Summer Training Report

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2019-2021

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AKNOWLEDGEMENT

I started of my summer work with a dream in my mind in order to find out about the parts of health services conveyance framework, Hereby I acknowledge this open way to convey my significant sentiment of gratefulness to every single one of the people who have been instrumental in effective consummation of my summer work.

Foremost, I would like to acknowledge with much appreciation **Dr PR Sodani** (Dean Institute of Health management and Research, Jaipur), To give me a chance to work and addition the learnings.

I offer my genuine thanks and respects to my mentor **Dr Seema Mehta** for her understanding, inspiration, and enormous information, her directions helped me in all the hour of examination and forming report.

Words are inadequate to thank **Dr Praveen Suthar** (SPH AIIMS Jodhpur), for being constant support and guidance throughout the research.

I likewise want to thank my organization and faculty members without whom this work would be a far off the real world.

Lastly, I am thankful to my parents and friends for their constant source of inspiration.

Dr Swati Kharbanda

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

PART-1

KEY ABBREVIATIONS

AYUSH- Ayurveda Yoga Naturopathy Unani Siddha Homeopathy

BMI – Body Mass Index

BPT- Bachelor of Physiotherapy

CDC- Centre for Disease Control

COVID-19 – Corona virus disease

GP- General Physician

e-HEALTH- Electronic Health

EHR-Electronic Health Record

HRS- Health Related Software

HIPPA -Health Insurance Portability and Accountability Act

ICT- Information and communication Technology

MARS- Mobile App Rating Scale

MOOC- Massive Open Online Course

MPT- Master of Physiotherapy

NHP- National Health Portal

NYU-New York University

OBC- Other Backward Class

OPD- Out Patient Department

WHO- World Health Organization

PART - 1

REPORT ON WORK FROM HOME

Assessment of Knowledge, Attitude and Practice towards e-Health tools use among Health professionals before and during COVID-19

SECTION:1

INTRODUCTION

With the COVID-19 Pandemic, Health systems and Public Health authorities are facing a major obstruction in terms of patient monitoring.[1]A Novel corona virus against which insusceptibility is still a mystery for many researchers.[2] COVID-19 pandemic has got a world to halt with destruction of economy[3] and evidently tremendous negative effect on human life and health with which COVID-19 crisis has become an reality for one and all.

Keeping oneself mindful with a sound prosperity is an essential right for each person.[4] It like goes about as a pointer of the monetary improvement of a country and the overall development of the nation.[5]

But nowadays in COVID-19 pandemic keeping sound health and in our hand is very challenging which is evident by looking at the current state of our nation.

As a preventive measure in the midst of Lockdown in COVID-19 individuals are being approached to maintain social distancing and to constrain the outside visit to stop additional spread of Novel corona virus, various people who routinely utilize health services are right now choosing to stay at home and patients and doctors are afraid to see each other face to face.[6] This has decline the use of healthcare services up to 70% in Out patients visit[4]. This way COVID-19 has challenged a health care sector in different way, and this has changed the health care seeking behaviour overnight, with the virtual health taking front seat to fight pandemic and emphasise the "NEW NORMAL" in terms of health delivery.

Digital e-Health is an application of information and communication technology (ICT) across the whole range of functions that affect health. This New Normal is a strong lobby to restrict physical contact among patients and health care providers also called "Medical Distancing" in the attempt to lessen the health-care services related COVID-19 transmissions. Telehealth administrations are quickly turning into a significant power and ensuring wellbeing of health care work force. The viability of telemedicine has been promising in many health areas, including diabetic consideration, dermatology and cardiology along with excellent in delivering remote health care, while saving the time and minimizing the physical space.[7]

And against this pandemic backdrop there has been seen a new start for digital infrastructure and services which have come forefront in aid of overcoming this gap, and gave a new way of healing from a distance ,which give rise to health in our hands, which earlier saw as an unnecessary service .

This study provides valuable insights into how Knowledge, Attitude and Practice differ among Health professionals on use of e-Health before and during COVID-19 and Aims to see the perception amongst health professional towards e-Health use.

RATIONALE

In the substance of COVID- 19 outbreak health professionals globally are waking up to the confinements of their health care system. Physical distancing and behavior etiquettes are strong 'social antibodies' for combating COVID-19. With COVID -19 individuals are progressively open to online medicinal services and teleconsultation

1mg an Healthcare App, until March shows just 8% of clients in the organization's doctor consultation business pay for service, over the previous two months, that number has ascended to 70%. In a similar period 10,000 health professionals have shown enthusiasm for joining with 1 mg to treat patients. Before March, it had only 150 specialists on the stage.

Amid COVID-19, one of the most embraced offering globally has been e- Consultation, giving their multiple virtual benefits like safety for medical staff, rapid access to doctors, avoiding travel and physical touch during outbreak, efficiently managing record.[9]

RESEARCH QUESTION

What is the Knowledge, Attitude, Practice of e-Health use among Health professionals before and during COVID-19?

OBJECTIVE

- To Assess the Knowledge, Attitude, Practice towards e- Health use among Health Professionals before and during COVID-19.
- To illustrate the perception of e-Health use among Health Professionals.

SECTION:2

METHODOLOGY

A mixed- method approach study containing both quantitative and qualitative approach, qualitative component carried out by descriptive format. Descriptive Quantitative component was used to assess the Knowledge, Attitude and practice regarding e-Health tool use among various Health professionals. Qualitative part added a comprehension to check the perception towards future challenges and opportunity of e-Health on Health Professionals point of view.

Study Area: Jodhpur

Study Period: May 2020- June 2020

Study Type: Descriptive Cross- Sectional Study

Study Approach: Mixed method study approach (qualitative and quantitative)

Study Sample: Purposive sampling (Non-Probability Sampling)

Inclusion Criteria: Health professionals who were currently using e-Health tool in their practice and one who agreed and were available at the time of study.

Exclusion Criteria: Health Professionals who were not currently using e-Health tool in their practice and were not present at the time of study and one who didn't sign the consent form were excluded.

Data Collection:

Study was a questionnaire-based survey. Primary data was collected using the structured questionnaire which contain questions developed in English language, related to knowledge, attitude and practice regarding e-Health use and was circulated via web based google form to the doctors who were currently using e-Health in their practice. Structured questionnaire consists of a consent form, quantitative and qualitative questions.

Type of Data Collection: Mixed (Qualitative and Quantitative Data Collection)

Quantitative: consist of 4 parts close ended questions:

Part 1- Demographic data

Part 2- consists of questions based on knowledge on e-Health regarding objective, platform used, e-Health services given by the health professionals.

Part 3 – consists of the Attitude based questions: five point Likert Scale ranging from Strongly Agree =1 to Strongly Disagree=5) (Strongly Agree, Agree, Neutral ,Disagree, Strongly Disagree) was used to assess Attitude on questions like does e-Health tool provide satisfaction towards reminders, notifications etc. Does it provide

provision of quality of information towards content correct, is e-Health is good to use during COVID 19 like Pandemic.

Part 4 – consists question on practice regarding Frequency, Modality and Average patient treated with e-Health tool.

Qualitative:

Descriptive qualitative open- ended question was used to check the perception on e-Health future challenges and opportunities.

Finally, received 81 responses, and these responses were taken further for analyzing, to meet the objective.

SECTION:3

DATA ANALYSIS

Data collected using online google form was further exported to the MS Excel format and interpretation of data collected was done using the graphs and tables and statistical analysis was done using SPSS software (Version 20 IBM)

Age was summarized in mean ±SD, rest all variables are expressed in proportions.

RESULT

Total of (n=81) responses were received, 34 of which were the existing users of e-Health in COVID- 19 and 47 were the new users of e-Health during COVID-19. Male study participants were 64.1%(n=52) whereas female participants count for 35.8% (n=29). Mean age of male participants was38.63 years with (SD±8.75), female mean age was 35.86 years with (SD ± 7.7) (Table 1)

TABLE 1 **Socio Demographic Characteristics of respondents**:

CHARACTERISTICS	RESPONDENTS n=81
GENDER (%)	
MALE	52(64.1%)
FEMALE	29(35.8%)
MEAN AGE(YEARS)	
MALE	38.63(±8.75)
FEMALE	35.86(± 7.7)
STUDY AREA (%)	
URBAN	61(75.3%)
RURAL	20(24.7%)
WORKING SECTOR (%)	
GOVERNMENT	19(23.5%)
PRIVATE	62(76.5%)
QUALIFICATION (%)	
MBBS/MD/MS/DM	37(45.6%)
BDS/MDS	24(29.6%)
AYUSH/MD/MS	16(19.8%)
BPT/MPT	4(4.9%)

1 Interpretation on start of e-Health use in practice

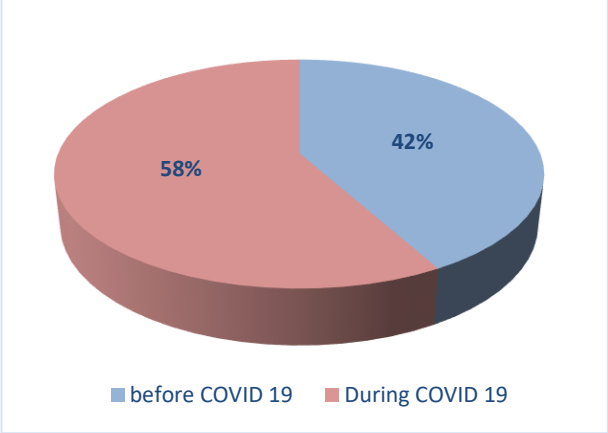

Fig 1: Response to question since when you started using e-Health tool in practice before or during COVID-19 (n=81)

When asked about the time being use of e-Health tool in practice, (FIG -1) of 81 respondents, 42%(n=34) interpret that they were the existing users of e-Health in the time of COVID -19 , whereas 58% (n=47) were the new users who started using e-Health service during COVID -19.

2 Interpretation towards e-Health Knowledge

2.1 Knowledge of health professionals towards primarily measurable objective of an e-Health system.

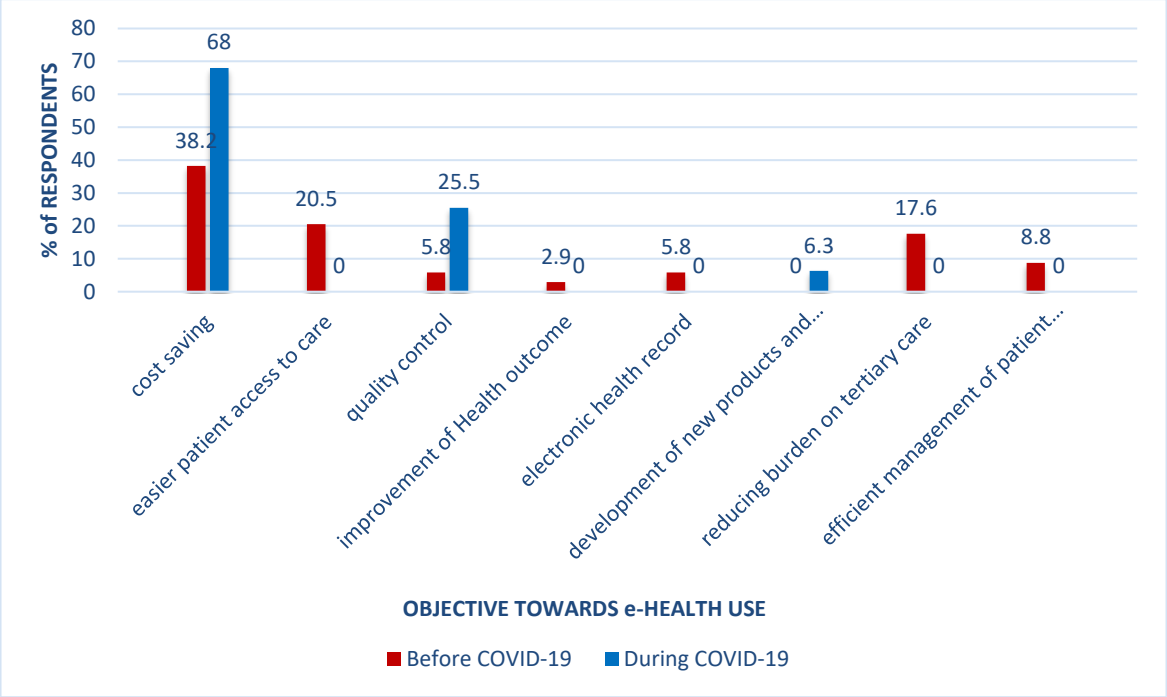

Fig 2.1: knowledge towards Primary measurable objective regarding e-Health before and during COVID-19

FIG 2.1 of n=34 Pre COVID-19 eHealth users, 38.2% think e-Health use is cost saving for both patients and providers, during COVID-19 cost saving percentage has risen to 68%, with 25.5% of health providers believe e-Health helps in quality control and 6.3% users targets e-Health in development of new products and services.

2.2 Knowledge of Health professionals towards e-Health Services

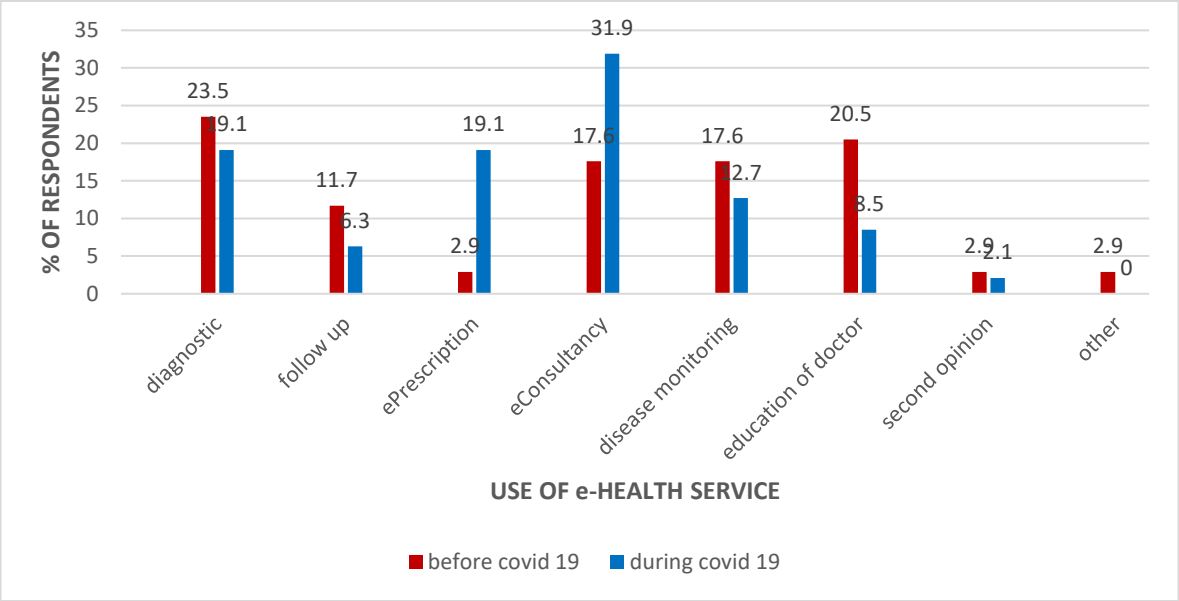

Fig 2.2: Knowledge towards e-Health Service given before and during COVID-19

FIG 2.2 Shows Before COVID- 19 outbreak, all type of e-Health services were delivered by the health professionals, but during outbreak e-Consultancy 31.9%, e- Prescription 19.1% e-health services were increased.

2.3 Knowledge of health professional regarding e-Health platform

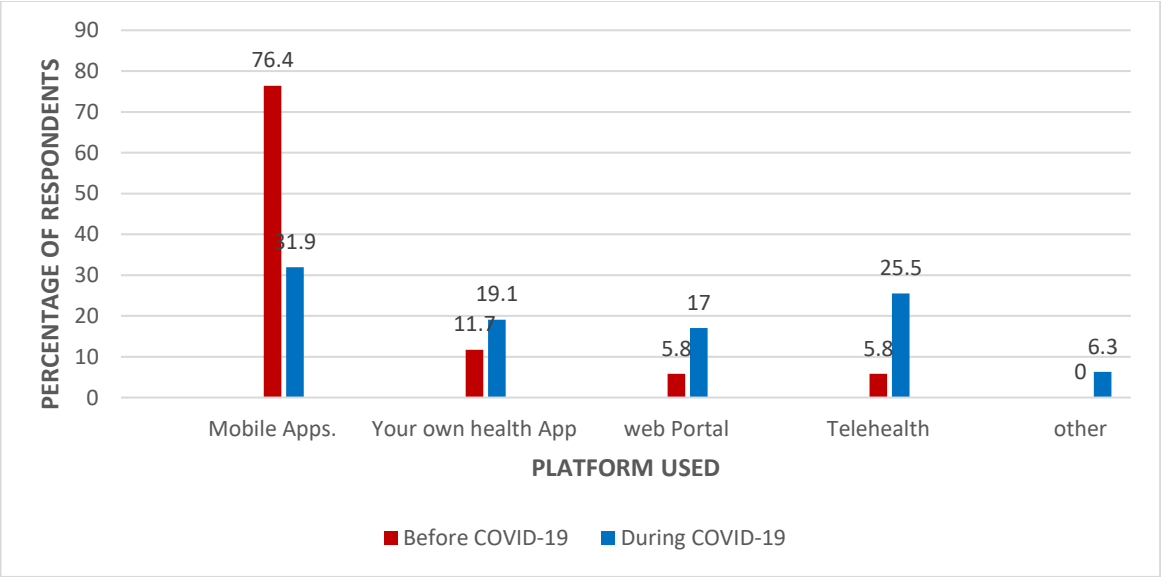

FIG 2.3: Knowledge regarding e-Health platform used for delivering health services before and during COVID-19

FIG 2.3 Interpret that before COVID-19, 76.4% of health services were given through Mobile Apps, but at the time of COVID-19 the platform is changed to Mobile Apps 31.9%, Telehealth 25.5%, own health App 19.1%.

3 Interpretation on Attitude towards e-Health use

Table 2 shows attitude (using Likert Scale) on satisfaction on reminders and notifications, quality and use of e-Health App by participants before and during COVID -19 which interpret that maximum participants shows favorable attitude during COVID-19 on use of e-Health app. And mean result 1.8 shows respondents are strongly agreed towards quality and are satisfied on use of e-health app during COVID-19.

Table 2: Attitude of health professionals towards e-Health tool use before and during COVID-19

ATTITUDE		STRONGLY AGREE (%)	AGREE (%)	NEUTRAL (%)	DISAGREE (%)	STRONGLY DISAGREE (%)	MEAN
Satisfaction On reminders, Notifications	BEFORE COVID-19 (34)	10 (29.4%)	12(35.3%)	8(23.5%)	2(5.9%)	2(5.9%)	2.2
	DURING COVID-19(47)	20(42.5%)	19(40.4%)	3(6.3%)	3(6.3%)	2(4.2%)	1.8
Quality of information	BEFORE COVID-19 (34)	5(14.7%)	16(47%)	6(17.6%)	7(20.5%)	0	2.4
	DURING COVID -19(47)	26(55.3%)	12(25.5%)	4(8.5%)	1(2.1%)	4(8.5%	1.8
Good to use in pandemic	BEFORE COVID-19 (34)	9(26.4%)	4(11.7%)	10(29.4%)	7(20.5%)	4(11.8%)	2.9
	DURING COVID -19(47)	23(48.9%)	11(23.4%)	6(12.8%)	3(6.4%)	4(8.5%)	2.0

4 Association of Knowledge and Attitude of health professionals towards e-Health use.

TABLE 3 shows significant association(*P<.05)* between e-Health Knowledge towards (objective *P=.03*, platform *P=0.00*) and Attitude regarding (Quality of information *P=0.00* and Good to use during pandemic *P=.03*) towards COVID -19 state. No association was observed(*P>.05)* between (e-Health services given *P=.84* and Notification alert *P=.24)*And no significant relationship was observed during this study between working sector of respondents with knowledge and attitude(*P*>.05) means despite of working in different sectors ,knowledge and attitude of health professionals towards e-Health app use, appears to be same.

Table 3: Association of Knowledge and Attitude towards e-Health use with COVID state and working sector of respondents. (n=81)

VARIABLES	KNOWLEDGE						ATTITUDE					
	Objective		e-Health service		Platform used		Notification alert		Quality of information		Good to use in Pandemic	
	χ^2	*P*	χ^2	*P*	χ^2	*P*	χ^2	*P*	χ^2	*P*	χ^2	*P*
COVID-19 STATE	**6.73**	**.03**	**33**	**.84**	**16.02**	**0.00**	**5.44**	**.24**	**18.97**	**0 .00**	**10.16**	**.03**
Before COVID-19 (34)												
During COVID-19 (47)												
WORKING SECTOR	**5.51**	**.06**	**.67**	**.71**	**8.55**	**.73**	**2.33**	**.67**	**.70**	**.95**	**9.00**	**.06**
GOVERNMENT (19)												
PRIVATE (62)												

5 Interpretation on Practice towards e-Health use:

5.1 Modality preferred by health professionals for delivering health services

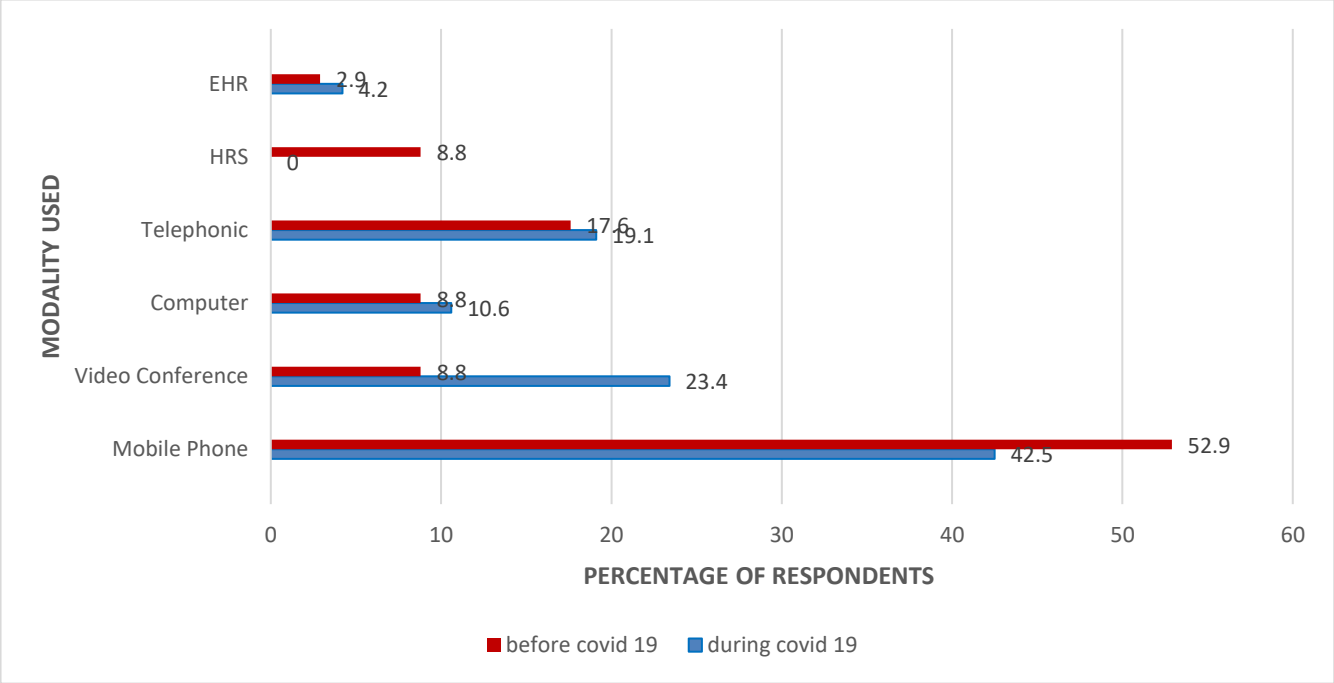

FIG 3.1: Type of e-Health Modality preferred by health professionals before and during COVID-19

Fig 3.1 shows that focus towards modality preferred has been shifted towards video conferencing (23.4%) during COVID-19 which was earlier seen as non-essential mode, along with Mobile phone (42.5%).

5.2 Frequency of e-Health tool used in practice

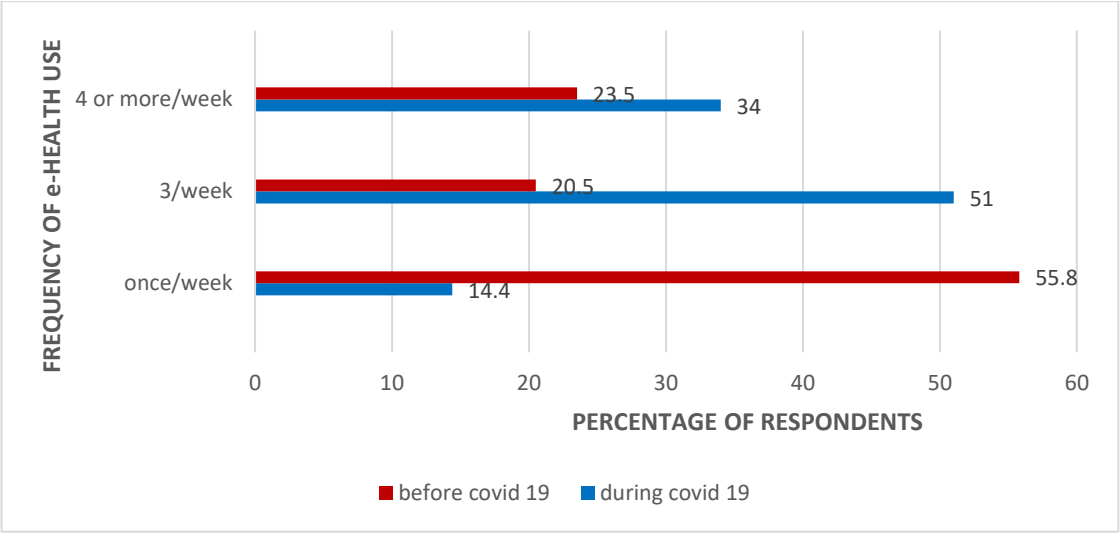

FIG 3.2: Frequency of use of e-Health in practice before and during COVID-19

Fig 3.2 shows Before the pandemic use of e-Health tool in practice was once a week 55.8%, but during the Pandemic the change in frequency is seen to thrice a week 51% and 34% of use is 4 and more times a week.

5.3 Average Patient treated with e-Health tool

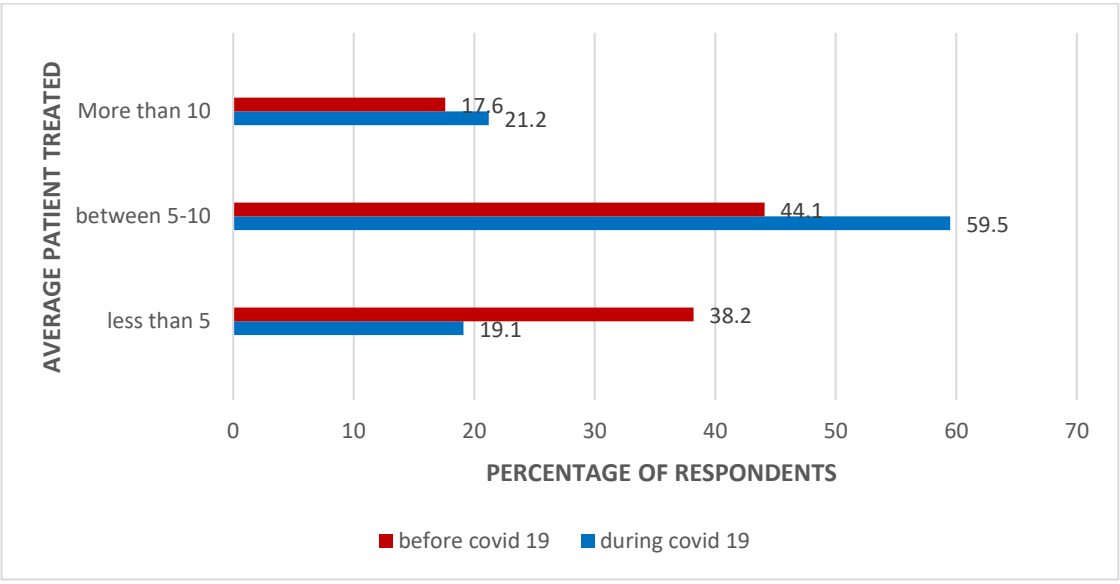

FIG 3.3: Average patients treated with e-Health before and during C0VID-19

Fig 3.3 shows During COVID outbreak rise in average patients treated with e-Health tool seen from 44.1% to 59.5% between 5-10 patients and increase 21.2% is seen in more than 10 patients treated, with a decline in less than 5 average patients treated.

6 <u>According to health professionals what future challenges and opportunities e-Health hold:</u>

participants in the study reported concerns about perception of eHealth on future challenges and opportunities

Future challenges:

For proper functioning of e-Health App Good access of internet is required specially in the Rural area. Data security and privacy laws should be confidentially maintained in terms of exchange of communication between doctor and patient. Care givers need to be tech savvy along with beneficiaries. Physical examination of the problems and symptoms of the patients can't be done virtually which is very crucial while diagnosis and prescribing medicines specially of the pelvic region. Due to shortage of IT and resources many a times operational errors do occur.

***Future Opportunities**:*

Self-monitoring and managing of patient being at home in physical therapy, occupational therapy especially for elder people is upmost opportunity of e-Health. e-Health is a good way to heal mental health problems of children via online mental games. e-Health is efficient in managing patients visit to OPD therefore reducing burden on Health care premises and improving quality. Various devices that aimed in quitting smoking, alcohol need to be developed. Apps which manages Breast Care are the present future of e-Health. Need for more development of Home Health Apps like Med- Chat. In COVID-19 like pandemic it is good to use, as with eHealth use patient has freedom of choice to choose doctors in non-emergency cases. Moreover, it reduces the patient travel time and cost, which leads to less pollution and holds paperless data collection, which is an ecofriendly way for the Sustainable Development of our nation. with more e-Health use doctor patient relationship will improve.

Discussion

- In this study, most of study participants were the male(n=52) [64.2%] and with MBBS [55.7%] which is similar to study led by Parvin et al[10].
- Earlier Telemedicine was Catastrophe and pandemic present extraordinary difficulties in delivering medicinal services and the experience before COVID-19 has been mixed. During pandemic backdrop, telemedicine turns into even more significant attribute with its significant potential benefits of Sudden upscaling of virtual care capacity in COVID-19 pandemic has shown a favourable outcome in terms of digital health.[11]
- To mitigate the further circumstances of COVID -19 government of India for the first time unfolded guideline on telemedicine amidst COVID-19 with audio-video aids and messaging as three wide methods of correspondence for consultation for providing timely and best possible care.[12]
- This study shows during COVID-19 most widely recognized e-Health services are e-Consultation (31.9%), e-Prescription (19.1%), As per Redseer Analysis e-Consultation are being acknowledged all the more unequivocally in COVID-19 period[9]. And Before COVID-19 most well adopted e-Health services were follow up (42%) and diagnostics (28%).[10]
- Practo found that 44% of the tele-consultations were from non-metro cities.[13]
- The present study showed lack of technology knowledge, infrastructure, which are the most common challenges faced towards adoption of e-Health. Similar result was shown by study conducted in Nigeria in 2018.[14]
- There is less awareness regarding smoking and Breast care e-Health App is seen in respondents of our study. which is in contrast as various smart phones intervention apps, games have been developed in India for the cessation of smoking[15] and Breast Care Management.[16]

SECTION: 4

RECOMMENDATION

- In future a study needs to be done to evaluate the e-Health app use among Doctors post COVID-19.
- Obligatory telemedicine courses in the medical understudy and mandatory classes for clinical professionals and technical staff of Jodhpur on e-Health sensitization.
- A future study should be further attempted to explore the perspectives of doctors who are not using e-Health tool in their clinical practice and what would further motivate them to use.

CONCLUSION

STRENGTH: As per knowledge no previous study is done on e-Health app use among doctors before and during COVID-19 in Jodhpur

LIMITTAION: this study has some limitations that it was approached to those doctors only who were in contact list of the author and this study is restricted geographically.

COVID- 19 pandemics is causing deaths in thousands and in millions, with enormous number of hospitalizations, social aggravation, and immense money related adversities around the world. Telehealth innovation and its utilization are not new, but before COVID-19 adoption of e-health platforms was limited to mobile phone for correspondence between health professional and patients. The first six months of 2020 end up where digital health bolster the public health system with increase in patient treated and frequency of eHealth App use along with rise in video conferencing user modality is seen in this study. A favorable attitude is seen among doctors towards the use of e-health in pandemic. While this study shows significant association between knowledge level and attitude on e-Health use before and during COVID-19 also no significant relationship was observed between working sector of health professionals on knowledge and attitude towards e-Health. It was also observed that during Pandemic, e-Health is overcoming the gap between individuals, doctors and health system, therefore allowing everybody, particularly suggestive patients, to remain at home and communicate with doctors through virtual channel, assisting with decreasing the physical visits. e-Health holds exceptional assurance in moderating the impact of a pandemic and further preventing nosocomial infections.

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ANNEXURE

ANNEXURE 1

Definitions

e-Health – is the use of information and communication technologies for health through the computer and related technologies.

Telehealth- use of electronic information and telecommunication technologies to support long distance clinical health care, patient and professional health related education, public health and health administration.

EHR- electronic health records are real time, patient centered records that make information available instantly and securely to authorized users.

e- Prescription- a way of entering prescription information into a computer device like a tablet, laptop, desktop computer.

e-Consultations-a way of consulting health professional online.

ANNEXURE 2

Data Collection Tool- Questionnaire

1. Name *

2. Gender *
   Mark only one oval.
   - Female
   - Male

3. Age *

4. In which area you are practicing. *
   Mark only one oval.
   - Urban
   - Rural

5. In which sector you are working. *
   Mark only one oval.
   - Government
   - Private

6. Qualification *
   Mark only one oval.
   - MBBS/MS/MD/DM
   - BDS/MDS
   - AYUSH/MS/MD
   - BPT/MPT

7. Since when have you started using eHealth tool (Mobile Apps, Patients Portals, electronic health record, internet/software to monitor patients etc) in your practice ? *
   Mark only one oval.
   - Before COVID 19 *Skip to question 8*
   - During COVID 19 *Skip to question 14*

Untitled Section

8. On what platform you have used eHealth system BEFORE COVID 19? *
   Check all that apply.
   - Mobile Apps (Practo,Credihealth etc)
   - Your own health app
   - Web portal /web forums
   - Telehealth
   - any other

https://docs.google.com/forms/d/1yAm_vSRaCOC8NVm5-GTX9 1pxLm_ZSkJtGMxCrRTI/edit

7/2 1/2020 Survey to Assess Knowledge,Attitude,Perception regarding eHealth App among doctors during COVID-19

9. What type of eHealth Modality did you preferred the most in your practice BEFORE COVID 19 ? *
   Check all that apply.
   - Mobile phone
   - Video conference
   - Computer
   - Telephonic
   - Health related software
   - Electronic health record

10. What kind of eHealth services you were providing via this system BEFORE COVID 19 ? *
    Check all that apply.
    - Diagnostic
    - Follow ups
    - Disease Monitoring
    - eConsultation
    - ePrescription
    - education of doctors through online sources
    - Second opinion
    - other

11. What was the frequency of use of eHealth tool in your practice BEFORE COVID 19 ? *

Mark only one oval.

- Once/week
- 3/week
- 4 and more times a week

12. What was the average no of patients you treated using eHealth tool BEFORE COVID 19? *

Mark only one oval.

- Less than 5
- between 5-10
- More than 10

13. According to you what should be the primary measurable objective of an eHealth system BEFORE COVID 19? *

Check all that apply.

- Cost saving
- Easier patient access to care
- Quality control
- Improvements of health outcomes
- Electronic health records
- Development of new products and service
- Reducing burden of tertiary care in out patient visit
- Efficient management of Patient's waiting time

Untitled Section

14. On what platform you have used eHealth system DURING COVID 19? *

Check all that apply.

- Mobile App (Practo, Credihealth etc)
- Your own health App
- Web portal /web forums
- Telehealth
- any other

15. What type of eHealth Modality did you preferred the most in your practice DURING COVID 19 ? *

Check all that apply.

- Mobile phone
- Video conference
- Computer
- Telephonic
- Health related software
- Electronic health record

16. What kind of ehealth services you were providing via this system DURING COVID 19 ? *

Check all that apply.

- Diagnostic
- Follow ups
- Disease Monitoring
- eConsultation
- ePrescription
- Education of doctors through online sources
- Second opinion
- other

17. What is the frequency of use of eHealth tool in your practice During COVID 19 ? *

Mark only one oval.

- Once/ week
- 3/week
- 4 and more times a week

18. What is the average no of patients you treated using eheaith tool During COVID19 ? *

Mark only one oval.

- Less than 5
- between 5-10
- More than 10

19. According to you what should be the primary measurable objective of an eHealth system DURING COVID 19? *

Check all that apply.

- cost saving
- easier patient access to care
- quality control
- improvements of health outcomes
- electronic health records
- development of new products and service
- reducing burden of tertiary care in out patient visit
- Efficient management of Patient's waiting time

20. Does your eHealth tool gives you satisafaction regarding Raminders/Appointments/erable sharing/Notification/Alerts/Feedback/Messages ? *

Mark only one oval.

	1	2	3	4	5	
Strongly agree	◯	◯	◯	◯	◯	Strongly disagree

21. Does your el leaith tool provide quality of information regarding content correct and is it re evant to its goa /topic? *

Mark only one oval.

	1	2	3	4	5	
Strongy agree	◯	◯	◯	◯	◯	Strongy disagree

22. Do you think eHealth is good to use during Pandemic like COVID19 . *

Mark only one oval.

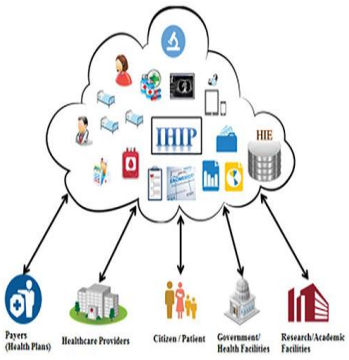
	1	2	3	4	5	
Strongly agree	◯	◯	◯	◯	◯	Strongly disagree

23. What according to ycu are the future challenges and oppo'tunities of eHealth system ? *

ANNEXURE 3

Pictures

e-Governance Initiatives by Indian Government



PART – II

REPORT ON ONLINE COURSE

Name of the course: e-Health more than just an electronic record

By the university of Sydney

COURSE DESCRIPTION:

e-Health: More than just an electronic record is an Massive Open Online Course***(MOOC)***", is multidisciplinary in nature, and aims to equip the global audience of health clinicians, students, managers, administrators, and researchers to reflect on the overall impact of e-Health on the integration of care. It explores the breadth of technology application, current and emerging trends, and showcases both local and international eHealth practice and research.

The whole e-Health Course comprises of 5 modules, with graded assignments components in module 2 and module 5.

OBJECTIVE OF COURSE:

- To Recognize an e-Health model which illustrates how key e-Health domains intersect to impact on fundamental principles of eHealth.
- To see the potential of mobile technology to support the shift from “healthcare” to “health”.
- To Describe a range of innovative e-Health interactions between consumers and healthcare professional.

COURSE CONTENTS:

Week 1- module 1- What is e-Health

- Lesson 1- Introduction to e-Health
- Lesson 2- Experts View on e-Health
- Lesson 3-Introductory Learning Activities

Week 2-Module 2 Health in our Hands

- Lesson 1- Health in your hands
- Lesson 2- collecting your own data
- Lesson 3- Apps, social media and health online
- Lesson 4- Designing and evaluating eHealth solutions

Week 3- module 3 – Data and the "Quantified Self"

- Lesson 1- Introduction
- Lesson 2- Electronic health records
- Lesson 3- predictive and precision medicine

- Lesson 4- patient reported data
- Lesson 5- Privacy and security
- Lesson 6- using Data to Improve performance

Week 4- Module 4- health professionals interactions using New Technologies

- Lesson 1- improving access to Healthcare
- Lesson 2- Innovations in healthcare
- Lesson 3- Supporting Health professionals

Week 5- Module 5 - e-health in Professional Practice

- Lesson 1- course review
- Lesson 2- health Case study examples
- Lesson 3- Assignment Guide and Peer Review

LEARNING METHODODLOGY:

Learning methodology include:

Week 1: Module 1 - What is e-Health?

5 videos, 4 readings, 2 practice quizzes

Week 2: Module 2 - Health in our Hands
9 videos, 3 readings, 1 practice quiz
Graded: Assignment 1 - Reviewing a health app

Week 3: Module 3 - Data and the "Quantified Self"
10 videos, 3 readings, 1 practice quiz

Week 4: Module 4 - Health Professionals interactions using New Technologies
8 videos, 3 readings, 2 practice quizzes

Week 5: Module 5 – e-Health in Professional Practice
7 videos, 2 readings
Graded: Assignment 2 - A Practice based e-Health case

KEY LEARNINGS:

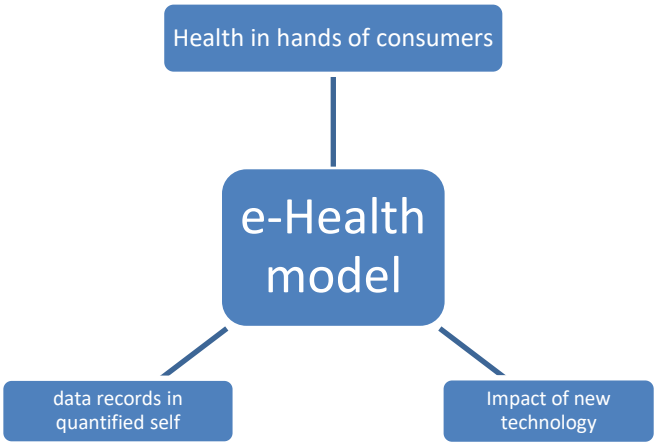
Module 1 Learnings:

Introduction to eHealth from both health consumers and professionals:

- e-health is an evolving field in the juncture of medical informatics, public health, stating to the health services and information distributed or heightened through the Internet and associated technologies,
- One of the growing areas of e-Health is, how using technology to support communication between healthcare providers, and healthcare consumers. This is used in the context of rural practice to reduce travel time for both practitioners and healthcare consumers.

According to healthcare professionals: e-health is pervasive nowadays, and has taken a front seat in our life in health research and in health implementation, provide best care to patients by enabling care team to have access to patients whenever required, use of digital technology ranges from Fitbits to surgical robots, with the advent of smart phones to track and monitor health, which means health in the hands of consumers.

e-Health model which illustrates how key e-Health domains intersect to impact on health care-



1) Health in the hands of consumers: which incorporate the developing utilization of wearable gadgets, Apps and Social media to screen and report on our wellbeing and health.
2) How patient and health specialists communicate with each other with new health technology.
3) Data records in the quantified self: which differentiates how data was stored in traditional medical records and data stored with technology.

   Ideally these three domain should go hand in hand for maximum health impact.

Future of eHealth: As telemedicine, telehealth is bringing things to people in their homes. One can access doctor, psychologist, dietitian and could go online and reassure with the key thing that information is available.

Smart Stop by Chrono Therapeutics: A smart gadget which is planned for helping individuals to quit smoking. The Smart Stop is installed with sensors that will detect changes in the body and sense the feeling that an individual is longing for a cigarette and nicotine. At that point it will convey prescription to the individual with the goal that hankering can be controlled. This wearable gadget will positively be another of those distinct advantages in the coming years.

iTBra by Cyrcadia Health is a smart bra that monitor breast wellbeing with detector cells installed and alarm if the chance of malignancy detected.

Challenges faced:

- Cost challenges
- paucity of IT and constrained clinical assets
- limited software knowledge
- work force expenses
- Privacy and security of data
- The inaccessibility or lack of the fundamental framework, for example, web connections
- think one of the biggest challenges is patient expectations, is quality care being delivered?
- Although saves time, but lack comprehensive information related to health

MODULE 2 LEARNINGS:

Health in hands

As people love to have data about the health in their hands of what they do, Applications or apps, wearable devices, online health information and social media are all being used to motivate healthy behaviours and monitor existing conditions. This includes capturing and displaying personal health data, plotting data to monitor and track progress, delivering information in a variety of formats and providing opportunities for communication with health care professionals and patients.

Collecting your own data

Wearables: These wearable devices interact with apps to monitor personal health data and are used to see how many steps walk per day, heart beat rate, calories burn , Km they walked in a day , speed tracking, BMI, even sleep tracker which help many people to know about their sleeping habits and sleep apnea along with Healthy eating habits and tracking gym sessions.

App, social media, information on health online

- **Apps:** The use of apps, mobile devices, sensors, etc is commonly referred to as **m-Health** or Mobile Health and it represents a significant and ever-changing component of e-Health. like in the present time of COVID-19 outbreak government of India brings about **Arogya Setu App** making convenient to people to self-monitor and to connect with health services to fight COVID-19. Rajasthan govt. **Aayu and Sehat**

Sathi app provide 24*7 online consultation and medicine delivery to people during COVID-19 outbreak. using e-Health as a helpline to provide assessment, and treatment support for remote monitoring, and data collection. **TfH app** a maternal health solution for women in India, a mother companion App.

Various **Skype** or video conferencing services are convenient via which health professionals are delivering their treatments to patients putting health and healthcare in hands.

Some Apps make emergency card with significant wellbeing data like types of blood, Allergic to, especially emergency contact details all is shown on lock screen of phone. Useful when one is not able to communicate by themselves.

- **Social media for health:**

  As we live in the internet-driven age and, in this web driven age everything is readily available. speedy google search yields us to a huge number of results in terms of disease, outreach for clinical assistance, choice of specialists, emergency clinics and so on, to settle on informed choice to look for best consideration.

  Include #hashtags to get involve in conversation like **#BSCM** (Breast Cancer Social Media Community) and one can access an entire world of support, guidance and information related to breast cancer. Health care services use these instruments and sites to share data in assortment of ways, like **WHO** is sharing every keen details of COVID-19 on site to avoid further spread.

  Sharing of live updates during clinical procedures can convey well versed modern data of information to individual, students, specialists, interns, and people.

  Communicate in time of crisis, latest ongoing crisis COVID -19 happening globally, through web-based system, hospitals, clinics and different associations are able to virtually convey continuous updates by giving webinars/TV, interviews and so forth.

- **Health information online:**

Utilizing blogging to share thoughts regarding various subjects, gives them authority over their own wellbeing from all the points. And it constructs the truly intriguing virtual correspondence as People have the chance to remark and pose inquiries and offer their encounters

The use of digital games like (Diabetic Mario, Packy and Marlon) has been developing in fame in health services since last decade., This is mostly because of the expanding prevalence of cell phones, which makes them available to nearly everybody.

. **Designing and evaluating eHealth solutions**

Once something is built it needs to bring people in again, to try it out. So, assessment is one of those procedures that unites everybody, there are different ways to assess these devices. One way is by **MARS rating scale** in view of Engagement, usefulness, design and quality of information, used for evaluating the nature of m-Health applications.

MODULE 3 LEARNINGS:

Electronic health records

The utilization of health information has enormous ramifications for how health care is conveyed and how health is managed. Who holds our health data, who owns the data, who can use it, and for what purposes?

Digitizing paper records is clearly beneficial. It enables a patient's medical history to be tracked over time. To alert patients for routine or follow up consultations, to monitor patients' vital signs. And overall, to improve the quality of care. flow of information and use it in a wise fashion to benefit the care of the patient? With increasing connectivity means the ability to share cases, information, and to improve the diagnosis for patients. As we connect, hospital to hospital, state to state, patient information should be available across the entire network. This is great for patients. It means that their previous images, their previous results, and their previous context is available to the next clinician at the time of imaging. So, a radiologist can see the history of the patient, their previous chest x-ray in association with their current CT scan, so that no matter where the patient goes, their history follows them. In India **Doxper** company comes up with mighty pen in fight against India's poor health records, it is an digitise health records helping doctors to digitise their case with pen and a dotted prescription paper , pen transfers data through Bluetooth and doctor can access prescription in digital format along with it reminder for next appointment is send to patient. And **Vytal app** for management of health records of entire family, with photos, prescriptions, lab summaries, clinical notes, vaccination schedule etc, emergency profile of every family member can be maintained.

Australian government manages this by **PLEHR** (personally controlled electronic health record) is now renamed as **MyHealthRecord**, they represent the standard records of patients like discharge summary, list of medications, list of allergies, immunizations etc.

Privacy and Data security

In healthcare data privacy and security are a major concern. From the patient prospective it should be safely available whenever required or e-Health to really function at its best much data about each patient is needed. It's very different to keeping patient records in a database.so the data needs to be sent somewhere and the cloud is really something that's quite important to consider in this matter. If sending of data away to a third party is

required, and one have to have the belief that they have the correct systems in place to make sure that this data is secure.

The Health Insurance Portability and Accountability Act (HIPAA), was enacted in 1996. And is designed to protect healthcare information security and confidentiality.

MODULE 4: learnings

Improving access to healthcare

Innovative e-Health interactions between consumers and healthcare professional is now going at a faster rate than ever. Model of e-Health is the sweet spot where the use of data, communication technologies, and mobile technology overlap. eHealth in the early days used to be about static websites, about information, about telepsychiatry. E-Health now is probably on the cusp of being the most exciting area to work in. It ranges from assistive technologies, to biometric devices, apps, gaming. It's an interesting meld of new and emerging technologies, that's eHealth. As India's substantial population becomes digitally literate and India's e-Health sector accelerates under COVID-19 outbreak with a boom in new e-Health business models, which include solution for online health services – e-Consultations , e-Diagnostic and e-Pharma giving patient easy access and making easier for doctors to keep online record of patients.

Advantages e-Health shows:

- With e-Health framework, patients can plan their meeting with health professionals online specially outreach patients. It can spare time, cost and additional endeavours of patients in a compelling way, as patients don't need to move from their home as they will have the option to mastermind an online consultation.
- Electronic health information will give individuals clear and more knowledge about their health, according to their desire, they can even share their health-related data with anybody in a couple of seconds. Can easily access their health-related information at any time and from any location. So, people do not have to carry their medical reports everywhere.
- Doctors need to do less paperwork, as everything will go on the web. They will have the option to share the data among different associates in a simple and secure way and at the same point they can get access to information about patient medical history.
- Privacy and security of e-Health records will be enhanced in an effective manner.
- e-Health system will help providers to improve quality, productivity, and work-life balance.

Innovations in healthcare

Tele health- The Nepean Telehealth Technology Centre focus on four main things. Between the hospital communication, within the hospital, hospital to community communications as well as, of course, hospital back to patient's home.

Hospitals are equipped with high definition ceiling camera which is capable of transmitting audio and visual data to our hospital and permits to speak with the patient, their family members and with the medical caretakers. The main challenges for this project are need a lot of resources. with a good audio-visual connection. Images need to be sent over and there is software needed to process all these images, so it's a costly thing. And the second challenge faced is it is very time consuming on the doctors in the hub hospital.

How e-Health is changing the way in business, is in fact the use of the mobile devices within community nursing team in Sydney district nursing. And it enables community nurses where they're in someone's home to enter the data there. And what found is that the patients really appreciate the fact that when they're telling the nurse about their condition, about their own status, that the accuracy is improving because they know it's going straight into the medical record And so, patient details have improved, the accuracy is improved. And in fact, it enables nurses to have teleconferences with other members of the care team who can all see the same information at the same time. and so, it's enabling much better coordination of care. Has moreover increase the credibility of community nurses.

Social media: mobile technology is the way that most youth want to work; on their phones or tablet computers, more than sitting at a PC. And health professionals focused is on how to engage more young people in preventive mental health. They want them to learn more about mental health, so that they understand the symptoms and signs of depression, anxiety, and stress, the three common ailments that lead to other problems down the track. And can talk to other kids about it in an open-air atmosphere without stigma. So they went to **Kids Help Line** and develop the world's first social media that's closed, private, and can actually be tracking all of the clients that sign up to it. So, they can talk with other kids from Australia of the same age going through the same experiences to understand that it's okay to feel depressed, and sad, and anxious at times. And these are the ways by which kids can deal with it by talking, learning about it, and applying new methodologies to helping themselves get through struggles they are facing by seeking help from a counselor one to one.

Personal app: **My Physio app** has numerous benefits to the patients, particularly in regard to adherence to an exercise program. So, once they leave the clinic, they then get an email to their phone, which has the exercise program which they can download either as a PDF or access the app inside. So then, once they get into the app, they can view video demonstrations of each exercise, but also a description of how to perform the exercise. In addition to this, customization of instructions can be done, additional benefit to this is that the My Physio app comes with a whole lot of educational material that you can use and include in different patients' exercise programs. specify the number of reps, sets, rest time, and number of days, makes the patient feel as well like they're getting personalized exercise advice.

Another app develop is a **multi-modal app** for the people who have aphasia, which is a language problem they lose some or all of their language skills, typically after a stroke or a brain injury. they've got a video screen, but they've also got a white board that they can write on. And then they've also got a custom designed section to

present assessment materials remotely. So that patient can do naming task for example they can indicate if they're feeling depressed, happy etc.

how eHealth is used to support professional development:

Countries like Australia that are so sparse, people sometimes live in such remote locations, it's very important to have tele-health systems where a doctor and a patient can interact remotely. E-Health can use technologies, for example, to improve communications between a doctor and a patient. Doctors are currently being trained on, for example, bringing bad news. For a doctor to have to come and tell a patient, sorry, but you have cancer. That's probably the hardest thing any doctor has ever had to do. And doctors therefore are trained on protocols on how to bring bad news as well as how to collect the information from patients and so on. **EQ Clinic** a platform to help doctors improved their communications skills. By providing effective computing technologies, these are automatic detection of emotions. So, when they are having conversation, their nodding, shaking, smiling, all these aspects of the conversation are actually be automatically detected.

Multiple different game platforms in the context of health, are also available mostly looking at how to support health sciences students and medical students in learning and revising anatomy. And to do this, a team-based strategy game called **They Know** is used, which is a game that means that you have to collaborate with a group of people to basically capture the flag and take control of a home base. So, what it's supposed to do is encourage students to repeatedly go through content so that they retain it over the long term.

Platform called **Q Stream**. Used that for hospital-based education basically dealing with oncology registrars. The game used the system to helps oncology registrars cover quality improvement cases and learn the stuff they need to know to basically improve patient care. And the game allocates them points based on how quickly and how accurately they answer questions, to sort of encourage them to keep coming back. The course is delivered on-line so it's very, very easy for people to just not log-in one day. And it's a team-based learning and scores go towards the respective teams.

MODLUE 5 - LEARNINGS

eHealth case study examples

Electronic record supporting remote care: So the value of the electronic health record or electronic medical record is that they can go to one of the nearby computers and find out all the care that has been given to that patient in that facility and possibly beyond. So, they'll usually give very basic information. How many times one has been in hospital? What was it for? What was the diagnosis of that admission? Like So, just knowing that if one had a range of admissions that have been for a mixture of chest pain, which is thought to be acute coronary syndrome, but without having had a heart attack in the past. And the fact that one been in a couple of times for

chronic obstructive pulmonary disease, and that one had regular visits to a clinic for management of diabetes is incredibly valuable information. So, this help GP and the nursing staff at the center to be out of their depth.

‘‘My home Dialysis’’ program: An example of Telios project My Home Dialysis. And this is for renal patients who have dialysis machine at home to record the health data. So, this is the patient app part of the My Home Dialysis Project. And this has been designed together with both the patient's needs and also the needs of the clinical healthcare staff. The home screen which shows their last dialysis session. And this is where you can start your new dialysis. also have a section for to list all medications and history, so all the treatments that have been share with doctors or caregiver is that can generate a report. Another advantage of an app like this is that as data is put in, it can do error checking for you and it would also send alerts if something is not rightly done before.

This way e-Health modules have introduced to the key concepts and domains of e-Health and guided us in considering how one might incorporate an e-Health strategy in own’s professional practice.