certain diseases or diseases, could be briefly listed for further treatment with the specialist.

Using Artificial Intelligence (AI) technology in particular in medical applications could reduce costs, time, human expertise and medical error. Although there are now many AI applications that have been implemented in high-income country contexts, use remains relatively nascent in resource-poor environments.

In 2017, the United Nations (UN) held a global meeting to address the creation and implementation of poverty reduction AI technologies and provide a wide range of essential

public services. Recently another UN meeting brought together different stakeholders to determine the role AI could play in achieving the Sustainable Development Goals (SDGs). In 1950 Alan Turing was one of the pioneers of modern computers and AI.

The eighties and nineties saw a rise in interest in AI. In different clinical settings in health care artificial intelligence technologies such as fuzzy expert systems, Bayesian networks, artificial neural networks, and hybrid smart systems were used. In 2016, the biggest amount of AI research investment was in healthcare applications compared to other sectors

AI in medicine can be dichotomized into two subtypes: virtual and physical.[3] The virtual component varies from applications such as electronic health management systems to clinical decisions support based on neural networks.

The physical part deals with robots that assist with surgeries, intelligent prostheses for people with disabilities and elderly care.

Artificial Intelligence and advanced innovations are beginning to be adapted to healthcare. These developments are capable of changing certain areas of medical treatment as well as functional processes in the healthcare sector.

Since AI is an emerging technology in health sector proper awareness and acceptance especially of the doctors is important for successful implementation of AI technology. With increasing awareness about the benefits and capabilities of AI the willingness and perceptions of doctors could be enhanced. As AI technology in health care is emerging to facilitate its adoption. It is important to explore view point of doctors like their perceptions, awareness and acceptance towards adoption of AI technology which could determine the future scope and success in India.

METHODOLOGY:

- Research Design: Descriptive cross-sectional Study
- Data Type: Primary Data

STUDY TOOL:

The study questionnaire was designed and modified on the basis of previously published research articles. The questionnaire was evaluated by the mentor under whom the study was performed and was adopted in English only.

It was administered online through Google form.

The questionnaire consisted of mainly 3 sections:

1.Demographic characteristics

2.Acceptanceof doctors towards AI in medical application, The levels of Acceptance was measured using Likert Scale.

3.Perceptions of doctors towards medical application of AI.

STUDY POPULATION: I surveyed medical students, Dental students and Doctors who graduated from Indian Medical and Dental colleges.

Calculated Sample Size: 256

Achieved Sample Size:176

Ethical consideration: Informed consent prior filling the questionnaire Participation was free. Participants could not be recognized from information provided and no potential harm could result from the research to the involved persons. Response was made on a single web page with one submission button.

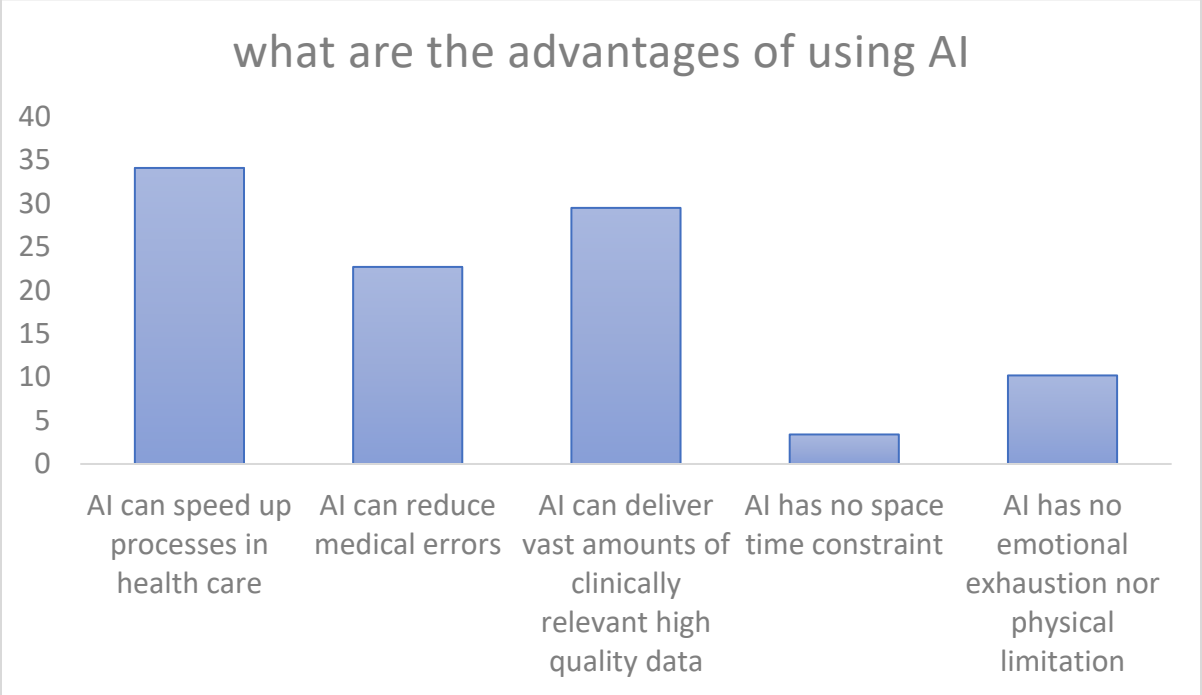
RESULTS:

A total of 176 study participants were included in the study. Out of total participants 56.8(%) were females and 43.2% were males. More than 50% of the respondents were from Urban and 13.1% respondents from rural part of India. 61.3% respondents are below 30 years age group.44.3% respondents are practicing as doctors.16.5% respondents are dentists and 44.4% are from different specialities.

Table1: Socio- Demographic characteristics of Study population (N= 176)

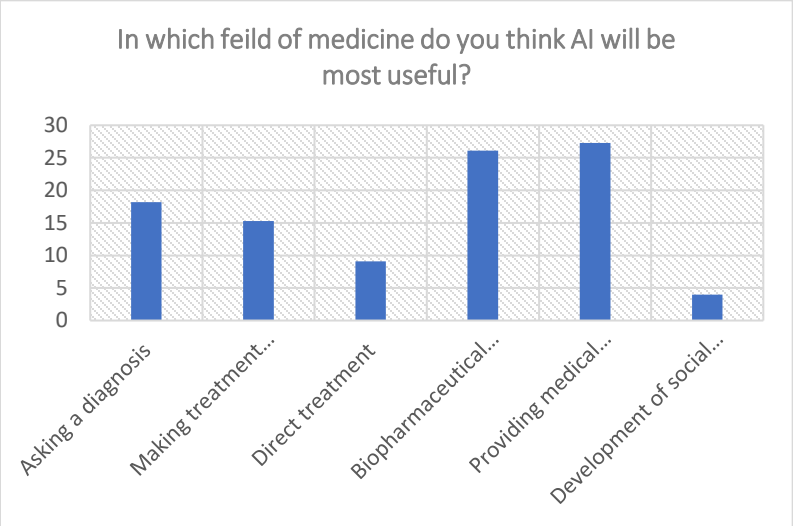
Characteristics	Frequency(n)	Percentage(%)
AGE IN YEARS		
<30	108	61.4
31- 40	50	28.4
41-50	18	10.2
GENDER		
Female	100	56.8
Male	76	43.2
LOCATION		
Rural	23	13.1
Urban	153	86.9
SPECIALITY		
Dentist	29	16.5
MBBS	69	39.2
MD	78	44.3
WORKING STATUS		
Graduate medical student	50	28.4
Post graduate medical student	48	27.3

Practicing as doctor	78	44.3

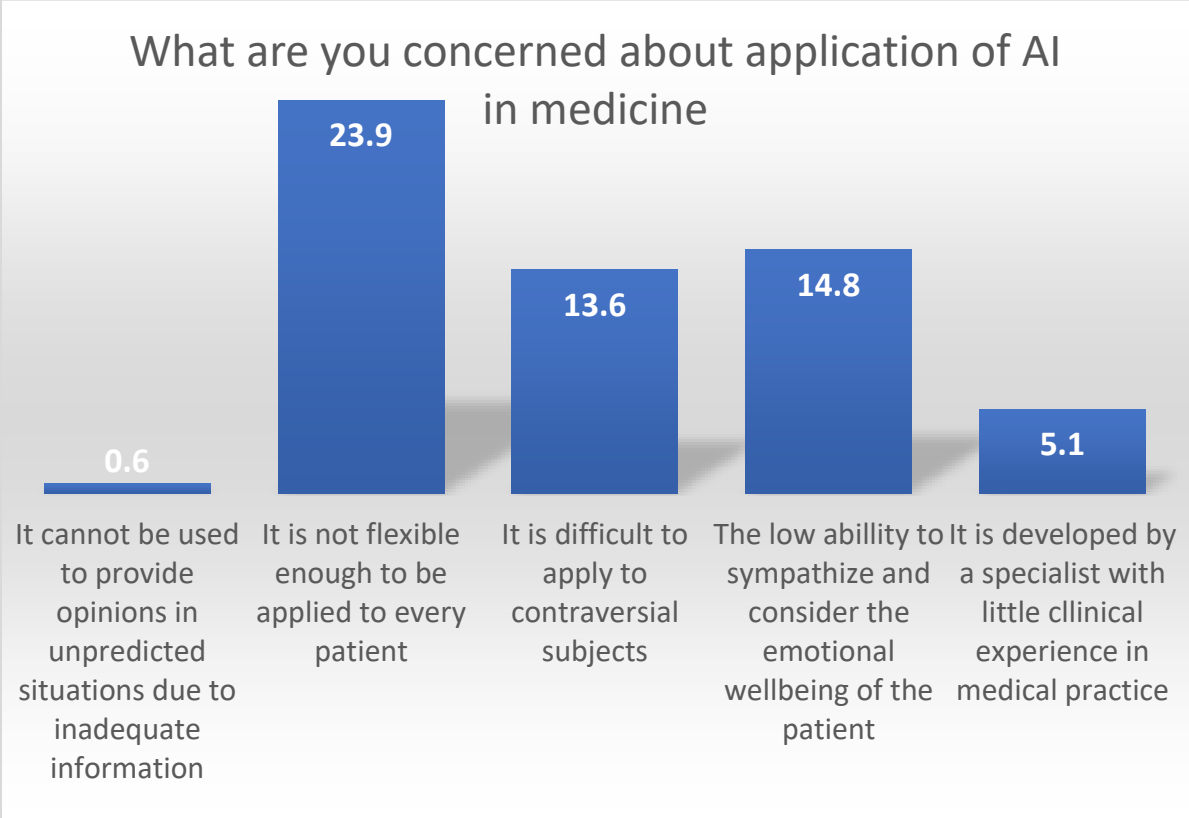


33.3% respondents agreed that advantage of using seen as AI can speed up process in healthcare. And around 31% responded AI can deliver vast amounts of clinically relevant high-quality data. Respondents agreed that the area of medicine in which AI would be most

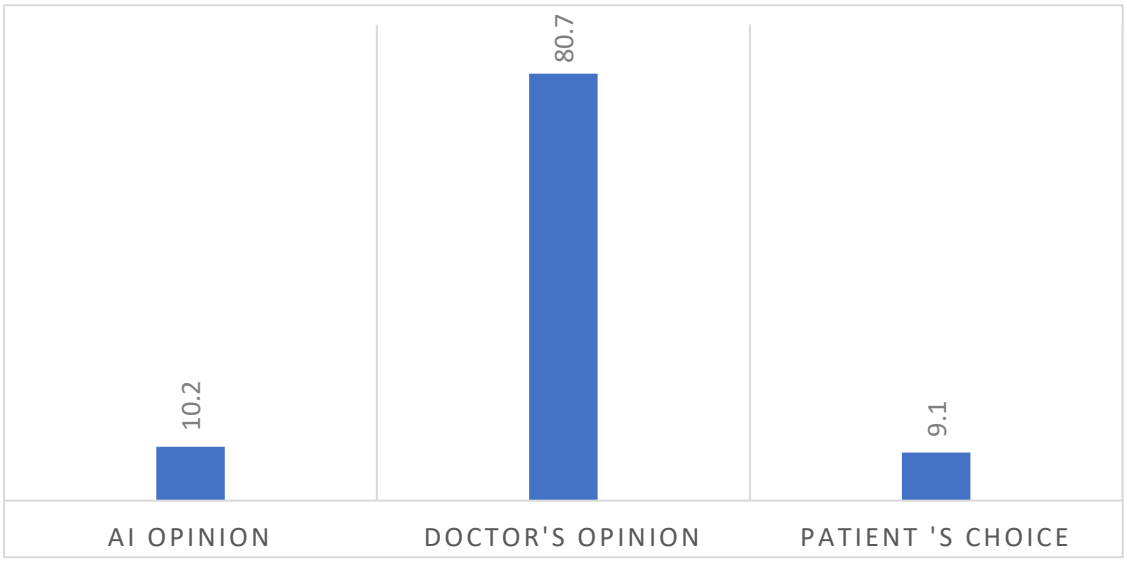
useful is in providing medical assistance in underserved areas.



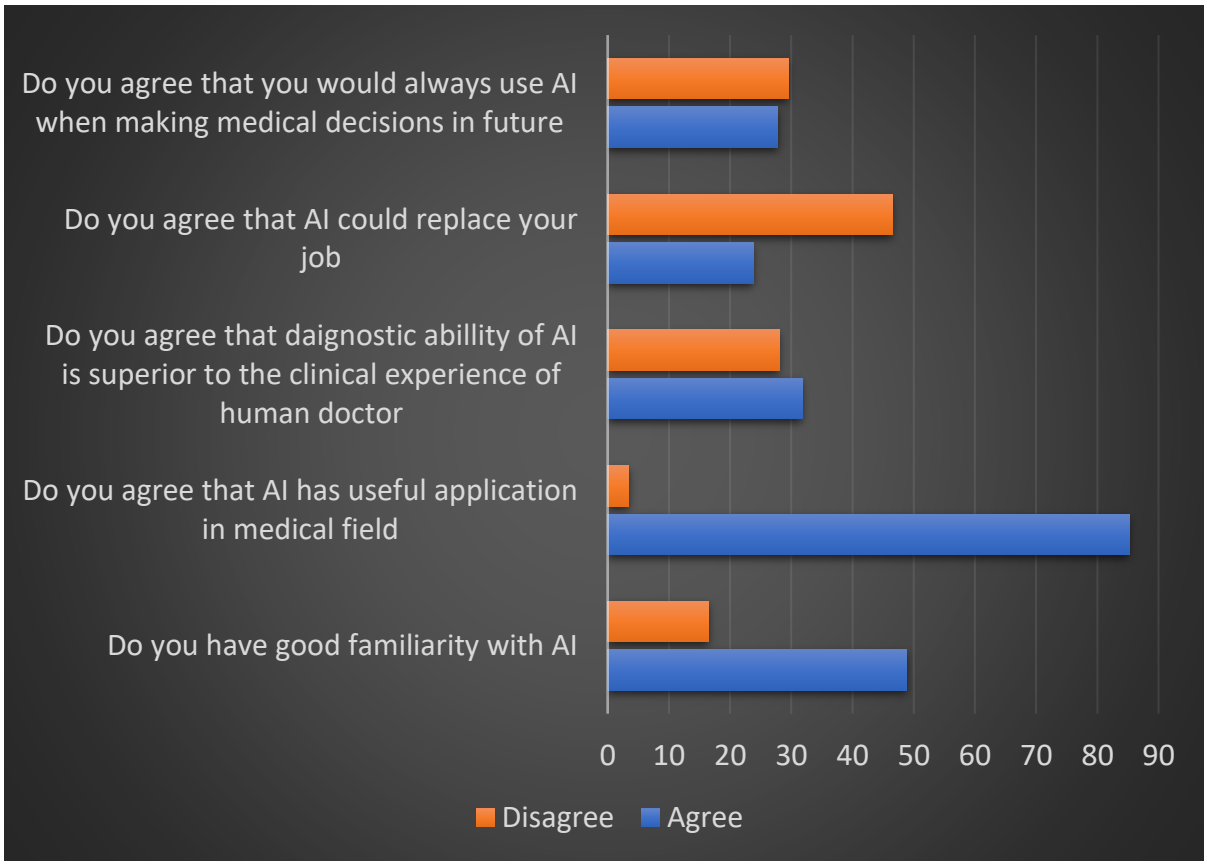
One possible problem cited by the 23.9%participants was that AI is not flexible enough to be to applied for every patient.



Only 10.2% respondents agreed that medical judgement of AI is superior to human doctors.



The below figure depicts: Acceptance levels of doctors regarding the use of AI in clinical Management.



Only 48% answered that they have good familiarity with AI.85.2% participants considered AI is useful in medical field and 23.8% answered that they agreed that AI could replace them in their Jobs.

DISCUSSION: In the current study, the results reveal that doctor's overall acceptance regarding use of AI in medical field is favorable. It was quite similar to other studies that were reviewed like a study conducted on south Korean doctors by Songhee oh, MD. Doctors and all medical graduate students felt that AI would be most useful for providing medical assistance in underserved areas. Majority of the doctors do not believe that AI will replace them.

We asked respondents regarding medical judgment when there is a difference in view point of doctors and Artificial Intelligence. Around 80.7% of doctors agreed that they would take doctors opinion. 30% of Doctors agreed that AI is diagnostically superior to AI. [47] In order to win their confidence, persuade them or demonstrate empathy, AI cannot participate in high-level communication with patients.

LIMITATIONS: We did not ask context questions about how well AI is theoretically known by the individual participants. Each participant may have had multiple AI conceptualizations. Selection bias is possible. Participants may have been more motivated and may have expressed more positive attitudes compared to non-participants.

CONCLUSION: This study found that doctors felt the application of AI to medicine would be useful. Doctors felt that areas in medicine where AI would be most useful were providing medical assistance in underserved areas. More than half of the doctors did not believe AI would replace their jobs in future. when there is a difference in point of opinion between doctor and AI from a medical judgment point of view, doctors favored doctors opinion over AI.

ACKNOWLEDGMENTS:

I acknowledge Dr. Sumesh Kumar (Associate professor IIHMR, Delhi) for analysis and review of this paper.

CONFLICT OF INTEREST: There is no conflict of interest among authors.

Annexure

Consent Form

Dear sir/madam,

You are requested to volunteer for “A Study on Perceptions of doctors regarding use of Artificial Intelligence in Clinical Management. The study will be supervised by first year student of IIHMR, DELHI, Dr. Kuncharam Sravani. Reddy You will be required to answer a questionnaire to discover the level of perceptions and acceptance of doctors regarding use of Artificial Intelligence in Clinical Management. You have the right for withdrawal, if you wish to discontinue with the study at any point of time. All the transcripts from the study will be anonymous and locked after use. The study will last approximately for 5mins.

I _____ give permission to take part in the study.

Signature:

Date:

REFERENCES:

1. https://pubmed.ncbi.nlm.nih.gov/30907742/

Hastie TT, Friedman J, Tibshirani R. The Elements of Statistical Learning. New York: Springer Science & Business Media; 2009. [Google Scholar]

2. Abu-Mostafa Y, Magdon-Ismail M, Lin HT. Learning from Data. Learning From Data: AMLbook.com; 2012. [Google Scholar]

3. Kononenko I. Machine learning for medical diagnosis: history, state of the art and perspective. Artif Intell Med. 2001 Aug;23(1):89–109. [PubMed] [Google Scholar]

4. Pyo S, Lee J, Cha M, Jang H. Predictability of machine learning techniques to forecast the trends of market index prices: hypothesis testing for the Korean stock markets. PLoS One. 2017 Nov;12(11):e0188107. doi: 10.1371/journal.pone.0188107. http://dx.plos.org/10.1371/journal.pone.0188107. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

5. Miller DD, Brown EW. Artificial intelligence in medical practice: the question to the answer? Am J Med. 2018 Feb;131(2):129–133. doi: 10.1016/j.amjmed.2017.10.035. [PubMed] [CrossRef] [Google Scholar]

6. Patel VL, Shortliffe EH, Stefanelli M, Szolovits P, Berthold MR, Bellazzi R, Abu-Hanna A. The coming of age of artificial intelligence in medicine. Artif Intell Med. 2009 May;46(1):5–17. doi: 10.1016/j.artmed.2008.07.017. http://europepmc.org/abstract/MED/18790621. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

7. Ohno-Machado L. Research on machine learning issues in biomedical informatics modeling. J Biomed Inform. 2004 Aug;37(4):221–223. doi: 10.1016/j.jbi.2004.07.004. https://linkinghub.elsevier.com/retrieve/pii/S1532-0464(04)00071-1. [PubMed] [CrossRef] [Google Scholar]

8. Nemati S, Holder A, Razmi F, Stanley MD, Clifford GD, Buchman TG. An interpretable machine learning model for accurate prediction of sepsis in the ICU. Crit Care Med. 2018 Apr;46(4):547–553. doi: 10.1097/CCM.0000000000002936. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

9. Dreyer KJ, Geis JR. When machines think: radiology's next frontier. Radiology. 2017 Dec;285(3):713–718. doi: 10.1148/radiol.2017171183. [PubMed] [CrossRef] [Google Scholar]

10. Alsharqi M, Woodward W, Mumith A, Markham D, Upton R, Leeson P. Artificial intelligence and echocardiography. Echo Res Pract. 2018 Dec 05;:30400053. doi: 10.1530/ERP-18-0056. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

11. Shameer K, Johnson KW, Glicksberg BS, Dudley JT, Sengupta PP. Machine learning in cardiovascular medicine: are we there yet? Heart. 2018 Jan 19;104(14):1156–1164. doi: 10.1136/heartjnl-2017-311198. [PubMed] [CrossRef] [Google Scholar]

12. Lusted LB. Logical analysis in roentgen diagnosis. Radiology. 1960 Feb;74:178–93. doi: 10.1148/74.2.178. [PubMed] [CrossRef] [Google Scholar]

13. Schwartz WB. Medicine and the computer. N Engl J Med. 1970 Dec 03;283(23):1257–1264. doi: 10.1056/nejm197012032832305. [PubMed] [CrossRef] [Google Scholar]

14. Chockley K, Emanuel E. The end of radiology? Three threats to the future practice of radiology. J Am Coll Radiol. 2016 Dec;13(12 Pt A):1415–1420. doi: 10.1016/j.jacr.2016.07.010. [PubMed] [CrossRef] [Google Scholar]

15. Jha S. Medscape. 2016. May 12, [2019-02-11]. Will computer replace radiologist? https://login.medscape.com/login/sso/getlogin?urlCache=aHR0cHM6Ly93d3cubWVkc2NhcGUuY29tL3ZpZXdhcnRpY2xlLzg2MzEyNw==&ac=401 webcite.

16. Bakkar N, Kovalik T, Lorenzini I, Spangler S, Lacoste A, Sponaugle K, Ferrante P, Argentinis E, Sattler R, Bowser R. Artificial intelligence in neurodegenerative disease research: use of IBM Watson to identify additional RNA-binding proteins altered in amyotrophic lateral sclerosis. Acta Neuropathol. 2018 Feb;135(2):227–247. doi: 10.1007/s00401-017-1785-8. http://europepmc.org/abstract/MED/29134320. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

17. Trivedi H, Mesterhazy J, Laguna B, Vu T, Sohn JH. Automatic determination of the need for intravenous contrast in musculoskeletal MRI examinations using IBM Watson's natural language processing algorithm. J Digit Imaging. 2018 Apr;31(2):245–251. doi: 10.1007/s10278-017-0021-3. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

18. Malin JL. Envisioning Watson as a rapid-learning system for oncology. J Oncol Pract. 2013 May;9(3):155–157. doi: 10.1200/JOP.2013.001021. http://europepmc.org/abstract/MED/23942497. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

19. De Fauw FJ, Keane P, Tomasev N, Visentin D, van den Driessche G, Johnson M, Hughes CO, Chu C, Ledsam J, Back T, Peto T, Rees G, Montgomery H, Raine R, Ronneberger O, Cornebise J. Automated analysis of retinal imaging using machine learning techniques for computer vision. F1000Res. 2016 Jun;5:1573. doi: 10.12688/f1000research.8996.2. https://f1000research.com/articles/10.12688/f1000research.8996.2/doi. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

20. Korfiatis P, Kline TL, Lachance DH, Parney IF, Buckner JC, Erickson BJ. Residual deep convolutional neural network predicts MGMT methylation status. J Digit Imaging. 2017 Oct;30(5):622–628. doi: 10.1007/s10278-017-0009-z. http://europepmc.org/abstract/MED/28785873. [PMC free article] [PubMed] [CrossRef] [Google Scholar]