Summer Internship

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A Report

By

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Abbreviations

SACHi- Save a Child's heart initiative

SAHI- Society to Aid the Hearing Impaired

TLC- Tender Loving Care

CT- Computed Tomography

ALOS- Average length of stay

TSC- Telecommunication Service Centre

NGO- Non- governmental organization

NCD- Non-Communication Disease

CD- Communication disease

EMR-Electronic medical records

ICT- Information and communication technology

PHC- Primary Healthcare Centre

CHF-Congestive heart failure

CAD- Coronary Artery Disease

LVF- Left ventricular failure

EF- Ejection fraction

Section 1

CASE STUDY ON INDRAPRASTHA APOLLO HOSPITAL, DELHI

1.1 Introduction:

About Apollo Hospitals

Apollo Hospital is a major Hospital chain based in Chennai, India. It was founded by Dr. Prathap C Reddy in 1983. Today, Apollo is largest private Healthcare provider in Asia and first corporate healthcare in India. Apollo has spread its wings in India as well as internationally. There are 70 Apollo hospital branches, pharmacies (2556), primary care (over 172) and diagnostic clinics, telemedicine unit (148) in 13 countries. Apollo encompasses health insurance services, project consultancies, academic institutions and research foundation with an aim focusing on global clinical trials, epidemiological studies and genetic research. Apollo' vision is to "Touch a Billion Lives", to achieve this hospital believes in implementing social initiatives. Apollo' Mission is to embrace healthcare of international standard within the reach of each individual. Apollo hospital group has conducted many social initiatives like SACHi, SAHI, CURE Foundation, YouWECAM and many comprehensive health camps in urban, semi urban, rural areas and also to remote areas via telemedicine and m-health capabilities. Hospitals have met the criterion of quality control such as healthcare associated infection like ventilator associated pneumonia and blood stream infection.

About Indraprastha Apollo Hospital

Indraprastha Apollo Hospital is an India's largest healthcare chain at Delhi. In 1995, it was established. In 2005, it was the first internationally accredited Hospital in India by Joint Commission International USA. This hospital got re-accreditation from JCI consequently for a fourth time, which was the great achievement to make it first hospital in India to do so. In 1998, the first paediatric and adult liver transplants were performed successfully here. It has largest sleep lab in Asia. This hospital has well versed with advanced medical technologies like: PET-CT, PET-MR, Da Vinci Robotic Surgery system, Portable CT Scanner, Novalis Tx, Cobalt based HDR brachytherapy, 3 telsa MRI, 128 Slice CT scanner and Radixact- X9 etc. The hospital has met the best criterion to do complex surgeries with ALOS for post-operative patient and outcomes comparable to global standard.

About Organization culture:

1.Value- A ray that represents Apollo leadership which is beacon for millions looking for cure…looking for hope.

2.Owernership: Values the uprightness and advancement of the just use of resources empowers to the betterment of people's life.

3.Quality: High quality and evidence-based care leads to save more lives and less time in hospital.

4.Innovation: Encourage innovative work to improve.

5.Patient centricity: Analysing patient need, creating partnerships that input effectiveness and personal throughout the continuance of care. By practising Tender Loving Care to create better experience for the patients by supporting in physical, emotional and psychological aspects.

6. Teamwork: By analysing the diversity of everyone culture and maintains mutual respect and open communication to each other.

7.Teaching excellence: Try to engage the standardised training for the professional.

1.2 Roles and responsibilities of teams –Focus with a envision for new horizon- a future where nation is health and people are fighting fit.

To provide research facilities

To prescribe course and and curricula for academic purpose.

To provide teaching facilities for academic courses.

To establish and maintain relation with other institution to give training different healthcare professionals.

1.Role of hospital administrators:

Manage hospital departments and make sure that hospital runs efficiently and delivers adequate health care to the patient.

They work as a liaison between government, doctors, healthcare professional and department heads and amalgamate the tasks of all units so they work as a whole.

2.Roles of Medical Units:

Delivers preventive, primitive and curative health care to human life.

Along with comprehensive health policy contributes services at the level of international standards of quality which results in providing overall development of hospital.

3.Role of support service department:

To help an establishing the benefits in their field through rapid reimbursement, reduced administrative cost and increased income.

1.3 Services and programmes

Hospital services-

- In-Patient Department services
- Out-Patient Department services

Various Health check-ups:

Pro Health Check	Basic Health Checks
Advance Health Checks	Senior Citizen Health Checks
Basic Health Checks	Personalized Health Checks
Cancer Screening	Well women health checks
Child Health checks	Whole body health checks
Heart health checks	Diabetic checks
Knee Checks	Obesity Checks

Apollo cosmetic clinic

Apollo sugar

Dietetics and clinic Nutrition

Hyperbaric oxygen therapy

Pain clinic

Physiotherapy and rehabilitation

Transfusion Medicine

Laboratory services

Programmes-

- Quality improvement program- For the purpose of quality control Quality Steering Committee has been established.
- Total Health Programme
- Heart Beating Campaign
- SACHi Initiative

Research:

- Apollo hospital education and research foundation

- Apollo Research and Innovation

Academics:

- DNB
- Postgraduate Diploma courses
- Training to paramedical staff
- Fellowship program
- Emergency Medicine

1.4 Operational Aspects-

Currently, total bed strength -718 beds with a capacity to expand 1000 beds

Specialities - 52

1.5 Path breaking initiatives

1. Billion Heart Beating Campaign, which empowers Indians through the knowledge of how to fight heart disease.

2. Apollo Hospital educational and research foundation

3.Corporation with National skill development foundation.

4. SACHi which have aims to provide qualitative cardiac care with financial support to underprivileged children.

5. In 2015, SEHAT was launched along the Apollo Hospital with a goal to get network with 60,000 Common Service Centre across the country to acumen network.

6. Porter management system

7. Tele stroke ICU and Digital EMR

8. Apollo Home Care

9. Apollo Elder care- to address physical, psychological, medicinal and financial concerns of an elderly patient and their caregivers.

10. Apollo clinical Excellence (ACE @25)- to monitor quality and clinical outcomes subsequently. In this parameter included complication rate, mortality rate, one-year survival rate, ALOS after major procedures covering all major specialities.

11. Hospital collaborate with Zebra Med to install AI based screening tool.

12. Launch Apollo Mobile clinic for the access in remote areas.

13. To combat CVs disease set up National Clinical Coordination Committee.

14. On World Sickle Cell Day, they organized a successful programme for health awareness.

Milestones

2017

- According to The Time Health Multi-Speciality Hospital Survey, it was 1st ranked in India.
- Launched the Healthy Health Program.
- Awarded for NCDs initiative of the year at BMJ Award South Asia.
- Apollo Hospitals Partnered with MCO for to conduct a series of their initiatives in UAE.
- Another survey conducted by Times Health as All India Critical Care Hospital Survey; it was at 2nd position.

2016

- Enters the prestigious Guinness World Records for having the highest participants in a hand sanitizing survey.

2015

- It was first centre of excellence in Hip Arthroscopy.
- Asia's first heart and liver transplant combined en-block.
- Launched Ask Apollo
- The first telemedicine connection of India with Central Asia inaugurated by Hon'ble PM.

2014

- Win the prestigious International Medical Tourism Award.
- Launch Apollo Sugar Clinic.

2013

- A new campaign – Apollo Protect was launched
- Apollo Tele networking Foundation (ATNF).

2012

- Partnered with NSDC, a public -private partnership.

2010

- m- health service.

2005

In India, it was the 1st hospital that receive accreditation from JCI, USA.

1.6 Strategies

1. Apollo innovation and quality awards -Aim to promote performance excellence through innovation and sharing of successful innovative performance strategies and benefit derived from their implementation.

2. They sponsored events and organize medical camps to help and reach the underprivileged people.

3. To keep running their Tendor Loving Care movement, they provide world class healthcare delivered with empathy, expertise and experience.

4. Apollo Elder Care- As a holistic approach to health needs for elderly.

5. They evolved the concept of preventive healthcare by offering a range of health check-ups to fulfil everyone's need.

6. To increase the individual contribution for services, attendance, honesty and best performer in the organization, reward and recognition programmes being practiced.

1.7 Communication channels

1. The leaders explain the decisions to their employees to ensure that their leisure as well as social needs are always been fulfilled.

2. Mode of communication is centralized but feedback is given to the top management to enhance morale.

3. Apollo clinical Audit Team (ACAT)- Audit the accuracy of ACE@25, RACE parameters, Apollo quality plan parameter, Mortality review and compliance to Apollo procedure, plan, polices.

4. A single report has been disseminated every month to all clinician and administrators about the compilation of all latest advances in Medicine.

5. Apollo accreditation program-It is a web-based tool having a single dashboard summarizes the overall compliance from all group of Apollo hospitals which are accredited under JCI and NABH.

6. Apollo clinical Innovation Group- To strengthen the leadership in adoption of new technology.

7. The financial reports are displayed on website which have quarterly result

8. Official news also get displayed on website

9. Medintegra- web based tool for telemedicine to provide healthcare services via telecommunication

10. Other various technologies are used such Ambulance monitoring, ICU monitoring, Mobile based application and EHR.

11. The progress, achievement, workshop and conferences are disseminated in annual report.

12. Apollo Torch- The network of Apollo alumni built to strengthen the bond of being part of institution.

1.8 Human resource policies and practices

1. Sexual harassments redressal policy-to ensure women's right about gender equality and to live with their dignity at their workplace.

2. Human resource department play a role in ensuring the hospital adopts CSR responsibility programmes (community development in healthcare sector, touching a billion lives in healthcare wellness, promote research in healthcare, education and skill development) and proactively monitor its adoption and documenting its success.

3. To ensure a value-based culture that will drive the much-needed change towards champions for achieving better business result

4. The HR team oversees the quality of delivery of services at hospital and the to ensure the growth track of quality initiatives that has been implemented.

5. Whistle Blower Policy: - A vigil mechanism, according to this policy- Employees and directors may raise their concern about unethical behaviour, fraud or violation of any policy and may get direct access to their chairperson of the Audit Committee (committee of board of director of Indraprastha Medical Corporation Limited)

6. HR team focus on Talent and leadership development programmes for middle and senior management and team also get awarded to give such contribution.

7. The team also focus on the excellence coded in DNA of the organization such Tendor Loving Care, academic, research and cutting-edge technology.

1.9 Leadership

Founder and Executive Chairman

- Dr. Prathap C Reddy

Executive vice chairperson

- Preetha Reddy
- Shobana Kamineni

Managing Director

- Suneeta Reddy

Group Medical Director

- Prof. Anupam Sibal

Joint managing director

- Ms. Sangita Reddy

Independent Directors-

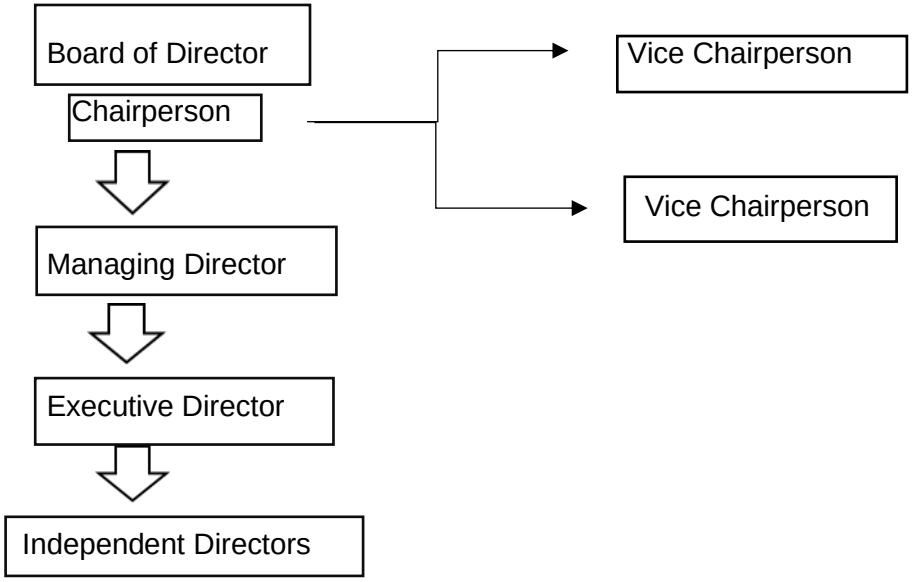
- M B N Rao
- Vinayak Chatterjee
- Dr. Rajagopal
- Smt.V Kavitha Dutta
- Shri. Murali Doraiswamy

1.10 Local and global reach

- Patient comes from different part of India at Indraprastha Apollo hospital

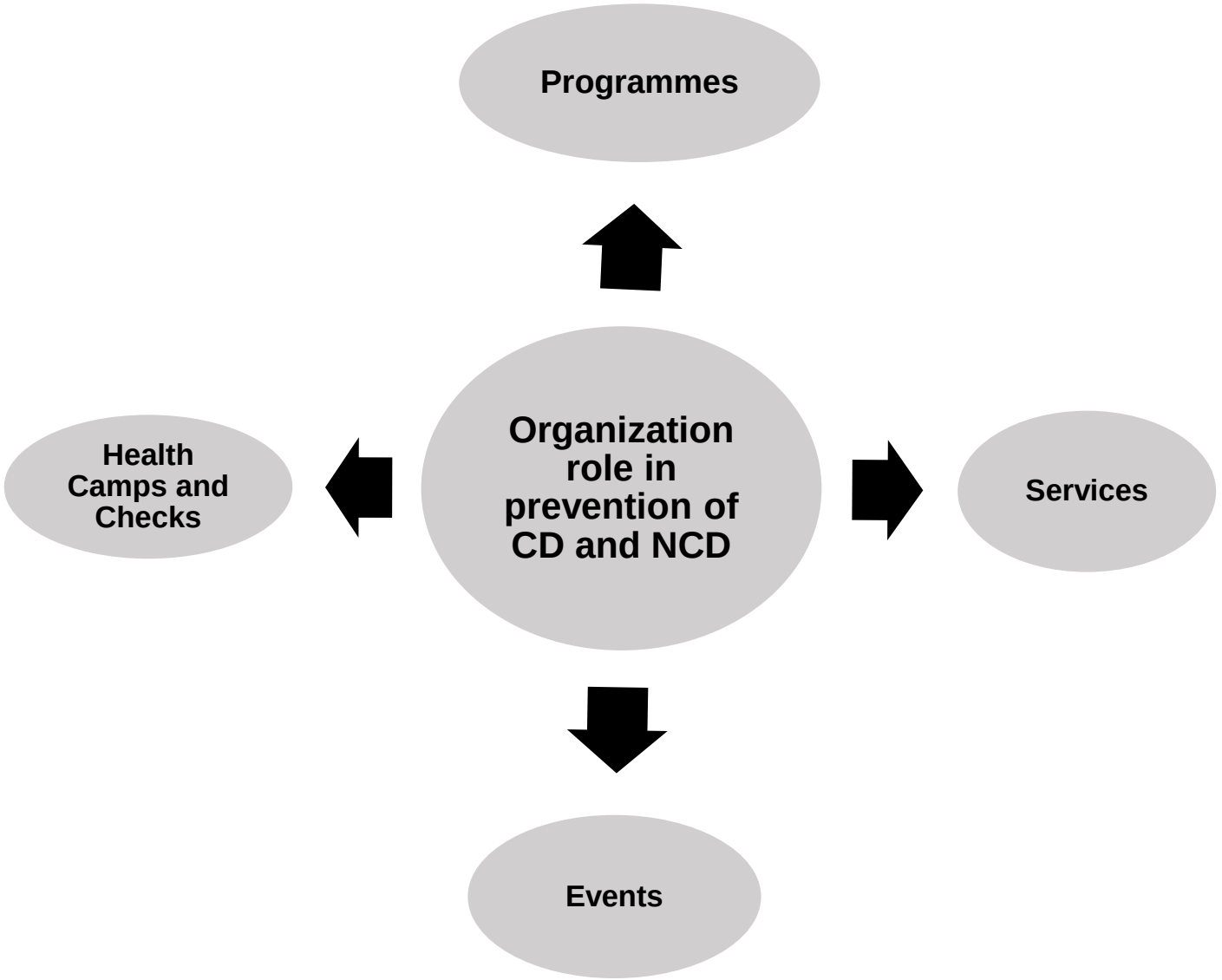
- Many healthcare programme initiatives which help to reach urban, slum and rural population and with the help of latest technology and Telemedicine hospital outreach has been increased.
- Apollo hospital is able to provide their services by doing public-private relationship.
- Medgate is a health centric magazine. It is international healthcare monthly magazine. This magazine help in catering of health education among those society which are deprived of health-related education and also provision of health, wellness and lifestyle among the hospitals and doctors.
- Patient comes to hospital from Middle East, Russia, Afghanistan, Nepal, Bangladesh and Burma etc. and shared their good experience about the services.
- Some specialist of Hospital also gets honoured from nation and international awards for providing excellence healthcare services.

1.11 0rganogram



Section 2

INDRAPRASRTHA APOLLO HOSPITAL, DELHI


Programmes
Health Camps and Checks
Organization role in prevention of CD and NCD
Services
Events

2.1.1 Various programs

- **Healthy Heart Program**

Implementation- initiated in 2017. As they observed in their hospitals that young age group people are suffered from heart disease are around 20%. So, they focused on preventive measure.

Objective- to prevent the NCD burden. If people who had suffered from disease then they were given preventive measure or reversal of heart disease.

Methodology- fee based enrollments of the people and program conducted annually.

Patients were physically screened and classified into 2 categories- low and high risk after considering under 15 parameters.

Action undertaken (for patients who get enrolled) –

1) Four visits to the cardiologist\physician.
2) Life style modification like smoking cessation, stress management,
3) Diet modification, yoga and meditation session.
4) Continuous monitoring

Outcome- According to study conducted by, wellness institute of Cleveland clinic, around 0.6% people who enrolled in comprehensive life style intervention was 0.6% have less occurrence rate of cardiac disease as compare to people who get not enrolled. In another study, patient who participated in intervention program had severe chance to get anginal attack as compare to non-participants.

- **SACHi**

Implementation- It was initiated in 2003.

Two projects held under this programme – a) Congenital Heart Surgery b) School of Heart Programme

- **Congenital Heart Surgery** –

  Objective- To detect and then treat the congenital heart diseases in children.

  Methodology- monthly free screening and health camps for screening.

  Action undertaken- free or subsidized treatment including open heart surgeries were given.

  Deliverable- 11 children has undergone surgeries in Delhi as well as in Hyderabad in year 2018.

- **School of Health Programme**-

  Objectives- to increase education and awareness about the health to develop healthy leaving among the children of poor socioeconomic society.

  Methodology- free checkup camps and workshops to aware the children

  Action undertaken- Health checks, told about healthy diet, sports activity, health quiz and BLS demo was performed for children above 14- year age.

  Deliverable- the program was held in 10 NGO and public school in Delhi.

  Outcome- over 2600 children get benefit.

  In SACHi initiative, over 50000 lives have been enrolled under Apollo Hospitals.

- **<u>Billion Heart Beating Foundation</u>-**

Implementation- Non-for-profit organization.

Objective- to increase awareness about contributing risk attributes to the heart disease.

Give 5 solution – eat healthy, get active, quit smoking, beat stress, get a regular heart check.

Billion heart beating programme-

- **Old Age Home Adoption programme**-

0bjective- To measure medical status of older population and to provide medication to them.

Methodology-Provision of health need assessed through monthly health checks in Approx. 34 old age homes.

1) Cardiology camp: To check the prevalence of disease, screening was done.
2) Eye camp: primary examination is done if found any special treatment then refer for special care.
3) General examination and blood density checkup are done.

medicine disseminated at free of cost

- **Basic life support training**

With the aim to save the lives by providing skill to the people at corporate and schools.

- **Awareness Drives- Digital and on ground campaigns**.

➢ **<u>Apollo Aushad</u>**

Objective- health checks and medicine distribution

Methodology- health camps

Outcomes- people in 32 old age homes and 12 orphanages get benefited.

➢ **<u>SEHAT-</u>**

Objective- to deal with the disparity and access to healthcare between urban and rural reason. So, the government of India with Apollo hospitals launched SEHAT to bridge the gap via telemedicine and m- health.

Action- telemedicine Centre were set up at remote areas.

In 2015, honorable PM Narendra Modi disclose e-project at Bishkek (capital of Kyrgyzstan) and Osh, connected with Apollo hospital Delhi.

One information Centre was launched in Nepal for teleconsultation in collaboration with this hospital.

Outcomes- provision of easy access to health care facilities and enabling patient to improve their own health. Services get more effective when there is private partner relationship. This initiation results in common service Centre all across the world.

➢ **<u>SAHI</u>** - **Objective-** to provide awareness and informing people about auditory health.

Early detection and prompt treatment so that their overall development of the children does not hampered.

Educate the parents about the understanding of identification of hearing problems in their children.

Methodology- by rural camps, print and digital media, awareness session about effect of noise pollution on hearing loss.

Deliverable- 100 camps has been held and around 14000 children screened

Free hearing screening has been done and hearing devices had been given to the needy patient at free of cost.

Free of cost minor surgery has been performed to the children with middle ear deformity.

Partial funding to be provided to the children who undergoes cochlear implant for severe hearing loss.

Habilitation therapy given to the children after surgery.

In 2015, an event was held to build the self-esteem and confidence among the underprivileged hearing-impaired children to showcase their talent.

Roles and responsibility of the trained therapist team- They organize therapy session every week.

They plan set goals to speech, language and cognition goals which were designed listening and understanding level of individuals. And then continuous monitoring to be done.

- **Cure foundation: -**

Objectives-

Cancer awareness and screening

Cancer education and research

Subsidized and free treatment to the needy person

To increase awareness, early detection, treatment and rehabilitation programme.

Approach- Organize conference, seminar and workshops.

Screening programme for cancer

Use latest technique and technology for screenings and treatment.

Outcome- over 500 needy patients has been involved in research, education and rehabilitation programme.

- **Steps towards prevention of COVID-19**
  - The Apollo Hospitals group helps to train doctors around country through telehealth services with the support of MCI and Telemedicine society of India. With this orientation program helps to effectively deliver the clinical care.
  - For COVID-19 screening, they are providing the online service in their ASK APOLLO app.

Project Stay-I (Project Kavach)

Objective-

1) To create isolation quarantine facilities in cities across the country away from main hospital to reduce the burden on hospitals providing acute care.
2) To provide quarantine facilities to the people Apollo hospital partnered with Zomato, Oyo, SBI, Deutsche Hindustan Unilever bank and lemon tree hotel. They provide single sanitized rooms with all facilities. The rooms in Oyo hotels are free and financially supported by CSR – based initiatives.
   - They are providing information related to Coronavirus which has been written their blogs.

- Apollo hospitals has tied up with Airtel to provide free COVID-19 scan AI tool, which provides the risk score and suggest the best possible action. It suggests the social distancing guidelines and prevention steps as suggested by WHO and MoHFW. Apollo claims to have been offering over 2,000 quarantine hotel room in addition to 600 dedicated beds to fight this outbreak.

➢ **Disaster Management**

In April 2015, during massive earthquake has happened in Nepal, a multispecialty team from Apollo hospital went there. And performed the 80 surgeries (including spinal fixation surgery) on all age group patient.

➢ **Health Camps**

Apollo hospitals has initiated the free health camps. These camps are held on the 9th of every month.

Objective – specially for pregnant women in urban, rural and semi urban areas.

➢ **Infection Control Program**

Objective- prevention and control of infection in both patient and staff.

Methodology-evidence based polices and guidelines are followed and supported by information management in relation to notifiable diseases and microbial surveillance. Periodically audits were taken.

Action- guide the healthcare workers on infection risk management and to ensure safety.

Deliverable- to train all employees orientation and training was conducted regularly.

Sanitary water was supplied in all patient care areas.

Monitoring of all the devices and focus on dialysis, sterilization and disinfection process to ensure the patient safety.

➢ 2.1.2. Services

This Hospital have many centers of excellence. It provides comprehensive, preventive, diagnostic and therapeutic treatment with well-versed and latest technology to the patients with TLC.

Few examples are listed below: -

- ✓ Robotic surgeries- da -Vinci surgical system, Robotic radiosurgery (cyberknife@), Novalis Tx and many advanced technologies help to perform the complicated surgeries and with the precise surgery it helps to patient benefit such as quick recovery, less pain and less time stay at hospital.
- ✓ Comprehensive treatment facilities have been provided in oncology department.
- ✓ Department of Cardiology- the hospital is well equipped with Cath labs, critical care units and advanced technology.
- ✓ Noninvasive vascular testing and comprehensive management of patient has been done.
- ✓ Proton radiation therapy.
- ✓ Fully equipped sleep, respiratory and critical care department.
- ✓ Apollo PFT lab is known for its accurate result.
- ✓ Highly advanced ventilator has been used.
- ✓ Elder home care.
- ✓ Various health checks.

Section 3

Comparative Analysis

Benefit and challenges of Telemedicine: Among healthcare providers and Healthcare receivers

3.1.1 Introduction

Telehealth is the provision of healthcare remotely by means of variety of telecommunication tools, including telephones, smartphones and mobile wireless devices with or without a video connection. It encompasses health provision as well education. Telemedicine used by m- health in an asynchronous (store and forward via SMS/WhatsApp/Email/EHR) and synchronous (real time via telephone and videoconsultaion) nowadays it has been become popular by hybrid of both (health apps, web apps). As the transition of disease from communicable to non- communicable has happened in last decades so with this platform it is possible to reach every individual in urban, rural and remote areas to improve access and quality of healthcare. Patients diagnosed and timely provision of treatment often have improved outcome which result in reduce morbidity and mortality. Telemedicine can be effective way to deliver some aspects of behaviour health services, monitoring discharge patients and treating chronic conditions. Telemedicine is generating a very positive contribution during this COVID-19 pandemic situation in precaution, prevention and treatment to stop covid-19 spread. During this time, it is bridging the gap between doctors and people who are suffering from other medical ailments, they can receive homecare, without admitting hospitals, hence minimizing their risk of contracting the virus. But there are some challenges to use this platform for the medical professional and patients such medicolegal issues, lake of face to face meeting and many others. In addition to this, there are various challenges faced in the implementation of telemedicine such as lack of infrastructure, public private relationship, technical issues and less confident about telemedicine effectiveness. objective of this comparative study to see the opportunities and challenges in the use of telemedicine in various disease like diabetes, cardiac, skin cancer and screening programmes.

3.1.2 Literature review

Study	Methodology	Objectives	Outcome	Limitation
Study 1 Prevention of Diabetes in rural area with Telemedicine intervention.	Cross-sectional study	To see the effectiveness in health of rural population of telemedicine intervention.	With the help of telemedicine, it become possible to do mass screening and to provide	Does not allow cause-relationship effect.

(Chunampet Rural Diabetic prevention Project), Tamil Nadu, India Published on 2012			earlier prevention to improve the health of population in 42 villages.	
Study 2 Evaluating the effectiveness of Teledermoscopy for skin cancer. Published on 2019	Online survey (5 sections), recruitment through snowball	To identify the healthcare practitioners' view on enablers and barriers to use mobile tele dermo-scope for the diagnosis of skin cancer.	52% of respondents were satisfied and found positive impact on the use of teledermoscopy. But some felt the issue related to medicolegal concerns and barrier for old age patient to cope up with use of such technology.	Response rate was low, only 44 healthcare practitioners participated. This finding could not be generalizable as mostly participants included in study belongs from Australia. Survey was lengthier take 30 minutes to complete, hence this may be a bias factor between respondents and non- respondents.
Study 3 Teleophthalmology use in diabetic eye screening. Rural primary care clinic, US Study conducted from July 2016 to April 2017	Qualitative method (open ended interviews)	To identify the patients and And primary care providers facilitators and barriers with teleophthalmology program.	Teleophthalmology has been proved effective for diabetic eye screening in rural population according to this study. Some patients were not familiar about this tool and having misconceptions	Sample size was small (29 participants, out of which 20 diabetic patient and 9 PCPs) Included patients were Caucasians and majority of them have high level of health literacy as compared

			about eye screening for diabetes.	to same age adult in rural population. For Diabetic eye screening patient's knowledge were not systematically accessed.
Study 4 Use of Telemedicine in Apollo Telehealth services, Telangana Hyderabad, India Study conducted in TSC Apollo hospital from June 2013 to August 2013. **Study 5** Telemedicine and Telehealth – The Indian scenario Published on 2016	Cross sectional study. Participants -122 (doctors who worked in TSC=51, Patients from North Eastern State=71) Article reviewed from literatures from the official documents belonging to Health Ministry	To identify the effective of telemedicine in term of quality, cost effectiveness and to evaluate problems encountered from patients and doctor's perspective. To identify the bottlenecks and benefits of the use of telemedicine in healthcare system.	Respondents: 80%= quality Effectiveness 90%= cost Effectiveness 47%= technical issues 39%= Time scheduling 31%= patients were uncomfortable to face camera This tool enables to bridge the gap between rural-urban health service. Enables to provide early diagnosis and treatment. Barriers- data confidentiality Lack of public private relationship	Response Bias, Large sample size might be more effective.

Study 1 (Deepa, Anjana, & Mohan, 2012)

	Healthcare providers	Healthcare receivers
BENEFITS	The diabetologist were able to prevent the complication of diabetes through telemedicine. They were able to do mass screening for the diabetes in 42 villages from year 2004 to 2010. It enables them to keep follow up for diabetic patient.	Primordial prevention was given to increase awareness and screening for Diabetes. Monitored people who has diabetic complication such as foot surgery were referred to Diabetic hospital, Chennai. Retinal images which was taken by retinal camera and sent to ophthalmologist via satellite. ECG was also taken for complicated cases and sent to diabetologist. Reduce the travelling time and cost. Approx. 5% people were developed diabetic complication and referred to tertiary care hospitals.
BARRIES	There were not qualified paramedical staff was available, so training was provided to Village Health Workers. Initially there was lack of public- private partnership.	

Study 2 (Harsham, Soyer, & Janda, 2019)

	Healthcare Providers	Healthcare Receivers
BENEFITS	Help to monitor a lesion on time. Keeping records enables to monitor during follow up. Helps to review during clinicopathological correlation.	Provide more awareness and education about their skin lesions. Early diagnosis of skin cancer. If the patients are worrying about the lesion, the recorded images help them to see the change. very beneficial to those people who live in rural and remote areas.
BARRIERS	Sometimes there is need of physical examination to check tenderness and lightening illumination. It is necessary to see full skin examination in many lesions such as melanocytic lesions.	Older aged and people find difficulty to cope up with such technology. Sometime patient often selects the symptomatic benign lesion without noticing asymptomatic another lesion.

Study 3 (Smith, Zupan, & Liu, 2019)

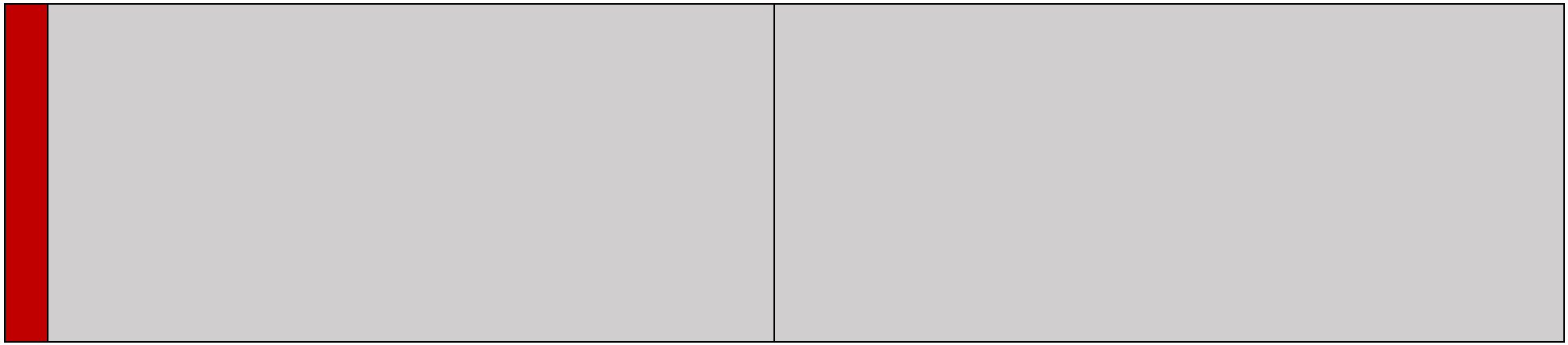
Healthcare providers	Healthcare receivers
Benefits: With the help of teleophthalmology, it become easy to screen the patients and referral process. Perceived benefits to patients in term of cost and convivence. Benefit to healthcare organization.	This technology enables them to know earlier through teleophthalmology screening and receive treatment at right time which is very important to prevent vision loss later. Travelling cost get reduced and time for referral process from admission process to treatment also greatly reduced. Very convenient to them.
Barriers: PCPs faced difficulty when diabetic patients are due for eye screening and being unfamiliar about teleophthalmology.	Misapprehension about the diabetic eye screening through it. In some cases, they believe that in- person examination should be there.

Study 4 (Deepa, Anjana, & Mohan, 2012)

	Healthcare Providers	Healthcare Receivers
BENEFITS	Majority of specialist (90%) acknowledged that telemedicine is beneficial for them as: - It reduces time It helps to follow the patients Reduce travel time Cost effective Able to provide the treatment in low healthcare resource setting.	Most the patients (82%) satisfied from their treatment through telemedicine. 90% of them were satisfied about their appointments schedule as it has been given according to their convenient as well. 89% of the respondents stated that treatment was feasible and convenient.
BARRIERS	Faced technical issues (40% of doctors) 39% faced time scheduling.	55% of the patients respond that they found difficulty in understanding the telemedicine process. 18% of the them acknowledged that they had uncomfortable to face camera. lack of face to face contact.

Study 5 (P, A, & A, 2016)

	Healthcare providers	Healthcare receivers
BENEFITS	To bridge the gap between rural and urban healthcare facility Enables specialists to monitor patients in rural and remote areas with help of this tool. Telemedicine provides synchronous interaction between doctors and patients. Used for education purpose as they could interact with each other's through telemedicine.	They can take the benefit the health services at their place, hence reduce travelling cost and time. Provided primary prevention. Helps them to earlier diagnosis of any emergency case. Immediate urgent care.
BARRIERS	Lack of awareness about the application of ICT in their practices. Lack of public- private relationship. Difficulty in assessing the skilled man powers in low resources setting areas	Data confidentiality Lack of confidence about monitoring and treatment consultation through telemedicine.



3.1.3 Conclusion-

Telemedicine is a valuable and reliable tool for enhancing the quality of care, prevention and earlier detection and screening of diseases. With the help of telemedicine, it has become possible to provide healthcare at rural and remote areas with low cost. Telemedicine also reduce unnecessary visits and eliminates travelling cost for regular check-ups. It also helps to boost revenue and provide the better access to healthcare regardless of location. Some patients require physical examination but by using wearable devices some issues get resolved. Trust factor should exist between patient and physician. Physical burden of the staff has been reduced that was due to patient care and coordination activity. Regular follow was possible. Doctor can see online patient record. The biggest challenge is lack of public- private relationship. When it comes to data storage then there is the fear of data security. although DISHA enforces the privacy and security measures for digital health data in India. As the PDP bill passed by the Parliament of India covers the mechanism for protection of personal data but there are some lacunae still exist. Many specialists feel less confident as they are not providing services over in- person interactions. Technological barriers and limited infrastructure prevailed as an issue. In India, PHC has shrunk so we need to correct by telemedicine, therefore, identify the sort of patients for whom we should use this platform and measure should be taken to develop the confident and motivate people to use this platform.

Section 4

4.1.1Title: Role of telemedicine in management of cardiac disease

4.1.2 Introduction:

Telehealth is the provision of healthcare remotely by means of variety of telecommunication tools, including telephones, smartphones and mobile wireless devices with or without a video connection. Telemedicine used by m- health in an asynchronous (store and forward via SMS/WhatsApp/Email/EHR) and synchronous (real time via telephone and videoconferencing) nowadays it has been become popular by hybrid of both (health apps, web apps). As the transition of disease from communicable to non- communicable has happened in last decades so with this platform it is possible to reach every individual in urban, rural and remote areas to improve access and quality of healthcare. Patients diagnosed and timely provision of treatment often have improved outcome which result in reduce morbidity and mortality. Telemedicine can be effective way to deliver some aspects of behaviour health services, monitoring discharge patients and treating chronic conditions.

The mortality due to non- communicable disease annually equivalent to 71% of all deaths globally and 82% premature death from NCD in developing countries. The leading cause of NCD deaths (44% of all NCD deaths) were cancer (22% of all NCD deaths), respiratory disease including asthma and COPD (9% of all NCD deaths), diabetes (1.6% of all NCD deaths) and cardiovascular diseases. The self-management of chronic disease such as diabetes, cardiac disease, cancer and more is very important to reduce morbidity and mortality. To see the benefits of telemedicine various articles were reviewed:

1) To assess the effectiveness of telerehabilitation program with SMS for cardiac patients at Belgium (Frederix, Hausen, & Dondale, 2015).

2) A study was conducted in Italy to examine the impact of telemedicine monitoring in the management of heart failure patients (Sardu, Santamaria, & Rizzo, 2016).

3) A study was reported at Belgium with the objective of use of telemonitoring on the quality and physical activity of cardiac patients (Avila, claes, & Goetschalckh, 2018).

4) A randomized control trial study conducted to examine the effect of telehealth exercise training program on health outcomes in patients with HF in China (Peng & Su, 2018).

5) A study conducted to examine the impact of cardiac rehabilitation through web application on CAD patients (Rutger & kemps,2017).

6)To see whether intervention through telerehabilitation in cardiac patient improved the self-management skills (Kraal &Peek,2014).

7) The author Yosef conducted the study to determine the effect of live interactive telecardiology on quality of life (Salekhadar, Ismail, & Talban, 2014).

8) To access the therapeutic effect of add on computed radiography and teleradiology on patient's diagnosis as well as treatment, Mweso (Grumley & Halton, 2020).

4.1.3 Objective: -To assess the effectiveness of telemedicine in the management of cardiac disease.

4.1.4 Methodology

Research Design-Literature review-based study**.**

Search strategy- PubMed, ProQuest

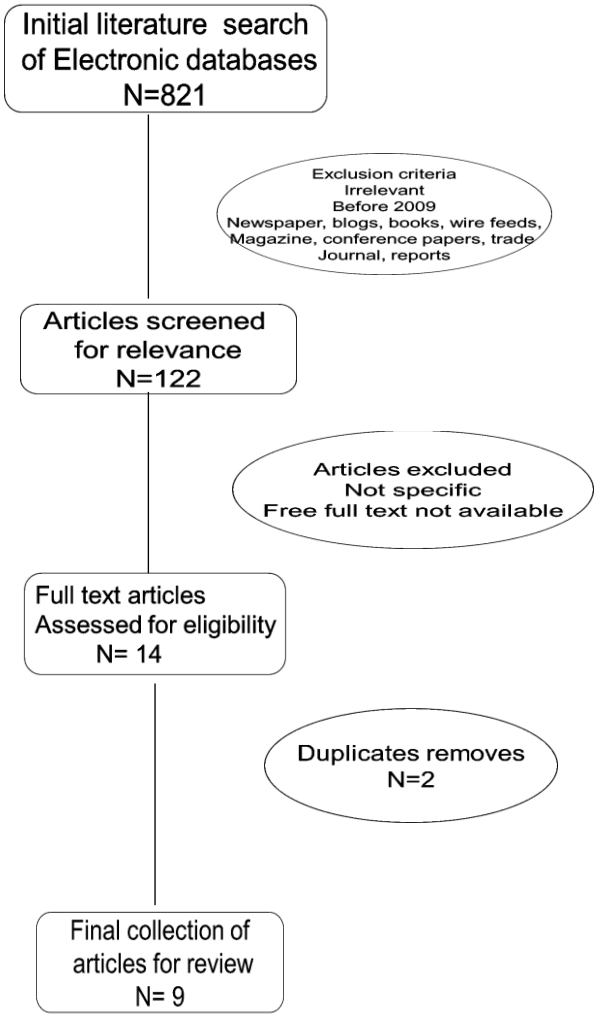
Keywords- Telemonitoring, Cardiac disease, physical activity

Inclusion criteria- Research papers that considered for review were based on: -

Time: - only articles that are published after 2009

Location: - Worldwide

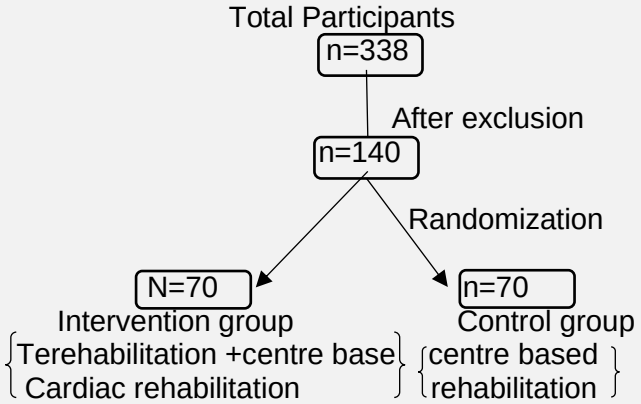
Language: - English



4.1.5 Literature review

<table>
<tr><th>STUDY</th><th>METHODOLOGY</th><th>RESULTS</th><th>STRENGTH</th><th>WEAKNESS</th></tr>
<tr>
<td>To see the effectiveness of cardiac telerehabilitation with SMS for cardiac patients, Belgium

Authors: Ines Frederix, Dominique Hausen, Paul Dendale.

Published on: July, 2015</td>
<td>Randomised Control Trial
Eligibility criteria:
Inclusion Criteria-CAD with conservatively percutaneous coronary intervention, CABG, CHF with either reduced or preserved EF according to NYHA class (I, II and III).
Exclusion criteria: patients with NYHA class IV CHF, symptomatic arrythmia within previous 6 months, physical disability, severe cognitive impairment.
 
</td>
<td>After 24 weeks outcome measure
<table>
<tr><td>outcome</td><td>Intervention group</td><td>Control group</td></tr>
<tr><td>VO2 peak (ml/min*kg)</td><td>Increased P<0.01</td><td>Decreased P=0.02</td></tr>
<tr><td>Vigorous/ moderate walking</td><td>Increased P=.01</td><td>Stable P=.72</td></tr>
<tr><td>HRQL scale
Physical
Emotional
Global</td><td>improved
P=.01
P=.14
P=.01</td><td>stable
P=.05
P=.80
P=.20</td></tr>
</table></td>
<td>1) The outcome supports the effectiveness of cardiac telerehabilitation program.

2) By taking qualitative feedback from intervention group,97% of them were very satisfied by using telerehab’ motion sensor.</td>
<td>1) Very few patients of CHF with either reduced or preserved EF have participated in study.

2) Staff was not giving sufficient time to check operability of service and feedback from the patient.</td>
</tr>
</table>

STUDY	METHODOLOGY	RESULTS	STRENGTH	WEAKNESS

Telemonitoring in heart failure patients treated by cardiac resynchronisation therapy with defibrillator (CRT-D)- The Telecart Study
Italy

Authors- C, Sardu, M. R. Rizzo, M. Barbierl

Published on
2016, July

Randomised control trial

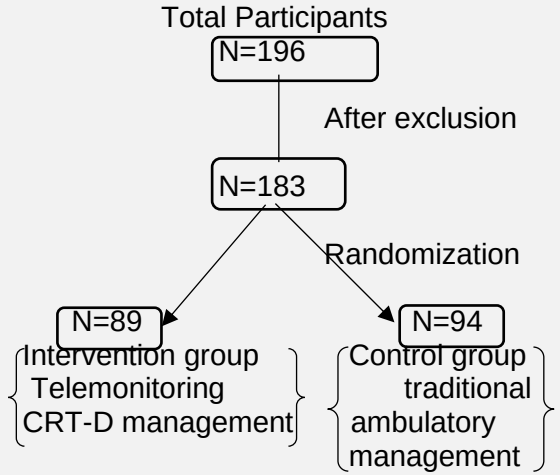
Eligibility criteria

Inclusion criteria:

Patients (age 18 year above) having CHF for last 3 months, NYHA class II or III left bundle branch block, LVEF<35%

Exclusion criteria:

Age less than 18 year and more than 75 years, LVEF more than 35%, cardiac surgery, pacemaker implants.



Clinical Events	Intervention group	Control group
Cardiac death	3	5
Heart failure hospitalization	14	27
ICD shocks	10	13
stroke	3	4
Ventricular Tachycardia	7	17

Intervention group had more improvement in heart failure disease progression.

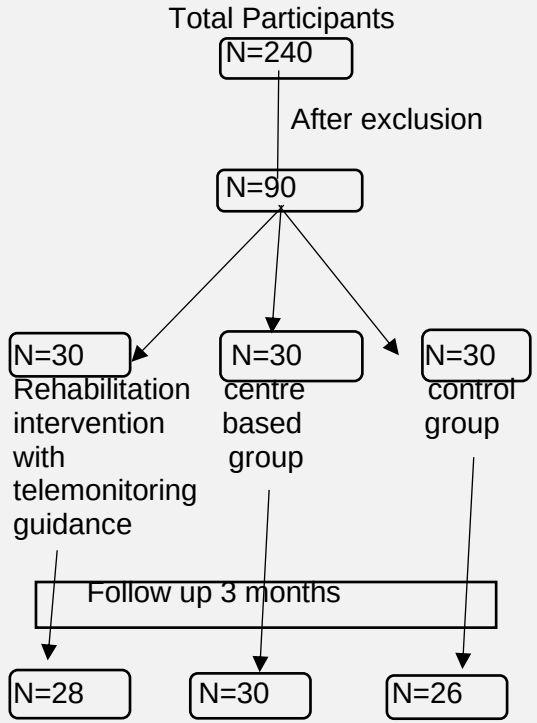
Control group had small sample size as compared to intervention group.

Loss of patients during follow up.

STUDY	METHODOLOGY	RESULTS	STRENGTH	WEAKNESS

<table>
<tr>
<td>Home-based rehabilitation With telemonitoring guidance for patient with CAD, Belgium

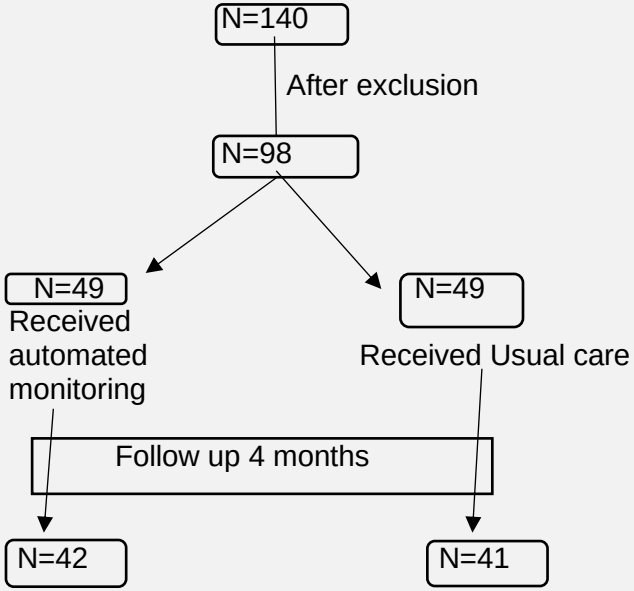
Authors-
Andrea Avila, Jomme claes, Kaatije Goetschalckh, Roselien Duys

Published on
25, January 2018</td>
<td>Randomised control trial
Eligibility criteria: -
Inclusion criteria:
Patients (age 40-75 years) with CAD, previous MI who had completed supervised ambulatory cardiac rehabilitation program, Access to computer.
Exclusion criteria:
Patients have clinically significant VA, exercise induced VA and MI, significant patient’s illness for last 6 weeks.
 
</td>
<td><table>
<tr><th>Outcome Measure</th><th>Home based patients (Intervention group)</th><th>Centre based patient</th><th>Control group</th></tr>
<tr><td>VO2P</td><td>p=0.03</td><td>p=.04</td><td>p=0.04</td></tr>
<tr><td>Ventilatory threshold</td><td>p=0.03</td><td>p>0.03</td><td>p>0.03</td></tr>
<tr><td>Change in physical activities</td><td>Significant change</td><td>Increased sedentary time</td><td>No significant change</td></tr>
</table></td>
<td>This study has successfully achieved the objective that telemedicine intervention has significant improvement quality of life and physical activity of cardiac patients</td>
<td>Among all cardiac rehabilitation activities only 30-50% of physical activities training were comprised

Heart rate monitoring were used in intervention group only.

Lack of blinding among test personnel.</td>
</tr>
</table>

STUDY Study	METHODOLOGY Methodology	RESULTS Results	 Strength	 Weakness

Home-based telehealth exercise training program in Chinese patients with heart failure. China **Authors:** Xingchen Peng, Yonglin Su, and Xiaolin Hu, **Study conducted** from 2014 to 2015 **Published on** August 2018	**Randomised control trial** **Inclusion criteria:** Patients age above 18years having a primary diagnosis of chronic heart faliure for at least 3 months; New York Heart Association I, II, III. A clinically stable condition with a regular medication regimen for at least 4 weeks, the ability to use smart phone, discharged to home, and the ability to understand and speak Chinese. **Exclusion criteria:** myocardial infarction within the last month, unstable angina, uncontrolled hypertension, decompensated non-cardiac disease, physical disability within the last month. **Total Participants**  	1) Patient with home-based telerehabilitation has improved quality of life significantly as compare to control group. 2) Telerehabilitation have significantly improved functional capacity as compare to control group.	A telehealth exercise training program found effective for cardiac rehabilitation.	Patients were recruited from one hospital. Short time follow up. Lack of generalizability

STUDY	METHODOLOGY	RESULTS	STRENGTH	WEAKNESS

Effect of cardiac telerehabilitation in patients with CAD using a personalised patient centred web application. Netherland

Authors -Hareld M.C. Kemps, Ruud F. Spee, Rutger

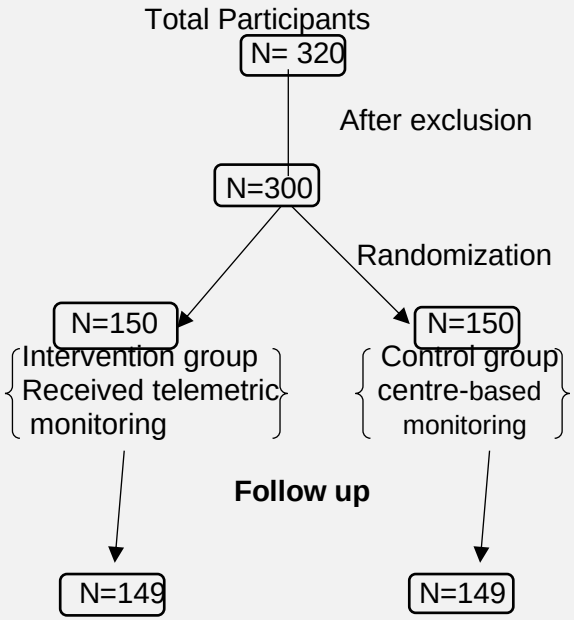
Published on 2017

Randomised control trial

Eligibility criteria

Inclusion criteria: Patients (age over 18 year) with stable angina pectoris, acute coronary syndrome had refereed for cardiac rehabilitation.
Patient having internet access and mobile phone.

Exclusion criteria:
1) Myocardial ischemia, ventricular arrhythmia during exercise
2) Heart failure (NYHA Class 4)
3) other comorbidity (orthopaedic or cognitive conditions)



Outcome (S.D.)	Supported telemonitoring	Usual care
BMI	7	6.4
Systolic B.P.	14.7	13.7
Diastolic B.P.	9.9	10.3
Change in Physical activity	Decreased sedentary time	No significant change
VO2(p value)	P=0.03	P=0.04

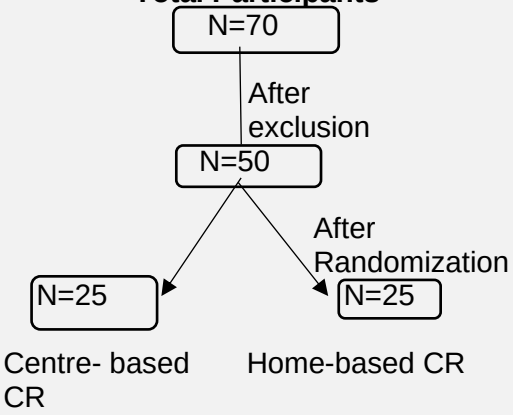
Hence, people with telemonitoring had significantly greater improvement of B.P. than the people who had treated as usual.

The supported telemonitoring for the CAD patients had significant improvement in blood pressure, BMI and sedentary life style as compare to patients on usual care.

Number of training sessions vary among both groups.
Hawthorne Effect - patients who wore sensor were more physically active

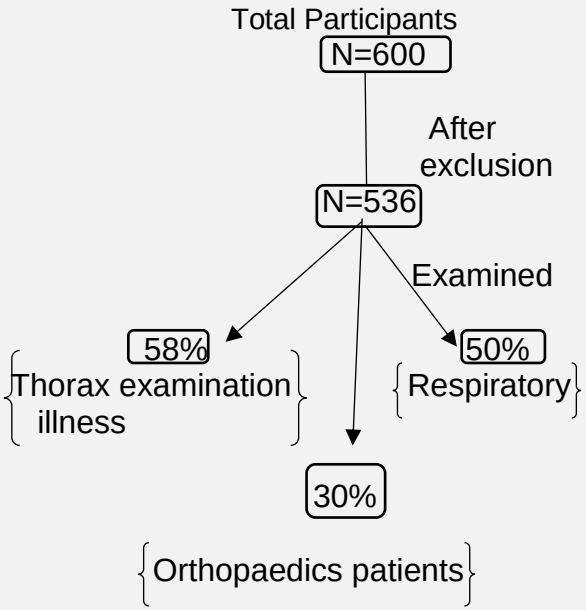
<table>
<tr><th>STUDY</th><th>METHODOLOGY</th><th>RESULTS</th><th>STRENGTH</th><th>WEAKNESS</th></tr>
<tr>
<td>Effect of home- based training with telemonitoring guidance in low to moderate risk patients entering cardiac rehabilitation. Netherland

Authors- Hareld MC kemps, Niels Peek and Jos J Kraal.

Published on 2014</td>
<td>Retrospective observational study
Eligibility criteria
Inclusion criteria:
Patients with low to moderate risk of cardiac events.
Having internet asses.
Patients who had MI, unstable angina and coronary artery bypass grafting who are on cardiac rehabilitation after hospitalization.
Exclusion criteria:
Patients having high risk of cardiac events, no internet access and who had not fulfilled the informed consents.
Total Participants
 
</td>
<td>
<table>
<tr><th>OUTCOME</th><th>Centre based</th><th>Home based</th></tr>
<tr><td>Peak VO2 (ml/min/kg)</td><td>26.1±6.4</td><td>26±5.9</td></tr>
<tr><td>Heart rate</td><td>147.2±25.3</td><td>142.7±17.4</td></tr>
<tr><td>Quality of life</td><td>5.8±0.7</td><td>6.1±0.5</td></tr>
</table>
</td>
<td>All the participants had given exercise training and received instruction about the wearable heart rate monitor and to upload their exercise data on Internet.</td>
<td>Only low to moderate risk patients of cardiac disease entering at Maxima Medical Centre were included. Small sample size.</td>
</tr>
</table>

STUDY	METHODOLOGY	RESULTS	STRENGTH
To assess patient's perception and satisfaction with telemedicine application and determine its effectiveness, quality of care and health outcome, Telecardiology Application in Jordan **Authors-** Yousef salehkhadar, Mohamad Ismail Jarrah, Mohamad AL Talban **Study conducted** from September 2013 to Jan 2014 **Published on** oct 2014	pre-test and post-test one group design	**Total participants N=76** **Effect of telecardiology on the quality of life:** Improved quality of life ($p<0.005$) **Change in treatment plan** **N=58** Established as a part of telecardiology consultation. **N=5** treatment plan remained same as the initial plan. **N=12** treatment plan changed due to telecardiology teleconsultation.	Majority of patients in the study has perception that visit to telecardiology clinic result in improvement in quality of life and treatment plan.

STUDY	METHODOLOGY	RESULTS	STRENGTH	WEAKNESS

The impact of computed radiography and telecardiology On patient's diagnosis and treatment, Mweso, The democratic republic of CONGO. **Authors-** Iona Corumbley, Jarred Halton **Study conducted** from 2016 to 2017 **Published on** 15 January 2020	Descriptive type (patients paired before and after study) **Eligibility criteria: -** **Inclusion criteria:** All adults and paediatric patients present at Hospital General De Reference who had taken the computed radiography and teleradiology consultation. **Exclusion Criteria:** Patients who withdrew consents for participation.  	1) Change in diagnosis and treatment plan= **47%** 2) Change in diagnosis plan was **15%** 3) Decrease in absolute number of antibiotics treatment =**100%** 4) Decrease in exploratory surgery was **72%** 5) Change in surgical orthopaedics intervention =**62%** 4) Change in TB treatment =**52%**	The study thus has proved the implementation of teleradiology consultation along with computed radiography support significantly changed the diagnosis and treatment plan related to respiratory illness and surgery.	Treatment diagnosis were made on interpretation of radiograph by treating physician without seeing telecardiology interpretation in all cases. The use of other diagnostic test and tools might have change in diagnosis as well as management.

4.1.6 Conclusion:

- Study proved an extra six-month patient specific comprehensive telerehabilitation program can lead to a bigger improvement in physical fitness (VO2 peak) and quality of life compared to centre- Based CR alone (Frederix, Hausen, & Dondale, 2015).
- A TELECART study was conducted at Italy observed that there was positive impact of telemonitoring on clinical outcomes in a population of CRT- D with heart failure (Sardu, Santamaria, & Rizzo, 2016).
- A Randomised control trial in home -based rehabilitation intervention with telemonitoring guidance results in improvement of exercise capacity with reduction in cardiovascular mortality in CHD patients (Avila, claes, & Goetschalckh, 2018).
- The conducted in Mweso sought to test the hypothesis that impact of computerized radiography and teleradiology consultation support had significantly changed the diagnosis and the treatment plan in resource limiting settings (Grumley & Halton, 2020).
- A study was carried out in Netherlands has supported that the cardiac telerehabilitation improved the blood pressure, physical activity level through web application (Kraal & Spee,2017).
- Author Xingchen Peng stated that telehealth exercise training program is a feasible and effective method for cardiac rehabilitation (Peng & Su, 2018).
- The study conducted in Netherland shows that home-based training with telemonitoring guidance has similar short -term effects on exercise capacity and quality of life as centre based training in cardiac rehabilitation patients (Kraal & Peek,2014).
- Majority of the patients in the study conducted in remote area of Jordan has determined that telecardiology clinic visit results in improvement in quality of life. (Salekhadar, Ismail, & Talban, 2014).

Telemedicine is a valuable and reliable tool for enhancing the quality of care, prevention and earlier detection and screening of diseases. With the help of telemedicine, it has become possible to provide healthcare at rural and remote areas with low cost. Telemedicine also reduce unnecessary visits and eliminates travelling cost for regular check-ups. It overcomes geographical barriers by bridging the gap between urban and rural healthcare. It also helps to boost revenue and provide the better access to healthcare regardless of location. Some patients require physical examination but by using wearable devices some issues get resolved. In India, MoHFW has aligned its initiative with SDGs by utilizing ICT with available health infrastructure to meet the challenges of healthcare delivery to rural and remote areas to ensure continuum of care.

4.1.7 Discussion:

As healthcare access, efficiency, equity and cost- effectiveness are the issues which has been faced across the globe. Thus, the modern technology has great potential to help these health problems globally. Nowadays telemedicine services (synchronously and asynchronously along with biometric measurable devices such as blood pressure, heart rate and physical activity) increasingly used to remotely monitor and manage patients with acute and chronic illness, hence supporting the primary, secondary and tertiary health promotion and disease prevention agenda. Telemedicine is maintaining a very positive contribution during this COVID-19 pandemic situation in precaution, prevention and treatment to stop the spread of covid-19. It is bridging the gap between doctors and people who are suffering from other medical conditions during this time, they can receive home care, without going medical facilities, hence, minimize their risk of contracting the virus. So, Telemedicine plays a very effective role in healthcare system, to enable it more effective there should be involvement all stakeholders with best alliances among themselves to make necessary changes for the social need. But further evaluation process is required to generate more reliable data which helps us to identify benefits and lacunae of telemedicine usage.

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Kraal, J., Brouwers, R., & Spee, R. (2017, January). Effects of cardiac telerehabilitation in patients with CAD using a personalized patient centre web application. *BMC Cardiovascular Disorders*. Retrieved from https://bmccardiovascdisord.biomedcentral.com/articles/10.1186/s12872-017-0477-6

Kraal, J., Peek, N., & Marle, M. E. (2014). Effect of home based training with telemonitoring guidance in low to moderate risk patients entering cardiac rehabilitation . *European Journal of Preventive Cardiology*. Retrieved from https://pubmed.ncbi.nlm.nih.gov/25354951/

Peng, X., & Su, Y. (2018, August). Home- based telehealth exercise training program in chinese patients with heart failure. *Wolters Kluwer Health*. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6392598/

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Sardu, C., Santamaria, M., & Rizzo, M. (2016, June). Telemonitoring in heart faliure patients treated by cardiac resynchronysation therapy with defibrillator- The Telecart study. *HHS Public Access*. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5813

DECLARATION

I **Sunita Godara**, hereby declare that this Internship Assignments entitled

a) Case study- Indraprastha Apollo Hospital Indraprastha Apollo Hospital

b) Organization role in communicable and non- communicable disease prevention- Indraprastha Apollo Hospital

c)Comparative study: Benefits and challenges of telemedicine among healthcare provider and receivers

d)Study on Role of telemedicine in management of cardiac disease

This is the outcome of my own study undertaken under the guidance of **Professor Manish Priyadarshi**, IIHMR-New Delhi.

It has not previously formed the basis for the award of any degree, diploma, or certificate of this Institute or of any other institute or university.

I have duly acknowledged all the sources used by me in the preparation of this field internship report.

Date:

Sign:

Postgraduate Diploma in Hospital and Health Management

International Institute of Health Management Research

New Delhi

CERTIFICATE OF COMPLETION

This is to certify that student **Dr. Sunita Godara** (PG/19/90) of Post Graduate Diploma in Hospital and Healthcare Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone the summer internship assignments at **IIHMR**, **Delhi from 1st April to 31st May 2020.**

The Candidate has successfully carried out the study designated her during internship training and her approach to study has found to be a committed, sincere and diligent student who has a strong drive & zeal for learning.

We wish her all the best for future endeavours

Dr. Pradeep K Panda

Dean- Academics & Student Affairs

Professor Manish Priyadarshi

Mentor Name & Signature

Certificate of Approval

The following Summer Internship Project titled

a) Case study- Indraprastha Apollo Hospital Indraprastha Apollo Hospital

b) Organization role in communicable and non- communicable disease prevention- Indraprastha Apollo Hospital

c)Comparative study: Benefits and challenges of telemedicine among healthcare provider and receivers

d) Study on Role of telemedicine in management of cardiac disease

is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the report only for the purpose it is submitted.

Name of the Mentor

Professor Manish Priyadarshi

IIHMR, Delhi

FEEDBACK FORM

Name of the Student: Dr. Sunita Godara

Summer Internship Institution: IIHMR, Delhi

Area of Summer Internship: Healthcare IT

Attendance:

Objectives met:

Deliverables:

Strengths:

Suggestions for Improvement:

Signature of the Mentor (Internship)

Date:

Place: IIHMR, Delhi

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