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TELEMEDICON 2020 Abstract SECTION

Invited Lectures' and Keynote Speakers' Abstracts

Day I Session 01: CME – COVID Pandemic and Telehealth Challenges in India

Chair:

Meenu Singh – Vice President, TSI

Bijoy – Unarv Telemedicine & Healthcare services Pvt Ltd, Kerala, India

Umashankar Subramaniam – Arogyayathi Pvt Ltd, Bengaluru, India

01.1

Coronation of digital pathology during corona pandemic

Vidya Rao, Rajiv Kumar, Sathyanarayanan Rajaganesan, Swapnil Rane, Gauri Deshpande, Subash Yadav, Asawari Patil, Trupti Pai, Santosh Menon, Aekta Shah, Katha Rabade, Mukta Ramadwar, Poonam Panjwani, Neha Mittal, Bharat Rekhi, Munita Bal, Uma Sakhadeo and Sumeet Gujral and Sangeeta Desai

Department of Pathology, Tata Memorial Center, Mumbai, India

Background: Digital pathology (DP) served education, research, and multidisciplinary discussions at tumor boards as primary purposes at our tertiary cancer institution. The coronavirus 2019 (COVID-19) pandemic posed profound challenges to uninterrupted laboratory services amid a nation-wide lockdown. We aim to report our experience, as earliest adopters of DP during the pandemic, for primary surgical pathology diagnosis using existing resources.

Methods and Materials: A whole slide image scanner, VENTANA DP 200, was employed for scanning biopsies during a 3-month duration from March 21 to June 20, 2020. The whole slide images were made accessible from a web-based server. A brief verification activity was undertaken before live digital sign-out. Cases were signed out remotely by 18 participating

pathologists from their respective homes in a risk- mitigated environment using a web-based image management system (IMS) and synoptic reporting system, which was interfaced with the patient's electronic medical records. We assessed the efficiency indicators and an overall concordance following a rereview of glass slides after a washout period of 2 weeks.

Results: Of the 594 cases, 567 cases from seven subspecialties were signed out remotely with a deferral rate of 4.5% and a rescan rate of 2.3%. Additional tests, including special stains and immunohistochemistry, were performed in 203 cases. Network speeds varied between 4 and 80 Mbps, with an average download speed of 20 Mbps. All pathologists used personal laptops for remote sign-out, and 14 of them preferred the digital workflow during the ongoing pandemic. There was an average reduction in Turn Around Time (TAT) by 1 day due to flexibility imparted by same-day reporting, despite staggered on-site working days for different pathologists. The overall concordance rate was 98.8% owing to 1.2% minor discordance and no major discordance.

Conclusion: Whole-Slide Imaging (WSI) provides a safe and efficient means for primary diagnosis from the remote site and provides patients an undisrupted access to subspecialty expertise, despite the several challenges posed by a pandemic. The operational convenience resulting from factors such as time saved on commuting to workplace, fast on-demand case accessioning, workload leveling across hospital sites, and availability of a network of expert pathologists for consultation is likely to influence how we function in the post-pandemic era.

Day I Session 02: CME – Data Breach

Chair:

Krishna Kumar – KnackSun Life Sciences, Navi Mumbai, India

Ikramullah – Ikram Hospital, Vaniyambadi, India,

Manick Rajendran – iMMi Life Healthcare, Chennai, India

02.1

Cyber security for doctors – basic precautions and how to keep consultations and records secure

KK Chaudhary¹, Alok Jha¹ and Tarini Kumar Das²

¹WeSeSo Learning Foundation, Gurgaon, India; ²Mahan Hospital, Madhya Pradesh, India

Background: Owing to the highly valuable information in the medical industry, patient health data (PHD) have become the prime target of hackers. These hackers are continuously trying to breach the defense of hospitals and medical facilities for harvesting the information of patients and doctors. As per the statistics, PHD is sold in Dark Web at 10–20 times the premium of financial data. Some of the biggest healthcare data breaches of 2020 that forces us to deliberate more seriously on the safety of PHD include (1) inadequate security, policies led to LifeLabs data breach of 15M Patients; (2) Magellan Health breach of 365,000

patients; and (3) Dr Lal PathLabs leaks millions of patients' data in the public domain.

Material: During this session, the speakers highlighted the various regulations and guidelines of Government of India on the subject. According to Telemedicine Guidelines 2020 – Govt of India, 'it is doctor's responsibilities to ensuring data privacy, ethics, and maintaining records of all the patients whose records are being collected during medical examination'. Similarly, the Digital Information Security in Healthcare Act (DISHA), which is in the draft stage of formation and the personal Data Protection Bill-2019, has placed the onus of security of patient's data on those who store and handle such data. The relevant part of the amendment is as follows: **(3.7.1) Medical Ethics, Data Privacy & Confidentiality: Principles of medical ethics, including professional norms for protecting patient privacy and confidentiality as per IMC Act shall be binding and must be upheld and practiced. (3.7.1.2) The Registered Medical Practitioner would be required to fully abide by Indian Medical Council (Professional conduct, Etiquette, and Ethics) Regulations, 2002 and with the relevant provisions of the IT Act, Data protection and privacy laws or any applicable rules notified from time to time for protecting patient privacy and confidentiality and regarding the handling and transfer of such patient's personal information. (3.7.1.3) Registered Medical Practitioners will not be held responsible for breach of confidentiality if there is reasonable evidence to believe that patient's privacy and confidentiality have been compromised by a technology breach or by a person other than a Registered Medical Practitioner (RMP). The RMPs should ensure that reasonable degree of care undertaken during hiring such services.**

Discussion: With reference to the above, the speakers highlighted why it is important for doctors to understand the underlying risk of holding PHD: **(1) patient data can be stolen, lost, or intentionally or un-intentionally transmitted; (2) why custodians of DHD and PII are bound by National (DPDA/DISHA) and International (HIPAA) regulations; (3) intent and pre-emptive action that can help; (4) for this, awareness about basic digital hygiene is very important; (5) ignorance of underlying technology of Internet; and (6) connected to Internet-based health equipment. Speakers also highlighted various methods or tricks used, such as phishing, vishing, mail or phone spoofing, social media postings, hacking computers or smartphones, and hacking the Internet-connected equipment.**

Result: It was concluded that the only safety for any medical practitioner in case of a data breach is to prove that due diligence was done and all possible care to protect such data were taken by the data custodians. Hence, it is essential

that doctors and medical staff must be aware of simple security steps that can not only prevent a data breach but also prove 'due diligence' in case of such breaches. Following recommendations were given: **(1) mandatory refresher course for all RMPs/nursing/record staff on an annual basis, (2) 10-min quiz and certification (may help in due-diligence claim too), (3) information security policy and audit of compliance for all clinical establishments, and (4) monthly awareness note on breach incidents of medical sector.**

02.2

Telemedicine and its role in leveraging health care economy

Moderator: Vimal Wakhlu -Past President, TSI

Anoop Wadhawan

Department of Commerce, Government of India

Telemedicine has played a significant role in the Healthcare domain in 2020, when the world was battling the COVID-19 challenge. There are a number of initiatives taken by the Government of India in enlarging the scope of Telemedicine in view of the emergency, which include the following: **(1) guidelines on Telemedicine Practice were issued, (2) e-Sanjivani – a platform for Telemedicine Practice was developed, (3) Aarogya Setu app for tracing and tracking of COVID-19 in the general public was put in place, (4) The need for rural telemedicine was felt and was formalized, (5) National Digital Health Mission was established, and (6) leveraging artificial intelligence for healthcare needs has been established.** These developments are gradually rolling out an ecosystem, giving a boost to the Healthcare Economy in India. These include various stakeholders in the process: **(1) regulatory framework provider, (2) trained medical practitioners, (3) Telemedicine Platform providers, (4) application developers, and (5) technology providers in domains, including (a) e-Networking, (b) artificial intelligence, (c) 3D printing, (d) extended reality – augmented reality/ virtual reality/ mixed reality (e) Digital Twins, and (f) Rural Telemedicine Service Providers Service providers.** The objective of this study was to highlight how various components of this ecosystem are changing, resulting in a boost to the Healthcare economy, and what the future trend is likely to be.

Day I Session 03: Symposium – Telemedicine and Diabetes (Parallel Session)

Chair:

R. Kim – Aravind Eye Hospital, Madurai, India

T. Senthil – Welcare Health Systems Pvt Ltd, Chennai, India

V. Mohan – Dr. Mohan's Diabetes Specialities Centre, Chennai, India

03.1

Experience with telemedicine for diabetes during lockdown (COVID-19)

Viswanathan Mohan

Dr. Mohan's Diabetes Specialities Centre, Chennai, India

The coronavirus 2019 (COVID-19) pandemic is playing havoc on the healthcare sector globally. The greatest hurdle imposed by COVID-19 restrictions on healthcare professionals are the management of the high-risk group of COVID-19: type 1 and type 2 diabetes patients, adults above 65 years of age, people with multiple comorbidities, unstable HbA1c \geq 8.5% and smokers. The challenges they face include lack of motivation to monitor blood glucose levels, reduced access to lab testing, ineffective implementation of a healthy lifestyle such as improper diet and lack of exercise, insufficient guidance and awareness, and spread of fake news and fear, which, in turn, affect their quality of life. Telemedicine is a proven treatment modality for diabetes care. The key concepts for the successful implementation of telemedicine were described with the successful telemedicine prototype, which incorporates procedures, such as receiving a call from patients directed to a dietitian for a check on the previous history, order the tests and fix an appointment for home care followed by phlebotomy done at the patient's home, processing of samples, and generation of reports followed by a telemedicine consultation and delivery of medicines at home. The study by Dr. Anjana et al. on the 'acceptability and utilization of newer technologies and effects of glycemic control in type 2 diabetes: lessons learnt from lockdown' conducted in 3,000 subjects sums up the challenges, acceptability, and utilization of telemedicine services in diabetes patients. Research outcomes highlight that 82% of the patients who adhered to telemedicine were satisfied with the telemedicine services, of which 58.1% were interested to continue the services in the future. There was a significant improvement in clinical and biochemical parameters in the diabetes population during lockdown. During the lockdown, the number of patients performing SMBG increased from 15.5% to 51.3%, which led to a significant improvement in glycemic control and other metabolic parameters. Some of the limitations include patients who were unable to express all

the problems in a limited period of time through telephone consultation, unhappy with tele-consultation as the consultant's voice was breaking, tele-consultation was not as good as consultation, not able to check blood pressure face to face, unable to have a family member with them during the consultation as the member may not be with the patient, consultation lasts only for few minutes, no improvement in health observed, technical problems, and so on. The **take-home message includes (1)** Telemedicine is a proven treatment modality for diabetes care, **(2)** Effective implementation of telemedicine services can result in a significant improvement in glycemic and other metabolic parameters.

03.2

23 Years of telemedicine practice in diabetes: merits and demerits

Jothydev Kesavadev

Jothydev's Diabetes and Research centre, Trivandrum, India

Diabetes Tele Management System (DTMS®) was launched in 1997, with an intention to better manage diabetes when the prevailing status of care was disappointing with an average A1c of above 9%. By successful partnership with technologies, over the next 10 years, DTMS® evolved into a decision support system; the major components include electronic medical records, personalized diabetes care, and a multidisciplinary team consisting of trained physicians, nurses, dietitians, diabetes educators, pharmacists, and psychologists. Telemedicine was not widely accepted in diabetes care due to several challenges, which included funding, reluctance of patients to pay, long duration of consultations, and so on. Over the past 20 years, we were successful in generating over a dozen robust research materials from DTMS®, documenting its clear superiority over conventional diabetes care. Effective use of telemedicine services resulted in more than 86% of the patients successfully reaching the customized targets of Estimated average glucose (A1c), Low-Density Lipoprotein (LDL) cholesterol, and blood pressure. The results were much more robust when compared with the introduction of a new therapy or device in diabetes. Evidence demonstrated a significant reduction in A1c without hypoglycemia, preventing the progression

of diabetic kidney disease, sustainable benefits for over 15 years, prevention of microvascular complications, benefits regardless of the geographical location, and above all cost-effectiveness. **The following are the key take-home messages:** (1) diabetes is the most important non-communicable disease where the expensive complications can be successfully averted with the implementation of telemedicine. (2) Telemedicine in diabetes care will invariably help in reaching targets when conventional therapy is failing in the majority. (3) Sufficient evidence from India proves the superiority of telemedicine services in diabetes over conventional care. (4) There is a robust reduction in cost and complications. However, hospitals and doctors need to be adequately compensated for their time and services for the sustainability of telemedicine in diabetes. (5) Third-party platforms for telemedicine need to be engaged cautiously due to fear of breach of confidentiality and probable commercial interests.

03.3

Tele-wound care – a need of the hour for diabetic patients in India

Sanjay Sharma

FootSecure & Yostra Labs, Bengaluru, India

Mobile health care is a major buzzword nowadays; take the devices to the patient and transmit the data to the doctor, not the other way round (patient going to the devices). Mobility in this concept is not restricted to the hospital, where devices and data flow freely from department to department, but encompasses clinics, primary care centers, and home. Wound management have not been a major focus of telemedicine, but it can benefit immensely from mobile devices – they support digital wound documentation to make wound management safer, more efficient, and cost effective. Wound documentation describes all criteria relevant for therapy planning, performance, control, and follow-up, as well as prognostic evaluation, to ensure that approved medical and care procedures are being followed; this is an indispensable quality control tool, as the differentiated parameters provide a detailed picture of the individual wound situation, which can offer guidance for all parties involved in therapy and care. While the cost advantages of telemedicine in wound management are praised unanimously, mobile technology has yet to conquer everyday clinical practice and routine. Recording of a wound along with pictures and videos can be accessed by physicians, nurses, and patients, ensuring that no contradicting measures are taken no matter who performs the wound care at any given point of time. Next, verbal agreements among the caregivers, and patients do not ensure

proper wound care. A precise, initial wound assessment will promote urgently needed interdisciplinary cooperation, if, for example, the development of a diabetic ulcer is detected, coordinated action by diabetologists, podiatric surgeons, orthotists, and community nurses, which can prevent major interventions like amputation. Tele-wound care is still new, even though it was welcomed 15 years ago, nothing much has evolved. In practice, there has been no significant progress, because nobody wants to pay for it. The clinical advantages are undisputed, but investments into wound care are not on priority. For example, it has been estimated that up to 50% of all non-traumatic lower limb amputations are performed on diabetic patients. Foot problems are important contributory factors to the high-morbidity and mortality rates observed in diabetic patients, and the economic impact of foot disease is substantial. The cost of treating this complication is much higher than that of renal or heart problem. All the latest therapeutic modalities for managing diabetes foot are now available to Indian patients. Unfortunately, the above-mentioned treatment modalities are fairly expensive for the average Indian patient. Studies show that a patient with a diabetic foot ulcer spends about INR 137,000 for a single wound to heal. Also, it takes about 12–52 weeks for the same to heal. Accessing trained wound care specialists and associated specialists has been painful for the patients and the hospitals focusing on wound management. The meticulous collection of data for wound documentation forces physicians and nurses to work systematically and look at the individual wound situation precisely and in depth using multiple wound parameters. Data, thus, collected would lead to a confident assessment of progress, stagnation, and setbacks. Consequently, well-founded decisions on therapy adjustments, which may spare on a patient from enormous suffering, can be made. FootSecure brings advanced predictive technologies, understanding of podiatry (both clinical and operational protocols), products, and talent training approaches to deliver better health outcomes. We take pride in reducing unnecessary amputations by solving complex conditions with simple and cost-effective approaches. Powered by an AI-enabled chatbot, the conversational nature of our CCDSS is a step ahead of the typical form-based systems. It helps in the monitoring and management of foot health and wound care in clinics or at home through mobile triage and tele-podiatry. It combines 2D and 3D imaging, gait analysis, plantar pressure scan, and videos of the wound or foot. During the pandemic, we implemented a prototype version of the tele-wound care, and the following are the parameter outcomes: (1) number of patients: 30 ([29M / 1F] / 40–80 years), (2) number of tele-wound care instances: 109, (3) DFU – venous ulcer: 22:12, (4) average consult time: 15 min, (5) recommended routine dressings: 10, (6) recommended advanced dressings: 6, and (7) recommended surgery / debridement: 14 (12 at FootSecure and 2 locally).

Day I Session 04: Telehealth-International Perspective

Chair:

K. Ganapathy – Apollo Telemedicine Networking Foundation, Chennai, India,
BS Bedi – Centre for Development of Advanced Computing, New Delhi, India
PK Pradhan – School of Telemedicine and Bioinformatics, Sanjay Gandhi Post
Graduate Institute of Medical Sciences and Research, Lucknow, India
Sunil Shroff – President Tamil Nadu Chapter TSI
BS Ratta – Pediatric Surgeon, Pune, India

04.1

Role of government and private insurance companies in the new patient centric healthcare delivery utilizing in-person and telehealth services interchangeably

Pramod Gaur

Adjunct Professor, Pace University, New York, NY, USA

Rapid advancements in the Digital Health Technologies during the last decade have enabled the key trend of moving health care out of hospital settings to community and home settings. This trend has the potential to significantly reduce the overall healthcare cost per patient. However, this trend brings major complexities in care coordination and standard-of-care delivery, and this needs to be addressed by technology. Healthcare cost payers (government and private health insurance companies) along with patients or caregivers, providers (hospitals and professionals), and policy regulators form the key stakeholders for optimizing healthcare ecosystem. The healthcare programs funded by Government include Medicare, Medicaid, VA Healthcare, and DoD Tri-Service Healthcare. Private insurance companies, such as United, Cigna, Aetna, Humana, and others, provide health insurance services on behalf of self-insured employers and individual members. The US Federal Government through its Centers for Medicare & Medicaid Services (CMS) agency issued several healthcare ‘waivers’ to allow the same insurance payment for virtual care delivery as allowed for in-person care delivery during the current COVID-19 pandemic to minimize access to health care during various lockdown situations.

Furthermore, CMS announced relaxed enforcement of key Health Insurance Portability and Accountability Act of 1996 (HIPAA) encryption regulations to allow patients to receive health care using ordinary phone and common consumer video capabilities like FaceTime, WhatsApp, and so on. In addition, an emerging key trend was reported where payers and providers form partnership to create PAYVIDER organization to streamline healthcare services and share relevant data. Several examples, including UPMC Payvider services, are reviewed. In summary, payers (government and private insurance organizations) have played a key

role in continuity of healthcare delivery both in-person and telehealth service interchangeably during the current pandemic. Major efforts are underway to make most of these payment ‘waivers’ to be permanent after the pandemic.

04.2

The international digital transformation of health care: telehealth development in the global community

Dale C. Alverson

Professor Emeritus, University of New Mexico Health Sciences Center, Albuquerque, USA

Using advances in information and communication technologies (ICTs), telemedicine and e-health services are providing a means to transform systems of care for people throughout the world by providing greater access to clinical service, consultation, sharing knowledge, education and training, public and community health, health systems development, epidemiology, and research. Leapfrogging over prior barriers, rapid advances in ICT, computing, and wireless networks are offering greater continuity in access to these services in both developed and developing countries. The use of telehealth services must be put in the context of the critical health needs in each country, cultural perspectives, current and future communication infrastructure, other supportive resources, and likelihood for sustainability. Furthermore, these telehealth efforts should be aimed at improving the local capacity in providing ongoing healthcare services in each country and blend into that country’s current and future healthcare strategies. As the world continues to ‘shrink’, developing this international telehealth ‘network of networks’ offers an opportunity for cooperation, collaboration, knowledge sharing, and improving the health of every individual in the world, applying information technologies for peace and the betterment of mankind. Considering the impact of the COVID-19 pandemic, the time is now for open and constructive dialogue designed to facilitate that coordination between key stakeholders and other international organizations. These types of international exchange experiences enhanced with telehealth

offer significant opportunities for understanding the common denominators, as well as unique differences, related to global health among countries and cultures around the world. These

programs can promote international understanding and mutual respect in a manner, which can improve the health of the entire global community.

Day 1 Session 05: Inaugural Address by Chief Guest Chair: Ashvini Goel – President Elect, TSI

05.1

Inaugural address by chief guest

Vinod K. Paul

NITI Aayog, Govt of India

The speaker who is the Member Health of Niti Aayog (Planning Commission of India) pointed out that it was necessary to move forward to the next level using the technology. Details of the 'New normal' and the importance of 2020 in the context of unusual different situations were touched upon. The importance of the *Telemedicine Practice Guidelines* notified on March 25, 2020 was brought out. It was repeatedly emphasized that the document was based on the faith-driven trust between a patient and provider. The normal trusted relationship between a doctor and patient in face-to-face situation would now be replicated virtually. The basis

of a teleconsultation is trust not commerce. The guidelines would be a dynamic document. There would be flexibility for modifications later. Technology has been used for benefit of the patient. Lockdown resulted in teleconsultations growing exponentially. Hospitals, doctors, patients, and everyone rose to the occasion. A Telemedicine revolution is likely to follow. The launch of the National Digital Health Mission is a major milestone in providing health care in India. A national registry of doctors, hospitals, and beneficiaries with a unique ID, with interoperable EHR in the public and private domains would also result in the growth of Telemedicine. There is a necessity for a secured framework, ethics regulation, and judicial oversight in a systematic way. The importance of Telemedicine Society of India as an advocacy group was stressed. Promoting affordable public health with accountability and responsibility would be the spin-offs. The address concluded with the speaker raising concerns about stakeholders primarily following a commercial path and violating transparency and ethics.

Day 2 Session 06: Morning 'WARM UP' Session Chair: B.S. Ratta – Ruby Hall Clinic, Pune, India

06.1

AR VR in healthcare physician's perspective

Sunil Sharma

Indian Spinal Injuries Centre, New Delhi, India

VR Apps for teaching structure and functioning of the body have been developed. The HoloAnatomy app is free to use. Virtual training is being provided before handling real patients to give injections, withdraw blood, insert catheters, perform Cardiopulmonary Resuscitation (CPR), manage patients in a running ambulance, emergency ward, operate Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) machines, perform complicated procedures like intubation, lumbar puncture, and so on. Preadmission written instructions for patients and relatives have become Preadmission Virtual Reality Tours. Starting from driving directions to parking in the hospital, walking to the admission counter, admission to the ward room, layout of the room, investigation instructions if any, virtual walkthrough the procedures and the surgery, postoperative care and rehabilitation, follow-up procedure, and recovery timeline everything is being shown in virtual reality. Surgeons can facilitate planning of their surgery,

practice the surgery, try out different approaches and instruments, practice invasive procedures, choose right size of implant, and predict outcomes through artificial intelligence built in the software. Augmented reality superimposes the structures in the body to facilitate the insertion of central lines, intra thecal injections, nerve blocks, and help perform invasive procedures where high precision is vital. Augmented reality is used to provide doctors quick access to a patient's electronic health records, previous visits, and current medications. It also records new prescription through speech to text apps. There are many virtual games and activities that use VR and help patients to speed up their rehabilitation. VR goggles can use eye-tracking abilities to test for visual impairments. It can also help to test for concussions soon after a person sustains a head injury. VR simulations are used to provide emergency care training in adult and pediatric patients in pre-hospital, perioperative, and postoperative care in complex obstetrical surgeries. A holographic visualization of a patient's anatomy is superimposed over the patient with augmented reality while performing complex interventional procedures. Virtual reality is used to simulate how the patient feels, allowing relatives or caregivers to experience life from their patient's perspective. Virtual reality clinics are being held to provide remote care to patients across the United States. Some challenges need to be tackled, which are related to ethical risks, privacy, and security of data.

Day 2 Session 06: Free Paper Session (Parallel Session)

Chair:

**PK Pradhan – School of Telemedicine and Bioinformatics, Sanjay Gandhi Post
Graduate Institute of Medical Sciences and Research, Lucknow, India**

Murthy Remilla – Hon. Secretary TSI

Ashwin Desai – A&T Video Networks, Madurai, India

Oommen John – The George Institute for Global Health, Australia

FA01

Designing a critical care safety net for India

Karsten Russell-Wood

Philips Healthcare, York County, PA, USA

Tele-critical care has been demonstrated to create value within healthcare systems delivery for critical care, and beyond. There are many types of critical care, and the evolution of critical care has shown models that can deliver varying value propositions based on the implementation of key performance indicators. This discussion will chronicle Tele-ICU evolution, including direct contributions from founding intensivists and data from leading global institutions that have implemented models of Tele-ICU. A review of literature, use cases, extensibility, and scalability is presented, as well as the return on investment potential as seen financially, clinically, and operationally. Implementation models and success Key Performance Indicators (KPIs) will be examined through the lens of case studies of Tele-ICU sites from key markets around the world, including USA, Japan, Australia, and the Middle East. The goals of this presentation are to present the peer-reviewed evidence and successfully used models of Tele-ICU, including also an analysis of the variables of success for hospitals, systems of hospitals, and systems of government.

FA02

Tele-pulmonology, a ray of hope in elderly COPD patients

Sarang Patil

MUHS Nashik, Maharashtra, India

Introduction: Chronic obstructive pulmonary disease (COPD) is the leading cause of morbidity and mortality worldwide. It is estimated that COPD contributes to almost 5% of deaths globally, with around 90% reported in low- and middle-income countries. Pulmonary rehabilitation is a proven comprehensive and multidisciplinary therapeutic

strategy to improve healthcare-related quality of life (HRQoL) and healthcare utilization in patients with COPD. However, there are multiple barriers to pulmonary rehabilitation, including insufficient capacity, lack of access, patient inconvenience, and cost of treatment. Therefore, affordable and easily accessible solutions to increase the availability and access to pulmonary rehabilitation are necessary. We conducted a study to examine the feasibility and effectiveness of pulmonary rehabilitation through a telemedicine-based homebound, pulmonary rehabilitation program at City Hospital.

Aims: The objectives of this research were to study the effectiveness and feasibility of home-based pulmonary rehabilitation offered through telemedicine and to study the improvement in the quality of life of COPD patient post home-based pulmonary rehabilitation.

Methodology: We included 25 patients in our study, and the study duration was 12 weeks.

Inclusion criteria: Patients diagnosed with COPD and on medications, those with basic knowledge of using smartphone, who are willing to spare 30 min per day, and consenting for this study are included.

Exclusion criteria: Patients not consenting for the study, those with active pulmonary tuberculosis and those with recent history of myocardial infarction in the past 3 months were excluded. A home-based pulmonary rehabilitation program was designed, which involved real-time 12 weeks interactive rehabilitation sessions with a pulmonologist. Baseline characteristics of 25 participants enrolled in a pilot study were collected between March 2020 and June 2020. Pre-program and post-program assessments were performed. The primary outcome measured was change in quality of life as evaluated by the chronic obstructive permanent disease assessment tests (CAT) score. Other outcomes included changes in functional ability, depression severity scale, and utilization of healthcare services.

Results: (1) The mean age of participants in the study was 68 years. (2) The mean FEV1 predicted was 56.4 ± 11.9 . (3) About 69% of enrolled patients had advanced COPD defined as gold stage D. (4) The home-based pulmonary rehabilitation program resulted in clinically and statistically significant improvements in CAT scores (20.7 ± 17.5 , $P < 0.05$). (5) Similarly improvements were noted in patient health questionnaire-9 (PHQ-9) and Duke activity status index (DASI) scores, as well as Body-mass index, airflow, Obstruction, Dyspnea and Exercise (BODE) indices. (6) A trend towards reduced healthcare utilization was observed but was under power to indicate clinical significance. (7)

Dropout rate was 18%, and the overall satisfaction score with this new modality was quite high, that is, approximately 98%.

Clinical implications: A home-based pulmonary rehabilitation program offered a potential for convenience and easy accessibility for pulmonary rehabilitation services, especially in the older population, and they did not seem to be psychologically disconnected from the concept of e-health as observed by promising results obtained on the statistically and clinically significant home-based pulmonary rehabilitation program. The dropout rate was relatively low, indicating the feasibility of administrating this program.

Conclusion: Therefore, we can conclude by observing that home-based pulmonary rehabilitation was an effective tool for increasing access of COPD patients to pulmonary rehabilitation services and demonstrated improvement in quality-of-life measures. A low dropout rate indicates that it can be easily used, especially in elderly population, if familiarized with the process and technical expertise are made available.

FA03

Tele-rheumatology during COVID-19 pandemic: nuts and bolts

Krishnan Shanmuganandan

Apollo Hospitals, Chennai, India

Introduction: The unprecedented evolution of COVID-19 pandemic has been matched by an exponential increase in tele-consultations, especially in the field of rheumatology.

Methods: Observational study of characteristics of tele-consultations in rheumatic diseases: The nuts and bolts.

Results: A total number of 970 consultations over 8 months were carried out through an android-based application portal. The demographic and epidemiological profile of the consultations will be discussed. The features of teleconsultation unique to rheumatic diseases will also be discussed.

FA04

Teleneurology in the COVID-19 pandemic

Somasundaram Kumaravelu

Department of Neurology, Ramesh Hospitals, Guntur, India

Introduction: Telemedicine has become the most important mode of medical communication during the COVID-19

pandemic, both consultation and medical education. Neurology consultation relies upon a detailed historical evaluation to reach a diagnostic formulation. This attains more significance when time constraints dictate therapeutic interventions like thrombolysis in Ischemic Stroke within the window period. We analysed our data from April 2020 to November 2020.

Material: In Ramesh Hospital Group, we have been doing telemedicine through a hub and spoke model in coastal Andhra Pradesh covering four districts for over a decade. We have expanded the telemedicine to direct patient and specialist interaction with the introduction of Telemedicine Act. Teleconsultations and tele-education activities constituted the material for the study. In addition, we carried out a significant number of telemedicine education events. These included teaching sessions for medical officers and residents in Medicine, Radiology, and Neurology; we also conducted several mass communication programs for the public on common neurological problems, such as stroke, epilepsy, and headache through Facebook and other media. There were 10 sessions for doctors on stroke, epilepsy, neurological manifestations of COVID-19, and protected code stroke among other subjects. There were a total of 3,120 teleconsultations. Neurology contributed 15.9% (496) of the consultations. Males constituted 52.41%, while females were 47.59%. Majority of them were adults within the age group of 18–86 years. About 11% of them were new patients seeking first time consultations, while 89% were for review. The disease entities for which consultations were sought were grouped into four categories, viz., stroke, including ischemic, intracerebral hemorrhage, cerebral venous thrombosis, and subarachnoid hemorrhage; headache; seizure disorders; and others. Stroke constituted 42.7%, while headache and seizure disorders contributed 12.6% and 7.5%, respectively; other disorders accounted for 37.2%. Few consultations were made through conference calls when the patients were uneducated, through intermediaries, and at times from abroad. One of the patients, who was within the window, was directed to the nearby facility for thrombolysis with good outcome. The parameters required to be provided by the patients and their attendants included pulse, temperature, blood pressure, and blood sugar levels in diabetics. The overall satisfaction rate was around 85% among patients, probably due to safety of not travelling in the COVID-19 pandemic; other parameters were convenience of home, saving cost and time of travel, and the clarification of problems without the interlude of hospitals. The few drawbacks encountered were non-availability of certain special tests and their reliability, and the availability of prescribed drugs at the place of residence. Samples for tests were collected from the residence in nearby locations. Medicines were also delivered at their doorsteps where feasible.

Conclusion: Teleneurology consultations were a welcome addition in the armamentarium of Neurologists. There was an increase in patient acceptance, especially in remote rural areas. Stroke was the commonest diagnosis among these consultations. Majority were for review.

Day 2 Session 06: Symposium – Health Insurance TeleHealth (Parallel Session)

Chair: Ravi Modali – Indian Society of Lifestyle Medicine, Bengaluru, India

Sunil Shroff – President Tamil Nadu Chapter TSI

06.2

Telemedicine: provider – insurer partnership

Harish Manian¹, Ramakrishnan² and
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Elect 2020, Indian Medical Association Tamil Nadu Chapter, India;
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Background: After the Government of India released the Telemedicine Practice guidelines, the healthcare economy needs to be driven through the healthcare system in India. The Health Insurance Industry is the largest consolidated private payer in India. The vital role of Health Insurance in the growth and development of a healthy nation needs a constructive deliberation. To discuss about this partnerships, four speakers, coming from the major stakeholders, namely, hospitals, doctors, and insurers were invited for the panel discussion.

Discussion: Mr Harish Manian, initiated the session from the hospitals' perspective. The lack of a transparent, automated model for payments from insurers was highlighted by him. He suggested that if the process of Insurance payments was linearized, it would make the entire process hassle free for the end user, the patient. Dr Ramakrishnan also suggested that Telemedicine practice has to be adopted by standalone clinics to ensure that the patients have options of virtual

consultations without delays. He also highlighted the fact that the Health Insurance Industry needs to penetrate to the grass roots of health care to ensure that benefits of insurance reach the masses. Dr S Dheeraj Krishnaa presented a feasible model for a unified payment portal, where the customers could avail cashless telemedicine. Through this method, Telemedicine will be the choice of consultation by a wider ambit of patients. He also suggested that Star Health was open to take this route and is open for partnerships with healthcare providers. Dr S Prakash, Chairman of this session, concluded by saying that Star Health and Allied Insurance Co Ltd, India's largest standalone Insurance provider aligns with the Healthcare providers and has proactively approached the Insurance Regulatory and Development Authority of India (IRDAI) for better regulations of the Telemedicine Industry. He also stated representing the Insurance industry that Insurtech and Health Tech must work hand in hand to create a robust, patient centric solution. Dr. Ravi Modali, moderated the session during which key questions from the audience were attended. The COVID-19 health insurance policy has benefited people and healthcare providers, with a significant underwriting loss to insurance companies in the short term. Another perspective on chronic disease coverage, Dr Prakash recommended a comprehensive health insurance policy over single-disease insurance policy.

Conclusion: The Insurance Industry has come forth to pay for Telemedicine consultation in hassle-free routes, and Star is ready to explore and pioneer the cashless payments of Telemedicine.

Day 2 Session 07: Legal, Ethical, and Social Issues in Telehealth

Chair: Abhishek Malhotra – TMT Law Practice, New Delhi, India

Ravikumar Modali – Indian Society of Lifestyle Medicine, Bengaluru, India

07.1

Emerging ethical challenges in digital health

Bangalore Nanjundaiah Gangadhara

Ethics and Medical Registration Board, National Medical
Commission, Government of India

This presentation by the President, Ethics and Medical Registration Board, National Medical Commission, India reviews critical areas in the field of ethics and regulations in the field of Telehealth. The importance of evidence-based medicine was discussed with specific mention of some limitations. The necessity for institution of Training and Competence programs on TeleHealth was emphasized, as well

as clear identification of the registered medical practitioner and any professional present during a teleconsultation at both the teleconsultant's and patient site. There would be special training for Telemedicine practice and accreditation. Traditional bedside manners would be replaced with (Webside) manners. These would also be need to be customized for general practice and specialties. Registration or licensing of the 'Teleclinic' would be necessary. Necessity for attention to the site, hardware, software, licenses and network service provider was emphasized. Precautions needed to be taken to avoid or minimize errors, lapses, and liability. These could refer to direct (doctor-related), unregistered activities and to medical negligence either deliberate or inadvertent, indirect (unrelated). Consent for a teleconsultation could be informed or implicit. Information on pros and cons and documentation and declaration of costs had to be made available. Right to terminate a teleconsultation by both

parties was touched upon. The speaker emphasized that under no circumstances should professional etiquette be transgressed. These would include personal, financial, and sexual boundaries. Confidentiality (direct/indirect) must be always maintained. Material could be used for anonymized clinical teaching with recording and documentation with informed consent. Other 'ethical' concerns would include the fear of diminishing personal touch, missing non-verbal cues to and from patients, lack of connectedness, and promptness in recognizing responses/results. Problems were also anticipated while issuing Tele-prescriptions and e-Prescriptions. Necessity to use generic names for drugs was touched upon. It was pointed out that the present list of drugs, which could be prescribed during teleconsultation, would be modified with increasing experience. The detailed principles laid down by the National Medical Commission in the field of ethics were primarily applicable to direct face-to-face consultations. These need to be modified for remote virtual consultations. Telemedicine errors and liabilities also need to be defined explicitly.

07.2

Legal, ethical, and social issues in telehealth

Shripathi R. Bhat

Judge, Supreme Court of India

This keynote delivered by a Judge of the Supreme Court of India gave an overview of the Legal, Ethical, and Social Issues in Telehealth. COVID-19 had resulted in a significant reduction of visits to hospitals and doctors, and the use of App-based medical platforms leading to integration of digital medicine technology has revolutionized easy access to teleconsultation, which has now become necessary. The need to regulate codes and ethics and revising them to keep up with technology as is being done by the American Telemedicine Association (ATA) was stressed. The key points notified in the Telemedicine Practice Guidelines were highlighted. It was pointed out that all aspects of telemedicine had not been covered. Access to telemedicine continues to be a point of concern because reliable Internet access was still only 38% with geographical disparity. Robust verification of a doctor's credentials was essential during a teleconsultation. Close attention is required to put in place mechanisms for grievance redressal and maintaining safety and security. Comprehensive legislation is necessary to address licensing needs and fiduciary relationship between doctors and patients. Establishment of liability when there is data loss is required. Reference was made to the HIPAA and HITECH Act in the United States. It was pointed out that greater regulation of online platforms was required. Regulators should concentrate on certain issues and stay away from others. Regulatory control over Fitness apps is a gray area. With masses of data, potential for misuse is immense. Accountability is more when there is direct interaction.

Websites like the Mayo clinic with impeccable credentials can be an outstanding source of information. Online verification of credentials of doctors would be difficult but is mandatory. Stringent oversight and consistent regulations are essential. Good practices and self-regulation are important.

07.3

Design Workshop Series (Parallel Session)

Chair: Reeta Mehrishi

Digital Impact Square (DISQ – A Tata Consultancy Services Foundation), Nashik, India

Breaking the barriers – design workshop series addressing the challenges for telehealth in India

Reeta Mehrishi

Digital Impact Square (DISQ – A Tata Consultancy Services Foundation), Nashik, India

We conducted a series of design-led workshops to identify, articulate, and address the challenges around telemedicine in India. The activities covered three phases: **(1) discovery** (exploration of the challenge area), **(2) diagnosis** (problem definition), and **(3) designing solutions** (ideation and problem solving) **Phase I: Discovery:** The pre-workshop discovery activities comprised asynchronous text-based methodologies, including questionnaires for doctors, Google forms circulated among all participants to get a sense of the challenges faced by them, and a WhatsApp group created to facilitate conversation. **Phase II: Diagnosis:** The subsequent series of online meet-ups covered various processes in Design Thinking, such as **(1)** the role of Persona creation in empathizing with the key stakeholders; **(2)** the '5 Why' technique to understand and articulate challenges or problems. This technique also enabled the participants to understand the basis of the problem. **(3)** The 'How Might We' technique to examine the various ways in which a challenge may be approached. This technique illustrated the emergence of several possible solution approaches. **Phase III: Designing Solutions:** The main ideation workshop (on the 19 December) used lateral thinking techniques for problem-solving. We demonstrated how parallel thinking can be applied to gain a holistic perspective about any general issue – starting with 'social distancing' as an initial example, and later applying the same technique to the context of Telemedicine. Participants were urged to participate continuously by sharing their insights on the chat window. The learning was thus demonstrated in the session itself, where the participants could see how parallel thinking, indeed, reduced the time required for analyzing the problem; minimized conflicts and personalization of issues and ideas; and generated a very comprehensive analysis of the phenomenon in question. Furthermore, although over

50 participants from diverse backgrounds were present, appropriate use of the technique resulted in generating ideas at a high pace without any conflicts or hiccups. In the

interactive session, we also demonstrated the value of ‘crazy’ ideas, as well as techniques to elicit such ideas from a diverse group of participants.

Day 2 Session 09: Symposium Tele-Urology (Parallel Session)

Chair:

Anant Kumar – President, Urological Society of India

Sunil Shroff – President, Tamil Nadu Chapter, TSI

09.1

Tele-urology practice – creating a framework

Thekumpadam Puthenveetil Rajeev¹, Rajeev Kumar², Sanjay Sinha³, Ketan Shukla⁴ and Sanjay Pandey⁵

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Background: The COVID-19 pandemic resulted in the Government of India notifying ‘Telemedicine Practice Guidelines’ in May 2020. Urological society of India (USI) in association with the Telemedicine Society of India organized a panel discussion to help formulate guidelines for practice of tele-urology.

Materials and Methods: The following were the areas identified to be addressed for teleconsultations: (1) most common problems in Urology that could be safely addressed, (2) consent process, (3) remunerations, (4) overseas teleconsultations, (5) confidentiality and privacy issues more in the field of Andrology, (6) How long to preserve the records after the telehealth consults (7) impact of tele-education on the PG teaching program, and (8) recommending medications for Urology: (a) list of drugs for first consults to be added to List A, (b) list of drugs that could be prescribed on follow-up or second consult or List B drugs, and (c) list of banned drugs.

Results: Many of the above issues did not have an answer and required more evidence. The most common problems in Urology that could be safely addressed through telehealth consults included follow-up consults for conditions, such as prostate enlargement, cancer prostate, kidney stone, urinary tract infections, overactive bladder, and erectile dysfunction. Consent – a standard consent form would be designed and made available for use by the members of the society that would cover privacy and confidentiality issues. Remunerations

for consultation – similar to in-person consultations with a small escalation for technology support. Overseas consults – currently, no provision existed in the guidelines, and hence, cannot be recommended. Patient’s confidentiality and privacy issues, especially in the field of Andrology – more detailed discussion was required. How long to preserve the patient notes after the telehealth consults and the mechanisms needed to device for such storage – A period of 3 years was advised till further clarifications are available. Impact of tele-education on the PG teaching program – the COVID 19 pandemic resulted in the deluge of educational webinars. The USI had put up a calendar soon after the pandemic. Recommending medications for Urology: the panel examined the global literature for evidence with regard to the online prescription of commonly used urological drugs. In view of the paucity of literature, evidence with regard to similar classes of drugs used across other subspecialties was also examined. **List A:** it is logical to support the addition of most commonly used drugs in Urology to this list. This includes medication used for the management of lower urinary tract symptoms and benign prostate disease, medication for uncomplicated urinary tract infection, pain medication for urinary tract stones or pelvic pain and medication for the treatment and prevention of urinary tract stones. **List B:** follow-up oral medication for urological cancer, continuation of immunosuppressive medication in transplant patients, and first-line parenteral antibiotics for infection. **Prohibited List:** all schedule X drugs and narcotics.

Discussion: There have been many learnings and innovations that have helped in delivery of health care during the COVID-19 pandemic, and some of these good practices will change the way medicine is practiced in the future. Urology is a specialty that too had seen a rise in tele-consults during the COVID-19 pandemic; however, the notified guidelines lacked clarity and required addressing to make them suitable for practice of safe and ethical tele-urology in India. The discussion among senior urology fraternity from USI resulted in a decision to create a cell within the society, which would address various issues and collect evidence for the same to produce a white paper that could be submitted to National Medical Commission

Day 2 Session 09: Free Paper Session (Parallel Session)

Chair:

Meenu Singh – Vice President, TSI

Rajesh Chandwani – IIM Ahmedabad, India

T. Senthil – Welcare Health Systems Pvt Ltd, Chennai, India

Bijoy – Unarv Telemedicine & Healthcare services Pvt Ltd, Kerala, India

Nishu Tyagi – Dept of Telerehabilitation Services, Indian Spinal Injuries Centre, Delhi, India

FA05

Effectiveness of the addition of virtual NIMHANS extension for community health outcomes tele-mentoring model for skilled capacity building in providing quality care in alcohol use disorders by existing staffs of district mental health program districts of Karnataka

Jinchu Paul

National Institute of Mental Health and Neuro-Sciences (NIMHANS), Bengaluru, India

There is a significant increase in the identification and management of alcohol use disorders by the intervention group (District Mental Health Program Extension for Community Health Outcomes). Till date, we have trained healthcare providers from the background of Psychology, Social work, and Nursing ($n = 54$) to provide right care at right place in right time. The total session of ($n = 27$) was conducted in 60 h during the period of 10 months. During the tele-mentoring ($n = 114$), patients' cases were discussed and ($n = 10,045$), patients were benefited with best practice.

FA06

Road map to pediatric oncology palliative care services through telemedicine

Thumallapalli Avinash¹, Mariswamy Shilpa², Lingegowda Appaji¹, Bendegedde Srinivasa Aruna Kumri¹, Chowdappa Ramachandra¹ and Nemali Anuradha²

¹Kidwai Memorial Institute of Oncology, Bengaluru, India;

²Anjani Healthcare Foundation, Madanapalli, India

Introduction: The motivation of this study is two newspaper reports pertaining to children with cancer, parents approaching a Local Court to grant Euthanasia after relapse/progressive disease as the children were in severe pain.

Objective: The aim of this study was to formulate a Childhood Cancer Shared Care Model and Integrated Palliative Care Services through Telemedicine to ease the challenges posed by COVID-19 pandemic situation.

Methods: (1) A communication was sent to the Government of India (GoI) as to what is the Programme to implement Early Diagnosis of Childhood Cancer Module. (2) A focused group discussion was held among the Faculty and Staff of Departments of Pediatric Oncology, Pain, and Palliative Medicine, Kidwai Memorial Institute of Oncology, Bengaluru to draw in a pathway of a Shared Care Model Integrating Palliative Care Services into Pediatric Oncology.

Result: In reply to the communication sent to GoI, a letter was received clarifying Rashtriya Bal Swasthya Karyakram (RBSK) is the Programme through which the module of early diagnosis of childhood cancers can be implemented. The focused group discussion resulted in a shared care pathway with Integrated Pediatric Oncology Palliative Care through Telemedicine throughout the continuum of care and at all levels of Public Health Delivery System. The Tertiary Oncology Center functions as the Core Provider Group. The nearest Medical College Hospital's Pediatric Medicine Department provides district-level services. The RBSK mobile health team provides community-level care and arranges transport for Respite care to the district-level hospital or the tertiary-level hospital. A United Platform would facilitate Civil Society Organizations' participation.

Conclusion: Providing Pediatric Palliative Care services through Telemedicine is in the best interest of a child and upholds their rights. An interface for all the stakeholders can be achieved using state-of-art Information & Technology Tools, such as internet of things and blockchain.

FA07

Home-based urotelemedicine – a rural Northern Ontario experience

Emmanuel Abara

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Introduction and Objective: For the last 30 years, we have been running an urban-rural Urology practice, with the rural program focusing on Northeastern Ontario. Arrival of the Ontario Telemedicine Network (OTN) in 2006 has improved

timely access to quality health care in Ontario. By 2017, a new initiative through the OTN Hub provides province wide direct-to-patient video visits using personal electronic gadgets. We report our early experience with this virtual, Uro-telemedicine visit to homes in rural communities.

Method: Approval was obtained by the OTN to participate in the program. Training of the urologist and office staff was completed. Informed consent was obtained from patients during enrollment. All participants need to have internet access, an email account, and a personal computer (with web cam, speaker, and microphone) or a tablet/smart phone. Steps to prepare for an e-Visit include e-mail invitation, testing connection/device and installation of the app/plugin. On the day of visit, patients open the invitation email at the scheduled time and click on Join Video Visit to connect with the urologist. Post visit survey follows. Patients who are underage and those with limited technical skills are assisted by parents, relatives, or primary healthcare providers. Patients, demographics, postal codes, diagnoses, reasons for encounter, and feedback were recorded.

Results: There were 110 patients: 82 male and 28 female, aged between 2 and 97 years. Patient encounters included follow-up to review test results and surgical outcomes (70), counseling (35), consultation (5), urological diagnoses include hematuria or UTIs (25), BPH (22), prostate cancer (17), Phimosis or Balanitis (10), renal cell cancer (9), abnormal PSA (9), voiding dysfunction (6), nocturia (5), bladder tumor (5), stones (4), chronic urinary retention (4), renal cysts (4), varicocele (1), and stricture (1). Based on the postal codes, all patients lived > 40 km further away from any urologist. Patients rated their experience of the e-Visit with such comments as time saving, convenient, and no distance to drive to appointment. There were a few technical issues and phone consultation completed the session.

Conclusion: Home-based Uro-Telemedicine through video visit at the OTN Hub is here to grow and pave way for digital health and possibilities for artificial intelligence (AI) in healthcare. Collaborative enrollment of more participants in multiple sites is required to better understand the benefits and challenges of e-Visits in Urology and Specialty Care to rural communities.

FA08

Patient experiences and feedback regarding telemedicine through video consultations for diabetes at a tertiary care center in India

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Introduction: After notification of 'Telemedicine Practice Guidelines' in March 2020 by Government of India in this

ongoing COVID-19 pandemic, patient care through various modalities of telemedicine has become more popular and necessary than ever before. As COVID-19 adversely affected the routine and specialty diabetes care services provided at our apex tertiary care institute, we planned and executed a previously unused strategy to offer teleconsultations primarily through the video mode, supplemented by other means, to our patients in a regular follow-up. Apart from focusing on clinical care and therapeutic advice, we wanted to evaluate qualitative aspects of these first time tele (video) consultations; patients' response, experiences, and issues.

Methods: Patients with complete documented follow-up in the diabetes clinic in the last 6 months prior to the start of COVID-19 lockdown were identified. They were called telephonically by the diabetes team comprising of a diabetes consultant and support team doctors from the department of medicine and pharmacology, respectively. The landline phone of telemedicine department was used to call patients initially to inquire about their medical status, and offer video consultation with their diabetes physician using a common video platform (Google Meet). Those who agreed were provided a convenient consultation date and time along with investigations to be done and the joining link beforehand using a dedicated WhatsApp number, which was also used to send photographs of prescriptions, as per the recommended format, soon after consultations. During the video consultations, at least two members of the support team individually recorded various parameters and qualitative aspects, such as duration of consultations, common issues, time management, and problems faced regarding the online platform. The experiences and responses of patients during the telephonic calls and video consultations were noted verbatim while interacting with them along with non-verbal cues. These findings were later combined and corroborated. Furthermore, post-consultation feedback was obtained through a simple Likert style questionnaire using Google forms sent through WhatsApp.

Results: Of the 160 patients contacted telephonically, video consultations were scheduled for 101 patients, of which 75 patients successfully completed them, rescheduling was requested by nine patients. The average duration of consultations was 6.65 ± 1.42 min. Common issues experienced were internet connectivity and login issues ($n = 11$), not having own video platform account (using family members', $n = 27$), muting/unmuting ($n = 17$) and not joining on a scheduled time ($n = 60$). The post-consultation feedback showed 'strongly agreed' as the most common response regarding utility ($n = 59$), satisfaction ($n = 63$), and wanting future consultations ($n = 55$). The most common reason for not attending scheduled consultation was not being able to get the prescribed investigations done ($n = 13$). Words of gratitude and appreciation, with expressions of happiness to see their doctor, were noted with the majority of patients.

Conclusion: This study gives a valuable real-world insight into patients' experiences towards video consultation-based telemedicine used in a previously untested setting, which were largely positive in terms of their response, satisfaction and appreciation of this modality of diabetes care. It demonstrated success of this comprehensive strategy in a resource-constrained setting catering largely to patients from

lower socio-economic strata, while also identifying potential issues and limitations. It outlines a roadmap, which can be further followed to execute and improve use of tele-diabetes through video mode in conjunction with other modalities such as telephonic calls and messaging services, with due consideration to important factors.

FA09

Use of telemedicine for asthma control and follow-up consultation during the COVID-19 pandemic

Govinda Narke

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Introduction: Follow-up is an important part of asthma management. A follow-up every 3 months for mild and moderate patients is essential. Owing to the current pandemic situation, follow-up at clinics was tough; therefore, we used WhatsApp for follow-ups.

Methodology: All patients due for follow-up were advised for use of WhatsApp for their follow-up. Asthma control questionnaire (ACT) was given to them on WhatsApp, and the patient or relative was asked to send a good quality video to us before consultation due date. The video was analyzed by physicians for the mistakes in steps of taking inhalers by the patient. ACT assesses the frequency of shortness of breath and general asthma symptoms, use of rescue medications, effect of asthma on daily functioning, and overall self-assessment of asthma control. A 5-point scale (for symptoms and activities: 1 = all the time, 5 = not at all; for asthma control rating: 1 = not controlled at all, 5 = completely controlled) was applied. The scores range from 5 (poor control of asthma) to 25 (complete control of asthma), with higher scores reflecting greater asthma control. An ACT score of >19 indicates well-controlled asthma.

Results: (1) 42 patients sent video and ACT on WhatsApp, and were eligible for the study. (2) Fourteen were mild asthmatics and 26 were moderate asthmatics based on the previous spirometry criteria. (3) All patients were trained earlier at clinics during the diagnosis or follow-up about the use of inhalers. (4) ACT score of 23 (54.76%) patients was below 19, indicating that asthma was not under control. Seventeen were from the moderate group and six patients were from the mild group. (5) Of 42 patients, 22 (52%) were using pMDI, 8 were using pMDI with spacer, and 12 were using rotahaler. Of 22 pMDI group, only 8 (40.9%) were using the inhaler correctly. In the pressurized Meter Dose Inhaler (pMDI) and spacer group, six patients were using inhaler correctly, while in the rotahaler group, eight were using rotahaler correctly based on video analysis. Overall, 45% reported to have incorrectly used an inhaler. The use of inhaler technique was corrected, and patients were again asked to send the correct video. Of 20 patients who were using the wrong inhalation technique, 18 sent the video and 16 (88.88%) were using the correct inhaler technique as patients were trained repeatedly, two patients

were not able to use their device correctly and were asked to see a local physician. ACT score of all patients was repeated by 3 months. About 38 patients responded for the ACT score, and 2 were positive for COVID-19 so were excluded. ACT was >19 in 30 patients of 36; therefore, 83% of patients showed good asthma control. Thus, the use of WhatsApp resulted in overall good improvement.

Conclusion: A widely used social media platform such as WhatsApp can be effectively used for follow up of asthma patients for good control of asthma and for assessing the use of inhaler technique.

FA10

Telemedicine consultation as an initial outreach strategy in treatment of acute respiratory infection and diarrhea in children aged 1 month to 5 years in rural areas of Uttar Pradesh

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Apollo Tele Health Services, Hyderabad, India

Introduction: Acute respiratory infection (ARI) with diarrhea is an important cause of morbidity and mortality in under-five age children. Appropriate and timely medical support is another cause of concern owing to the remote and difficult to reach areas for specialist medical care. The poor care-seeking behavior of people leads to progression of illness to the critical stage and add up to the mortality further.

Background: The aim of this study was to find the incidence of respiratory and diarrheal illnesses in under-five age children, and their initial management through telemedicine consultation.

Methods: A descriptive study was conducted in community healthcare centres of remote Uttar Pradesh designated for Apollo Telehealth services. In the study, data are collected from the period of 1 November 2019 to 30 October 2020 of the patients in the age group of 1 month to 5 years of age presenting with acute respiratory infection and acute diarrhea. Apollo telehealth designated Community Health Center (CHC) is manned with rigorously trained paramedical staff, and equipped with accredited social health activist (ASHA) and other technologies enabling video consultations. After registration and consent of attendant, patient's history was taken, and vital parameters were recorded. They were categorized as per age, gender, and symptomatology. After video consultation by Apollo telehealth pediatrician, the patient was prescribed medications with the management of secondary conditions and first aid at the CHC or referred to hospitals if critical. Management was categorized as OPD based at the Apollo telehealth center followed by home care or hospital referral.

Results: A total of 558 children were studied. The prevalence of ARI was 477 (85.5%) and acute diarrhea was 81 (14.5%).

In ARI, of 477 children, 147 (31%) patients were given antimicrobial therapy. The total number of children managed at Apollo telehealth facility was 464 (97%), and hospital referral was 13 (3%). In acute diarrhea, of 81 children, only 2 (2.5%) children were given antimicrobial therapy. The total number of children managed at the facility after teleconsultation was 79 (97.5%), and hospital referral was 2 (2.5%).

Conclusion: Considerable burden of ARI and acute diarrhea in under-five age children was managed through telemedicine specialty consultation, thus reducing the outpatient and inpatient load of the hospital.

FA11

Accreditation standards for telehealth

Bhupendra Rana

Quality and Accreditation Institute (QAI), Noida, India

Quality and patient safety are important factors to achieve the agenda of universal health coverage, and therefore, it is important that governments and stakeholders work together to promote access to quality and safe patient care. COVID-19 disease caused by coronavirus sars-cov-2 has forced people to lock themselves down in their homes and led to closure of healthcare facilities that carry out routine outpatient services and in-patient procedures. This has resulted in a major public health crisis, and people requiring health care other than treatment for COVID-19 were exposed to high risk. It therefore became essential to explore alternate approaches of providing access to health care to needy patients. Telehealth is one of such options to explore and utilize. It is very timely that the Government of India through its respective councils (Medical Council of India, Central Council of Indian Medicine, and Central Council of Homeopathy) has notified Telemedicine Guidelines to be followed by a Registered Medical Practitioner or AYUSH RMP providing teleconsultation. However, it is important that telehealth providers adhere to prescribed guidelines and always ensure appropriate care to patients at all times. Role of accreditation becomes vital in supporting telehealth providers. Adaptation is required to a set of standards complying with regulatory guidelines and providing safe patient care. Standards world over have been used as a framework to achieve desirable goals, and health care is not an exception. Standards for accreditation have always laid down a set of requirements, which are usually higher than basic requirements for licensing. Standards provide an opportunity to healthcare providers to look at their systems, policies, procedures, and processes to see whether they are able to achieve something better in terms of structures, processes, and outcomes. For the first time in India, Quality and Accreditation Institute (QAI) has developed accreditation standards for telehealth. These accreditation standards for telehealth are developed by a group of technical experts in telehealth keeping these aspects in mind

and in a manner easily understood by telehealth facilities to adapt and implement. The standards were developed using the principles of International Society for Quality in Health Care (ISQua) for developing the standards, which follow the framework of Relevant, Understandable, Measurable, Beneficial, and Achievable (RUMBA). These standards are meant to accredit standalone facility or organization providing telehealth, as well as a specific telehealth service of a large organization such as hospital. These standards included 10 chapters, 61 standards, and 239 criteria, and covers entire governance, operational structure, and care continuum. These chapters include Governance and Leadership (GAL), Human Resources Management (HRM), Facility and Risk Management (FRM), Information Management System (IMS), Continual Quality Improvement (CQI), Patient Assessment and Care (PAC), Patient Rights and Education (PRE), Medication Prescription and Safety (MPS), Hygiene and Infection Control (HIC), and Digital Health Application (DHA). We are hopeful that implementation of these standards would certainly help telehealth facilities, their patients, and stakeholders to get benefits, such as high-quality care, patient safety, compliance to regulatory requirements, use of best practices, and transparency in functioning.

FA12

Mobile health apps: using the five factor model of personality as a predictor of the preference for gamified features and their usage characteristics

Moaz Hamid

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Introduction: Less than half of the population achieve the recommended daily activity level in the UK, and mobile health app makers are increasingly attempting to ameliorate this problem. An innovative tool at their disposal is gamification, a process that can increase intrinsic motivation and engagement of users in health apps. The aim of this study was to determine, in the context of mobile health (mHealth) apps, the effects of personality traits on the desired features of gamification and on the usage of these apps. Areas of peripheral focus, such as the effects of gender and age with relation to gamified features, were also investigated.

Methods: Following a review of the literature, a questionnaire was developed. Questionnaires were distributed in electronic format using online and mobile survey media. Data analysis was conducted using the STATA statistical software package, and included ordinary least squares regression analysis as well as logistic regression for categorical dependent variables.

Results: Certain personality traits, in particular extraversion and agreeableness, positively affect an individual's preference for gamified features in health and fitness mobile

applications. Age and gender were also found to impact on the preference for a number of features. Relationships were also found between these factors and the usage of mobile health apps. There were 340 responses in total. **Conclusion:** Personality plays a significant role in the usage of gamified mHealth apps. Tailoring mHealth apps, as shown in this context with fitness apps, can lead to improved health outcomes. Further research is needed to provide an ongoing evidence base for this emerging field of health interventions.

FA13

Ethical implication of ehealth healthcare decision making in the public health care sector

Leena Kar

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Introduction: Health care as a science has developed in the last few decades providing service for all sexes and age groups for different types of diseases. The streams of health care include Gynaecology, Paediatrics medicine, surgery, Orthopaedic, mental health, ENT, dental, neurology, plastic surgery, and so on. The consultants practicing ehealth belonging to specific streams of above medical science have some ethical dilemmas and constraints while delivering the services. The usage of technology has facilitated their healthcare practice in other way, it has created a moral issue, which is questioning the conscience of the medical practitioner. There are many concerns while using ehealth practices, such as privacy of patients, privacy of data, proper transmission of data related to health of a patient, collection of data within a time frame without breakdown of flow, accuracy of advice or diagnosis given to a patient. Whether using ehealth or technology is right or wrong is discussed in this article, taking the public health ethical principles into consideration.

FA14

Perception of doctors for prescribing drugs in teleconsultation

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Apollo Tele Health Services, Hyderabad, India

Introduction: The Ministry of Health and Family Welfare, Government of India issued the Telemedicine Guidelines, 2020 for the country to provide equal access to quality

health care. This indicates that the Government of India is committed to and recognizes the far-reaching benefits of Telemedicine. However, prescription of drugs for Teleconsultations (TC) could be further explored to make it more comprehensive. This study delves into the perception of doctors on prescribing drugs considering the diversity in Teleclinic models and modes of consultations and availability of expertise at the patient's end for making this effective. The aim of this study was to provide a perspective to policy makers on inclusion and exclusion of drugs for prescription in Teleconsultation to benefit the population at large.

Methods: About 88 general physicians and 39 specialist doctors who are either Telemedicine physicians or conventional physicians had participated. A four-scale survey instrument was designed for data collection based on Essential List of Medicines, 2015. It captured the perception of doctors on prescribing drugs in TC based on four classifications – first, empirical treatment (prescription of drugs with history collection from the client), second – with investigations and third – aid of objective evidence from multifunctional remote examination device, and fourth – non-prescription of drugs in TC.

Results: The results strengthen 'over-the-counter', 'add on', and 'usually prescribed' medicines as presented in the guideline. More than 74% of specialist doctors and general physicians have the opinion of prescribing analgesic drugs and anthelmintic drugs, and 89.7% for vitamin and mineral supplements empirically. About 84.1% of physicians agreed for gastrointestinal drugs to be prescribed empirically in TC. More than 55% of doctors have the opinion to prescribe antiallergic, anti-protozoal, anti-migraine, disinfectant, and antiseptic drugs empirically. However, the results also highlight the prescribing of drugs after using diagnostic aids and/or investigations. About 50–65% of specialist doctors and general physicians have the opinion of prescribing drugs, such as anti-bacterial, dermatological, anti-fungal, cardiovascular, diuretic, endocrine, hormonal, and respiratory drugs and contraceptives, and solutions correcting water and electrolyte disturbances after using diagnostic aids and/or investigations. About 40–50% specialist doctors and general physicians have the opinion of prescribing drugs, such as anti-bacterial and anti-protozoal drugs, after using diagnostic aids and/or investigations. Physicians had the opinion that many injectables cannot be prescribed in the TC, which includes erythrocyte factors, immunoglobulins, and antitoxins. Antidote-poisoning drugs cannot be prescribed during TC but can be used in Tele-emergency and Tele-ICU.

Conclusion: The above-mentioned results show that broader applicability of prescribing drugs in Teleconsultations just not limited to Telemedicine guidelines, 2020. Physicians and specialist doctors are confident in prescribing certain drugs empirically. However, after using diagnostic aids and/or investigations, the choice of drugs has increased drastically to be prescribed through Teleconsultation. Telemedicine practice guidelines of India, 2020 does not specify or elucidate on prescribing drugs after using

diagnostic aids and/or investigations. Hence, the above study lays a foundation and broadens the choice of drugs through Teleconsultation, which can be further explored to be included in the Telemedicine guidelines.

FA15

Regulatory and legal concerns in deployment of artificial intelligence in health care

Krishnan Ganapathy

Apollo Telemedicine Networking Foundation, Chennai, India

We are in a stage of transition as artificial intelligence (AI) is increasingly being used in health care worldwide. Transitions offer opportunities compounded with difficulties. It is universally accepted that regulations and the law can never keep up with exponential growth of technology. This article discusses liability issues when AI is deployed in health care.

Ever changing, futuristic, user friendly, uncomplicated regulatory requirements promoting compliance and adherence are needed. Regulators have to understand that software itself could be a medical device (SaMD). Benefits of AI could be delayed if slow, expensive clinical trials are mandated. Regulations should distinguish between diagnostic errors, malfunction of technology or errors due to the initial use of inaccurate or inappropriate data as training data sets. The sharing of responsibility and accountability when the implementation of an AI-based recommendation causes clinical problems is not clear. Legislation is necessary to allow apportionment of damages due to malfunctioning of an AI-enabled system. Product liability is ascribed to defective equipment and medical devices. However, Watson the AI-enabled supercomputer is treated as a consulting physician and not categorized as a product. In India, algorithms cannot be patented. There are no specific laws enacted to deal with AI in health care. DISHA or Digital Information Security in Healthcare Act when enacted in India would hopefully cover some issues. Ultimately, the law is interpreted contextually, and perceptions could be different among patients, clinicians, and the legal system. This communication is to create the necessary awareness among all stakeholders.

Day 2 Session 10: Telehealth-Looking Ahead

Chair:

K Ganapathy – Apollo Telemedicine Networking Foundation, Chennai, India
Reshmi Ayesha – Kerala Institute of Medical Sciences, Trivandrum, India
PK Pradhan – School of Telemedicine and Bioinformatics, Sanjay Gandhi Post Graduate Institute of Medical Sciences and Research, Lucknow, India
Masood Ikram – Mellon.ai, Chennai, India
Ravikumar Modali – Indian Society of Lifestyle Medicine, Bengaluru, India

10.1

Removing telemedicine barriers and boundaries across organizations and countries: can information technology revolution be copied?

Amar Gupta

Department of Computer Science Electrical Engineering and Artificial Intelligence Lab, Massachusetts Institute of Technology, Cambridge, USA

The Y2K crisis led to global acceptance of information technology (IT) services across countries. The 9/11 incident led to immediate deployment of automated nationwide processes for reading and processing of bank checks. Healthcare and financial industries have many similarities

in terms of emphasis on costs, security, privacy, turnaround, quality, and safety. The COVID-19 pandemic has acted as a global catalyst for telemedicine, surmounting forces that inhibit change (Machiavellian forces) and fostering sudden jump in the use of telemedicine services across towns, states, and countries. Health care is increasingly utilizing a three-pronged approach that involves persons in proximity to the patient; medical specialists in the concerned domain located in a different city, state, country, or continent; and use of innovative computer and communication technologies. Our research study contributed to the US Department of Veterans Affairs to adopt a new national policy to enable seamless practice of telemedicine across all states in the USA, and also to medical personnel working during daytime in one continent to look after ICU patients during nighttime on the other side of the globe. While islands of telemedicine services have come up, the main hurdle today is the lack of interoperability across niches, organizations, political boundaries, and medical specialties in the healthcare ecosystem leading to billions of dollars being wasted each year and other problems. The growing problem of information glut needs to be addressed

too. By virtue of its strong IT industry, India could play a major role in addressing this void along the lines of its role in the IT revolution earlier. Globalization demands action at national, supranational, and international levels. By applying an interdisciplinary approach that involves considerations of medical, technical, business, economic, legal, policy, and strategic issues, telemedicine can be leveraged to provide health care for all: better, quicker, and less expensive.

10.2

Symposium – Rural Tele-Healthcare (Parallel Session)

Chair: Suchitra Mankar

Telehealth and rural healthcare

Lavanian Dorairaj

LYNK AmbuPod Pvt Ltd., Bengaluru, India

Introduction: The Government of India (GoI), during the past 8 years, has been encouraging and supporting start-ups with various schemes for wealth creation, improving economic growth, and employment. There is also a growing support system in India in the private sector for funding, mentorship, and techno-commercial support for telemedicine-enabled start-up projects. In practice however, there are many critical decisions that need to be taken and pitfalls to be avoided, for start-ups to achieve success, as envisaged by the GoI.

Objective: This article shares the challenges encountered to help upcoming healthcare start-ups navigate this route skillfully, avoiding pitfalls.

Results: The results of 4 years of work (Jan 2016 to Mar 2020) and the present status are discussed, and the learnings are drawn from the AmbuPod Project (on-going) summarized.

Conclusion: Telemedicine supported Rural Healthcare Start-Up projects have a good business potential in India, provided challenges are planned for, addressed, and resolved.

Keywords: *Telehealth; Rural Health; Affordable Telemedicine in India; AmbuPod; Start-ups in Telemedicine; Circle of Care; Patented Telemedicine Device; Invention; Rural Capacity Building; Healthcare Capacity Building*

Day 2 Session 11: Telehealth-Looking Ahead

Chair:

Vimal Wakhlu – Past President, TSI

Ashvini Goel – President Elect, TSI

11.1

TeleHealth: opportunities for the future

Soumya Swaminathan

World Health Organisation, Geneva, Switzerland

The Chief Scientist of World Health Organization (WHO) shared her thoughts on how WHO would like to deploy Telemedicine services and use digital technology in public health, particularly after the pandemic. Necessity for universal access to technology, particularly in the present more complex situation, was stressed. Developing countries are at an advantage, as they do not have to reverse and undo what was done earlier. Prevention and education are more important than diagnosing and treating. Systems need to be interoperable not only between different hospitals and cities but with different countries. End outcomes need to be identified. WHO has a full mHealth program, including teaching of physical exercises, messaging, and two-way interaction chats. Many apps are used by WHO, particularly with the onset of COVID-19. Specific strategies have been adopted for leveraging mobile phones to achieve goals through health promotion. The necessity for global collaboration

through knowledge transfer and digital health governance, including establishing guidelines, norms, standards, and EHR, was emphasized. Forecasting pandemics with digital health tools where high-quality data would be collected and machine learning would be deployed was touched upon. Caution was advocated due to overabundance of information, including false information. Data protection, data integrity, and confidentiality are required at the regional national and global level. Global regulations are essential when using clinical information, health systems, and health research data. WHO is looking internally to digitize faster. Dynamic living guidelines will be adopted soon. Global collaboration has reduced the time for development of vaccines from 10 years to 1 year. Innovations were described in virtual shared medical data, supply chain, and massive scale up of vaccines. Shared medical appointments would save time and resources for the provider, benefiting patients at the same time in a cost-effective manner. Patients would also learn from other patients having similar problems. ICT would increasingly be used in 'Teleresearch'. The talk also touched upon bioethics, artificial intelligence, and contact tracing apps. Every new technology has untapped potential with limitations and concerns. It was emphasized that building trust was essential remembering the importance of privacy and security of data use. Outcomes need to be evaluated without overrating technologies.

Day 3 Session 13: Transforming Telehealth
Chair:
Dhananjay Mangal – Babylon Hospital, Jaipur, India
Prachee Sathe – Ruby Hall Clinic, Pune, India
Gunda Srinivas – Shree Akshaya Clinic, Bengaluru, India

13.1

Telehealth for continuity of care in thyroid cancer

Prasanta Kumar Pradhan

School of Telemedicine and Bioinformatics, Sanjay Gandhi Post Graduate Institute of Medical Sciences and Research, Lucknow, India

Post-surgery monitoring response of radioactive iodine therapy and side effects, if any, compliance of Thyroxine suppression, and monitoring for recurrence using tumour marker thyroglobulin are the main goals of telecare. Protocol-based periodic local examinations via trained personnel help in indirect clinical examination. The study showed 15-year overall survival to be around 97%, and recurrence found to be on par with the standard published literature highlighting the similar effectiveness of the telemedicine channel of care. About 90% of patients found to be satisfied with the telemedicine mode of follow-up, and each patient saving Rs 18,000/- per visit along with valuable time and energy of the family compared with a physical visit.

13.2

Establish safe practice of telehealth in cardiology

Sujeeth P.Reddy

Click2Clinic, Hyderabad, India

In various successful models of telecare like Tele-Heart Failure, they emphasize timely transmission of data, receipt of information and availability of the trained personnel to analyse, closed feedback to patients, and appropriate patient empowerment, which are crucial to success of telemedicine. Implantable digital devices, such as permanent pacemaker, implantable cardioverter-defibrillators, and pulmonary artery sensor, are examples of remote monitoring using the

telemedicine channel. DICOM format for transmission of images and high-quality, stable connectivity are very essential. Mobile connectivity, smartphones, and video compression have brought down the cost of technology drastically. Home-based monitoring of various clinical parameters connected to smartphones along with wearables bring in a huge value. Telerehabilitation via robotic, virtual reality, gaming devices, and so on is the future. Improved education in quality telehealth; development of interoperable, simpler, and less expensive technology platforms; and incorporating telehealth into Electronic Medical Records (EMRs) and appropriate coverage, reimbursement shall go a long way in successful adoption of telemedicine in cardiology.

13.3

Reimagine rural healthcare: connecting service-oriented doctors to underprivileged rural patients with remote treatment

Raj Kondapalli

iMedWorks, Visakhapatnam, India

Many doctors are willing to provide their services to the underprivileged (around 34% in India), but are not able to find suitable channels or platforms to deliver the care. Around 50,000 patients can be provided free consults per week if an appropriate platform is available. Currently, willing doctors either charge very nominal fee like 20/- by spending 1–3 hours/day, rent a place, arrange medical camps, or travel to villages. This is challenging and needs a lot of dedication. There are pros and cons of various service types, such as non-profit hospitals, independent private clinics, phone consultation, and health camps. Social works from iMedworks, a technology platform, is a solution to provide free consultations to patients. Tribal Health Monitoring system in Andhra Pradesh on the iMedworks platform has been successful in connecting the Primary Health Centres (PHCs), sub-centres with the tribal community via an iMed agent who coordinates the care and assists in telemedicine.

13.4

Panel Discussion – Teleconsultation Challenges and Solutions

Chair: Sunil Shroff – President, Tamil Nadu Chapter, TSI

Teleconsultation challenges and solutions

Sanjay Sood¹, Ajay Alexander², Manuj Garg³, Ayesha Nazneen⁴, Krishna Kumar⁵ and Reshmi Aysha⁶

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Background: The COVID-19 pandemic resulted in the invocation of the Disaster Management Act in March 2020, and soon after the government of India released the Telemedicine Practice Guidelines and created a framework for teleconsultation. The requirements for physical distancing and the fear of visiting hospitals led to manifold jump in teleconsultations among both public and private healthcare patients in India. Telemedicine Society of India along with five independent healthcare providers from the public and private sector conducted a systematic review of their data, with the aim of looking at the role of telehealth services in India, its challenges, and learnings in preventing, diagnosing, treating, and controlling diseases during the COVID-19 outbreak.

Methods: The panel discussion between key stakeholders represented the government hospitals, private hospitals chains, and three leading health apps in India. The following sections were addressed in the panel: (1) What are the most five conditions and medical specialties for which tele-consults take place? (2) Doctor's and patient's profile for tele-consults. (3) Tele-consults from outside India. (4) Were the current guidelines adequate to fulfil requirements for safe teleconsultations? (5) How long were the patient data being preserved? (6) Did all patients provide a consent before the consults start? (7) Were there any concerns about privacy and confidentiality issues? (8) Reimbursement – what percentage of consults are free, subsidized, and fully paid? (9) What percentage return for another consults? (10) How were quality issues addressed? (11) The future of tele-consults – Post-pandemic.

Results: Answers provided were variable depending on the stakeholders – (1) The most 5 conditions & medical

specialties for which tele-consults are taken. This included conditions related to skin (Dermatology), fever (General Medicine), pregnancy (Obstetrics and Gynaecology), and anxiety-related (Mental Health). (2) **Doctor's and patient's profile for teleconsultation** – Doctors were mostly from tier 1 or 2 cities but patients were mostly from tier 2 and 3 cities or towns. There was a spurt of consultations from rural areas. (3) Tele-consults for outside India. This was generally less than 10% overall. (4) **Were the current guidelines adequate to fulfil requirements for safe tele-consults?** In the guidelines, there were many sections that were left open-ended and required clarity. These included (1) prescription of drugs, (2) privacy and confidentiality issues, (3) consent process – while the guidelines specify that patient consent is necessary for any telemedicine consultation, it does not mandate the collection of patient consent for the processing, storage, and transfer of the patient's medical records and health information. (4) How long were the patient data being preserved? (5) Most stakeholders were aware that this would be as per the norms by Ministry of Health and Family welfare and IT act, Govt. of India but if this could be clearly spelled out, it would help. (6) **Did all patients provide a consent before the consults start?** All stakeholders believed that this was a must before initiating any teleconsultation. (7) **Were there any concerns about preserving privacy and confidentiality** – This was an area of concern in the current guidelines, and it was pointed out that this required more deliberation and discussion, and required to be clearly spelled out and could also be specialty specific. The sample provided for the prescription form format itself was a clear breach of confidentiality. (8) **Reimbursement – what percentage of consults are free, subsidized, and fully paid** – The Government and some health apps were providing the consults free, while others were charging a fee, which was generally subsidized. Once the customer created an account, other areas of engagement were potential for revenue generation. (9) **What percentage return for another consults** – This varied depending on the stakeholders. A closed hospital network could have 50–60% returns, whereas a standalone app it was lower at 20–40%. (10) **How were quality issues addressed** – Most stakeholders had process and audits in place to monitor quality. (11) **What is the future of tele-consults post-pandemic** – All stakeholders were of the opinion that the growth of telemedicine observed during the pandemic was here to stay. **Conclusions:** There were multiple take-home messages from the panel discussion on Telehealth consultations in India during the COVID-19 pandemic. While the rise of tele-consults was here to stay, the current telemedicine guidelines required a second version that can provide better clarity to make the telehealth consultations in India a safe, secure, and trustworthy so as to make it an enabler for providing affordable access to health care.

13.5

Showcasing Telehealth Success Stories from India

Chair: Sunil Shroff President, Tamil Nadu Chapter, TSI

Tele-education for transplantation

Sumana Navin

Mohan Foundation, Chennai, India

Introduction: Transplant coordinators are mandated by law in India to be appointed in all hospitals performing transplants. MOHAN Foundation started structured training programmes for transplant coordinators to impart the necessary knowledge and skills for the job in 2009. Training was conducted face-to-face with durations varying from 1 week to 1 month. Working healthcare professionals found it challenging to attend because of time constraints. In addition, participants were from different educational backgrounds and had varied skill sets and learning requirements. To meet this challenge, MOHAN Foundation embarked on a tele-education programme and formally rolled out a 1-year E-learning course 3 years ago. The COVID-19 pandemic has resulted in expanding the use of tele-education with the introduction of a short-term course and more in the pipeline. A total of 2,593 candidates have been trained through both face-to-face training and tele-education from December 2009 to December 2020.

Methods: The 1-year course is a 'Post Graduate Diploma in Transplant Coordination and Grief Counselling'. The course structure comprises E-learning along with face-to-face sessions for soft skills, activities, counselling, and role play, now conducted through webinars. There are 70 E-learning modules that cover the medical, legal,

ethical, and religious aspects of organ donation and transplantation, as well as counselling, grief counselling and transplant coordination, and 45 video lectures and films. The high-quality video lectures give the learning a 'live' feel. These feature faculty from both India and abroad give the participants an international learning experience. The films include simulations on testing for brain stem reflexes, apnoea test and Arterial Blood Gas analysis. Self-assessments are included at the end of each module. In addition to assignments, participants are assigned a 120-h project to be completed over 3 months. There is a final online examination. The short-term 'Transplant Coordination Professional Certificate' course has been exclusively designed for candidates with hospital experience who want to pursue transplant coordination. They can access the course at a time and pace that is convenient to them during the week. In addition, they get to experience weekend webinars with lectures by guest speakers on key topics, review of study material, interactive sessions, and role-play. Polls and quizzes are used during the webinars. Participants receive a course completion certificate on passing the final examination, both online.

Results: Tele-education for transplant coordinators was launched in September 2017 and over the past 3 years has seen participation both nationally and internationally. The geographic spread of participants covers the entire country and includes participants from Jammu, Kashmir, Bihar and Mizoram. International participants are from Qatar, Vietnam, Malaysia, Singapore, Nigeria, Spain, Nepal and Pakistan. Tele-education participants increased sixfold compared to face-to-face participants in 2020 because of the COVID-19 pandemic with 24 participants for the face-to-face training versus 155 tele-education participants. In 2018 and 2019, there were 667 participants for the face-to-face training totally versus 15 tele-education participants.

Conclusion: Tele-education has the potential to increase the cadre of healthcare professionals dedicated to transplant coordination and grief counselling not only in India and South Asia but also in other parts of the world.

Day 3 Session 12: Free Paper/Poster Session (Parallel Session)

Chair:

Meghna Chawla – Ruby Hall Clinic, Pune, India

Umashankar Subramanian – Arogyayathi Pvt Ltd, Bengaluru, India

Repu Daman – School of Telemedicine and Bioinformatics, Sanjay Gandhi Post Graduate Institute of Medical Sciences and Research, Lucknow, India

Nishu Tyagi – Dept of Telerehabilitation Services, Indian Spinal Injuries Centre, Delhi, India

FA16 (Free Paper)

Early detection of sepsis using physiological data

Deepa Jose, Nanduri Achyut, William Irene Michelle, Zakir Hussain Mohamed Ashik and Thulasiraman Nitya

KCG College of Technology, Chennai, India

Introduction: Sepsis is a potentially life-threatening illness, occurring when chemicals released into the bloodstream to fight an infection trigger inflammation throughout the body. This can cause tissue damage, organ failure or even death. The burden of sepsis is most likely highest in low- and middle-income countries. Three out of every 10 deaths due to neonatal sepsis are thought to be caused by resistant pathogens. The inputs are patients' information, including vital signs, laboratory values and demographics. The output are the results whether the model predicts non-sepsis patients or sepsis patients 6 h ahead of clinical onset time.

Method: In this article, we use clinical data of ICU patients from two different hospitals. Each row of a patient file represents a single hour worth for all the measurements within that ICU hour stay. As large amount of missing data is our biggest issue in preprocessing, we have imputation models and classification model. We are making use of the non-temporal approach ignoring the time component associated with each patient hourly record and treat them as independently and identically distributed. After performing descriptive data analysis on the train data, these were the concerns that highlighted, extremely imbalanced data. Here, we are going ahead with the original distribution of data and choosing an appropriate evaluation metric for modelling the data.

Missing data: Instead of imputing continuous features. We engineer categorical features out of existing continuous features and impute the missing with a new category. The data have 40 features, which can broadly be classified into demographics, vital signs and laboratory values; Sepsis is mostly prevalent in either infants and old patients, making age an important feature. Deep Learning Models, Auto-encoders have proven to be useful for anomaly detection use-cases, which involves high-class imbalance. Auto-encoders increased the average precision to 7%, which is a good number for the healthcare domain. Considering the case, we are not compromising neither false positives nor false negatives.

Results: Recurrent Neural Networks (RNN) that combines imputation and classification functions implements a fixed sliding window on each patient, better catching and summarizing the time dependency.

Conclusion: If sepsis is detected, doctors are alerted, who can quickly recognize symptoms to identify sepsis and treat patients at the earliest. Our Machine Learning (ML) model will use RNN, which has a higher Area Under the ROC (AUROC) compared to other alternatives. The proper use of RNN along with the aid of Long Short Term Memory Networks (LSTM) serves as a potential solution for the detection of sepsis at an earlier stage and outperforms all other currently available alternatives.

FA17 (Poster)

Teleneurology: the way forward

Partha S. Ray

NHS England (Walton Centre for Neurology Foundation Trust), Liverpool, United Kingdom

Neurology has often been looked upon as a super complex speciality and its practitioners as highly valued individuals. With approximately 2,500 neurologists serving the population of 1.37 billion Indians, we need to think and work differently looking at the future to maintain critical and rational service levels for the population in remote areas at acceptable levels. We can no longer restrict ourselves to the health needs of population in metropolises and Tier 1 and 2 cities. With COVID-19 came the widespread roll out of the teleneurology and telemedicine platforms internationally. This happened across India as well. Practitioners have slowly adjusted themselves to the novel experience of virtual/digital format. User friendly government guidelines have encouraged clinicians to deploy Telemedicine particularly during the pandemic with travel restrictions. The advantages of virtual care include improvement in access to specialist neurology care for people in geographically remote areas, decreased travel-related costs and time spent travelling with easier inter-speciality communication and fewer space requirements and non-significant wait times. The barriers include inertia among neurologists to adopt new ways of working, apprehensions about medicolegal claims and confidentiality worries, optimum compensation for services delivered and the obvious lack of the conventional complete physical

examination of patients' opportunity in a face-to-face visit. Technological barriers, including Internet speeds particularly at the patient's end, will obviously be a limitation, including hardware costs and limitations of technological education in remote communities. There will be the need for enablers and facilitators to help in the smooth roll out of the process as the neurologists get used to using the digital format and its teething problems while attending CME/CPD in COVID times. The experience so far has amply demonstrated wide acceptance among the population of the tele-neurology platform of medical service delivery. Additional potential obstacles will involve mindsets of investors in the healthcare sector who would notice a reallocation of face-to-face to the virtual format and consequent financial restructuring of their real estate investments. From the doctors' perspective, streamlining of the consultation process and working around the potential roadblocks that have been experienced so far in the delivery of daily virtual neurology services need to be further scrutinised and ironed out (The details of the future virtual neurology/medical examination process are covered in a separate poster presentation by this same author). Thus, the future of Teleneurology is bright globally, and the same should not be lagging behind in India where it will be of immense benefit to the last person living in remote India and awaiting the fruits of medical progress at an affordable cost and in a manner that is easy to access.

FA18 (Poster)

Tele-consultations: neurology

Partha S. Ray

NHS England (Walton Centre for Neurology Foundation Trust),
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The apparent complexity of the neurology patient interaction has proven to be a relative obstacle in its practice through virtual platforms – its practice has never materialised through a combination of physician inertia, lack of acceptance of new ways of working and overreliance on neuro diagnostics. Then came the COVID-19 pandemic, which changed the entire healthcare delivery model. Both patients and practitioners were compelled to accept the new normal. Nine months on, the situation remains as uncertain as it was in the beginning of the year, and practitioners of neurology have learnt that the innovations they made in the recent months will have to become the established practice modalities for the future. In view of the above scenario, new standards of care and benchmarking need to be established for every specialty, including that of neurologists, to ensure that the standards of care evolve to reflect the new working practices. Practicable medicolegal boundaries, clinical care standards, patient privacy and trust, altered modes of a digital consultation with its own limitations and examination techniques with restrictions therein need to be appreciated. The neurology consultation, traditionally, is based predominantly on the history. In the face-to-face contact with the patient apart from the verbal history, there is the additional non-verbal communication,

including body language and facial expression, and also the quality of the voice that has helped to establish a meaningful doctor–patient relationship built on trust and responsibility. Issues of consent on the virtual platform are reprogrammed into the consultation, as the patient and the doctor are engaging digitally. The advantage of having tele history using the audio-visual platform facilitates the non-verbal expression cues, establishes tonality and makes the interaction as near to face-to-face communication as possible. Finding a quiet space within the home if possible, being able to set up the camera position, ensuring lighting of adequate amount and angle, and most importantly, having the right hardware become minor obstacles, which with time and practice are circumvented. The above protocols have been addressed formally by the American Academy of neurology telemedicine workgroup recommendations way back in 2017, with suggestions for the model curriculum. During the neurological examination, both the neurologist and the patient appreciate the potential limitations of the tele neurology consult, and that the laws and guidelines allow either side to terminate the digital interaction and convert it to a face-to-face interaction should either of them feel the service provision otherwise would be suboptimal. With this trust ensured between the two engaging individuals on most occasions guided by clinical need, the consultation is completed on the digital format. The Canadian Association of physical medicine and rehabilitation has carried out significant pilot studies for introducing virtual care for neurology examination. Tele-prescription, Tele-investigations and Tele-referrals are added benefits. Thus, from a neurologist perspective, a complete assessment and evaluation are nearly always possible through the virtual patient consultation. In the least, it provides a triaging opportunity with a specialist.

FA19 (Poster)

Clinical application of telerehabilitation in pediatric population: a review

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Introduction: Tele-rehabilitation is the delivery of rehabilitation services over telecommunication networks and the Internet. Telemedicine services encompass a variety of services, such as patient consultation, education and training of families and professionals in the area, follow up of the patients, and monitoring of tele-services. Providing Neuro-rehabilitation service is a great challenge in view of limited resources and manpower. Clinical effectiveness and applications of technology in delivering effective telerehabilitation service and alternative interventions are limited. Also, there are very limited data on the role of telemedicine in pediatric rehabilitation.

Aim: The aim of this review article was to discuss about the clinical application of Tele-rehabilitation in the pediatric population used as part of physical therapy treatment protocol by searching all relevant data.

Method: In this review, a total of 143 publications were screened initially using the different combinations of Mesh, Key terms from databases, such as PubMed, google scholar and Cochrane library. Thirteen articles were appropriate based on the inclusion and exclusion criteria, which resulted in eight articles for further final review.

Results: Various researchers reported Tele-rehabilitation can be considered as a branch of telemedicine. The effect of telerehabilitation is a viable and effective strategy in the treatment of pediatric conditions. Telerehabilitation reduces the cost of both healthcare providers and patients. However, patients who live in remote places can be benefited from this technology.

Conclusion: A review of articles revealed that telerehabilitation is frequently used in pediatrics, specifically for children with physical disabilities, and is an effective mode of treatment in enhancing motor skills but more clinical trials with uniformity in sample selection and larger sample size with follow-up should be conducted.

FA20 (Poster)

Feasibility of tele-rehabilitation of swallow and communication functions

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HCG Hospital, Bengaluru, India

Tele-rehabilitation has always been an important sub-discipline of telemedicine. Although its history has been relatively brief when compared with the other aspects of telemedicine, it has played a large role in benefitting patients and professionals who capitalize on the advantages of information technology in health care. The COVID-19 pandemic saw an inadvertent reinstatement of telerehabilitation practices, especially that for communication disorders. Disorders that can be managed via tele-practice include adult neurological speech, language, and swallowing disorders along the lines of aphasia, dysarthria, dysphagia, apraxia of speech, voice disorders, stuttering, laryngectomy, articulation, language and even pediatric literacy disorders. It was imperative to uphold the safety of the practitioner and his patient, considering that most patients who present with neurological speech, language and swallowing disorders usually suffer from other co-morbidities, which makes them more vulnerable to the complications associated with infection. However, in an effort to maintain the norm of social distancing, it is also necessary that practitioners do not compromise on the standards of service that they provide in the process. Currently, there is a dearth of

research or clinical evidence that support the feasibility and direction towards betterment of such tech-driven practices. This will help to address the challenges faced by both sides and improve the outcome measures of such rehabilitation practices, specifically in swallowing. This study developed and validated a survey questionnaire based on the literature reported needs of individuals having communication and swallowing disorders irrespective of the cause. The developed questionnaire was administered among 100 speech-language pathologists, all of whom were directly involved in the telerehabilitation of swallowing and communication disorders. The responses recorded were on the efficacy of screening, assessment and treatment protocols through tele-practice of each function targeted. The respondents were also provided with options to suggest the scope for improving the efficacy in delivering telerehabilitation services encompassing administrative, technological, clinical and patient-related factors. It was concluded that although there is differential efficacy in delivering rehabilitation services through tele-practice among the targeted functions, there seems to be an abundant possibility for incorporating process advancements administrative and technological aspects in clinical practice. However, swallow rehabilitation is considered to be the most challenging in majority of the speech-language pathologists who have incorporated telerehabilitation into their clinical practice. Further studies need to be carried out to address the challenges in monitoring progress, as well as risks to manage domains. It may be useful for speech-language pathologist to adopt some of the tele-medicine methodologies in conditions, which are progressive in nature, such as oncology, neurology and those, which require constant monitoring.

FA21 (Poster)

Tele-nursing for patients with chronic diseases

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Introduction: Telenursing provides access to health care for the poor and for people living in rural areas who may need advice on such issues as diabetic counseling, diet, healthy living, post-operative follow-up, and any topic that falls under the nursing domain. Telenursing is effective in decreasing the costs borne by patients, decreasing the number of outpatient and emergency room visits, shortening hospital stays, improving health-related quality of life, and decreasing the cost of care. Nurses constitute the backbone of healthcare systems. When there is an acute shortage of qualified nurses like in urban India, it will be difficult to identify. A tele nurse needs to be a multifaceted personality with excellent communication skills, be tech-savvy, and have quick thinking ability with technical knowledge.

Method: An integrative literature review of the telenursing for patients with chronic disease, using the descriptors: telenursing, chronic disease, nursing care from Web of Sciences, PubMed, Online Library Wiley, and Google Scholar search engine.

Results: From the seven studies examined, three studies had examined the effect of telenursing on diabetes control and self-management: There was a significant decrease in HbA1c and PPG in the intervention group. One study has selected its patient with chronic obstructive pulmonary disease (COPD) for tele home monitoring. There were significant decreases in the use of healthcare services; however, it does not affect mortality in severe and very severe COPD patients. There was one study on the use of telenursing to reduce hospitalization for patients with heart failure: heart failure-related re-admission charges were >80% lower in the telenursing groups compared with usual care, and these groups also had significantly fewer CHF-related emergency visits. There was one study on the effect of telenursing on self-efficacy in patients with non-alcoholic fatty liver disease (NAFLD): telenursing could improve self-efficacy and physical activity in patients with NAFLD. There was one study on the effect of telenursing in follow-ups on depression, anxiety, and stress in hemodialysis patients. There was a significant decrease in anxiety and stress experienced in hemodialysis patients.

Conclusion: Telenursing is an opportunity for social innovation, but change is not easy. There are significant benefits for both nurses and patients in some situations depending upon the disease condition, the number of visits to the hospital, duration of hospitalization, and so on. Telenursing in India is emerging due to the increased number of old-aged and ill population, wider distance between the patient and healthcare centre, concern for cutting costs of health care, and thinly populated regions.

Keywords: *telenursing; chronic diseases; telenurses; care; technology*

FA22 (Poster)

Nursing interns' perceptions of telenursing: implications for nursing education

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Introduction: Telehealth and telemedicine have become a vital process for providing cost-effective quality care to patients during the COVID-19 pandemic. Telenursing is considered a subset of telehealth and is expected to grow exponentially. However, little is known whether undergraduate nursing students are prepared adequately on telenursing to offer holistic patient care.

Aim: The objective of this study was to investigate nursing interns' knowledge and perceptions of telenursing.

Methods: This was a cross-sectional descriptive survey carried out among conveniently selected nursing interns ($N = 183$) from renowned colleges in Bangalore, South India. The data were collected using a self-reported questionnaire. This was a five-point Likert scale (strongly Agree to strongly disagree

with 27 items with two multiple-choice closed questions). The demographic part of the questionnaire included age, gender, access to computers, and the Internet, and frequency of internet use per day. The reliability of the questionnaire was established through the test-retest method ($r = 0.83$). The data were analyzed using SPSS version 21.

Results: The majority of the respondents included females (97.8%) with a mean age of 21 years (SD 0.87). Nearly three-fourths of the respondents had their smartphones, and 21.9% of them were accessible to computers. Similarly, the majority of the respondents were accessible to the Internet (96.7%) and using it for more than 3 h per day (73.3%). While a majority (65.6%) of the respondents were able to correctly identify the definition of telenursing, only 33.9% of them appreciated the definition of telemedicine. Most of the interns felt that mobile phones (74.4%), Internet (72.1%), and audio-video conferencing system (73.8%) are essential for telenursing practice. The majority of interns hold positive perceptions as they have agreed that inclusion of telenursing in undergraduate studies would be useful for future healthcare workers (92.4%), telenursing is an additional form of patient care in their future work (88.6%) and need to introduce telemedicine services in the health care in our country (62.3%). Concerning advantages of telenursing, a majority have accorded that telenursing can improve the efficiency of the medical staff (59.6%), facilitate the contact of medical staff with patients (76.5%), and directly reduce the cost of patient care (61.2%). Also, most of the interns denied that telenursing can cause technical problems (71.0%). The highest percentage of interns have agreed that telenursing can be most widely used in all nursing specialties.

Conclusion: This research study shows that nursing interns had a good level of knowledge and hold positive perceptions of telenursing. The majority of them viewed telenursing as future-oriented and felt that the nursing curriculum should include the concepts of telenursing to prepare future healthcare providers to be able to provide safe and competent care in a highly technical and digital environment.

FA23 (Poster)

Telehealth during COVID

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Introduction/background: Functional cognition is defined as the cognitive ability required by an individual to perform daily life occupations like vocation. Functional cognition is a critical domain of concern for occupational therapy practice. The principal author who is an occupational therapist (OT) works as a vocational coordinator at a vocational centre, and guides the vocational assessment and training programs. Owing to the COVID-19 pandemic and lockdown, the in-person vocational training being provided had to be modified and crossed over to tele-vocational training. The rationale of this study was to compare the in-person and tele-vocational assessment and training using a functional cognitive approach from an occupational therapy perspective.

Methods: STUDY PARTICIPANTS: About 15 individuals with mild-to-moderate intellectual disability, age range 18–24 years, working as trainees at the vocational centre, were selected by convenience sampling STUDY PROCEDURE: VOCATIONAL ASSESSMENT AND TRAINING: A new cooking activity which the participants had not performed before, that is, making oatmeal was selected IN PERSON VOCATIONAL ASSESSMENT AND TRAINING: *Week 0- Educator Training and Baseline Assessment:* The OT trained the educators at the centre, 1 h every day, 5 days a week to carry out a task analysis and demonstrate the steps of the vocation in person to the participants with appropriate level of assistance. Assessment using an Executive Function Performance Test (EFPT) was done on the fifth day of week 0 to note the baseline functional cognitive ability and the level of assistance required. *Participants Training and Reassessment: Weeks 1–4:* The OT trained the educators to continue with the protocol for 4 weeks, 1 h every day, 5 days a week, that is, in-person demonstration for 15 min, followed by performance by the participants for 45 min, this time with fading of assistance from most to least using positive reinforcements. The assessment using EFPT was done on the last day of week 4. *BREAK Weeks 5–7:* The participants received a vacation of 3 weeks as per the centre protocol. TELE VOCATIONAL ASSESSMENT AND TRAINING: *Week 8: Caregiver Training and Baseline Assessment, Weeks 9–12: Participant Training and Reassessment:* The same protocol as above, with the difference of educator giving real-time demonstration remotely and the participant performing the vocation at home, with caregiver assistance.

Results: Analysis of scores using a Wilcoxon-signed rank test showed a significant difference in 0–4 weeks and 8–12 weeks at $P < 0.05$. The Mann–Whitney U-test showed no significant difference between 0 and 8 weeks and between 4 and 12 weeks at $P < 0.05$.

Conclusion: Both methods of service delivery, that is, in-person and tele-vocational assessment and training using a functional cognitive approach, led to a significant improvement in functional cognition as observed through a decrease of assistance required, that is, an increase in independence in the vocation of cooking. Future implication for occupational therapy is that tele-vocational assessment and training is as good as in-person vocational assessment and training, and therefore, can be chosen as an evidence-based method of service delivery for clinical and research practices.

FA24 (Poster)

Feasibility and acceptability of teleconsultations through video mode for diabetes at a tertiary care centre in India

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Introduction: After notification of ‘Telemedicine Practice Guidelines’ by Government of India in this ongoing COVID-19 pandemic, patient care through various modalities of telemedicine has become more popular and necessary than ever before. As COVID-19 adversely affected the routine and specialty diabetes care services provided at our apex tertiary care institute, we planned and executed a previously unused strategy to offer teleconsultations primarily through the video mode, supplemented by other means, to our patients in regular follow-up. Apart from focusing on clinical care and therapeutic advice, we wanted to evaluate qualitative aspects of these first-time tele (video) consultations: patients’ response, experiences, and issues.

Methods: Patients with complete documented follow-up in the diabetes clinic in the 6 months prior to the start of COVID-19 lockdown were identified. They were called telephonically by the diabetes team comprising of a diabetes consultant and support team doctors from the department of medicine and pharmacology, respectively. The landline phone of telemedicine department was used to call patients initially to inquire about their medical status and offer video consultation with their diabetes physician using a common video platform (Google Meet). Those who agreed were provided a convenient consultation date and time along with investigations to be done and a joining link beforehand using a dedicated WhatsApp number, which was also used to send photographs of prescriptions, as per the recommended format, soon after consultations. During the video consultations, at least two members of the support team individually recorded various parameters and qualitative aspects, such as duration of consultations, common issues, time management, and problems faced regarding the online platform. The experiences and responses of patients during the telephonic calls and video consultations were noted verbatim while interacting with them along with non-verbal cues. These findings were later combined and corroborated. Furthermore, post-consultation feedback was obtained through a simple Likert style questionnaire using Google forms sent through WhatsApp.

Results: Among the 160 patients contacted telephonically, video consultations were scheduled for 101 patients, of which 75 patients successfully completed them, and rescheduling was requested by nine patients. Average duration of consultations was 6.65 ± 1.42 min. Common issues experienced were internet connectivity and login issues ($n = 11$), not having own video platform account (using family members’, $n = 27$), muting or unmuting ($n = 17$), not joining on the scheduled time ($n = 60$). The post-consultation feedback showed ‘strongly agreed’ as the most common response regarding utility ($n = 59$), satisfaction ($n = 63$), and wanting future consultations ($n = 55$). Most common reasons for not attending scheduled consultation were not being able to get the prescribed investigations done ($n = 13$). Words of gratitude and appreciation, with expressions of happiness to see their doctor, were noted from majority of patients.

Conclusion: This study gives valuable real-world insight into patients’ experiences toward video consultation-based telemedicine used in a previously untested setting, which were largely positive in terms of their response, satisfaction, and appreciation of this modality of diabetes care.

It demonstrated success of this comprehensive strategy in a resource constrained setting catering largely to patients from lower socio-economic strata, while also identifying potential issues and limitations. It outlines a roadmap, which can be further followed to execute and improve use of tele-diabetes through the video mode in conjunction with other modalities, such as telephonic calls and messaging services, with due consideration to important factors.

FA25 (Poster)

Transforming telemedicine services using 5G technology

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Introduction: Communication technologies play a key role in delivering medical care remotely through Telemedicine services and health-IT medical devices. It is challenging situation to deliver quality healthcare services to end users balancing rural and urban areas considering the increasing population. Remote locations and rural areas are still unreachable for Telemedicine services due to limitations or continuous disruption in communication medium. Telemedicine services are facing challenges, such as real-time coordination, immediate response, handling large data size, high-resolution medical images and inadequate bandwidth due to limitations in current modern communication technologies. Challenges can be overcome using 5G technologies in Telemedicine services, improving the quality of patient treatment. High-speed, high bandwidth, reliable and low latency network will help improve Telemedicine services.

Methods: The 5G technology in Telemedicine significantly enhances Quality of Service (QoS) and Quality of Experience (QoE) to the end users delivering efficiently and timely. Test bed facility may be used to test for ensuring high availability, accuracy, high throughput, low latency, and ultra-reliability. The 5G technology is capable of supporting remote patient monitoring, virtual clinical assistance, real-time image collaborations, tele-robotic surgery, 3D videos, wearable health devices, augmented and virtual reality-based telehealth educations. It is capable of handling larger medical images, and reliable real-time image collaboration with high-definition AV conference can be observed using 5G. As virtual clinical assistance and remote surgery are becoming more reliable and approachable, hence utilizing of medical experts across large population.

Results: The 5G technology with higher bandwidth, low latency, and ultra-reliable nature ensures Telemedicine services to have a positive impact in the healthcare domain. It will overcome challenges like real-time coordination, immediate response, handling large data size, high-resolution

medical images, and inadequate bandwidth due to limitations in current communication technologies. **Conclusion:** 5G technology have potential to change the way of delivery for Telemedicine services to the end users by providing capabilities to Telemedicine services for handling large data with low latency delivery reliability, thus improving the quality of service and experience. Lifesaving healthcare services and products can be delivered efficiently and timely with the advancement of 5G technology. Healthcare services are efficiently managed, used, and delivered to end users breaking the barrier of rural and urban areas.

FA26

Maintaining continuity of care integrity using telemedicine

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Introduction: Continuity of care is one of the primary characteristic features of a health record. Key role is to ensure that the (medical) multidisciplinary team is patient centric and utilize telehealth technologies to support continuity of care process and reduce re-hospitalizations. There are various positive healthcare outcomes with continuity of care, such as better clinical results, patient's satisfactions, lower mortality rates, enhanced quality of care, and preventive care. Despite these positive outcomes, we have less to few studies on how to maintain and improve continuity of care in a Telemedicine setup. The importance of having a sustained continuity of care is that it improves the quality of care and has a positive impact on healthcare outcomes. **Methods:** Telehealth technologies and Telemedicine can enable healthcare providers to bridge care between the hospital and home, encouraging earlier interventions, and thus, reducing the need for re-hospitalizations. Telemedicine technology also helps to overcome the traditional care that occurs in the period between the initial hospital discharge and a patient's first follow-up appointment. Continuity of care can also be achieved by connecting all multidisciplinary practitioners all together using Telemedicine application, which helps to connect all specialist team together and treat a patient.

Result: Continuity of care using Telemedicine expands in post-discharge care and other healthcare services, which improves patient care and safety. It also ensures cost-efficiency for both the hospital and the patient.

Conclusion: Patients who might not otherwise have access to a high quality of care can avail themselves of continuity of care through both Telehealth and Telemedicine. These types of virtual healthcare not only reduce the travel time and cost but also improve continuity of care through real-time communication, responsive concern, and reduced admissions.

FA27

Wearable antennas for RS detection and monitoring system in remote areas

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Introduction: Remote monitoring of COVID-19 patients in telehealth applications requires that the monitoring must not affect the patient's regular habits. To ensure this requirement, the components (i.e. sensor and antenna) necessary to carry out such monitoring should blend in with the patient's daily routine. To this end, an effective strategy relies on employing wearable antennas that can be fully integrated with clothes and that can be used for remotely transmitting or receiving the sensor data. In this regard, wearable antennas are regarded as one of the key strategies for a substantial reduction of the social costs related to health care, while still providing the necessary support to the elderly and guaranteeing a good quality of life. Wireless technology is a key ally for remote health monitoring. In fact, the combination of non-invasive wearable sensors and information technologies can allow the elderly to receive the needed assistance, while continuing to live in their own homes, rather than in impersonal and expensive nursing homes. Accordingly, at the state of the art, several solutions are available, which are dedicated to activity recognition to extract information on habitat behaviour and to

detect possible anomalies in health parameters. Among these, a system (consisting of a metamaterial antenna, sensor, and a wirelessly connected base station for data processing) for remote fall detection in an indoor environment is presented.

Methods: Several textile antennas have been proposed in the literature. One of the major differences among them relates to the materials employed for implementing the conductive parts. These materials can be roughly grouped into four main categories: (1) NWCFs, (2) conductive threads, (3) electro-textiles, and (4) conductive inks. Generally, materials that fall into the NWCF and conductive thread categories allow for obtaining better spatial resolution and better performance in terms of integration of the antenna with the clothes/surface. These mounted components will be shown in the presentation. Two fabrication techniques that employ these materials are also presented and discussed.

Result: The outlined receiving wire reenactments are performed using the finite element method (FEM) based on High Frequency Structural Simulator (HFSS). The reflection coefficients of the radio wire at different developments are arranged. In this manner, to bring down the recurrence area, both scaling down and indent impacts are observed, which will decrease the reception apparatus pick up. Scaling down of receiving wires is considered.

Conclusion: The wearable antennas that could be integrated with sensors for remote monitoring of elderly people are addressed. Numerical and experimental results related to the design, simulation, and characterization of wearable antennas obtained are reported and commented on. The results demonstrated with the proposed novel antenna are flexible and can be effectively used to obtain a low-cost wearable antenna with performance tailored for the specific application at hand.

Day 3 Session 13: TeleICU Transforming Critical Care: The Forward Way (Parallel Session)

Chair:

Sai Praveen Haranath, Apollo Hospitals, Hyderabad, India

13.6

TeleICU transforming critical care

Understand the concept of remote critical care

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This is a summary of the deliberations of the panel convened during Telemedicon 2020. The 16th International Conference

of the Telemedicine Society of India was conducted virtually on December 20, 2020. The theme was to discuss Tele-intensive Care (TeleICU) and the way forward to establish its use in India. The panel discussed the history of teleICU globally and in India. The technical and human resource barriers were reviewed. The business case for teleICU as an evolving process was examined, and the need for multiple models as well as insurance coverage elucidated. Technology and software are available to ensure that data are collected easily and stored safely while maintaining privacy and being available for continuity, as well as research. Public private partnerships with government institutions, state governments, and examples of multiple other smaller and large entities for provision of critical care were shared. The panellists spoke about their practical difficulties in starting and sustaining teleICU. It was agreed that there is a need for better communication, increasing skill levels and optimal technology integration. The role of the Telemedicine Practice Guidelines released in March 2020 as a driver for telemedicine adoption at scale in India was agreed by the

panellists. Similarities were noted between critical care and industries like aviation where a high level of skill, feedback and technical expertise is necessary. Paperless charting, use of AI to detect abnormalities, and datasets to generate research output are areas that will shape teleICU. Education in critical care basics and the need for team-based practice with upskilling are essential. Provider acceptance, ideal patient experience and institutional support are critical. Examples from panellists included working models using light touch approaches with teleconsultation, development of apps to

answer critical questions in real time, as well as supporting regional hospitals in retaining patients for economic benefit and patient comfort. The group agreed to work towards creating a collaborative national Tele-Critical Care Network and committed resources from their institutions to ensure its functioning, especially during a disaster. The 90-min session covered all aspects of teleICU and was composed of intensivists and end users with vast experience and global expertise.

Day 3 Session 14: Symposium – Digital Ayush Chair: Arjun Bhaskaran – Gamasec, Bengaluru, India

14.1

Digital Ayush – potential and prospects

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Introduction: Telemedicine regulations were introduced for Allopathy medicine in India on March 31, 2020 by Medical Council of India. Following this, AYUSH Councils like CCIM, CCH, and CCRYNS also introduced Telemedicine Practice Guidelines for their professions. This article attempts to identify the issues that need to be addressed to facilitate growth of Telemedicine in AYUSH.

Methods: This includes interview and discussion.

Results: The panel identified the following issues, with regard to the rollout of Telemedicine in AYUSH – (1) With the acceptance of Yoga under the United Nations, the potential for providing Telemedicine in Yoga is immense. This along with the wide presence of the NRI diaspora, the potential for accelerating AYUSH telemedicine for NRIs needs to be urgently leveraged. (2) AYUSH being rooted in socio-cultural settings can provide low-cost, medical interventions and guidance for 3 million expatriate workers in Middle East in vernacular medium, such as Ayurveda Telemedicine in Malayalam and Siddha Telemedicine in Tamil to 2 million

NRIs in Malaysia, Singapore. (3) AYUSH Telemedicine could make a strong beginning with AYUSH Medical Colleges as telemedicine providers. AYUSH Colleges have experienced Faculty to deliver telemedicine, as per the guidelines on CCIM, CCH, and CCRYNS. (4) AYUSH PG and UG students are digital natives who will adopt and evangelize AYUSH telemedicine faster. (5) With the Insurance Regulatory and Development Authority making it mandatory from April 2020 for all insurance companies to provide 100% coverage in sum insured for AYUSH under the AROGYA SANJEEVANI Scheme, AYUSH Telemedicine will get a big boost from Insurance. AYUSH Telemedicine can play a key role in achieving Universal Health Coverage. (6) AYUSH can leapfrog in Telemedicine and EMR as it has very few baggage IT systems. (7) There is a need for a strong IT Platform run by a neutral, credible market aggregator to promote AYUSH Telemedicine. Care needs to be taken to ensure adequate visibility is provided in the IT Platform for all credible, experienced AYUSH doctors, all of whom may not be market-savvy or technology-savvy to promote themselves in social media.

Conclusion: The panel on Digital AYUSH concluded as follows: (1) the panel identified Bangalore, Kerala, and Chennai as suitable Telemedicine ecosystems to implement proof-of-concept Telemedicine practices – Kerala has state-wide acceptance of AYUSH as mainstream medicine, Bangalore has over 10+ AYUSH medical colleges and a vibrant AYUSH clinical practice, and Chennai has the strong support of Tamil Nadu Government in promoting Siddha. (2) The panel resolved that AYUSH Telemedicine should steer clear of COVID-19-related controversies and complications.

Day 3 Session 15: Closing Session – Telehealth Looking Ahead

Chair:

AK Singh – President, TSI

Ashvini Goel – President Elect, TSI

Sunil Shroff – President, Tamil Nadu Chapter, TSI

15.1

Space medicine – ultimate telemedicine application

Thais Russomano

InnovaSpace, London, United Kingdom

Telehealth services has great applications for meeting the challenges presented by the extreme environment of space, where astronauts on missions to the ISS and Moon are exposed to the effects of microgravity, hypo-gravity, radiation, confinement and isolation. It is well known that exposure to microgravity affects the entire human body, resulting in, for example, a redistribution of blood, reduction in heart size and blood volume, impaired balance control, decreased bone and muscle mass, and diminished immune response, thus having an impact on emotions, behaviour and mental health. Astronauts in space for short- or long-term missions have demonstrated important physiological changes, which may lead to undesirable health consequences and operational difficulties, and can be aggravated by medical issues requiring clinical evaluation, diagnostic procedures and treatment interventions. In general, missions do not have a qualified doctor on board, requiring that astronauts undertake a training programme to equip them with the skills required to identify health problems, collect and transmit medical data to a ground-based doctor, and perform basic medical procedures and treatment. In such scenarios, telehealth has great relevance in delivering health-related services and information to support the health and wellbeing of individuals in remote and extreme conditions. The challenges presented by such environments can be overcome with the advances in state-of-the-art innovations, solutions and the high technology of artificial intelligence, and virtual and augmented reality. It is well accepted that the appropriate identification and management of medical problems are essential for long-duration missions and will become more so with the advent and popularisation of space tourism, potentially involving older and less fit space travellers with pre-existing medical issues, especially if much longer missions to Mars become a reality. The advent of Gaganyaan, India's first crewed space mission, which will send 3 Vyomnauts into Earth's orbit, provides an excellent opportunity and motivation for greater collaboration between the Indian Space Research Organisation and Indian health professionals, who can use their existing vast expertise in telehealth for the advancement and crew safety of the Indian human space programme.

15.2

Keynote on teleHealth

Lav Agarwal

Ministry of Health & Family Welfare, Government of India

This presentation will review India's demographic and health profile covering 28 states, 9 union territories and 200,000 Government-owned healthcare facilities. The key objectives of Digital health in India are as follows: **(1)** the creation of EHR for 1.3 billion people with national interoperability in a secured manner; **(2)** setting up of a far-reaching, PAN-INDIA Telemedicine Network; **(3)** optimal use of ICT for pan-nation surveillance and monitoring of health programmes; and **(4)** efficient use of IT tools for capacity building and training and wide-scale deployment of IT innovations for governance and information dissemination. *India has undertaken various initiatives to achieve these objectives for efficient delivery of health-related services.* Planning and Monitoring, Hospital Information System, Public Health Solutions, and Supply Chain Emergency Response Management and Citizen Portals will be discussed along with Tele-Health Opportunities, particularly for providing Continuum of Care across the spectrum. Focused areas include Health and Wellness Centres, Tele-Radiology Services, Remote Health Monitoring and Online OPD services. The Ministry of Health and Family Welfare Govt of India in technical collaboration with CDAC-Mohali launched the eSanjeevani Telemedicine application, which, in a short span of a few months, has already been utilized 11 million times in 25 states by 7,700-trained practitioners. The presentation reviews Ayushman Bharat – the world's largest Universal Health Coverage services with specific reference to Telehealth. The use of artificial Intelligence (AI) to detect COVID-19 and challenges in implementing Health IT are discussed. Highlights of the National Digital Health Mission will be presented. India organized the seventh summit of Global Digital Health Partnership (GDHP) in New Delhi with a participation from 19 countries, including Academia, Industry and Start-ups. The Delhi Declaration of Digital Health for Sustainable Development was adopted. The way forward included Positioning India as the world leader in Tele-Health, establishment of PAN India Telemedicine System covering every healthcare facility and a National Digital Health Ecosystem.

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