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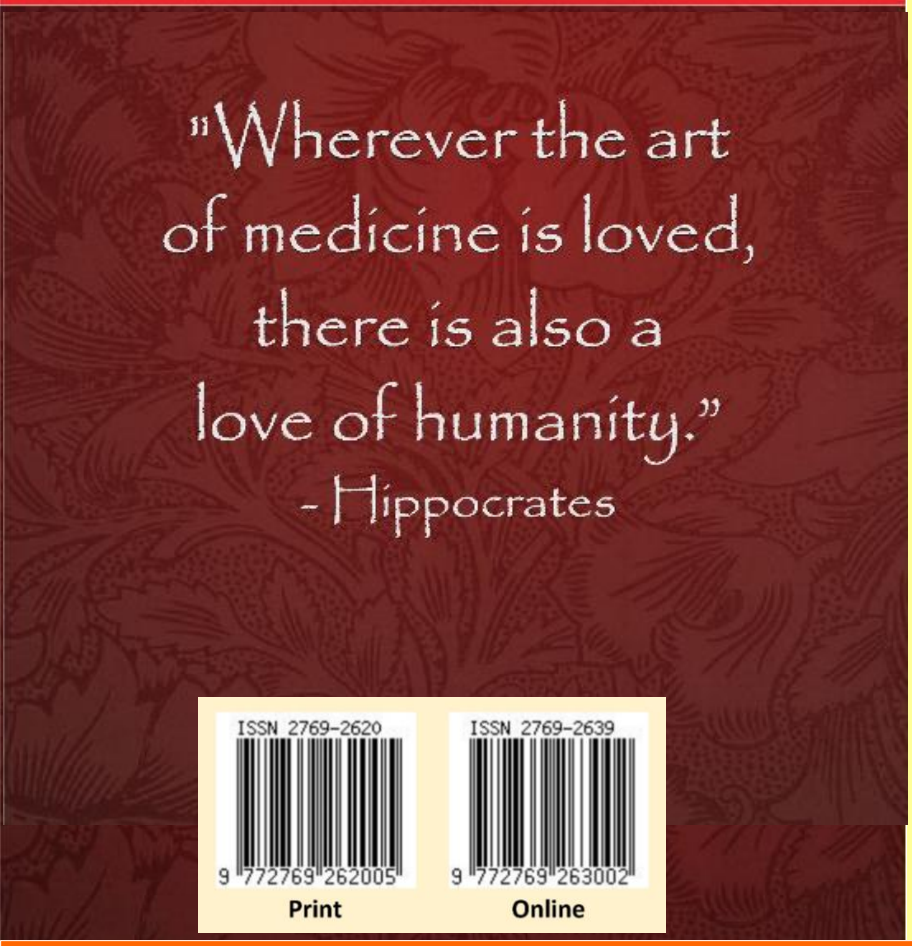

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In this Issue...

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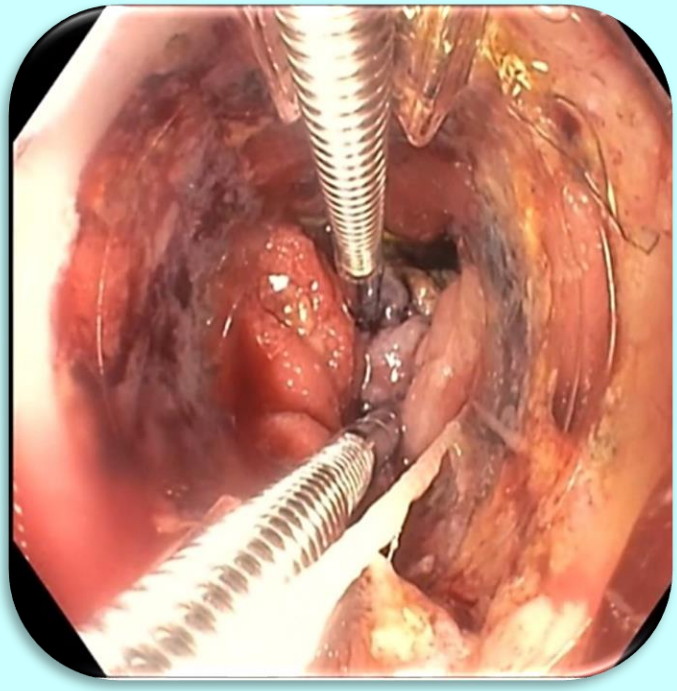
This Issue of JAAPI is Dedicated to

Pioneers of Endoscopy



Images: Courtesy of Asian Institute of Gastroenterology, Hyderabad, India

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Invited Editorial

Evolution of GI Endoscopy in India: Current Status and Future

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Prologue: The landscape of gastrointestinal (GI) healthcare in India has undergone profound transformations over the past few decades, significantly influenced by advancements in endoscopic technology and techniques. Traditionally, the diagnosis and treatment of GI disorders relied heavily on invasive surgical procedures and radiological imaging, often associated with longer hospital stays, greater risks, and considerable discomfort for patients. The introduction of endoscopy marked a pivotal shift, offering a less invasive, more accurate, and efficient means of visualizing the GI tract, diagnosing conditions, performing therapeutic interventions, and ultimately enhancing patient outcomes and experiences.

Scope of the Editorial: This editorial aims to comprehensively examine how endoscopy has revolutionized GI practice in India, detailing its profound impact on treatment approaches, clinical outcomes, and patient experiences. It traces the journey from the early adoption of basic endoscopic techniques to integrating advanced technologies such as high-definition imaging, endoscopic ultrasound (EUS), and the potential future integration of artificial intelligence (AI). The editorial seeks to highlight the milestones in the evolution of endoscopic practices, the current state of endoscopy in the Indian healthcare system and envisage the role of AI in shaping the future of GI diagnostics and treatment. Through this exploration, the review will shed light on the challenges and opportunities that lie ahead, emphasizing the need for continued innovation, training, and infrastructure development to fully harness the potential of endoscopy and AI in improving GI healthcare in India. The ultimate goal is to provide insights into how these technological advancements have not only transformed medical practices but also significantly improved the quality of life for patients with GI disorders, setting a precedent for future healthcare innovations.

Historical Overview: As there are no records or publications on the origin of GI endoscopy in India, the historical aspects have been obtained from personal communications with the physicians and support staff of that era. We apologise if there are minor discrepancies in the milestones mentioned as well as inadvertent omission of a few of the pioneers.

Early Beginnings and Evolution:

- **Diagnostic Gastroscopy and Colonoscopy:** The practice of GI endoscopy in India began in the late 20th century, with the first endoscopic procedures being relatively simple diagnostic interventions. Diagnostic endoscopy and sigmoidoscopy were started in the early and mid-1970's in the central institutes like Post-graduate Institute (PGI) in Chandigarh (Prof. SK Mehta) and All-India Institute of Medical Sciences (AIIMS) in New Delhi (Prof. BN Tandan). These early steps marked the beginning of a rapidly evolving field within Indian gastroenterology. The earliest practitioners who laid the foundation of gastroenterology in India were Rakesh Tandon, MP Sharma, and DK Bhargava at AIIMS; BJ Vakil, FP Antia and HG Desai established dedicated GI departments in Mumbai and KN Jalan in Kolkata.

  Pioneering work on the endoscopic prevalence of peptic ulcer in India was carried out by Khuroo and colleagues (1). The same researchers were also credited with the landmark publication in the New England Journal of Medicine on the role of proton pump inhibitors in reducing re-bleeding in cases with bleeding peptic ulcers (2). In their seminal work, Zargar and colleagues proposed an endoscopy-based classification for corrosive injury to upper GI tract in 1989 (3, 4). Until today, this remains the most frequently utilized classification system across the world.

- **Therapeutic Endoscopy:** Among the earliest therapeutic procedures for interventional GI endoscopy include sclerotherapy and polypectomy. Sclerotherapy for bleeding esophageal varices was established by DK Bhargava at

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AIIMS who is also the first to perform laparoscopy as an outpatient procedure, especially in identification of abdominal tuberculosis. After the initial description of an endoscopic band ligation system by Van Steigmann and colleagues in 1986 (5, 6), Nijhawan et al published the first experience of EVL in India in 1993 (7). Sarin and colleagues introduced the classification system for gastric varices which is still the most utilized system among the classifications proposed subsequently (8). The same group also pioneered the management of esophageal and gastric varices in cases with portal hypertension (9,10). These procedures significantly improved the outcomes for patients with portal hypertension, reducing the risks associated with bleeding varices. The field of small bowel endoscopy (single and double balloon) was pioneered by Karambir Chakrabarty (Kolkata) and late P Murali Krishna (Vishakhapatnam) in the early years. Subsequently, Mohan Ramchandani at the Asian Institute of Gastroenterology, Hyderabad, significantly contributed to the development of this field.

- **Endoscopy in Pancreaticobiliary Disorders:** ERCP, introduced in India during the late 1970s and early 1980s (1977, JB Dilawari and 1980, Rakesh Tandon: personal communication), was a significant milestone that revolutionized the diagnosis and management of pancreaticobiliary diseases. Other pioneers who initiated ERCP during early years included RH Kalro and Sharad Shah in Mumbai, and Krishna Rau in Chennai. Over the subsequent years, pioneers such as D. Nageshwar Reddy propelled the field of therapeutic ERCP to new heights. Manu Tandan and colleagues are credited with the introduction of ESWL for the management of large and difficult stones in the pancreaticobiliary tract (11-13). We are also credited with the largest single center experience of ESWL in pancreatic ductal calculi (14). This experience along with few other published studies formed the basis of ESGE recommendations regarding the use of ESWL as a primary modality for the management of symptomatic PD calculi.

  Khuroo and colleagues also reported the utility of ERCP for the diagnosis and management of pancreaticobiliary ascariasis (16, 17). In the early 1990s, Dilawari and Khuroo reported biliary abnormalities on ERCP in cases with extrahepatic portal venous obstruction (18, 19). The seminal work forms the basis of our current understanding regarding portal cavernoma cholangiopathy. The diagnostic role of ERCP in early years declined gradually with the emergence of EUS in the 1990s. Diagnostic EUS was introduced in the late 1990s (Gourdas Choudhary, SGPGI) followed by RK Dhiman and Deepak Agarwal from the same institute. The adoption of EUS was swift and further enhanced diagnostic and therapeutic capabilities, especially in the assessment of pancreatic diseases and in guiding fine-needle aspiration biopsies.

- **Third Space Endoscopy:** India embraced third space endoscopy techniques, such as Peroral Endoscopic Myotomy (POEM) for achalasia in 2012. These advanced endoscopic procedures offered minimally invasive alternatives to traditional surgery, with Indian centers rapidly adopting and contributing to the global knowledge base. Multiple, large studies from India have established the safety and long-term efficacy of POEM in achalasia and other motility disorders of esophagus (20-21).

Current State of GI Endoscopy in India: From very humble beginning in the early 1970's, GI endoscopy in India, has come a long way. Today, the Indian endoscopists command respect for their skill, innovation, and technique. Many international trainees come to select centres in India to learn or sharpen their skills in GI endoscopy.

- **Technological Advancements**: The field of gastrointestinal (GI) endoscopy in India has witnessed remarkable advancements, keeping pace with global developments, and adapting to the unique healthcare needs of the country. This progress reflects a concerted effort to embrace innovative techniques, expand the scope of minimally invasive procedures, and ultimately enhance patient care. The inclusion of advanced endoscopic procedures such as endoscopic submucosal dissection (ESD), third-space endoscopy procedures, endoscopic ultrasound (EUS)-guided interventions, and endobariatric procedures marks a significant evolution in the capabilities of GI endoscopy services in India.

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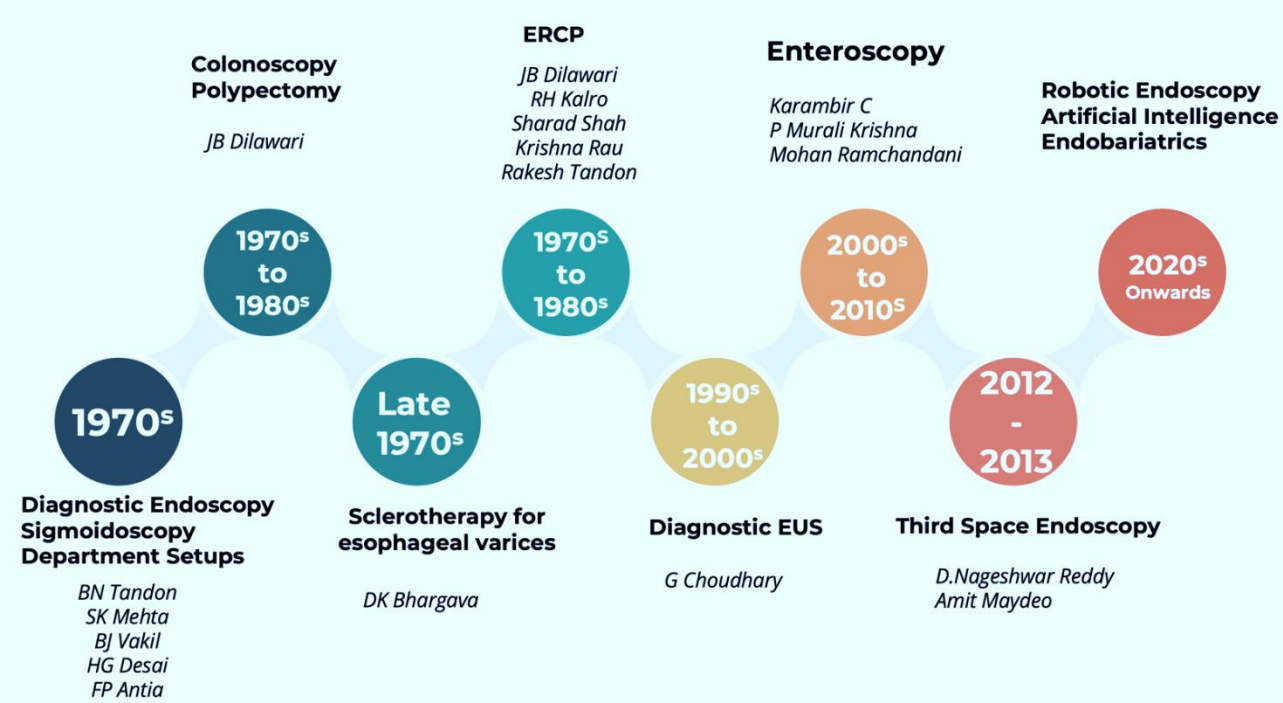

Figure 1. Evolution of gastrointestinal endoscopy in India

- **Training and Education**: The landscape of training and education in gastrointestinal (GI) endoscopy in India has undergone significant evolution, driven by technological advancements, increased demand for skilled endoscopists, and the growing complexity of endoscopic procedures. This evolution reflects a concerted effort to enhance the quality of care, improve patient outcomes, and address the challenges of a diverse and populous nation with varying levels of healthcare access. One of the major developments in the training of GI endoscopy in India has been the move towards more structured and standardized curricula (22). Professional bodies and medical institutions have defined clear learning objectives, competencies, and benchmarks that guide the training process. This includes the incorporation of both diagnostic and therapeutic endoscopic procedures, ensuring that trainees acquire a comprehensive skill set.

Another key area of development regarding training in GI endoscopy is hands-on training which remains a cornerstone of GI endoscopy education. Currently, workshops and live demonstrations are conducted regularly and provide valuable opportunities for learners to observe advanced techniques and engage in practical learning. These sessions often include discussions on patient selection, procedure planning, and the management of complications, offering a holistic view of endoscopic practice.

Challenges, Limitations and Future Directions: The field of gastrointestinal (GI) endoscopy in India has made significant strides, yet it faces several challenges and limitations that must be addressed to continue its advancement and ensure equitable access to care across the country. Understanding these challenges is essential for setting future directions and priorities in the field. One of the primary challenges is the uneven distribution of advanced endoscopic services, which are predominantly available in urban and tertiary care centers. This leaves rural and underserved areas with limited access to such services, exacerbating healthcare disparities. **In addition,** the availability of state-of-the-art endoscopic equipment and infrastructure is limited by high costs and resource constraints, particularly in public healthcare settings. This limitation affects the quality and range of endoscopic services that can be offered. Although there has been progress in training endoscopists in advanced procedures, there remains a shortage of trained personnel, especially in specialized areas such as therapeutic endoscopy and endoscopic ultrasound (EUS). Expanding training programs and increasing the number of skilled professionals is essential for meeting the growing demand for endoscopic services. In this regard, the society of GI endoscopy of India has initiated a dedicated training program for technicians to meet the unmet need of the ever-growing field of GI endoscopy in India.

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Besides the afore mentioned challenges, there is a need for increased investment in research and innovation within the field of GI endoscopy in India. Local research can help adapt existing technologies and develop new techniques suited to the Indian population's specific needs and healthcare system constraints.

Future Directions: In future, strategies to enhance access to advanced endoscopic services across India include increasing public investment in healthcare infrastructure, mobile endoscopy units for rural areas, and tele-endoscopy for remote consultations and training (23, 24).

1. Training and Capacity Building: Expanding training initiatives, including simulation-based education and international collaboration for knowledge exchange, can help build a more skilled workforce. There is also a need to focus on continuous professional development and subspecialty training in areas like interventional endoscopy.

2. Technological Innovation: Emphasizing the development and adoption of cost-effective and locally relevant technological solutions can help overcome infrastructural limitations. This includes low-cost endoscopic devices and AI-based tools for diagnosis and patient management.

3. Research and Clinical Trials: Encouraging local research and participation in international clinical trials can drive innovation in GI endoscopy, leading to the development of new techniques and the adaptation of existing ones to better suit local needs.

4. Policy and Regulatory Frameworks: Developing comprehensive policy and regulatory frameworks to govern the ethical use of advanced technologies in endoscopy, ensuring patient safety, and promoting data security is crucial.

Finally, integrating advanced endoscopy and artificial intelligence (AI) into gastrointestinal (GI) healthcare has set the stage for unprecedented improvements in diagnostic accuracy, treatment efficacy, and patient outcomes. However, the full realization of these technologies' potential is contingent upon sustained investment in three critical areas: technology, training, and infrastructure.

Disclosure: Authors are pioneers in GI endoscopy related to patient care, education, research, and training in India. There are no commercial interests in contributing to this Invited Editorial.

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About the Contributors:

Dr. D. Nageshwar Reddy is Chairman, Chief Gastroenterologist & Therapeutic Endoscopist. Dr. Reddy received Rudolf V Schindler Award from The American Society of Gastrointestinal Endoscopy (ASGE). He is one of the first to promote endoscopy in India and has led the charge of educating numerous endoscopists all over the world.

Dr. Manu Tandan is the recipient of the International Service Award from ASGE for contribution in the field of endoscopy. He is also credited with training over 1000 fellows in basic and advanced endoscopy procedures.

Dr. Zaheer Nabi is currently the Director of Interventional Endoscopy at the AIG.

Video of Per-oral Endoscopic Appendectomy done at the AIG by Dr. Reddy

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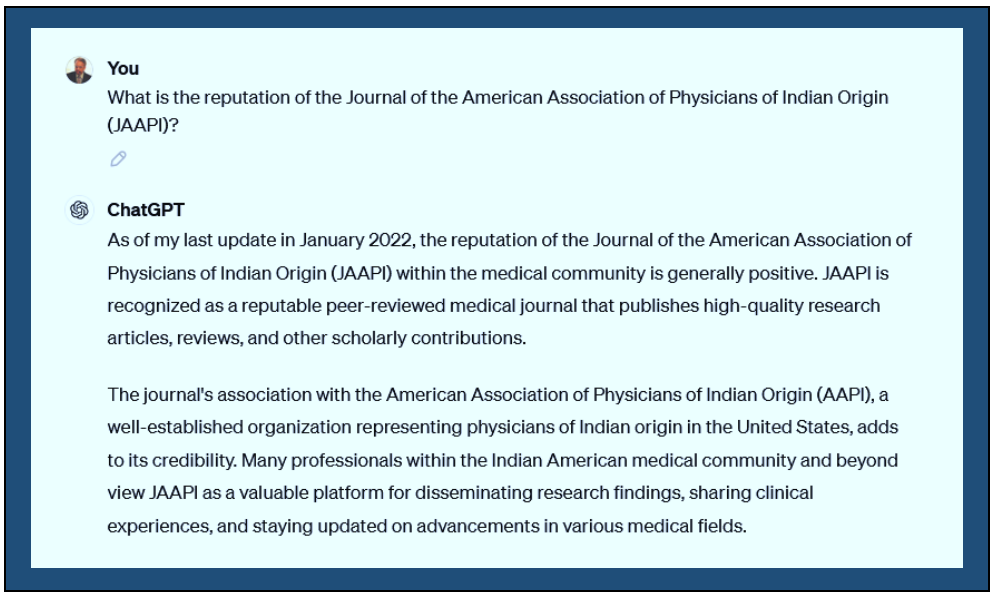
From the Editorial Desk

Three Years After Launching JAAPI in May 2021

Bellamkonda K. Kishore, M.D., Ph.D., MBA
Editor-in-Chief of JAAPI

On May 12, 2021, during the peak of COVID-19 pandemic, JAAPI was launched. On that day, in a virtual event held, Dr. Susan R. Bailey, then President of the American Medical Association (AMA) graciously inaugurated the first peer-reviewed medical and healthcare journal published by a community of ethnic physicians in the United States. In her message to AAPI, Dr. Bailey stated *"I am confident that JAAPI will become an invaluable and trusted source for scientific study and healthcare information for a wide range of users, including practicing and academic physicians, residents, interns, medical school students and many others. You are embarking on an important mission at JAAPI to gather the collective knowledge and hands-on experience of subject matter experts in a range of medical fields and share these insights and experiences with physicians around the world"*. Dr. Sudhakar Jonnalagadda, then President of AAPI, in his message stated *"JAAPI will provide not only strong educational materials, but also opportunities for enhanced learning through deep interaction. AAPI support for this journal will be crucial. I urge you to do your part to eagerly read, discuss, and contribute to each issue of JAAPI."* Two Nobel Laureates and then President of the American Heart Association felicitated the birth of a peer-reviewed journal in the hands of AAPI, one of the strong, influential, and role model professional society of ethnic physicians, setting standards for other such organizations in the United States.

As per the expectations of its peers, the committed editorial board of JAAPI worked diligently and published three issues per year (Spring, Summer, and Winter) without compromising the quality and standards of the journal, and ethics of peer-review process. Thanks to a dedicated editorial team and board members, external reviewers, and contributing authors, as well as unconditional support of successive presidents of AAPI, JAAPI made rapid strides. Within a short span of time, JAAPI is recognized as a medical and healthcare journal of standards catering to the needs of practicing as well as academic physicians, especially the Indian American physicians. This is what ChatGPT says about JAAPI.



It is obvious from the response of the ChatGPT that we all need to work together to not only sustain the health and life of JAAPI, especially during its infancy and childhood, but to take it to greater heights over the time. Just like the saying *it takes a whole village to raise a kid*, it takes the whole organization to nurture the growth of JAAPI as a premier medical journal published by one of the best organizations of physicians in the United States. Peer-reviewed journals are not just

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publications of professional organizations like the American Medical Association or the British Medical Association. They are the guiding lights, guardrails, and benchmarks of medicine and healthcare. In a world where commercial and open access journals are trying to take over the peer-reviewed publication into their domain, often trying to overshadow the traditional journals published by the age-old professional organizations, the need to sustain peer-review publication as neutral one with high standards and no commercial interests is the need of the hour. In this context, we are proud that JAAPI is made available free of cost to the readers, and with no expenses to the authors and contributors. This should encourage authors from different corners, including medical students, residents, and fellows to avail this opportunity and submit their work and articles to JAAPI. JAAPI is open to all sections of physicians, irrespective of their nationality.

On its third anniversary, JAAPI has crossed the boundary line of 40 peer-reviewed articles required for registration with the National Library of Medicine (MEDLINE), following which articles published in JAAPI will be cited in PubMed, the benchmark for biomedical journals. In addition to this, JAAPI meets all other criteria for registration with the MEDLINE, and we are starting to work on that front with the support of AAPI Administration. We are also obtaining DOI (Digital Object Identifier) numbers for all published articles and then register JAAPI with all other indexing databases.

Coming to this issue of JAAPI, we had to combine Summer and Winter 2023 editions, because we had to turn down a couple of articles submitted to the Summer 2023 edition as they did not meet the publication standards of JAAPI. We will have the Spring 2024 edition released as soon as possible. In this combined issue, there are a few articles on medicine and healthcare in India. The Invited Editorial by Drs. Zaheer Nabi, Manu Tandon, and Nageshwar Reddy describes the evolution and advancements in GI Endoscopy in India to the extent that opening the abdomen with a surgical knife is becoming an outdated practice like using a landline telephone. It also highlights how natural orifices, such as the mouth, are increasingly used to do therapeutic GI endoscopy. In view of this exceptional developments in GI Endoscopy, we dedicated this issue to Pioneers of Endoscopy. The AAPI-sponsored study by Dr. Manju Ramakrishnan and associates on improving health outcomes in rural India brings out a grim picture of how people in rural India are developing non-communicable diseases (NCDs), such as hypertension or diabetes at a relatively young age, and often are not aware that they had these diseases. This emphasizes the need for regular check ups by primary care physicians. Hopefully, publication of this original study and presentation of these data conferences such as the 1st AAPI World Health Congress in July 18-22, 2024, in New York will ring alarm bells that may prompt the authorities to do the needful to promote early diagnosis and preventive healthcare in rural India. Another healthcare aspect in India that needs attention by the authorities, as highlighted in the article by Drs. Sandeep Chilakala and Ramasubbareddy Dhanireddy, is lack of proper transportation facilities for critically ill neonates in India on par with those in the developed world. Considering the enormous progress made in transportation infrastructure in India in recent years, this should not be an issue, provided authorities notice it and address it on high priority basis. In a populous country like India, with a record number of sudden cardiac arrests, often at a relatively young age, training the people in cardiopulmonary resuscitation is a challenge. In this context, the Brief Report by Drs. Indubala Maurya, Rakesh Garg, and Ram Gopal Maurya emphasizes the need for hybrid cardiopulmonary resuscitation training programs.

In recent years, many Indian American physicians are taking interest in writing books on different subjects. JAAPI recognized the need to highlight such books on medical and healthcare subjects. Accordingly, this issue has two book reviews, one on irritable bowel syndrome (IBS) authored by Dr. Sripathi Kethu, and another on the pain solution, authored by Dr. Saloni Sharma. We encourage the AAPI community to submit reviews on books authored by them. Guidelines to prepare the reviews can be found in the Instructions to Authors section in this issue of JAAPI.

Nicotine products have become like the flea on the back of a dog, coming back in different forms when driven out. Dr. Niharika Khanna, who spent considerable time researching this subject and published papers contributed a Short Communication on nicotine pouches, which are targeting specific demographic of people with serious consequences.

Finally, globalization of technology flattened the world with respect to communications, transportation, education and training, but did not do much for flattening healthcare for many reasons. Dr. Padmini Murthy emphasized the need for Health Diplomacy in today's world. It is predicted that implementing AI rigorously will flatten the world in healthcare sector also. In this contest, the Perspective article by Dr. Satheesh Kathula sharing his experience in getting an online training in AI tailored for physicians, is timely and should help the physician community.

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Editorial Perspective

The Major Role of "Health Diplomacy" in Today's World

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Prologue: Diplomacy has a significant role in promoting Global Health and improving the health status of communities. The contribution of health diplomacy to foreign policy, security policy, development strategies, and trade agreements is immense. In addition, Health Diplomacy focuses on protecting the health of communities regionally, nationally, and internationally. It creates a platform for promoting positive partnerships to advance the United Nations Sustainable Development Goal # 3, "To ensure healthy lives and promote well-being for all at all ages."

According to the World Health Organization (WHO), global health diplomacy (GHD) is an emerging field that bridges the disciplines of Public Health, international affairs, management, law, and economics, focusing on negotiations that impact the global policy environment for health (1). Furthermore, health diplomacy has been regarded as a means to protect the health of communities in the global society as well as creating an opportunity for bridging the gap among governments, the private sector, and non-governmental organizations in order to improve public health (2).

History of Health Diplomacy: The history of health diplomacy can be traced back to the 1800s. The term "Global Health Diplomacy" was coined in 1851, when European countries came together to address the challenges posed by diseases like cholera, plague, smallpox and Yellow Fever (3). Peter Bourne, who served as President Jimmy Carter's special advisor for health affairs, introduced "Medical Diplomacy" for the first time in 1978. Improvements in international communications between policymakers and researchers changed this concept to "Global Health Diplomacy," a concept that refers to cooperation between public and private actors in order to improve global health (3). Interestingly, in the past few years, physicians have played a crucial role in advancing Global Health Diplomacy transforming policy into service delivery for the communities.

It is not an exaggeration to highlight The Alma Ata Declaration of September 1978 (4), a major global conference that showcased the importance of diplomacy in promoting global health across the member states. In the year 2000, during the United Nations General Assembly, world leaders adopted the Eight Millennium Development Goals (5). Health is critical in foreign policy, security policy, development strategies, and trade agreements. Health diplomacy is conducted in many venues and at different levels, i.e., local, regional, national, and international, and the focus of these can be specific to a single health issue or a broad range of issues. The global community has experienced the power of Health Diplomacy, which has assumed many forms, such as public health initiative, medical exchanges, collaborative research, and emergency response efforts. It is often used to address infectious disease outbreaks, environmental health threats, and the global spread of chronic diseases (6), which we have witnessed during various pandemics, from SARS to COVID-19. "Vaccine Diplomacy" is an excellent illustration of health diplomacy as it allowed the development of ongoing international collaborations irrespective of the resources of a particular geographical location.

Role of Physicians as Health Diplomats: The diplomacy of medicine can achieve the dual goals of improving global health while repairing failures in diplomacy, particularly in conflict areas, in providing humanitarian and medical assistance. An excellent illustration of it is the efforts by members of "Médecins Sans Frontiers" (MSF) or "Doctors Without

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Borders," an international, independent medical organization working in seventy countries. MSF was founded in 1971 in Paris by Journalists and Physicians, and its members are from various countries (7).

Physicians serve in formal and informal settings, working to promote health diplomacy. The World Health Executive Board comprises 34 technically qualified members from the regions of the WHO elected for three-year terms. The Annual Board meeting is held in January. That is the time when agenda for the World Health Assembly and the resolutions to be considered by the Health Assembly take place. There are several committed players.

Professor Dr. Jozef Suvada is the Ambassador of Global Health for the Republic of Slovakia and currently serves as a member of the WHO Executive Board. He has been on the frontline working with several countries, the WHO, and state actors such as St. Jude's Children's Research Hospital to advance initiatives such as Universal Health Coverage Realization and Bridging the Survival Gap in Childhood Cancer (8). Dr. Satoshi Ezoe, Director of Global Health Strategy, Division of Foreign Affairs, Japan, serves as a counselor covering health in the Permanent Mission of Japan to the United Nations. He was also a critical player in the first high-level meeting of the United Nations General Assembly on Universal Health Coverage in 2019 (9). The efforts of such eminent health diplomats have been instrumental in shaping and transforming policies into excellent health care delivery. It illustrates the importance of physicians serving in both formal and informal roles to advance global health in a neutral, apolitical manner.

Other Key Players in Health Diplomacy: Other key players in promoting health diplomacy include health, foreign and finance ministers, academia, advocates, health professionals, civil society members, and diplomats. Foundations such as the Bill and Melinda Gates Foundation, Chan Zuckerberg Initiative, Rockefeller Foundation, non-governmental organizations, American Medical Women's Association, American Medical Association, Association of American Physicians of Indian Origin (AAPI), American Public Health Association, New York Academy of Medicine, and service organizations such as Rotary International and think tanks, e.g., Chatham House, play crucial roles in promoting health diplomacy. Diplomatic discussions regarding the health of the United Nations Sustainable Development Goals are held in various countries (8). A critical venue that focuses on health negotiations annually is the World Health Assembly (9), convened in Geneva.

In addition to the traditional health-focused agencies such as the World Health Organization and Pan American Health Organization (10), over the years, the United Nations General Assembly has convened high-level meetings on various health challenges facing the global community. These meetings have served as a platform to bring together various cross-disciplinary stakeholders to work on critical health issues.

The President of the 78th General Assembly convened three high-level meetings focused on health, and it was a milestone in the seventy-eight years history of the United Nations General Assembly that such meetings were convened in succession. On September 20, 2023, a meeting was convened in collaboration with the World Health Organization on Pandemic Preparedness and Response (11). The General Assembly adopted the Landmark Declaration and called for Strengthening High-level International Coordination to Improve Pandemic Prevention, Preparedness, and Response. A meeting was also convened on Universal Health Coverage on September 21, 2023. The 78th United Nations General Assembly endorsed the Political Declaration on Universal Health Coverage (12). The September 22nd meeting focused on the fight against Tuberculosis and resulted in the historic Political Declaration adopted by the Member States (13).

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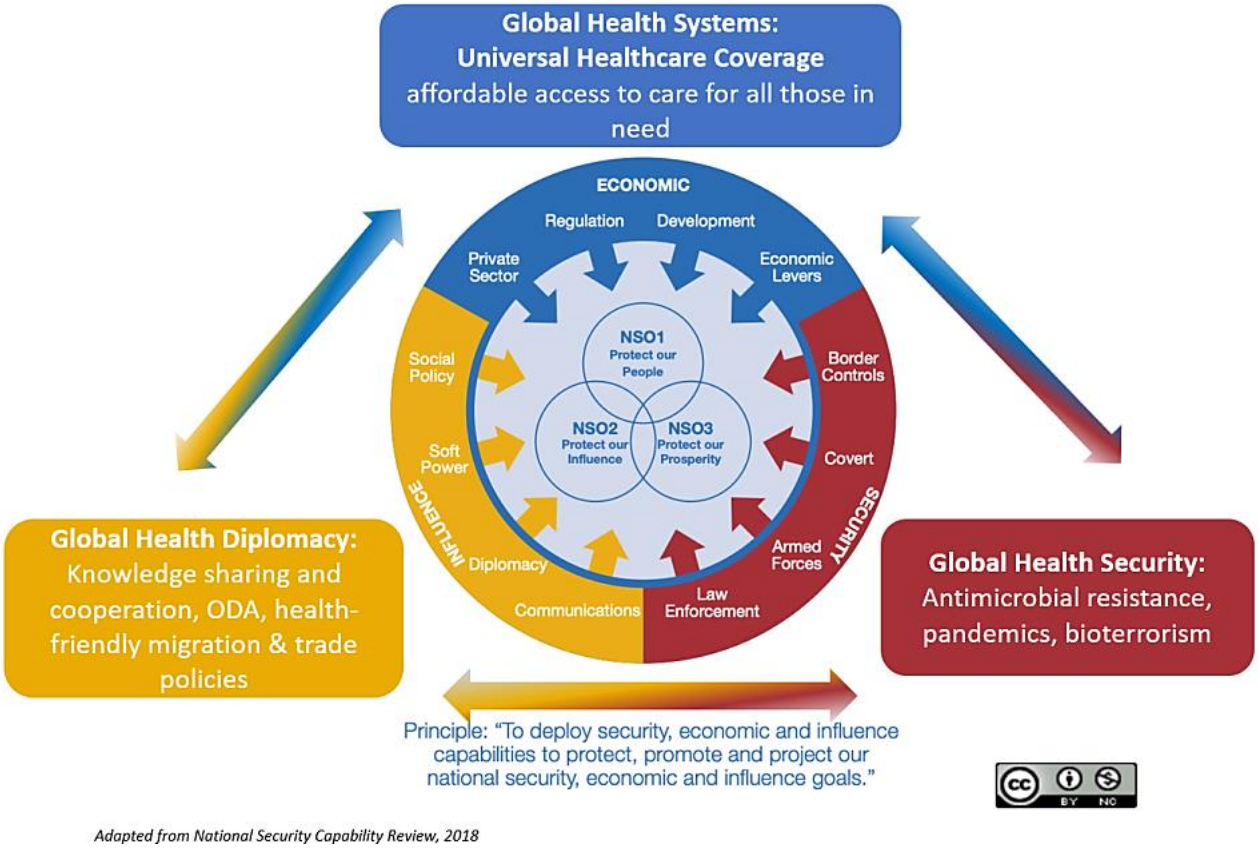

Source: Center for Global Development
https://www.cgdev.org/publication/why-global-health-missing-uks-integrated-review

Conclusion: As globalization progresses, it is more evident that healthcare topics once confined exclusively to national policy are now issues of global importance. Pandemics, newly emerging and reemerging communicable/infectious diseases, and threats of bioterrorism are now clearly perceived as direct threats to national and global security. The strategic relevance of health in global affairs has changed, as health has become an integral part of economic, geopolitical, security, and social justice agendas, including human rights and domestic-foreign policies, among other emerging agendas. It is interesting to note that the interconnectivity of policies in the areas outside of the health sector, such as trade and economic development, are now complemented by those in the areas of environment and health. Currently, the two essential goals of health diplomacy are: (i) to advance global health security and address strategies to improve population health so the 2030 agenda of "Leave No One Behind " is achievable, and (ii) to improve geopolitical relations between member states and increase purposeful partnerships between cross-disciplinary global leaders to work together. This will accomplish a reduction in poverty and increase in equity to advance the Sustainable Development Goals (SDGs). It is crucial to recognize health diplomacy as an essential foreign policy goal and a key contributor to development, peace, poverty reduction, social justice, and human rights.

Disclosure: The author is a Professor of Public Health and Global Health Director at the New York Medical College School of Health and Sciences and Practice. In her capacity as the American Medical Women's Association Global Health Lead and NGO Representative to the United Nations, the author is deeply involved in Global Health Diplomacy at the national level and at the United Nations. Apart from her professional roles in Global Health Diplomacy, the author declares no competing interests.

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Short Communication

Nicotine Pouches: How Did We Get There?

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Prologue: The evolution of tobacco is a fascinating history of an industry determined to sell its product, most interested in the bottom line, ignoring the health effects on the world. It is also an example of survival and invention of newer and newer methods of selling tobacco and nicotine products. For practicing physicians, it is important to keep up with the movement of tobacco and nicotine in the marketplace.

Historical Aspects: The Tobacco industry has spent the last seven decades in finding 'replacement smokers' marketing regularly to women, minorities, youth and children under age 21 years (1). Starting in 1954 when Richard Doll and A Bradford Hill published an article in the British Medical Journal to confirm the link between Smoking and Lung Cancer, the tobacco industry tried to discredit all research and start to deny evidence, eventually funding their own research to prove a point (2-4). In 1964 the first Surgeon General's report on smoking was published, "Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service", clearly iterating the link between smoking and lung cancer (5). After the Federal Cigarette Labeling and Advertising Act (FCLA) was passed in 1965, the first warnings appeared on cigarette packs in 1966, "Caution-Cigarette Smoking may be hazardous to your health" (6).

Targeting Specific Demographics: Selling a highly addictive substance for decades by the tobacco industry is a study of creativity with substantial budgets devoted to advertising to newer and younger users (1). Starting in 1968 when Phillip Morris's Virginia Slims introduced its brand to women with "You've come a long way baby" thus initiating and encouraging women to smoke (7). Smoking in women would introduce a whole new demographic for the tobacco industry and expand their footprint on the marketplace and enhances revenues. The year 1987 saw the introduction of the first cartoon character targeting children, 'Joe Camel" enticing them to smoke cigarettes and getting a good response from children under 18 years of age, introducing Joe Camel Lights in 1993(8). The goal was to get children addicted early and thus have a dependable buyer of their products for multiple decades. Other advertisements were designed to introduce adult men and women in 1958 to a cool lifestyle such as the Marlboro man's (9). At this time the HIV/AIDS epidemic was getting the attention of the press, and the tobacco industry recognized the LGBTQI+ population as a target for expanding their buyers and continued to design advertising to not only the LGBTQI+ but also minority, low socioeconomic and other vulnerable, marginalized populations (10).

Introduction of E-cigarettes: Fast forward to 2007 when e-cigarettes were formally introduced to the United States population, initially targeting existing older smokers. The tobacco industry surmised that as older smokers quit smoking, they may consider using the e-cigarette instead to step down their tobacco use. When this tactic did not work, the tobacco industry pivoted to advertising to children 12-17 years of age to try the cool e-cigarettes that came in many shapes, sizes, and flavors (11). Quickly we started to see that children were a particularly vulnerable group, susceptible to peer pressure and the desire to be cool and popular, just like their role models on social media. Over the ensuing few years, social media became front and center as an advertising venue with 'social influencers' vaping and creeping into the social fabric of younger and younger users (12). Vaping also became an avenue to try out products like flavors, Marijuana, CBD, and products with

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more than one additive. Not until 2014 did the FDA launch its "The Real Cost" campaign using social media and targeting children aged 12-17 years of age, eventually leading to other public health messaging to children (11). The Institute of Medicine published a new report titled, Health Implications of Raising the Minimum Age for purchasing Tobacco Products, suggesting that raising the age to buy tobacco to 21 years, would reduce youth initiation of tobacco and nicotine (13). Following this several states have elevated the age to buy tobacco to 21 years.

Flavored Cigars and E-cigarettes: Concurrent to flavored vapes, flavored cigars also appeared on the market, including menthol flavored ones that had been first introduced by the Lorillard Tobacco company to target the African American population in 1966, handing out free cigarettes to youth at carnivals in 2016, and in housing projects (14, 16). Menthol and mint would become a top selling flavor in e-cigarettes, popular with youth, increasing the subjective experience significantly (15). At the same time the number of tobacco outlets near schools started to multiply with greater concentration in lower socioeconomic neighborhoods (16). The FDA sent the final rule in November 2023 banning menthol and characterizing flavors to the Office of Management and Budget, the final step in the rule making process before it appears in the Federal Register to become effective. (14)

Heat-not-burn Products: These products are heated tobacco products that are not burned, and come in many forms including electronic heating elements, sticks, plugs, and capsules. Some heat-not-burn products come in sizes and shapes similar to cigarettes. The FDA describes these as a non-combustible cigarette which has tobacco wrapped in a paper like a cigarette, however the tobacco is heated to produce an aerosol that the user inhales. (17) Two heat-not-burn products were authorized by the FDA in 2019 and sales increased (18). However, in April 2020 RJ Reynolds claimed that the Phillip Morris Group and its parent company, Altria, has infringed on two of Reynolds' patents, leading to a US International Trade Commission ruling in 2021 which stopped the advertising and sales of the iQOS tobacco device. This decision was appealed by Phillip Morris, and in 2022 the FDA issued a modified risk granted order authorizing PMI to market the iQOS tobacco device with a reduced exposure claim (19).

Smoking Cessation Devices: The United Kingdom approved a British American Tobacco "e-voke" as a smoking cessation device in 2015, increasing pressure on other European countries and the US FDA to approve e-cigarette devices as a safe alternative to cigarettes (20). This was countered by public health messaging in the US and followed in 2019 by a large cluster of E-cigarettes/Vaping Associated Lung Injury (EVALI) cases, which drove home the point there was a lot we did not know about e-cigarettes (21). The advent of EVALI into mainstream media led to public discourse about the ill effects of e-cigarettes, the use in youth, and the need to change.

Nicotine Pouches: Around this time the nicotine pouch, first developed by Niconovum in the early 2000's, marketed in the Nordic countries as Zonnic (22). The largest snus manufacturer, Swedish Match introduced Zyn in the United States in 2014, starting US manufacture in 2019 (23). As Zyn became popular, the brand was bought by Phillip Morris in 2022, an integral part of their plan for a 'smoke-free future' (23). Marketing for the Zyn nicotine pouches has followed recent trends to use social media, 'Zyninfluencers', drawn from the contemporary social fabric (24). Zyn pouches are sold in round cans containing 15 nicotine pouches each, in multiple flavors, and at a cost of about $5 per can. Cheap enough for a child to buy if they were experimenting or sharing the tin. Zyn advertising has followed a similar pattern to e-cigarettes, using social media, and social icons like baseball players, and even a television personality, Tucker Carlson (25). Whereas Baseball players have endorsed the product on Fox media and other channels, Tucker Carlson has an entire video circulating on social media, where he is dropped off a helicopter followed by a large tin of Zyn and a statement by him to say that "the volume of nicotine in the tin of Zyn can save the world" (25). Additionally, Zyn is being marketed innocuously in print and media advertisements, endorsed by Jeff Rogan on radio, the Nelk Brothers on social media, Shane Gillis (former Saturday Night Live star) and others (25, 26). Zyn is also available in certain states as a mail order item.

Congressional Investigations: Senator Chuck Schumer has urged the Federal Trade Commission and the Food and Drug Administration to investigate the nicotine pouch, Zyn, demonstrating concern with its popularity in Gen Z and the influencers, characterizing the product as a 'pouch packed with problems' with

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marketing to teenagers and younger children (25). The Guardian talks about the "Fratty, bro-y, vocal jazz of nicotine fandom" that has accompanied Zyn, characterizing the use of Zyn as 'Zynning' by 'Zynnies', all designed to appeal to youth as a harm reduction tool (26). Although Zyn is the leader in sales, there are also other nicotine pouch products on the market such as, On! (Altria), Rogue (Swisher), Lucy (Lucy Goods) and others.

FDA Approved Tobacco Treatment and Cessation Methods: Tobacco cessation is a difficult process, one that is known to have multiple stops and starts, and one that is very difficult to go 'cold turkey'. A free and available resource is the Tobacco Quitline (1-800-QUIT-NOW) which allows an individual, a physician, any clinical provider to refer themselves or a patient to receive free phone or web counseling; and more recently texting supports have been added to accommodate preferences. There are several Nicotine Replacement Therapies available through the Quitline: Nicotine patches, gums, and lozenges. Nasal sprays are available through prescription, as are Varenicline and Bupropion. The CDC recommends utilizing one long-acting form of NRT (nicotine patch) together with a short acting form of NRT (gum or lozenge) (27, 28)

Conclusion: Tobacco and nicotine use leads to disease in 16 million Americans, and 480,000 deaths per year in the United States (26). Smoking cessation resources are available for free from the CDC website (27), and from the American Lung Association (28).

Disclosure: The author declares no competing interests.

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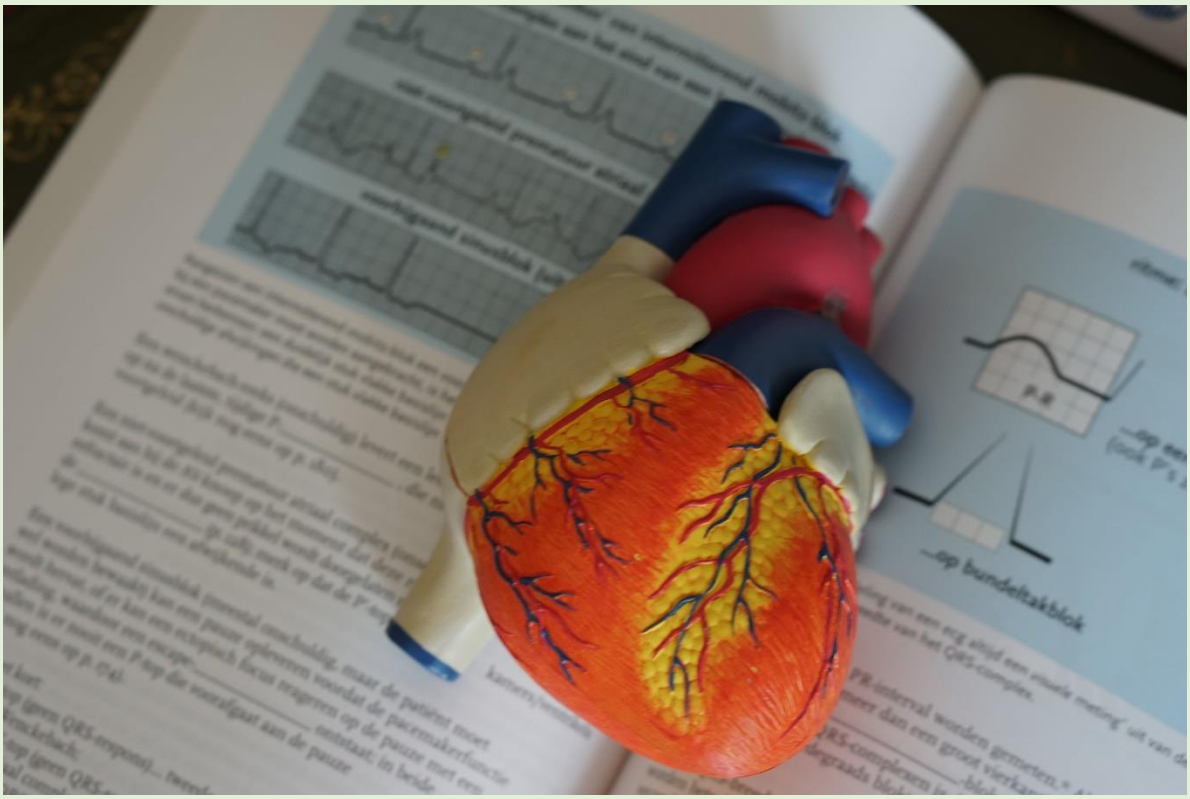
Call for Review of Books Authored by AAPI Community



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As many AAPI Community Members are authoring and publishing academic books, to provide them a visible platform, JAAPI is launching a new section on **Review of Books Authored by AAPI Community**. This will be limited to books on topics related to medicine and healthcare, but not to books on other topics. Both printed and eBooks published by traditional publishers or on self-publishing platforms and bearing ISBN number will be eligible for review. The review of the books should be written by an expert in the field, not by the author. More details can be found in the Instructions to Authors section of this edition of JAAPI.

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Book Review

Understanding Irritable Bowel Syndrome: A Comprehensive Guide

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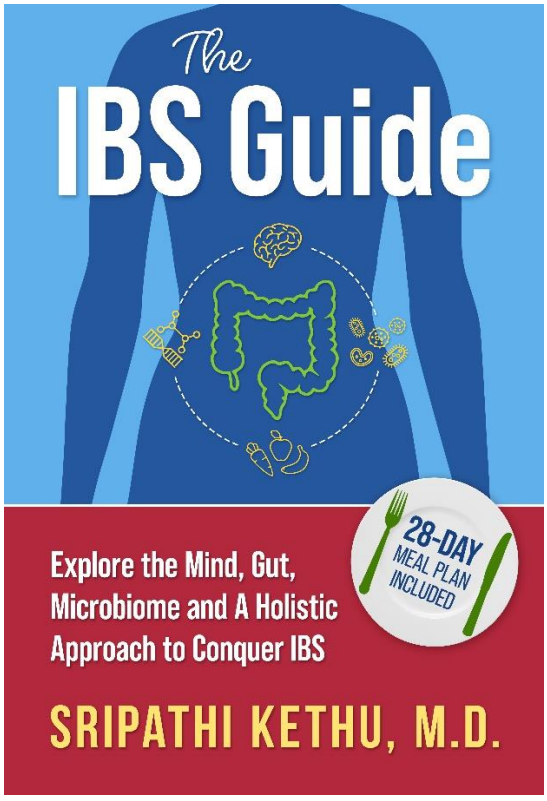

Amazon Paperback, Published June 7, 2023
ISBN: 979-8988359807
Pages: 358 Price $18.99
https://www.amazon.com/IBS-Guide-Microbiome-Holistic-Approach/dp/B0C7J7PGWK

Introduction: This comprehensive book on understanding and coping with irritable bowel syndrome, which is a very common disorder of the gut-brain interaction was written by Dr. Sripathi Kethu. Dr. Kethu has over two decades of clinical experience in taking care of patients with irritable bowel syndrome and has written a comprehensive, easy to understand and practical book which helps readers/patients and practitioners understand not just about the symptoms and the disease but helps sort out the quagmire of data so one can manage their symptoms with interventions supported by strong evidence. Irritable bowel syndrome has a universal prevalence. While not exactly life threatening it causes a significant disruption in one's life and impacts all aspects of life. It is not a new disease though the understanding of disease process, symptoms, mechanisms to cope and treat these disorders are still evolving. With the advent of internet and social media and support groups often there is an overload of information/misinformation with little or anecdotal evidence at times that leaves one seeking guidance often more confused than educated. This book is timely and focused for not just those suffering but treating patients with IBS.

Synopsis: This is a comprehensive guide on IBS written in an easy to read and understand manner that covers key concepts of symptoms, potential mechanisms, diagnostic evaluation, and differentiation from other entities. Readers, both novice and even practitioners will gain a greater insight into the disease, enabling treatment optimization. Rather than focusing on the gastrointestinal symptoms, this book also highlights other syndromes potentially associated with IBS including newer entities with limited data including "leaky gut" and candida infection of the gut.

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The book is well written, in an easy-to-read style, with real-life patient encounters and aims to correlate patient symptoms and treatment based on current understanding of pathophysiology. An overarching intent is to separate the "wheat from the chaff" with succinct recommendations, in an era of "information overload". The book is constructed with chapters and synopses which summarize key concepts. Evidence to support recommendations is provided with up-to-date references. The book focuses on a comprehensive approach and highlights Dr. Kethu's keen understanding and passion to deal with this disorder. Furthermore, it highlights various other conditions that mimic IBS and provides a comprehensive guide to the patients as to when to seek medical care, so they don't ignore more serious conditions considering it a "benign condition".

The major strengths of this book are the quotes of wisdom, clarity in explanation of a complex process. It does not cut short current evidence, gives a glimpse of new and evolving understanding of the disease, diagnostic and treatment options and imposes no personal anecdotal evidence. Of particular note is the chapter on "Mind-body Therapies". The growing evidence on cognitive approaches to IBS is key- recognizably to increase treatment efficacy beyond medication and diet directions. The cases studies keep the reader engaged and leave one with better understanding and gain a greater empathy for those dealing with this entity. While most books give recommendations this book comprehensively covers the pros and cons of every strategy including details of smart phone applications so that those suffering with IBS symptoms can readily use. It also helps those suffering with the disease to shed their stigma and encourages them to seek help and discuss their symptoms. Key references for additional information and resources are at the end of the book.

While some of the treatment options have been studied in experimental protocols, all the nontraditional treatment options might not be readily available and might be dictated by one's insurance coverage and rightfully the author could not provide cost data on some of these treatment options and some including fecal microbiota transplantation have limited evidence.

This is a succinct yet comprehensive, scientific, and evidence-based guide on IBS which will be of great benefit to all care providers with patients with IBS. In an era of increased demands on time and schedules, providers will better understand the key concepts which can help their patients. This book will be useful across a broad range of readership.

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Book Review

The Pain Solution

5 STEPS to Relieve and Prevent Back Pain, Muscle Pain, and Joint Pain without Medication

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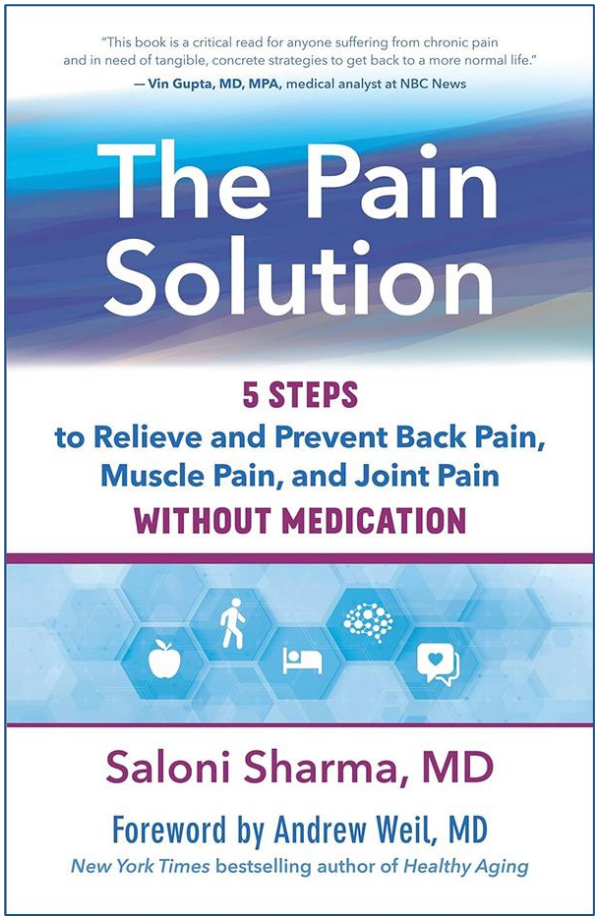

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Our country suffers from dual crises: a chronic pain crisis and the related opioid crisis. Low back pain alone impacts greater than 80% of Americans and is the leading cause of disability. Chronic pain hampers economies and devastates families and communities. Although pharmaceutical products are a cornerstone of medical education and the mainstay of treatment in our healthcare system, they are riddled with adverse and unexpected effects. Many patients may be surprised to learn that their physicians are often just as frustrated with an inability to comprehensively and safely manage painful conditions. Although multi-modal and multi-disciplinary treatment is lauded as the ideal approach, coordination of care can be complex and access to resources is often limited. Furthermore, sifting through a massive amount of conflicting information in the medical literature and lay media adds to the challenge of helping patients embrace an anti-inflammatory lifestyle and achieve their best outcomes.

This is the problem addressed by the award-winning book, *The Pain Solution: 5 Steps to Relieve and Prevent Back Pain, Muscle Pain, and Joint Pain without Medication* by Saloni Sharma, MD. She provides an evidence-based, whole-person approach to empower patients and us to live better, reduce reliance on medication, and augment our lifespan and health span. Her book motivates readers to proactively build health and reduce pain instead of suffering in a reactive and passive health care system. The forward, written by renowned integrative health expert, Dr. Andrew Weil, is a testament to the importance of the content.

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The Pain Solution touches on the human experience and consideration of the struggles of relying on pharmaceutical solutions alone. Dr. Sharma recognizes that patients are often left scrambling for multifaceted pain relief in a health system designed around acute and organ-based care. She illustrates how our system limits even the most well-intentioned physicians. This book empowers patients with health counseling that physicians often lack the time to adequately provide. Rather than dwell on problems with which we are already familiar, the bulk of this book focuses on how to develop practical and personalized solutions to chronic, painful conditions. The innovative "relief-5r" plan encourages patients to optimize their fuel, activity, sleep, stress, mindset, and relationships. While this general concept is familiar, this plan is attractive because it distills the best available evidence into simple and trackable tools. Dr. Sharma's "microboost" concept encapsulates the little steps that add up to big relief.

The Pain Solution shares patient cases and personal stories to illustrate the power of the plan. Geared for patients and professionals alike, the book enables readers to live better step-by-science-backed step. Dr. Sharma asks the reader to consider the impact of the Standard American Diet (SAD) in increasing the inflammatory processes that physicians struggle to control. The book weaves together the benefits of diet on the microbiome, the neuroprotective and hypoalgesic effects of exercise, and the healing nature of supportive relationships. Significantly changing one's life is daunting, but Dr. Sharma's microboosts help patients – and the physicians caring for them – be more confident in their ability to reduce pain and stress while improving mood and relationships. This is the whole-person medicine we want for ourselves as much as the patients we treat.

I am an Associate Professor of Physical Medicine & Rehabilitation and Sports Medicine at the University of Pennsylvania, and a Team Physician at the high school, college, and professional levels. I understand and cannot overstate the importance of the whole-person approach to optimal wellbeing to individuals of all activity levels and abilities. After reading this book, it was not long before I was teaching its concepts to my patients and athletes. I congratulate Dr. Sharma on this important work, and I am confident anyone who invests in this book will consider it a valuable resource for themself, their patients, and their institution.

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Perspective on Healthcare

Transporting a Critically Ill Neonate in India – Are We There Yet?

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Abstract: India, with an estimated 27 million live births each year, contributes globally to 27% of neonatal deaths, 40% of low birthweight babies, and a quarter of preterm births. In India, Infant, neonatal, and early neonatal mortality rates have shown significant reductions in the last decade and through its India Newborn Action Plan, it is aiming for further reduction in the rates to single digits by 2030. While institutional delivery and in-utero transport of newborns are regarded as the safest options, home deliveries constitute 21% of all childbirths; these births are associated with increased risk of preventable morbidity and mortality to mother and newborn. Newborn care in the public sector is provided by a network of newborn care corners, newborn stabilization units, and special newborn care units (SNCUs). Despite a rapid increase in the number of SNCUs and neonatal care units (NICUs) across the country, there is still a shortage of SNCU and NICU beds. Neonates in need of a higher level of care including mechanical ventilation and surgery must be transported to more advanced facilities, but there is no proper mapping of such services. Road ambulance is the dominant transport system in India and the capability for transferring critically ill newborns on a ventilator in an incubator is limited. These ambulances are not ideal for neonatal transport. Many households still depend on private vehicles such as auto/cycle rickshaws, cars, two-wheelers, buses/trains, or any available means to reach the hospital. Government sponsored ambulance services like National Ambulance Service (NAS) and specially designed neonatal ambulances under public-private partnerships through the '108' call center-based ambulance system was introduced in some states in India. Private hospitals offer neonatal transport services; however, they are expensive and beyond the reach of most families. Organized neonatal transport is patchy and not available in the public sector. All neonatal transport should be done by teams who are specially trained in neonatal resuscitation, stabilization, and management during transport. There is a shortage in the availability of a trained workforce, especially nurses and supporting paramedical and specialist staff. The success of neonatal transportation depends on the continuum of early identification, pre-referral stabilization, appropriate referral, care during transportation and ongoing monitoring throughout the process. To sustain the declining trends and reduce neonatal mortality, it is crucial to enhance public schemes by ensuring the provision of well-equipped, affordable, and dedicated neonatal ambulances throughout the nation. A comprehensive framework to improve the quality of neonatal transport both in the private and public sectors should be in place. Regionalized high-quality neonatal care holds the potential to significantly enhance neonatal outcomes. Existing systems should continue to focus on maternal (in utero) transport and the birth of high-risk infants in appropriately equipped hospitals.

Key Words: Neonatal Transport, Newborn, Neonatal Mortality, Neonatal Intensive Care

Abbreviations Used	
ASHA	Accredited Social Health Activist
CAMTS	Commission on Accreditation of Medical Transport Systems
EMRI	Emergency Management and Research Institute
ENAP	Early Newborn Action Plan
ENMR	Early Neonatal Mortality Rate
ICMR	Indian Council of Medical Research
IMR	Infant Mortality Rate
INAP	India Newborn Action Plan
LMIC	Low and Middle Income Countries
NAS	National Ambulance Service
NBCC	Newborn Care Corner
NBSU	Newborn Stabilization Unit
NICU	Neonatal Intensive Care Unit
NMR	Neonatal Mortality Rate
NNF	National Neonatal Forum
NNT	Neonatal Transport Team
NRHM	National Rural Health Mission
SAFER	Sugar, arterial circulatory support, family support,
	environment, respiratory support
SDGs	Sustainable Development Goals
SNCU	Special Neonatal Care Unit
STABLE	Sugar, temperature, airway, blood pressure, laboratory
	workup, and emotional support
TOPS	Temperature, oxygenation, perfusion, and sugar
UNICEF	United Nations International Children's Emergency Fund
VLBW	Very Low Birth Weight
WHO	World Health Organization

Introduction: India with an estimated 27 million live births each year accounts for 20% of global births (1). Most of these births occur at district-level and lower-level hospitals and at home (2). India contributes to 27% of global neonatal deaths, 40% of low birthweight babies, and a quarter of preterm births (3). One million newborns die each year. Prematurity, sepsis, and birth asphyxia are the major factors. Almost two thirds of the total neonatal deaths are within the first week of life. In India, in the last decade, there has been a steady downward trend in Infant Mortality Rate (IMR), Neonatal Mortality Rate (NMR), and Early Neonatal Mortality Rate (ENMR) (Figure 1) (4, 5).

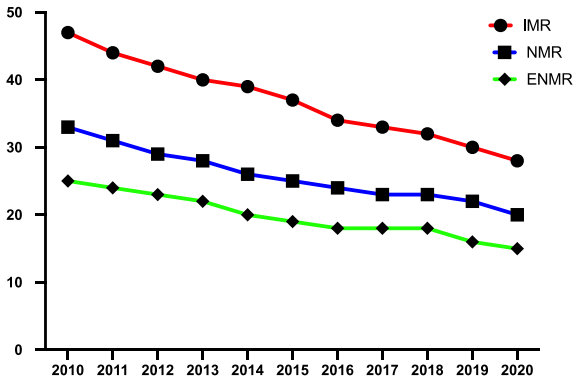

Figure 1: Trends in Infant Mortality Rate (IMR), Neonatal Mortality Rate (NMR), and Early Neonatal Mortality Rate (ENMR) from 2010 to 2020 (adopted from ref # 4, 5)

For 2020, at the National level, NMR is 20.4/1000 live births and the ENMR has been estimated at 15 per 1000 live births and ranges from 17 in rural areas to 9 in urban areas (3). Amongst the low and middle-income (LMIC) countries, India is at the forefront in its efforts, in reducing infant and neonatal mortality rates. Every newborn action plan (ENAP), a comprehensive, multi-partner initiative, was launched in 2014 by WHO and UNICEF to improve and achieve equitable and high-quality care for mothers and newborns. ENAP set a global target to reduce the number of newborn deaths to less than 12 per 1000 live births by the year 2030 (6). India introduced the India Newborn Action Plan (INAP) in September 2014, aiming at an overarching goal of a significant reduction in the rates of infant mortality and stillbirths to single digits by 2030 (7). With this ambitious target, India is on track to meet the child mortality objectives outlined in the 2030 Sustainable Development Goals (SDGs). To achieve the INAP 2030 goals India launched various national programs. It is beyond the scope of this article to explain all the interventions. One very important intervention is the National Rural Health Mission (NRHM) initiated by the Government of India in 2005. It stands as a crucial intervention to deliver quality healthcare services to rural communities across the nation. This showed a significant impact on maternal, neonatal, and infant outcomes. Under this scheme, comprehensive care for all categories of newborns is provided by a network of newborn care corners (NBCCs), newborn stabilization units (NBSUs), and special newborn care units (SNCUs) (8). This framework offers essential secondary-level care along with providing trained health professionals both in rural and urban districts. While SNCUs possess sufficient infrastructure and resources, concerns have been expressed regarding the inadequate knowledge and skills of the healthcare workers employed in these units (9). In India, home deliveries constitute 21% of all childbirths, thereby elevating the risk of preventable maternal and neonatal fatalities (10). To promote institutional delivery, India implemented "safe motherhood programs" under its flagship NRHM scheme. This federally sponsored scheme incorporates a conditional cash transfer mechanism to incentivize socio-economically disadvantaged women to give birth in public health facilities or accredited private hospitals (11). Delivery of high-risk pregnancies should occur in tertiary care centers for better perinatal outcomes. While

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institutional delivery and in-utero transport of newborns are regarded as the safest options, unfortunately, it is not always possible to anticipate preterm delivery and perinatal illness. Consequently, there remains an ongoing necessity to transfer neonates to more advanced facilities that can provide a higher level of neonatal care (12). There is a lack of availability of dedicated neonatal transport teams in most of the States in India. As a result, parents are compelled to organize transportation themselves, utilizing their own vehicles, which often lack pre-transport stabilization or are inadequately equipped for safe neonatal transport. The presence of well-equipped and skilled teams coupled with organized interhospital neonatal transport services significantly improves the outcomes for these critically ill neonates (13).

Regionalization of Neonatal Care: It is axiomatic that infants delivered at appropriate level facilities are more likely to have better neonatal outcomes. To provide risk-appropriate perinatal care, perinatal regionalization was introduced in the USA in the 1970s so mothers and infants are cared for at designated hospitals regardless of where they live. Perinatal regionalization also ensured a system for referral of high-risk pregnancies and low birth weight preterm infants to receive consultation and access to risk-appropriate care. An integral component of the regional perinatal services is an efficient referral transport system, so mothers and babies are transported promptly and safely between the community and the health care facilities (14). Studies have shown beneficial effects when preterm infants are delivered to high-level Neonatal Intensive Care Units (NICUs), with decreased rates of mortality and morbidity (15, 16). Regionalization with its intricate association with an efficient neonatal transport system will play a key role in advancing newborn care practices. Even in countries with well-established systems of regionalized perinatal care, variations in outcomes persist, potentially attributed to the organization of their referral and transport systems (17). In the USA, neonatal care is expanding rapidly and, there is a proliferation of smaller NICUs within the same region. This led to a recent trend towards de-regionalization in most States, and an association with increased adverse neonatal outcomes (15).

In India, regionalization is nonexistent . There are ongoing discussions regarding the implementation of regionalization of perinatal services in India, but there are perceived barriers to it. These include lack of availability of services, lack of access to services to the poor, and lack of referral transport system (14). Accordingly, the establishment, implementation, and sustainability of regionalized perinatal services pose practical challenges. Also, in contrast to developed countries where neonatal mortality is primarily observed among very low-birthweight (VLBW) babies, the contributors to newborn mortality and morbidity in this context are full-term and moderate-sized low-birth-weight infants (14).

Where are Neonates Receiving Care? Newborn care infrastructure in India and indications for neonatal transport as per standard treatment workflow by the Indian Council of Medical Research (ICMR) are shown in Scheme I (18). In the public sector, NBCCs provide essential care at birth including resuscitation and prompt referral of at-risk or sick newborns. **Level I** NBSU is a 4-6 bedded unit established at the sub-district level which manages low-birth-weight neonates not requiring intensive care and stabilization of newborns before referral. **Level II** care is provided in SNCUs. These are 12-bedded or larger units at district/sub-district hospitals and medical colleges with dedicated and adequately trained doctors, staff nurses, and support staff, providing intensive care to newborns except mechanical ventilation and surgery. **Level III** NICUs provide intensive care including ventilation and operative care. These are present both in the public and private sectors. The private sector offers newborn intensive care at Level II and above but there is no proper mapping of the services offered by the private hospitals (19). Infants who require extensive support, prolonged ventilation, and surgical/cardiac procedures are referred to tertiary-level centers in larger hospitals. In such cases, transport facilities are provided by the referral centers using an organized neonatal transport system. Despite a rapid increase in the number of SNCUs and NICUs across the country, there is still a shortage of SNCU and NICU beds. The recommended NICU bed strength per million population is 30 (20). In India, approximately, 18,000 NICU beds are available, but an exact estimate of current NICU beds is lacking as many are in private sector hospitals. To ensure sufficient care, it is estimated that at least 20,000–30,000 level 3 NICU beds and 75,000–100,000 level 2 SNCU beds are required (21, 22).

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In the country, with a population exceeding 1.4 billion people, approximately 60% of the population falls under the category of poor or very poor, relying on government facilities for newborn care. While the public sector infrastructure is in place to deliver neonatal care, it suffers from deficiencies in functionality and accountability. The INAP, with its objective of ensuring immediate and equitable care for small and sick newborns, proposes the inclusion of the private sector within a collaborative regulatory framework (23). The LaQshya initiative launched in 2017 oversees certification as part of National Quality Assurance Standards for both labor rooms and NICUs in the public sector. National Neonatal Forum (NNF) accredits newborn care units in the public and private sector (24).

How are Neonates being Transported? A comparison of neonatal transport infrastructure between India and the USA is shown in Table 1. Neonatal transport in the United States is a complex and highly regulated process. Implemented in the late 1970s when regionalized perinatal care was established, it is an integral part of the United States health care delivery system. It is accomplished by an organized neonatal transport team (NNT) of 2 or 3 healthcare professionals, which includes combinations of nurses, physicians, respiratory therapists (RTs), and paramedics. The NNT is a dedicated team or a unit-based team. Dedicated teams are based in receiving facilities whose primary responsibility is transporting sick infants and do not carry patient assignments. Unit-based teams are staffed by NICU personnel and have other patient care duties in addition to the transport of infants.

Extreme prematurity and congenital malformations are reported as the major indications for referral in the USA. Voluntary accreditation standards for medical transport programs are provided by Commission on Accreditation of Medical Transport Systems (CAMTS). Accreditation standards address issues of patient care and safety in ground, fixed, and rotatory wing inter-facility transport. In India, sepsis, birth asphyxia, prematurity, and low birth weight are the major indications for referral (25). Major modes of transport for neonates in India include road ambulances, rotary wing, and fixed-wing aircraft. Road ambulance is the dominant transport system in India and the capability for transferring critically ill newborns on a ventilator in an incubator is limited (26). Air transport is expensive and beyond reach for many Indian families.

At the national level, Janani Shishu Suraksha Karyakram was launched in 2011 for providing free referral transport for pregnant mothers and sick babies to public health institutions. These ambulances are not ideal for neonatal transport. However, there are no government programs for neonatal transport to higher centers.

A few states have implemented National Ambulance Service (NAS) while Emergency Management and Research Institute (EMRI), a public-private partnership, is working in some other states. The '108' call center-based ambulance system, works in partnership with three private institutes: the GVK-Emergency Medicine Research Institute (GVK-EMRI); the Ziqitza Health Care; and the Bharat Vikas Group Limited across 20 states and 2 union territories. Under this partnership, specially designed neonatal ambulances were introduced in some states in India. Private hospitals in the country offer neonatal transport services; however, it is expensive and beyond the reach of most families. India also relies on emergency transport services supported by charities, individuals, private hospitals, nonprofit groups, political parties, and religious institutes. There is no clear coordination among the available resources, and they are not streamlined.

Organized neonatal transport is patchy and not available in the public sector. Trained nurses or paramedics for transport services are not available. Most units involved in organized neonatal transport utilize the services of residents and fellows working in neonatology for this purpose. The majority of the infants are transported via community ambulances i.e., NAS. Personnel involved in community transport of neonates include ASHA (Accredited Social Health Activist) workers from the community, an Auxiliary Nurse Midwife (ANM), a paramedic (trained/untrained), or a family member. NAS staff are trained to provide basic life support, trauma life support, and advanced life support, but neonatal-specific training is sub-optimal (27). There is a significant gap in the availability of trained manpower especially nurses and supporting paramedical and specialist staff. Ideally, all neonatal transport should be done by specially trained teams who are specifically trained in neonatal resuscitation, stabilization, and management during transport. When transporting to SNCU or tertiary care center, the entire transport should be under the guidance of a physician trained in neonatal care.

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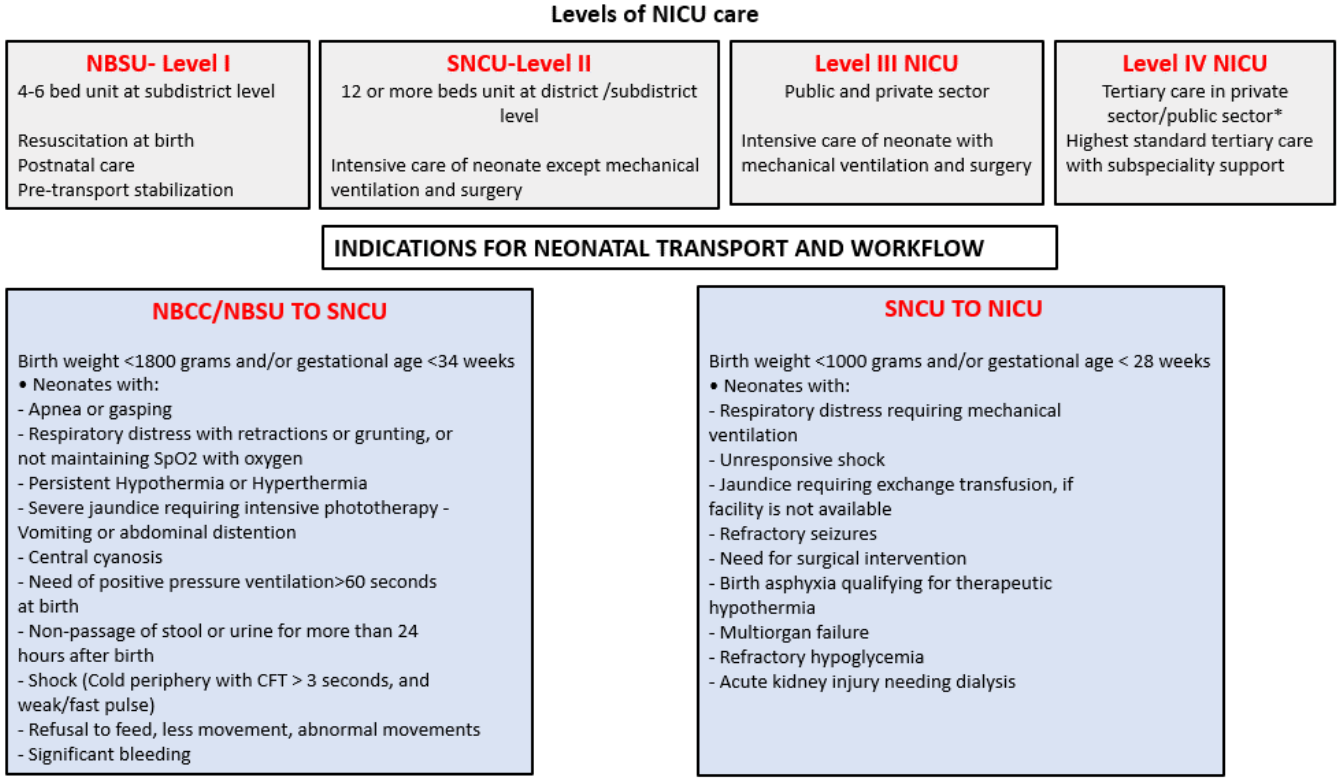

Scheme 1: Newborn care infrastructure in India and indications for neonatal transport as per standard treatment workflow by the Indian Council of Medical Research (ICMR) *Tertiary care in public sector is limited to metropolitan areas.

Table 1: Comparison of neonatal transport infrastructure between India and the USA

Neonatal Transport in the United States	Neonatal Transport in India
The neonatal care framework includes a network of Level 1, Level 2, Level 3, and Level 4 NICUs	The neonatal care framework includes a network of SBCUs, SNCUs, and NICUs.
Tertiary care NICUs are in both public and private sectors	Tertiary care NICUs are predominantly in private hospitals
Extreme prematurity and congenital malformations are the major indications for referral	Sepsis, birth asphyxia, and prematurity are the major indications for referral
Regionalized perinatal care is in place directing patients to hospitals where risk-appropriate resources and personnel are available	Regionalization is nonexistent. The need for regionalization exists especially for the treatment of VLBW infants and newborns requiring surgery
Predominant mode of neonatal transport is road transport.	Predominant mode of neonatal transport is road transport.
Neonatal transport is exclusively done by organized transport by either a dedicated neonatal transport team or a unit-based neonatal transport team.	Neonatal transport is done predominantly via community ambulances. Organized neonatal transport teams are based only in private hospitals and mostly in urban areas.
Team composition in Neonatal transport includes a combination of nurses, physicians, respiratory therapists, and paramedics.	Personnel involved in community transport of neonates include ASHA workers from the community, an Auxiliary Nurse Midwife, a paramedic trained / untrained, or a family member.
Voluntary accreditation standards for road and air medical transport programs are provided by Commission on Accreditation of Medical Transport Systems (CAMTS).	No centralized authority regulates neonatal transport in terms of setting up guidelines, capacity building, technical assistance, and accreditation.
Back transport mechanism for convalescing infants to lower-level NICUs is in place.	Back transport system is present but patchy. This will help efficiently utilize both SNCUs and NBSUs.

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Ambulance services are underutilized for neonatal transport. Many households still depend on private vehicles such as auto/cycle rickshaws, cars, two-wheeler, and buses/trains, or any available ambulance to reach the hospital; this leads to newborns often arriving hypothermic, cyanotic, and hypoglycemic on admission (28). Close to 40% of neonatal deaths occur within the first 24 hrs of admission. Mortality rates of 25%–35% among neonates transferred to tertiary care from distant locations have been reported (29). Pre-transport stabilization before transfer is the most critical aspect of inter-hospital care because it minimizes subsequent deterioration. Most neonates are transported with no pre-transport stabilization or care during transport.

Various pre-transport stabilization models are available such as STABLE (30) (Sugar, temperature, airway, blood pressure, laboratory workup, and emotional support), SAFER (31) (Sugar, arterial circulatory support, family support, environment, respiratory support), and TOPS (32) (Temperature, oxygenation [airway and breathing], perfusion, and sugar). These must be implemented with appropriate training of personnel at the peripheral health facilities. GVK-EMRI provides training for technicians at emergency learning centers (EMLCs) in all the 15 states and the two union territories. Periodic reorientation as a refresher course is conducted every year (33). In addition, IAP (Indian academy of pediatrics) and NRP India FGM (first golden minute) project offers NRP provider courses, Basic Newborn Care and Resuscitation (BNCRP) and Advanced NRP courses for pediatricians and other professionals involved in the newborn care (34).

In the USA, American Academy of Pediatrics (AAP) and Section of Transport Medicine (SOTM) strongly recommend developing a national neonatal transport database to allow benchmarking and improve quality of care and outcomes. Most of the transport programs provide data to Ground Air Medical Quality Transport (GAMU). A Quality Improvement Collaborative and data analytics platform for medical transport programs to track, report, and evaluate their performance on transport-specific quality metrics. Having such registries for neonatal transport in India would be extremely helpful. In addition, there is a need for a centralized authority that regulates neonatal transport in terms of setting up guidelines, capacity building, technical assistance, and accreditation. Guidelines for neonatal transport are available but are not followed effectively in remote parts of the country and rural areas which account for most neonatal transport.

In India where access to specialized care might be limited in certain regions, leveraging on telemedicine and AI (Artificial intelligence) technologies in neonatal transport can bridge the gap by providing timely expertise and support. Such technologies can be utilized for remote consultations, streamlining communication, remote monitoring of vitals and interpreting images. This will lead to better decision making and improved care enroute to a health care facility.

The success of neonatal transportation depends on early identification, pre-referral stabilization, appropriate referral, and care during transportation. For cost-effectiveness, the flow of neonatal care in the district should be a continuum in an integrated manner between different levels of care. A model of back-transport wherein the infants are shifted back to lower levels of care once they are stable can help lower costs and efficiently utilize both SNCUs and NBSUs (21).

Driving Forward: Remarkable progress in neonatal care, facilitated by various government schemes, has led to a significant reduction in the neonatal mortality rate in India. As a key player in the global initiative to reduce childhood and neonatal mortality, India is actively expanding its neonatal healthcare system. However, there remains a critical need for additional NICUs and skilled healthcare professionals to effectively address the rising number of preterm births. To sustain the declining trends in neonatal mortality, it is crucial to enhance public schemes by ensuring the provision of well-equipped, affordable, and dedicated neonatal ambulances even in the most remote areas. At the same time, it is essential to focus on improving the quality of neonatal transport. A comprehensive framework should be in place that encompasses the enhancement of skills and knowledge of transport staff, implementing strict neonatal transport protocols, pre-referral stabilization practices, a feedback system for referral doctors, and a reliable reporting system for outcomes. This framework should be implemented in both private and public sectors. IAP and NNF should play a significant role in guiding, influencing, and contributing to regulating neonatal transport in India. This should

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include setting standards and guidelines, advocacy for regulation, training and certification and quality assurance and accreditation. Ultimately, the goal is to ensure that all families, regardless of their financial situation, have access to safe and effective neonatal care including safe transfer to a higher-level care center when needed. Regionalized high-quality neonatal care holds the potential to significantly enhance neonatal outcomes. India should make concerted efforts to advance toward the regionalization of perinatal services. Meanwhile, the existing systems should continue to focus on maternal (in utero) transport and the birth of high-risk infants in appropriately equipped hospitals. A robust public-private partnership to implement an integrated, high-quality, and efficient neonatal transport system along with outreach education, systematic data collection, and quality improvement programs will further reduce neonatal mortality rates.

Disclosure: Authors declare no competing interests.

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Call for Articles on
Asian American Healthcare Issues

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It has been well documented that Asian Americans, especially the South Asians, have higher prevalence of cardiovascular diseases and face higher cardiometabolic risk. This is attributed to several factors, including genetics. On May 10, 2022, the Newsroom of the American Heart Association pointed out that "one-size-fits all" is flawed for assessing cardiovascular diseases risk among Asian Americans. In view of the above, starting from Spring 2022 Edition, JAAPI has a section dedicated to **Asian American Healthcare Issues.** We welcome articles on all aspects of Asian American or South Asian healthcare under this section.

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Original Research Article

Improving Health Outcomes in Rural India:
The AAPI Adopt a Village Project's Approach to Non-Communicable Disease Screening and Prevention

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Abstract:

Introduction: Noncommunicable diseases (NCDs) account for 85% of premature deaths in low to middle-income countries. A strategic approach to reduce NCDs in rural populations must meet the United Nation's 2015 Sustainable Development Goals. Our study aims to improve screening of NCDs, and promote lifestyle changes, thereby preventing NCDs in rural India.

Methods: American Association of Physicians of Indian Origin (AAPI) and Global Tele Clinics (GTC) have launched this ongoing screening program for NCDs in 75 villages across India. Phase-1 involves screening for hypertension, diabetes mellitus, anemia, obesity, hyperlipidemia, and chronic kidney disease. Phase-2 involves continuity of care by healthcare professionals for these patients, and Phase-3 aims to create an economically sustainable model.

Results: A total of 5541 people in 51 villages across five Indian states were screened for six NCDs. Hypertension (50·7% of females and 57·9% of males), and anemia (30·5% of females and 44·6% of males) were the most common conditions detected. Obesity was found in 44·1% of females and 38·7% of males. Hyperlipidemia was observed in 22·8% of females, and 9·6% of males, with an LDL >100 mg/dl in 59·0% of females and 58·1% of males. Elevated creatinine was found in 45·1% of females and 22·0% of males. Elevated serum creatinine, an indicator for CKD, accounted for the largest percentage of a first diagnosis for those less than 30 years old (36.8%). Initial diagnosis of hypertension was also increased to 47.7% for those 30 to 50 years old, and to 66.3% for those greater than 50 years old. A significant degree of comorbid conditions was also found. Of those diagnosed with diabetes mellitus (HbA1c ≥ 6.5%), 64.5% were also hypertensive, 51.4% were categorized as obese according to the Asia-Pacific Classification. Close to 30% of those with an HbA1c ≥

6.5% demonstrated border(line) hyperlipidemia and elevated creatinine. The distributions of hypertension, elevated creatinine, border(line) hyperlipidemia, and high lipidemia were consistent across both the overweight and obese categories according to the Asia-Pacific and WHO classifications. Hypertension was the most prevalent comorbidity for those overweight or obese (57.4% to 65.1%) followed by elevated creatinine (31.2% to 36.0%) and border(line) hyperlipidemia (21.0% to 28.7%).

Conclusion: The prevalence of NCDs and comorbid conditions has increased in rural India due to lifestyle changes, inadequate healthcare access, and awareness. Our study evaluated the feasibility of hybrid healthcare delivery model and identified gaps and concerns in providing efficient patient care. Our program seeks to promote a hybrid prevention and management model which will increase NCD screening and improve the overall health of the rural communities of India.

Keywords: Non-communicable Diseases, Rural India, Screening, Health Care Access, Prevention, and Management

Abbreviations Used	
AAPI	American Association of Physicians of Indian Origin
AHA	American Heart Association
CBC	Complete Blood Count
CDC	Centers for Disease Control and Prevention
CKD	Chronic Kidney Disease
DALYs	Disability-Adjusted Life Year
DIPAM	Digitally Integrated Prevention and Management
GTC	Global Tele Clinics
HbA1C	Glycated Hemoglobin
ICMR-INDIAB	Indian Council of Medical Research-India Diabetes
LDL	Low-density Lipoprotein
LDL-C	Low-density Lipoprotein Cholesterol
NCD	Non-Communicable Disease
PHC	Primary Healthcare Center
SRL	Super Religare Laboratories
NFHS	National Family Health Survey
WHO	World Health Organization

Introduction:

As reported by the World Health Organization (WHO) and the US Centers for Disease Control and Prevention (CDC), noncommunicable diseases (NCDs) are responsible for 71% of deaths worldwide (1, 2). Furthermore, 85% of premature NCD deaths occur in the middle to low-socioeconomic areas of developing countries, such as Ethiopia, Nigeria, Bangladesh, India, et cetera (2). Studies have shown that in tropical regions like India, NCDs accounted for a rise in morbidity measured by the Disability-Adjusted Life Years (DALYs) and contributed to 61·8% of total deaths (3). These countries have exhibited a major epidemiologic transition, with NCDs now causing prolonged suffering and death at younger ages compared to high-income countries (1).

Screening and management of NCDs have largely been neglected across India (4). In rural areas of India, this issue is exacerbated due to limited access to health screening, inadequate health promotion, health education, and a lack of preventive practices. Lack of education and awareness could lead millions of individuals to continue unhealthy dietary practices, alcohol and tobacco use with inadequate management of elevated blood pressure levels and high body mass index (5).

Social determinants like education, income levels, occupation, and gender also play a role in the rise of NCDs (5). With NCDs requiring treatment for several years and often life-long treatment, a never-ending cycle is created, where vulnerable patients are plagued by diseases that lead them into poverty-prone situations, secondary to expenses incurred by treatment (4). This emphasizes that initiating strategies and practices across the health, social, and economic sectors is imperative with screening programs for NCDs and creating actionable next steps to reduce the disease burden in rural populations.

One of the targets of WHO's Sustainable Development Goal 3 is Good Health and Well-Being. It aims to reduce the levels of premature mortality caused by NCDs by at least a third (relative to 2015), an important milestone to address the prevalence of chronic diseases and advance from disease management to disease prevention (1, 6, 7). A strategic approach would allow for the strengthening of health systems for the early detection and management of risk factors. Through our approach to raising awareness of disease management and prevention for the reversal of NCDs in rural India, we hope not only to improve health outcomes but also to establish a continuous and coordinated care model by partnering with healthcare professionals.

Thus, the purpose of this study is to provide healthcare screening for NCDs like hypertension, diabetes, anemia, chronic kidney disease, obesity, and hyperlipidemia, and to diagnose, prevent, and potentially reverse these diseases through a hybrid model of healthcare delivery involving

direct patient care and digital clinics as well as adequate lifestyle modifications in rural India.

Methods: In March 2022, the American Association of Physicians of Indian Origin (AAPI) celebrated India's 75 years of independence by initiating a screening program for non-communicable diseases (NCDs) in 75 rural villages across different states in India, including Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Tamil Nadu, and Telangana. The project aimed to assess the accessibility of doctors, nurses, and health assistants in rural primary healthcare centers (PHCs) and screen the population for six major NCDs, namely hypertension, diabetes mellitus, hyperlipidemia, chronic kidney disease, anemia, and obesity. The ethical clearance for the project was obtained from the institutional ethical committee of ACS Medical College Hospital, Chennai, India, a constituent unit of Dr. M.G.R. Educational and Research Institute in Tamil Nadu state. Thus, strict guidelines in conducting research involving human subjects were followed.

We designed a three-phase project to screen, evaluate, and create a sustainable program for NCDs over two to three years. The primary phase involved conducting a screening program in the adopted villages for the six NCDs, using a standardized screening protocol. The second phase is focused on managing positive patients for the six diseases and education on disease management and prevention. In-person visits will be conducted once a month, and a daily digital clinic will be set up in the evenings for three hours. These clinics will predominantly utilize a digital integration prevention and management model of care (DIPAM).

The third phase of the project is planned to focus on creating an economic model to ensure the program's sustainability. This involved identifying potential funding sources and developing a plan for resource allocation, as well as building partnerships with local governments, non-governmental organizations (NGOs), and private companies.

To screen for non-communicable diseases in rural areas of India, AAPI partnered with Global Tele Clinics (GTC), a startup company from Hyderabad, India with 12 years of experience in NCD screening. A memorandum of understanding was signed between AAPI and GTC to screen villages for six NCDs in three phases over two to three years. In the first phase, a willing sponsor who is an AAPI member had chosen a village of his/her preference to adopt. The screening program begins with physical examinations and laboratory tests, including CBC, HbA1c, lipid profile, serum creatinine, and pulse oximetry reading in addition to the measurement of blood pressure, height, and weight fulfilled by SRL (Super Religare Laboratories, Chennai, India). Approximately 150–200 patients were screened per village in phase one, to screen 75 villages across India by the end of 2023. As of September 2022, 51 villages had been screened. This manuscript's data includes the outcomes from the screening of these 51 villages. The process is illustrated in Figure 1 and the project road map is in Figure 2.

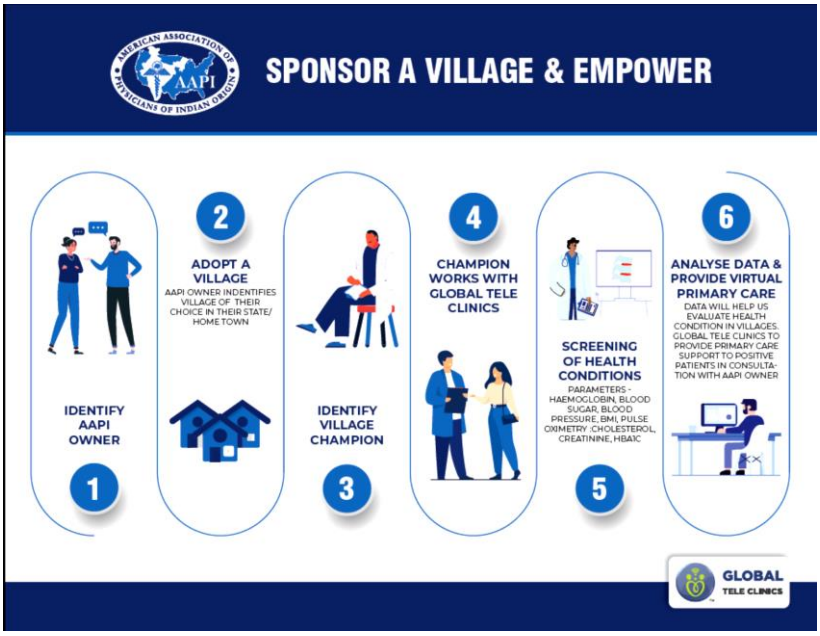

Figure 1: Outline of "Adopt a Village" Project

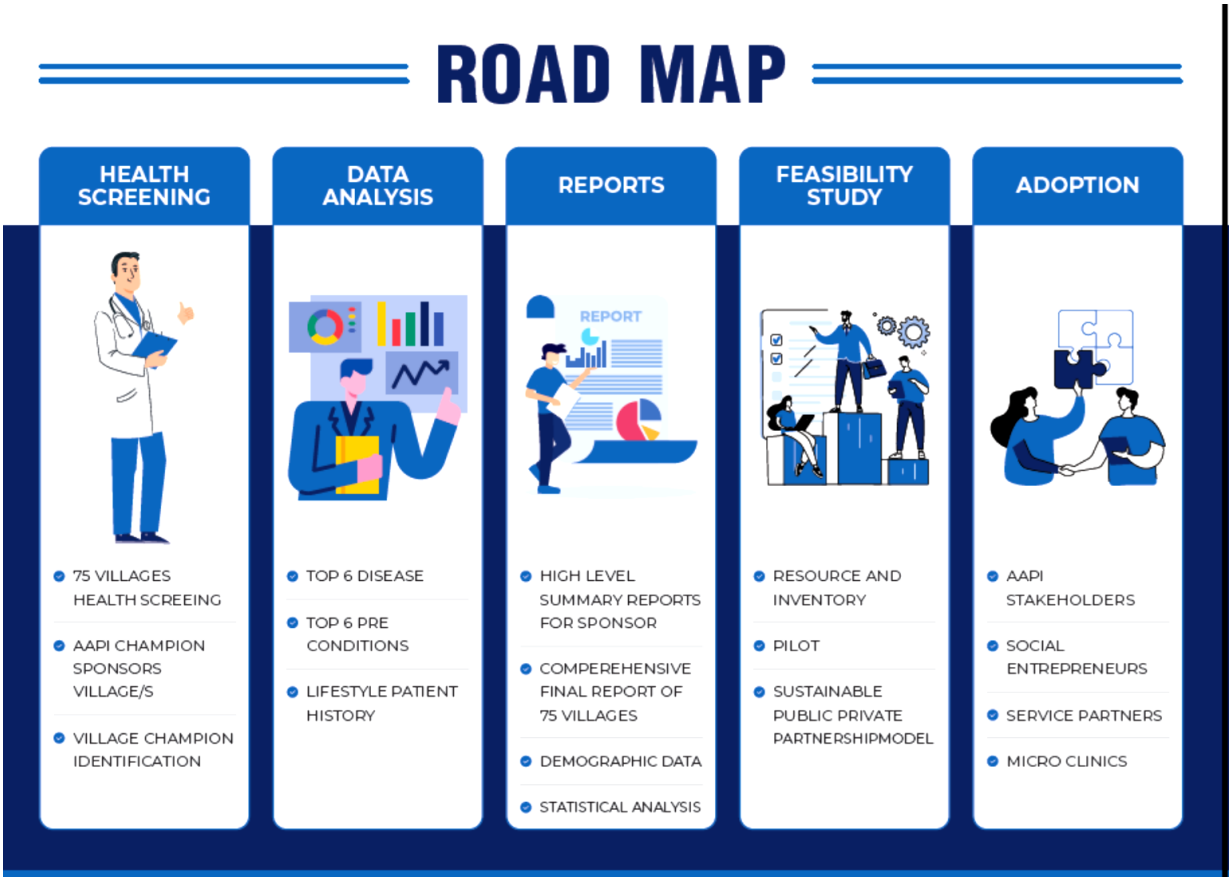

Figure 2: Roadmap of the DIPAM Project

Over a period of one to two years, we conducted health camps in 51 villages identified by sponsors (select AAPI members) and screened 5541 patients. Each donor from AAPI was provided with a report after the camp that included information about the prevalence of diseases in the area. Additionally, lab results were printed and given to the patients, who were then contacted by a GTC physician to explain the results. Based on the clinical needs of the patients, appropriate medications were recommended, and patients were advised to start medications or were guided to an appropriate medical facility or nearby primary care center for continued care. This loop of screening and consultation was part of Phase 1 of the AAPI Adopt a Village Project.

AAPI and GTC are partnering to launch the Phase 2 pilot program aimed at delivering continuity of care for patients diagnosed with NCDs. This program will focus on providing primary and preventive care for the six NCDs identified in patients screened during Phase 1.

Under Phase 2, AAPI members can select a village of their choice or sponsor one of the Phase 1 villages to participate in the pilot program. This pilot aims to assess the feasibility of implementing the DIPAM program. Over the next five years, GTC will continue to run Phase 2 for the rest of the villages that were part of Phase 1 based on the availability of funding.

GTC will hire trained medical professionals, i.e., MBBS/MD/MS physicians registered with the Medical Council of India to conduct physical examinations once a month during Phase 2. Access to GTC DIPAM Electronic Medical Records (EMR), powered by Nano Health India, will be available, and the physician will prescribe the required medications and provide a 1-month supply during the clinic visit. A daily telemedicine clinic (6 pm – 9 pm) will also be available using the Saathi app and facilitated by the village health worker hired by GTC. WhatsApp communication will also be available for villagers to communicate as needed. GTC will hire healthcare workers who will interact with the villages daily as needed and for emergencies to coordinate care with the licensed

physician. Local medical resources, such as primary healthcare centers or locally available registered medical practitioners, will be utilized for immediate care.

During Phase 2, patients diagnosed with NCDs will be evaluated by GTC-AAPI health care workers (Saathi) responsible for following up with the patients daily/weekly to monitor the effectiveness, compliance, and possible side effects of the prescribed plan of care. After the 3-month interval has been completed, the patient will have another in-person assessment by the physician and GTC-AAPI Saathi for a physical exam. SRL India labs will repeat the laboratory tests for follow-up. The patients will continue to be monitored for improvement through physical examinations and laboratory investigations at 3–6-month intervals.

All NCD-positive patients in Phase 2 will be required to implement the six pillars of lifestyle medicine into their lives. These pillars include nutrition, avoiding addictions, exercise, stress management, sleep, and maintaining social relationships (8). The program will focus on implementing these lifestyle changes into the lives of the villagers, which will lead to an economically sustainable model by charging patients the same amount as the local registered medical practitioner charges.

Statistical Methods: Descriptive statistics of cross-sectional data recorded from screening tests of six NCDs were summarized with categorical variables. Frequency counts were measured and presented as proportions (percents). The Chi-square (X^2) test of independence is the appropriate statistical method to examine if two categorical variables are independent or not. In other words, this test indicates if two variables are or are not related. The Chi-square test was used to compare NCDs across males and females and identify associations. A two-sided *P* value less than 0.05 was considered statistically significant. Since large sample sizes may increase the likelihood of a Type I error and not necessarily meaningful results, Cramer's V was used to measure the strength of statistically significant associations between NCDs and gender. Cramer's V ranges from 0 to 1 when testing associations between two dichotomous categorical variables and -1 to 1 when testing associations between categorical variables with greater than two levels. In either case, values closer to 0 indicate smaller levels of effect. These analyses will generate hypotheses and set the foundation for further categorical and longitudinal analyses in Phase 2 and Phase 3. SAS version 9.4 (SAS Institute Inc., Cary, NC) was used to perform all statistical analyses.

Results: By the end of September 2022, 5541 people were screened for six NCDs in 51 villages across five states, including Andhra Pradesh, Telangana, Gujarat, Himachal Pradesh, and Karnataka. Hypertension was the most prevalent of all the conditions, closely followed by anemia.
Age and Gender: The age of patients ranged from 4 to 100 years for females and 6 to 101 years for males. The mean age for females was 50.2 years (SD=15.2) and 53.2 years (SD=15.5) for males and the median ages were 50 years and 55 years for females and males, respectively (Figure 3). The study incorporated minors under the age of 18 who belonged to households from which data of adult participants were assessed. Our objective is to closely observe and analyze the trends of chronic diseases and health statuses during both Phase 2 and Phase 3.
A greater proportion of females were less than 30 years (56.5%) and 30 to 50 years of age (55.0%) and a greater proportion of males greater than 50 years old (55.3%) (Figure 4).

Body Mass Index (BMI): Per the Asia-Pacific Classification (APC), 44·1% of females and 38·7% of males screened were classified as obese (BMI ≥ 25), 14·3% of females and 15·57% of males were overweight (BMI of 23– 24·9), and 13·2% of females and 13·2% of men were underweight (BMI < 18·5) (Figure 5a and Figure 5b) (9).The Chi-square test indicated a significant difference in BMI among females and males (*P*<.001). The Cramer's V of 0.06 indicates a small yet, noteworthy level of association between BMI and gender. Under the WHO Classification, 15·9% of females and 10·22% of males were obese (BMI ≥ 30), 28·2% of females and 28·5% of males were overweight (BMI of 25–29·9), and 13·2% of females and 13·2% of males were underweighted (BMI < 18·5). The Chi square test also indicated a significant difference in BMI among females and males (*P* < .001) according to WHO Classification. In this case the Cramer's V of 0.09 indicates the association between BMI and gender approaching a medium level of association (Figure 6a and Figure 6b) (9).

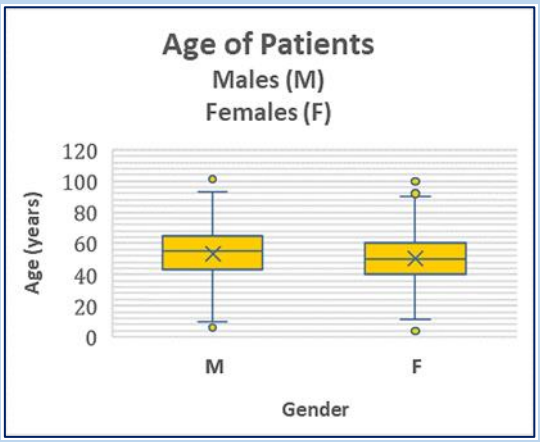

Figure 3: Age of Patients

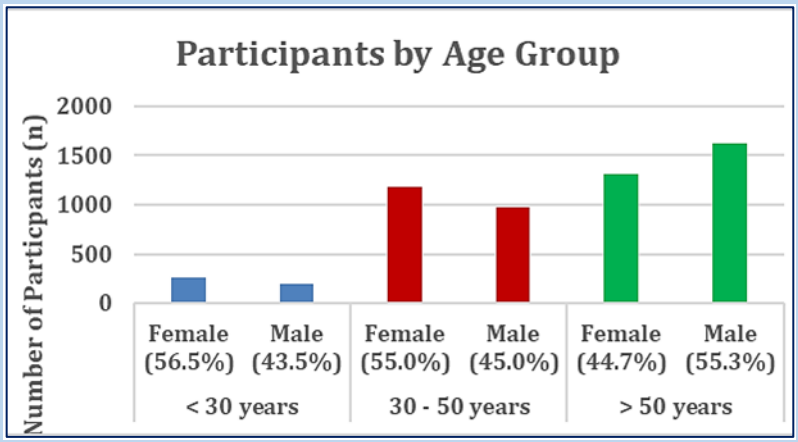

Figure 4: Participants by Age Group

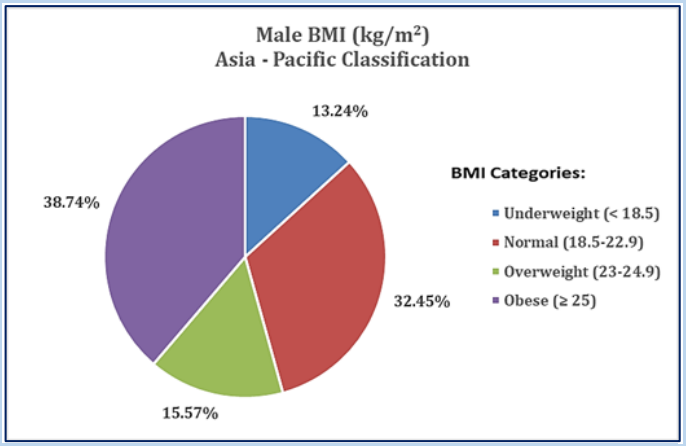

Figure 5a: BMI levels - Asia-Pacific Classification in Males

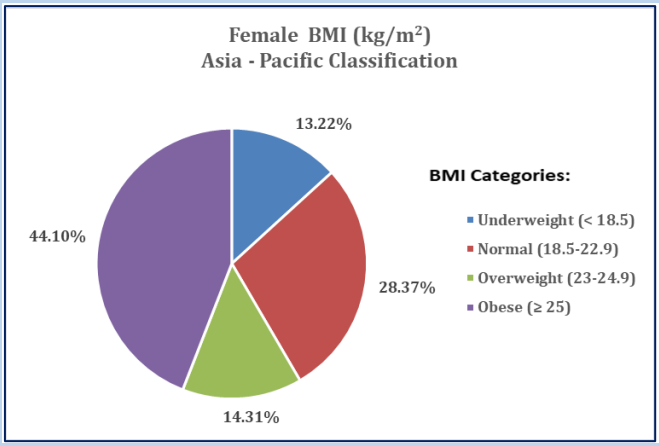

Figure 5b: BMI levels - Asia-Pacific Classification in Females

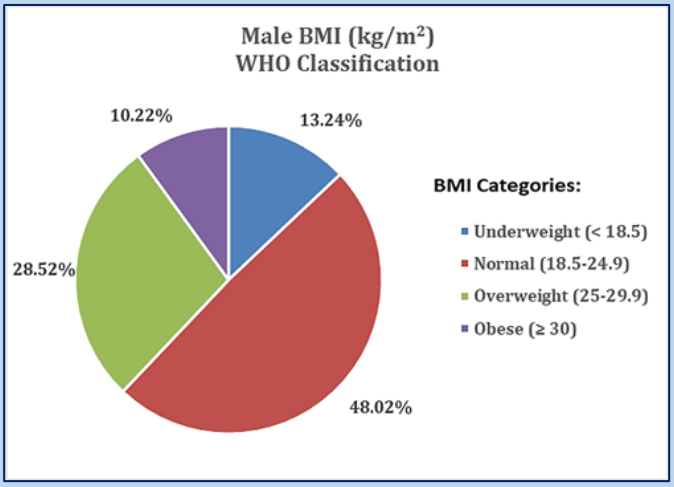

Figure 6a: BMI levels - WHO Classification

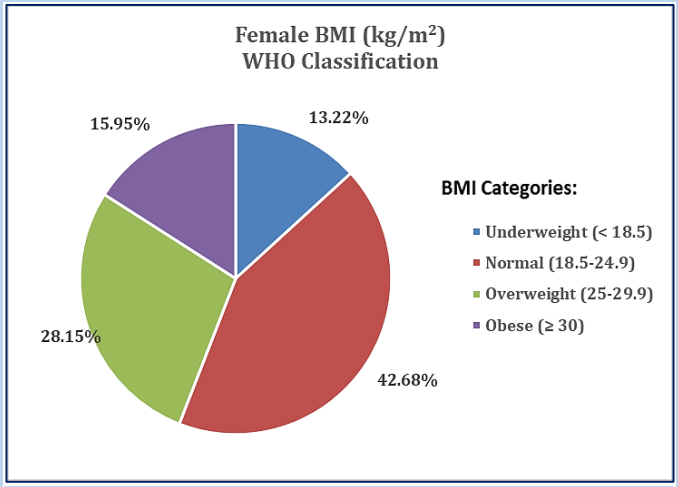

Figure 6b: BMI levels - WHO Classification

Anemia: Adhering to the WHO definition, wherein hemoglobin levels < 12 g/dl in women and < 13 g/dl in men are classified as anemia, 30·48% of females and 44·6% of males were found to be anemic (10). This notable difference in proportions across gender supported by a significant Chi-square test (*P*<.0001) and a Cramer's V of

0.015 indicating a small to medium level of association (Figure 7).

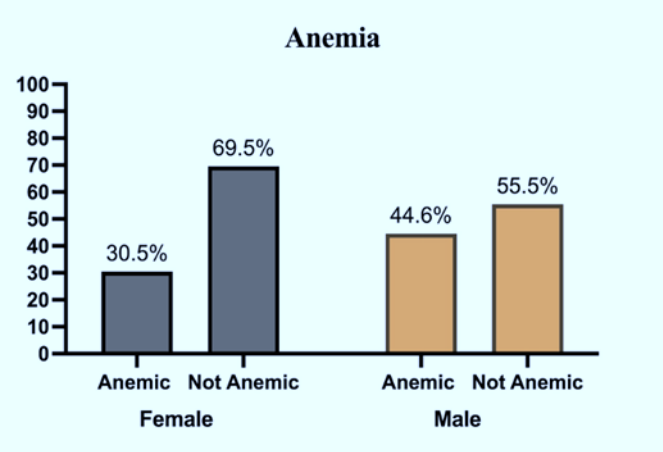

Figure 7: Anemia (Cut-off values for Hb in Male <13 g/dl; Female <12 g/dl)

Diabetes Mellitus: An HbA1c > 6·5% was used to demarcate those with diabetes mellitus. A value above 6·5% would indicate high levels of glycated hemoglobin informing us of the elevated sugar levels (11). By this cur-off point, 21·8% of women and 21·8% of men were found to have elevated levels of HbA1c. No difference in the proportion of females versus males with a HbA1c > 6.5 % was further demonstrated with the Chi-square test (*P>.05)* (Figure 8).

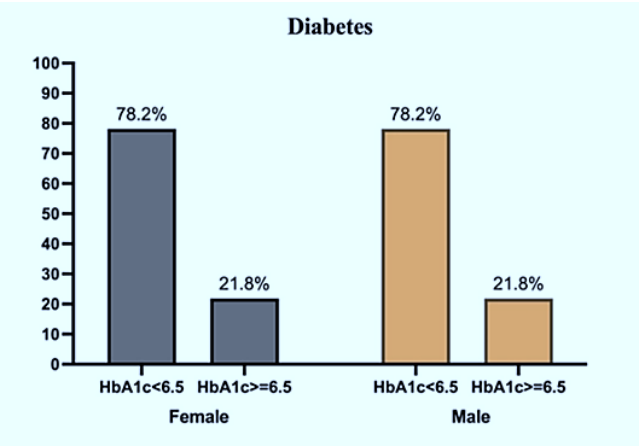

Figure 8: HbA1C Values (X-axis)

Hypertension: Systolic blood pressure (SBP) > 130 mmHg and diastolic blood pressure (DBP) > 80 mmHg readings were classified as hypertension. By this metric, 50·7% of females and 57·9% of males screened were found to be hypertensive (12). Although the Chi-square test was significant (*P*<.0001*),* the Cramer's V of -0.07 suggests a weak association between hypertension and gender (Figure 9).

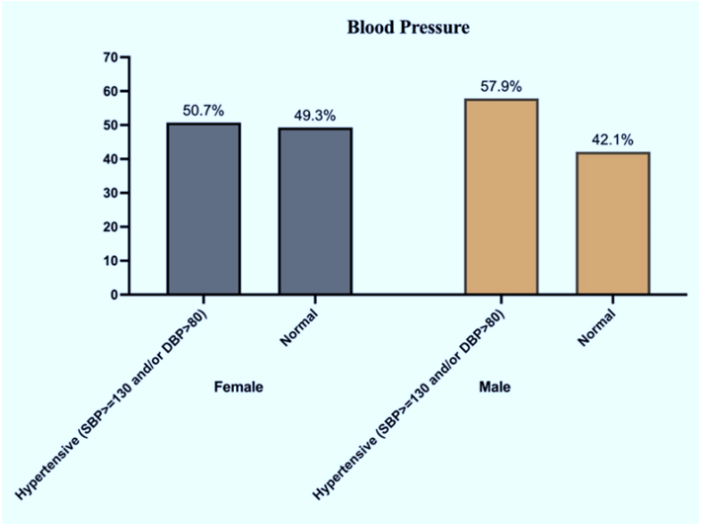

Figure 9: Blood Pressure (mmHg)

Hyperlipidemia: As defined by the Mayo Clinic, a total cholesterol (TC) level < 200 mg/dl is "normal," a TC level of 200-239 mg/dl is "borderline high," and a TC level of >240 mg/dl is "high." Of all females screened, 22·8% had borderline high, and 9·6% had high TC levels. In males, 22·9% had borderline high, and 9·3% had high TC levels (13) (Figure 9). After inputting the values into Friedewald Equation [TC - (TG/5) - HDL] for the accurate calculation of LDL-C, we found that 59·0% of females and 58·1% of males had a true elevation of LDL >100 mg/dl (14). The Chi-square test result was consistent with these observations (*P*>.05) (Figure 10).

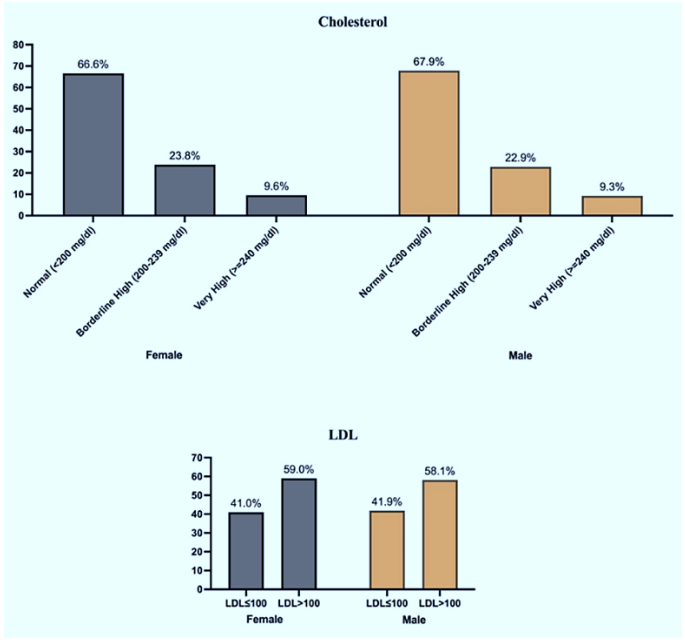

Figure 10: Total Cholesterol (mg/dl) and LDL (mg/dl)

Chronic Kidney Disease (CKD): According to the reference range provided by Mayo Clinic, the normal range of serum creatinine for men is typically 0·74 to 1·35 mg/dl, and for women, it is 0·59 to 1·04 mg/dl. We measured creatinine levels to identify any underlying kidney injury. Our results showed that 45·1% of females and 22·0% of males had elevated creatinine levels (15). These proportions are reflected in a significant Chi-square test ($P<.0001$) and indicate a moderate to strong level of association based on Cramer's V of 0.25. (Figure 11).

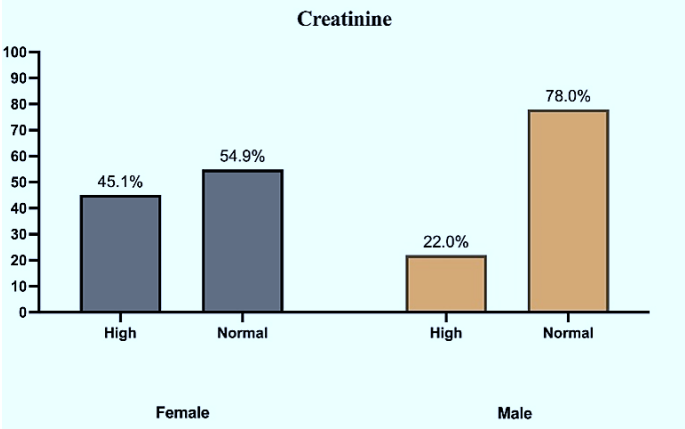

Figure 10. Serum Creatinine (mg/dl)

First Diagnosis by Age Group: The percentage of patients diagnosed for the first time with anemia remained relatively stable across the three age groups (31.0% to 35.9%). Elevated creatinine, an indicator for chronic kidney, accounted for the largest percentage of a first diagnosis for those less than 30 years old (36.8%). For those 30 to 50 years of age and greater than 50 years, an initial diagnosis of elevated creatinine increased as did obesity levels according to both the Asia-Pacific and WHO classifications. Initial diagnosis of hypertension also increased to 47.7% for those 30 to 50 years old and to 66.3% for those greater than 50 years (Figure 12).

Comorbidities: Of those diagnosed with diabetes mellitus (HbA1c ≥ 6.5%), 64.5% were also hypertensive, 51.4% were categorized as obese according to the Asia-Pacific Classification (A/P), and 33.4% were categorized as overweight according to WHO Classification. Close to 30% of those with an HbA1c ≥ 6.5% demonstrated border(line) hyperlipidemia and elevated creatinine (Figure 13).

The distributions of hypertension, elevated creatinine, border(line) hyperlipidemia, and high lipidemia were consistent across both the overweight and obese categories according to the Asia-Pacific and WHO classifications. Hypertension was the most prevalent comorbidity for those overweight or obese (57.4% to 65.1%) followed by elevated creatinine (31.2% to 36.0%) and border(line) hyperlipidemia (21.0% to 28.7%) (Figure 14).

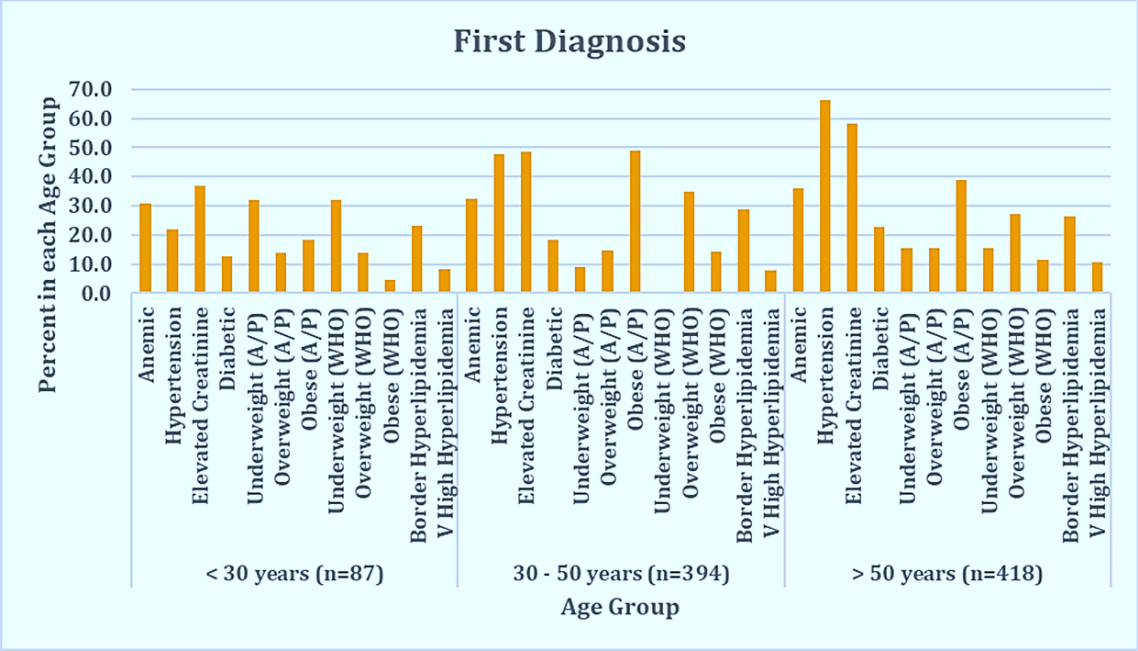

Figure 12: First Diagnosis by Age Group

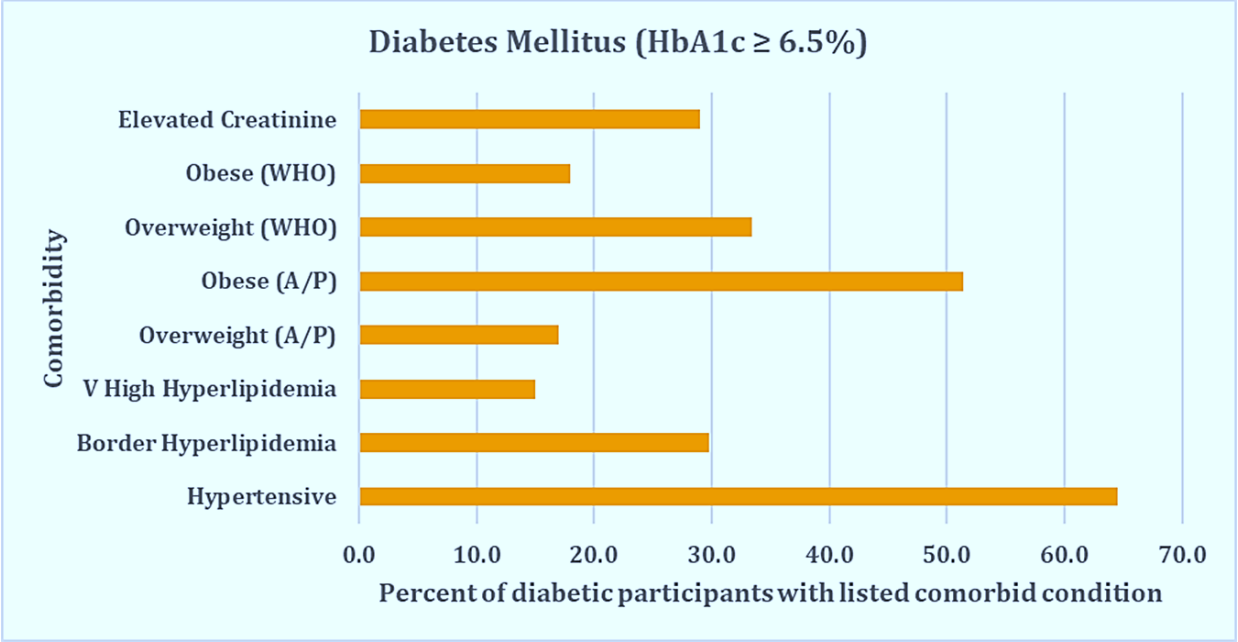

Figure 13: Comorbidities and Diabetes Mellitus (HbA1c ≥ 6.5%)

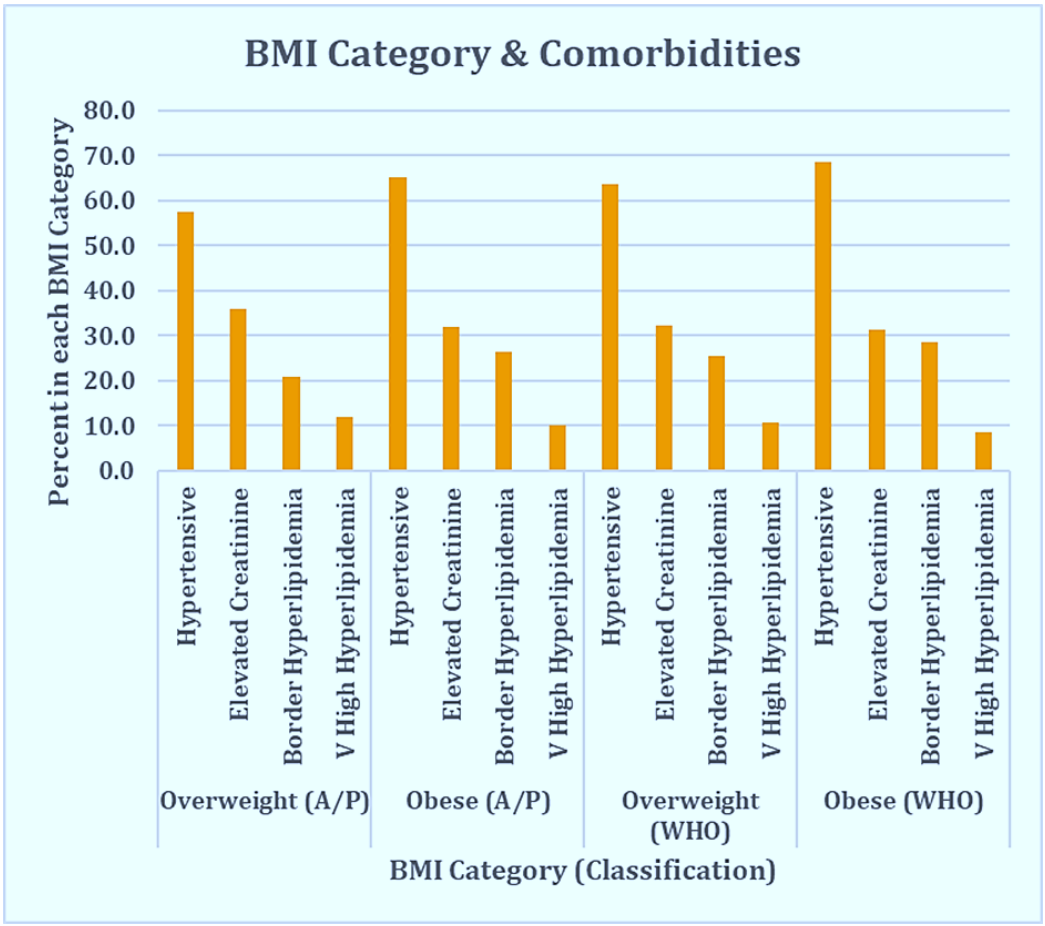

Figure 13: Comorbidities and BMI

Discussion: There has been a major epidemiological shift in the disease burden from communicable diseases to non-communicable diseases across the world. According to the WHO, NCDs have claimed approximately 41 million lives every year across the globe (16). In India, the proportion of deaths due to NCDs has almost doubled from 37·9% in 1990 to 61·8% in 2016 (16). Diseases that were predominantly observed among the wealthy urban populations are now increasingly seen in the villages of rural India (18, 19). Changes in rural lifestyles, such as nutrition, physical activity, tobacco and alcohol consumption, et cetera, are further complicated by the lack of adequate healthcare access, funding, and awareness of diseases, influencing the evolution of the epidemic of chronic diseases in these areas (20). Our study is a three-phase Digitally Integrated Prevention and Management program (DIPAM) initiated by the AAPI and executed and designed by GTC. It was established to increase the screening of non-communicable diseases and promoting a technology-assisted hybrid model for better access to prevention and management of these conditions in rural India.

Our preliminary Phase I study has focused on screening for six non-communicable diseases: obesity, diabetes mellitus, hypertension, hyperlipidemia, chronic kidney disease, and anemia. As per the Asian criteria for obesity classification, our analysis demonstrates that 44·1% of women and 38·7% of men are categorized as obese. In low and middle-income countries, the rapid economic growth and urbanization of rural areas have significantly influenced lifestyle and dietary modifications resulting in a switch from morbidity and mortality due to infectious diseases to more complicated illnesses requiring long-term care (21). According to the NFHS data, in rural areas, the prevalence of obesity almost doubled in a decade, escalating significantly from 8·6% in females and 7·3% in males during the 2005–2006 census to 15% in females and 14·3% in males in the 2015–2016 data (22). Being overweight or obese are major risk factors associated with the development of some of the most common NCDs like type 2 diabetes mellitus, hypertension, coronary heart disease, and even some cancers.

Diabetes is one of the major health problems with an increasing prevalence across the world due to changing lifestyles. India is the most populous countries in the world and has the second-largest diabetic population. In 2019, it was determined that 8·9% of India's population (77 million) were diabetic by the International Diabetes Foundation. The data from our study on the rural population suggest that a proportion of 21·83% of women and 21·84% of men were diabetic (HbA1c >6·5%). A pooled statewide diabetes prevalence analysis over the last three decades revealed that it rose from a 2·4–5·8% range during 1990–1999 to 2·4% to 17·4% during 2010–2019 (23). Swaminathan et al (24) in their study of a farming village in Tamil Nadu reported that rural areas have a higher prevalence of pre-diabetes compared to urban areas. This shift displaying a greater prevalence in rural areas is likely due to urbanization, which, along with positive development in the villages, also caused significant changes in dietary habits, including an increase in the consumption of fried food and junk food in rural areas (24).

According to the latest guidelines of the American Heart Association (AHA), we categorize patients as hypertensive when the systolic and diastolic blood pressures are consistently above 130 mmHg and/or 80 mmHg, respectively. Elevated blood pressure or hypertension is a leading cause of cardiovascular diseases and increased mortality rates. In our study, we found 50·7% of the females and 57·9% of the males were hypertensive, indicating that it affected more than half of our target population. Many people are unaware that this disease tends to progress with no warning signs or symptoms. It is prudent to note that hypertension can develop with other comorbid conditions like obesity, diabetes mellitus, and dyslipidemia with incidentally similar risk factors like unhealthy diets, reduced physical activity, and an increase in tobacco and alcohol use. A study conducted by Boro and Banerjee reported a higher prevalence of 12·4% in undiagnosed and 1·7% untreated hypertension in rural areas compared to urban areas where there were more undertreated cases (by 7·2%). These data suggest that the contributions of risk factors in the development of hypertension are further compounded by the lack of access to regular health care in rural areas (25-28).

Upon performing a screening lipid profile as part of our patient evaluation, we report that the total cholesterol was determined to be borderline high in 22·8% of the women and 22·9% of the men, and high in 9·6% in women and 9·3% in men, while 59·0% of the women and 58·1% men were determined to have a true elevation of LDL (>100 mg/dl). Total cholesterol includes HDL, LDL, and other lipid components, and elevated LDL is one of the common lipid

abnormalities. In the ICMR INDIAB study, the analysis revealed that 13·9% had hypercholesterolemia and 11·8% of the population had high LDL-C. Although there were no urban-rural differences, the common elements that contributed to the development of hyperlipidemia in both urban and rural areas are the female sex, sedentary lifestyle, and other comorbid conditions like diabetes and hypertension (29). These factors likely affected our study's target population, leading to an increase in the number of hyperlipidemia cases.

Chronic kidney disease (CKD) is one of the leading non-communicable diseases predominantly caused by diabetes and hypertension. It can develop because of persistent long-term kidney injury caused by conditions like diabetes, hypertension, and repeated infections. Although the data from our study showed that a higher proportion of elevated creatinine levels was found in females (45·1%) compared to males (22·0%), we must consider that their baseline levels were not available to us for our assessment. There could be other factors (like dehydration, increased physical activity, infections, acute kidney injury, measurement errors, laboratory cut-off ranges, et cetera) that can cause an increase in creatinine levels. These individuals were, therefore, recommended to follow up with primary care physicians for further evaluation during Phase 2. Previous studies have reported a higher prevalence of CKD in women than men, which could be explained by a greater life expectancy, increased likelihood of repeated urinary tract infections, over-diagnosis of CKD, reduced access to health care, et cetera. Although the evaluation of the exact cause for the prominent difference in prevalence is much more complex, physicians must take great care in reducing overdiagnosis and overtreatment of chronic kidney disease (30-32).

In our study, we found that 30·5% (<12 g/dl) of the women and 44·6% (13g/dl) of men were anemic. The cause for anemia can be multifactorial, viz., iron deficiency, B12 deficiency, folic acid deficiency, helminthic infections, genetic causes, et cetera. The most common causes of anemia are nutritional deficiencies. Previous studies have shown a high prevalence of iron deficiency anemia in Indian women. This is an important factor to consider when we determine its implications on the maternal mortality rate. To reduce nutritional deficiencies and the maternal mortality rate caused by them, it is essential to implement good preventive care programs (33). Other nutritional deficiencies are common in people from rural India due to a vegetarian diet, which results in the reduced bioavailability of vitamin B12. Although a vegetarian diet does not necessarily represent an inadequate diet, it is essential that we supplement appropriately with vitamin B12 to ensure the prevention of deficiencies (34).

A major strength of the study is that, to the best of our knowledge, this is one of the first to test the feasibility of a hybrid model of care using a licensed medical practitioner and digital platform to provide healthcare for people in rural areas. One of the study's limitations is that the representative study samples are from villages selected based on the preferences of the sponsors. This could affect the generalizability of the study. Additionally, due to limitations in funding, we could not provide continuous care during phase 1 of the study.

Future Considerations and Sustainability: In Phase 2, our initiative transitions from identifying chronic diseases to implementing comprehensive care strategies tailored to address them. We select specific villages for focused intervention, conducting regular in-person examinations and integrating telemedicine services to ensure continuous access to healthcare. This phase emphasizes the importance of proactive management and early intervention, with dedicated healthcare workers playing a crucial role in facilitating patient-doctor interactions and promoting adherence to treatment plans. By nurturing strong communication channels and leveraging technology, Phase 2 aims to lay the groundwork for sustainable healthcare delivery while addressing the immediate needs of identified populations.

Phase 3 represents a transformative shift towards community engagement and long-term sustainability. Building upon the successes and insights gained from earlier phases, we forge partnerships with public enterprises to establish a fee-based, low-cost model for healthcare consultations. This collaborative approach not only enhances accessibility but also ensures financial viability, enabling us to expand our reach and impact. By integrating local healthcare providers and leveraging lifestyle medicine principles, Phase 3 aims to empower individuals to take ownership of their health while addressing the root causes of chronic diseases. Through education, prevention, and holistic management strategies, we seek to create a lasting legacy of improved

health outcomes and enhanced well-being within rural communities.

By providing a more nuanced depiction of Phase 2 and Phase 3, we can better convey the depth and significance of our ongoing efforts to revolutionize healthcare delivery and promote sustainable change. The Hybrid clinic process involves telemedicine and in person visits and we named it as DIGITAL INTEGRATED PREVENTION AND MANAGEMENT PROGRAM(DIPAM): Which in Telugu language signifies light: Bringing light through healing hands. Please see below for the clinic process (Figure 15).

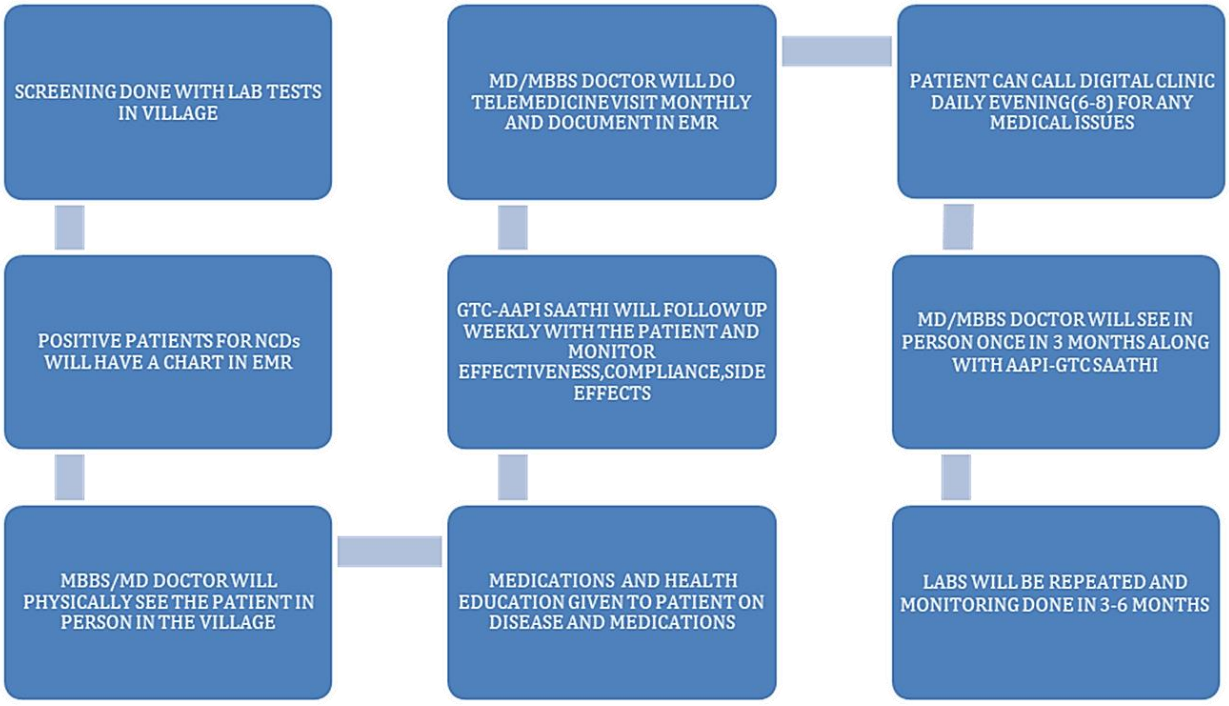

Figure 15: Digital Integrated Prevention and Management Program (DIPAM)

Conclusion: This study evaluated the feasibility of a hybrid healthcare delivery model and identified gaps and concerns in providing efficient patient care. It also showed that by leveraging a public-private partnership, primary care can be delivered through a combination of digital platforms and in-person, which is potentially the future of healthcare. Furthermore, this model allows for the introduction and implementation of lifestyle modifications for rural patients, which could reverse chronic diseases. This study is of considerable significance as it endeavors to establish a groundbreaking healthcare delivery approach in hard-to-reach, rural communities, which has not been previously explored. In addition, there is a pressing need for the development of annual preventive check-up guidelines tailored toward rural populations and their unique healthcare needs. Due to the challenges of accessing healthcare in remote areas, many rural residents may not receive regular checkups and preventive care. This can lead to undiagnosed health issues and a higher risk of chronic diseases. By tailoring guidelines and promoting regular checkups for rural populations, healthcare providers can help identify health concerns early and implement appropriate interventions. This is particularly important given the higher rates of chronic diseases, such as obesity and diabetes, in rural areas. By improving access to preventive care and addressing the unique health needs of rural populations, this hybrid healthcare delivery model has the potential to improve health outcomes and reduce healthcare disparities. It is imperative that we create Indian Preventive Services Task Force guidelines (IPSTF) based on evidence similar to the United States Preventive Services Task Force (USPSTF) guidelines to help clinicians and

healthcare providers implement preventive strategies and improve the overall health of the rural Indian communities.

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Authors Contributions: Gokula M was involved in the concept and design of the study and data acquisition. Gandrakota N and Kennedy M contributed to the analysis and interpretation of the data. Ramakrishnan M, Vanamada C S, Kiran V, Nair S, and Sudireddy K drafted the manuscript. Critical revision of the manuscript for important intellectual content was done by Murthy P, Gokula M, Gandrakota N, and Ramakrishnan M. Administrative, technical, or material support was provided by Gokula M; Supervision by Gandrakota N.

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Data Sharing: The data used in this study are available to the journal's peer reviewers and legitimate interested parties, to enable them to evaluate the study's findings. Data will be in a deidentified form to protect participant privacy. Any restrictions on data access will be disclosed to potential reviewers.

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Brief Report

Future of Global Resuscitation Education: Status of Hybrid Cardiopulmonary Resuscitation Training

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Abstract: Cardiopulmonary resuscitation (CPR) is a life-saving emergency procedure used for resuscitation in the scenario of sudden cardiac arrest. Early recognition, performing high-quality CPR, and early defibrillation are crucial steps to improve patient outcomes. The time it takes to perform CPR by bystanders is a critical determinant of survival after both out-of-hospital and in-hospital cardiac arrest. However, often, bystanders fail to initiate CPR or perform poor-quality CPR after witnessing cardiac arrest. Therefore, providing optimal and frequent training to every citizen is essential. However, there are many challenges in training and retraining due to local/regional differences in infrastructure, resources, language barrier, learning pace, cultural beliefs, etc. Conventionally, the CPR training course is instructor-led, mannequin-based, face-to-face training. Classroom-based CPR training demands dedicated time, cost and logistics for the instructor and course taker. The Indian Resuscitation Council (IRC) aims to make every Indian citizen a life saviour and has proposed "Compression Only Life Support (COLS)" for laypersons. In 2015, The American Heart Association introduced the concept of e-learning and blended/hybrid learning. Online training environments can be synchronous, asynchronous and hybrid. Where synchronous training requires simultaneous student-teacher presence, students can work on an e-learning platform at their own pace in asynchronous sessions. Hybrid CPR training combines online teaching and face-to-face classes into one. This article aims to present a brief report about the impact of hybrid learning for Cardiopulmonary resuscitation (CPR) courses and its future role and challenges in countrywide CPR training.

Key Words: CPR training, Global education, Hybrid, Layperson training, Remote learning

Introduction: Early recognition and performance of effective cardiopulmonary resuscitation (CPR) by bystanders are essential steps to improve patient outcomes. Often, bystanders struggle to initiate CPR in witnessed cardiac arrest or perform inconsistent CPR quality in both out-of-hospital and in-hospital settings. The incidence of bystander CPR in patients with out-of-hospital cardiac arrest (OHCA) is less than 50% (1). The survival rate after OHCA who have received bystander CPR is low (<10%), which varies widely across the globe (2, 3). Local/regional differences in infrastructure, resources and health policies also affect outcomes after witnessing cardiac arrest (4). Therefore, providing CPR training and retraining to every citizen regularly is crucial.

Even though concepts of CPR have been updated as per evidence, there is a considerable hiatus in what is known and how to perform CPR on out-of-hospital and in-hospital cardiac arrest victims. Various societies, such as the American Heart Association (AHA), European Resuscitation Council, Resuscitation Council United Kingdom, Australian Research Council, etc., promote CPR teaching, training and practice for

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laypersons and healthcare personnel. As early defibrillation increases survival outcomes, automated external defibrillators (AEDs) have been provided in public places such as malls, airports, tourist spots, schools, offices, etc., to increase early accessibility (5, 6). In India, the Indian Resuscitation Council (IRC) has provided a CPR algorithm as per Indian infrastructure and aims to make every citizen a Life saviour. IRC proposed "Compression Only Life Support (COLS)" for laypersons, which makes it easy for any bystander to initiate CPR as soon as possible (7, 8).

To close the knowledge-practice gap and improve the witnessed cardiac arrest survival rate, we must focus on the dissipation of knowledge and repeated CPR training at the regional/global levels. However, there are many challenges in training and managing people with diverse backgrounds, including but not limited to the language barrier, learning pace, cultural beliefs, etc. (9).

This brief report presents the impact of hybrid learning and its future role in CPR training. We selected relevant published articles in the English language with the keywords "CPR", "cardiopulmonary resuscitation", "Hybrid", "Online", and "Training" on PubMed and Google Scholar databases.

Classroom vs Hybrid CPR Training: Traditionally, CPR training is done in the classroom, which is instructor-based and face-to-face using a mannequin. Classroom CPR training demands dedicated time, cost, and logistics for the instructor and course taker. The American Heart Association introduced the concept of e-learning and blended learning in 2015 (10). The concept of hybrid/blended and e-learning resurfaced during the COVID-19 pandemic when local/countrywide classroom/in-person training restrictions were due to the potential risk of virus spread during sessions (11). A well-structured online CPR training effectively disseminated essential skills and knowledge to Indian paramedical staff during the COVID-19 pandemic. Both synchronous and asynchronous online CPR training were effective; however, participants preferred the synchronous mode. (12,13).

All societies/organizations must reconsider the CPR training format, which should be time-saving, convenient, and have broader coverage while maintaining high-quality outcomes. With technological advancements that can facilitate safe and practical learning, new training formats are being implicated and have time-saving results. A randomised controlled trial on 832 Taiwanese adults has shown that a blended CPR training program that included 18-minute e-learning and 30-minute hands-on is as effective as traditional CPR training. Knowledge and quality of CPR performance were comparable between the groups at 6-month and 12-month follow-up (14).

Hybrid CPR training combines online teaching and face-to-face classes into one. **(Figure 1: Hybrid CPR training model)** CPR self-instruction video or computer-based modules combined with hands-on practice may be compelling (15), especially during a pandemic or other calamities; planning is required for hybrid training to be effective and practical. It involves decision-making for timing, interaction, and location for hands-on training. Online training sessions can be synchronous (real-time or simultaneous), asynchronous or both. Students can enrol in online teaching and access classes according to their suitable time and venue. It is easy to implement as it does not require mannequins or other airway equipment. Knowledge assessment can be done instantly after administering tests online. Online resources are available to study and can be accessed multiple times. Hybrid learning also transforms the way CPR instructors interact with students. Either one-way or bi-directional interaction between instructor and student can be implemented during the online session (16). While hands-on sessions would provide immediate real-time involvement and feedback, this also gives a better opportunity to develop relationships between teachers and students. The time required for in-person/hands-on sessions in hybrid is less than in traditional teaching.

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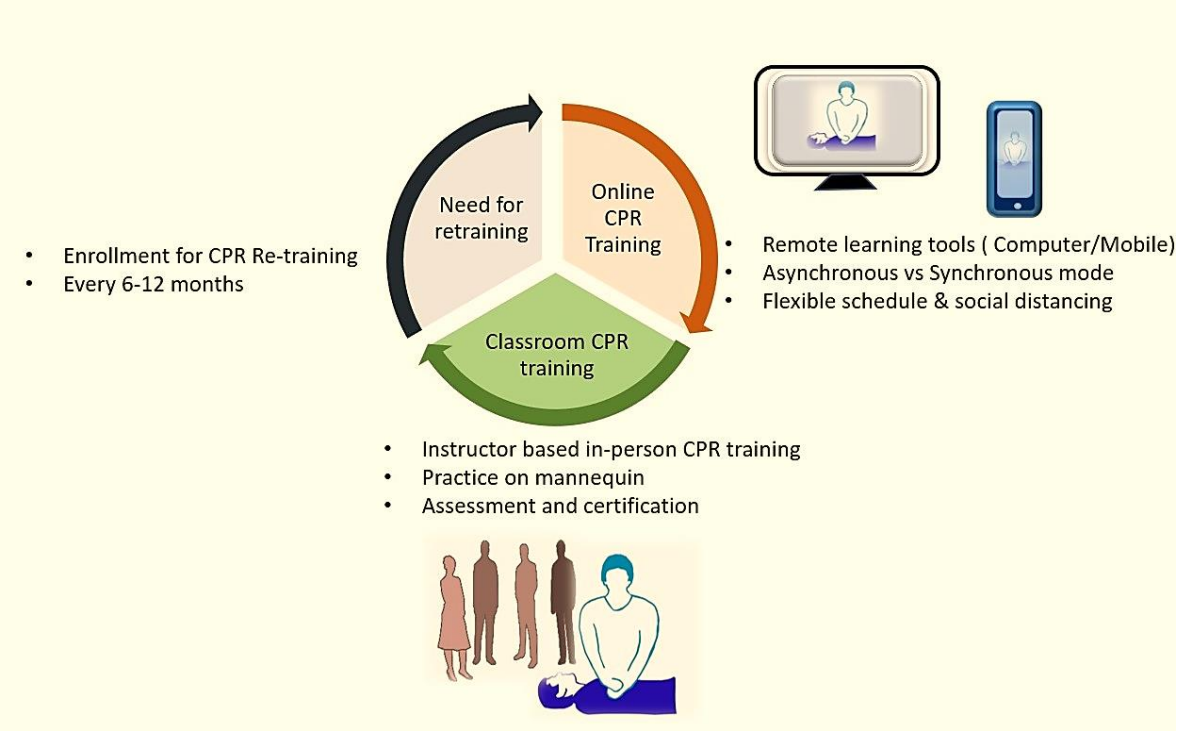

Figure 1: Hybrid CPR training model

Recently, a systemic review and meta-analysis by Ali et al. compared CPR performance, quality, and knowledge among laypersons after standard instructor-based classroom CPR training with the alternative CPR training techniques, which included non-standard face-to-face, hybrid and online methods. The hybrid CPR training method scores similarly or better than standard classroom training (17).

Hybrid CPR Teaching Techniques: Taizo et al. compared traditional CPR teaching with flipped CPR learning on medical undergraduates. In the flipped learning group, instructors directed students to watch a pre-recorded short video one week before the hands-on training. The video was based on AHA bystander CPR and lasted approximately 15 minutes. The students were allowed to watch content as many times as necessary, at any time and at their own pace. The flipped CPR learning group was comparable to traditional CPR at six months in terms of time to the first chest compression and the number of total chest compressions performed during the 2-minute test period (18).

Kiosk sessions, a type of hybrid CPR training, also showed comparable results to classroom training. A video on hands-on CPR was demonstrated to the participants. After the video, the AHA hands-on CPR training kiosk was a learn-and-practice module. Participants practised compressions with feedback meters on the screen. Though compression depth was poorer in the kiosk session, the total score, compression rate, and performance on hand position were similar to that of the classroom session. Using this kiosk, people can be trained quickly and efficiently (19).

Traditional classroom CPR training is most often paid, which further limits accessibility and makes people reluctant to retraining sessions. The online session can reduce costs to a certain extent. A recent study has shown preliminary evidence of the usefulness of a homemade CPR trainer: a mason jar lid with two toilet paper rolls placed directly on top. Full compression of inner toilet paper tubes equaled compression up to 5 cm. Full recoil was comparable to the opening of the inner tubes. This homemade CPR trainer was not inferior to a commercially available CPR trainer (20). Students can practice this homemade

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trainer during hybrid CPR training while waiting for the in-person hands-on session.

An indigenous interactive educational smartphone app can be developed and used for online sessions to allow students to learn CPR in a realistic and inactive manner. Lifesaver virtual reality is an app developed and endorsed by the Resuscitation Council of the United Kingdom. A study showed that training via virtual reality was not inferior in terms of compression rate, but compression depth was inferior to face-to-face training. This app may hold the potential to be included in hybrid CPR training and target a larger population in a shorter time (21).

To maintain CPR skills, we must consider retraining at different time intervals. However, the optimal gap for retraining to maintain skills remains unclear. There is a rapid deterioration in traditional CPR skills within 3- to 12 months post-initial training (22). Providing hybrid CPR training might overcome this barrier for both instructors and students. Lack of accessibility to CPR training centres and the requirement of money and time are associated barriers to learning in traditional CPR training classes. However, these can be addressed with creative training solutions, including hybrid CPR training.

Limitation: Despite the benefits of hybrid training, it is associated with operational and practical challenges for instructors and students. The possible drawbacks of hybrid CPR training, especially for laypeople, could be unfamiliarity with technology, server issues, and lack of internet access and gadgets. Often, participants find themselves too lazy to log in for the online session. Hybrid CPR training should be considered, requiring fewer resources and offering students more significant time and comfort without compromising the quality of CPR.

Summary: Hybrid CPR, which combines e-learning/ remote learning and hands-on skill sessions, could be a promising approach to disseminating CPR skills widely and efficiently. Hybrid CPR training is as effective as the conventional classroom-based person-to-person training for accredited BLS and ACLS courses. E-learning may offer benefits in terms of cost-effectiveness and easy accessibility, requiring fewer human resources and safety, thus providing a more efficient teaching method. This alternative method of CPR training is helpful during a crisis such as the COVID-19 Pandemic. A hybrid CPR training program can be an alternative training option for refresher training and retraining at regular intervals. However, there is still scope for improvement in online initial CPR training and skill retention methods. Future research would be needed to prove the non-inferiority of hybrid CPR training over traditional CPR training before its countrywide/global implementation.

Disclosure: The authors declare no competing interests.

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Call for Articles on
AI and Medicine/Healthcare

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Medicine and Healthcare are facing an unprecedented transformation by AI (Artificial Intelligence). The transformation is going to be phenomenal and essentially change the way physicians and healthcare professionals have been practicing. They have both excitement and fears as they are not aware of what is going to change and how to adapt to the change. To address this issue and to match the theme of AAPI Global Healthcare Summit 2024, which is Future of Healthcare & Artificial Intelligence, JAAPI is inviting articles on all aspects of AI that relate to medicine and healthcare for publication in the Winter 2023 Edition. Prospective authors should submit their articles by October 15, 2023. All articles will be subject to peer review. Instructions for submitting articles can be found in this edition of JAAPI.

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Perspective

AI in Healthcare Course: A Clinician's Journey

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Prologue: While Artificial Intelligence (AI) has been around for some time, the recent impact of ChatGPT is palpable. Healthcare providers and personnel are increasingly enthusiastic about the future of healthcare with AI technology. AI is already making strides in various fields, including radiology (1), dermatology (2), ophthalmology, diagnostics, precision medicine, and drug development (3). Undoubtedly, it holds promising implications for the future. I joined an online course offered by the Stanford University, namely "AI in Healthcare Specialization" to gain insights into AI in healthcare and to have an ability to converse about AI with more ease. In this perspective article, I would like to share my experience and impressions about this web-based course, and its potential for educating the physicians, who do not have the time to delve into the technological complexities of the AI.

Why did I do it? All physicians/healthcare providers ought to be familiar with AI for its potentials in healthcare: Improved Diagnostics, Personalized Treatment, Clinical Decision Support, Efficient Data Analysis, Workflow Optimization, Clinical Trials, Drug Discovery, and so on. AI is a reality unfolding right in front of our eyes.

Why Stanford Online? There are plethora of universities and programs which offer AI in healthcare certification, and they can be a little overwhelming to choose. I researched rather extensively before I chose the Stanford Online course. Most AI courses online take 6-8 weeks' period to complete, and they offer the course only a few times a year and one must apply within certain timeframe. However, the Stanford Online Course has the flexibility to complete. I would like to share my experience about this course which may be beneficial for some readers.

Course Structure: The course has 5 modules as follows. Once enrolled in a module it needs to be completed within 6 weeks and the next module can be started after that. In the course, there is an introduction to bioethics, what is fairness, bias, discrimination in AI models (4-7). Explanation and solutions are also part of the learning process. Each module has an exam at the end which consists of 25 questions and the pass mark is 80%. There is no limit to the number of attempts to pass. After passing each module and exam, one receives a separate certificate in that field which can be shared on social media such as LinkedIn.

1. **Introduction to Healthcare:** In this module, there are basics about healthcare systems in the United States such as interaction between patients and physicians, hospital systems, payers including private insurances and Medicare. For physicians, this is basic and essentially a good reminder for those taking the course. It is a good module to start the course as it builds confidence with what we already know. For non-healthcare professionals there is a learning curve.
2. **Introduction to Clinical Data:** Clinical data are a cornerstone of modern healthcare, supporting patient care, research, and healthcare management. As technology continues to evolve, effectively using clinical data plays a key role in the ongoing advancement of healthcare practices, especially in the development of AI. There is an opportunity to learn several things in this module. Clinical data mining, how to look at dataset from patient

timelines, analysis, handling unstructured data such as text, signals, images are the main focus. It is also relatively an easy module to navigate through.

3. **Fundamentals of Machine Learning:** Understanding these fundamental concepts provides a solid foundation for delving deeper into the world of machine learning and its diverse applications. This module has the following: Why machine learning in healthcare, biostatistics, programming, concepts and principles of machine learning in healthcare, strategies and challenges, how to label, clean and curate the data, training and testing the data, learning about neural networks, evaluating accuracy, precision, recall, overfitting, underfitting of the data, hyperparameters, learning about models including foundation model, large language models, etc. There is a steep learning curve in this module.
4. **Evaluation of AI Application in Healthcare:** A comprehensive evaluation of AI applications in healthcare requires a holistic approach that considers clinical effectiveness, safety, ethical considerations, usability, scalability, regulatory compliance, and long-term impact. Regular monitoring and updates are essential as technology and healthcare practices evolve. This module was relatively easy to learn and was interesting.
5. **AI in Healthcare Capstone Project:** Capstone project is a hands-on experience which is a guided exploration of a patient's healthcare experience. This revolves around a fictional patient who presents with respiratory symptoms prompting a visit to a primary care provider amidst the backdrop of the COVID-19 pandemic. The narrative unfolds through the lens of the data generated at each step of the patient's journey. This data includes electronic health records with image data for analysis. One can learn feature construction, selection of data types, model evaluation strategies, and the intricacies of managing the patient timeline. Along with technical aspects, there is an opportunity to learn regulatory landscape and ethical considerations in building an AI platform. The capstone project is not just a culmination of learning but a stepping stone into the dynamic realm of medical data mining, offering a glimpse into the future of AI- enabled healthcare.

Is There CME with This Course? Stanford offers around 10 Category 1 CME for each module. One can avail more than 50 hours of CME credit with the completion of the entire course.

How Much Time Does It Take? A common question for busy practitioners. Each module may take up to 8 weeks and it may take less if one puts in a greater number of hours each week. I took about 6 months' time to complete the entire course due to my busy schedule. For instance, if someone spends 5-6 hours a week, it can be completed in 2-3 months' period.

How Much It Costs? Other courses cost around $2,000-$3,000. The Stanford Online Course has monthly subscription fee of around $85. Thus, it turned out to be much cheaper than other courses. I spent less than $500 for the entire course. Each module has around 8 weeks and each week may take up to 2 hours of time.

How Difficult It Is? While "Introduction to Healthcare" module was a breeze, "Introduction to Clinical Data and Machine Learning" was harder. Evaluations of AI Application in Healthcare and Capstone projects were interesting and are useful in the real world.

What Did I Learn? Before starting the course, I had little knowledge about AI. This course taught me the basic principles of machine learning, what is good and what is bad data, data sourcing, ethical considerations, product validation, bias in AI development, FDA regulations, best ethical practices, good machine learning practices, how to choose stakeholders to develop an AI product, etc.

What Can I Do with It? It gives me an insight into the world of AI in healthcare. I gained some knowledge and ability to analyze an AI product based on the model used and other critical factors. It will help me participate in the development of AI products as a stakeholder from a clinical perspective and may open the door for serving on the board of healthcare technology companies.

URL Link to the Course:
https://www.coursera.org/specializations/ai-healthcare

Disclosure: The author declared no competing interests.

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AAPI Fall 2023 Virtual Research Symposium
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AAPI-01-2023: Adult-Onset Still's Disease: Report of a Case from Summa Health

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Adult-onset Still's Disease (AOSD) is a rare disorder characterized by quotidian fevers, rash, arthralgias and myalgias affecting young adults. If undiagnosed, AOSD can lead to lifelong debility. We present a 21-year-old woman with new onset AOSD.

Case History: A 21-year-old woman was admitted to hospital with fever to 39.4 °C (103°F), diffuse arthralgias and myalgias and an evanescent rash on her legs now spreading to trunk and arms. She had some food/environmental allergies. There was no travel history or sick contact exposure.

Physical exam: T=39.4°C; other vital signs normal. She was in mild distress and had a salmon-colored, non-pruritic, maculopapular rash on trunk and limbs that was more evident during febrile episodes. She reported soreness of elbows, hips and knees with Koebner phenomenon elicited upon tourniquet placement for IV access. Abnormal laboratory data: ferritin = 145 ng/mL (60-137), C-reactive protein (CRP) = 60.4 mg/L (0.0-9.9), aspartate aminotransferase (AST) = 78 U/L (15-46), alanine aminotransferase (ALT) = 98 U/L (0-34), procalcitonin = 0.21 ng/mL (0.00-0.09 ng/mL). Normal lab data: CBC, hepatitis B/hepatitis C testing, anti-cyclic citrullinated peptide antibodies, anti-RF antibody, antinuclear antibody (ANA), anti-neutrophil cytoplasmic antibody, C3/C4 complement, infectious cultures/serologies, tuberculosis QuantiFERON assay, creatine kinase, peripheral smear. Patient improved with IV steroids and was discharged on oral prednisone. At Rheumatology evaluation one month later, diagnosis of AOSD was established. She achieved remission and is maintained on anti-IL-1β monoclonal antibody (canakinumab) and low-dose prednisone.

Conclusion: AOSD is a diagnosis of exclusion made applying the clinical features of the Yamaguchi diagnostic criteria. Prominent features of AOSD include daily fever, characteristic rash usually present during febrile periods, arthritis with negative IgM Anti-Rheumatoid Factor antibody (Anti-RF) and negative ANA. AOSD should be considered in young adults with fever, rash and arthralgias. Early identification and treatment with appropriate disease-modifying agents can prevent permanent joint damage.

AAPI-02-2023: Correlation between Radiological Markers of Normal Pressure Hydrocephalus and Response in Gait Parameters

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Background: Radiological imaging plays a crucial role in the diagnosis of Normal Pressure Hydrocephalus (NPH), as symptoms of NPH can mimic other neurodegenerative disorders. Callosal angle (CA), Evan's Index (EI), and Lateral Ventricle Volume have been proposed as quantitative measures for diagnosing NPH and monitoring outcomes after Lumbar Puncture(LP).

Methods: We retrospectively identified 42 patients (average age 82.4 years) who were diagnosed clinically with NPH. These patients underwent brain imaging (MR or CT), and LP with high-volume CSF removal. CA and EI were measured on coronal and axial images, respectively. Lateral ventricular volume was measured by doing manual segmentation of the lateral ventricles on 3D SLICER (version 5.2.2). Clinical improvement in four gait parameters was measured: Cadence, Gait Speed, Stride Length, and Timed up and go, and scored from 0 (no improvement) to 1 (improved). The cumulative score was termed 'Response'. Spearman's correlation analysis was done to investigate relationships between gait 'Response' with Lateral Ventricular Volume, EI, and CA. Additionally, we categorized lateral ventricle volume into two groups based on the median (below 132 mm3, above 132 mm3) and performed Spearman correlation to examine their relationships with Response. Significance was set at $p < 0.05$. Statistical analysis was conducted using Spyder (Python 3.10).

Results: There was a significant correlation between Lateral Ventricle Volume and gait Response (Spearman correlation: 0.4, p=0.02). Further examination revealed a more substantial correlation among patients presenting with lower ventricle volume (volume < 132mm3, Spearman correlation: 0.57, p=0.01), as opposed to those presenting with higher ventricle volume (volume > 132mm3, Spearman correlation: 0.2, p=0.3).

Conclusion: Our research indicates that lateral ventricular volume has a stronger correlation with gait improvement compared to Callosal Angle or Evan's Index. Specifically, patients presenting with a volume less than $132mm^3$ are more likely to show improvement in gait after LP as compared to those presenting with higher volumes (over $132mm^3$). These findings suggest that assessing lateral

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ventricle volume may serve as a valuable predictor of clinical response in gait following lumbar puncture for patients with Normal Pressure Hydrocephalus.

AAPI-03-2023: Central hemodynamics and pregnancy induced hypertension: Mobil-o-graph based cross-sectional study

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Introduction: Pregnancy is a physiological state where major temporary cardiovascular adaptations take place to which mother herself must adapt. Pregnancy-related changes are more pronounced in central hemodynamics. Cardiac output increases by 30%–50% above baseline levels during the entire pregnancy, but half of this change occurs by week eight. This significant increase is provoked by increases in blood volume, reduction in afterload (decline in systemic vascular resistance) and rise in maternal heart rate. Failure to adapt to these changes can result in the development of hypertensive disorders of pregnancy namely hypertension, preeclampsia or eclampsia, gestational diabetes, and preterm birth.

Methods: We conducted an observational case control study in outdoor patients attending obstetric department and medicine department of tertiary care teaching care government hospital attached to our government medical college. We used portable, PC attached, calibrated, and validated instrument Mobil-O-Graph of IEM Company, Stolberg, Germany available in and successfully being used by Physiology department of our college. Pulse wave analysis was done by oscillometric method. Arterial pulsation generates pressure oscillations which were transmitted to blood pressure cuff and measured by transducer to be fed into microprocessor. Pulse wave analysis:-Computerized software records pulse wave of brachial artery and by a transfer factor derives central aortic pulse wave.

Results: We observed significantly higher central hemodynamics-cardiac output, aortic blood pressure and cardiac workload and arterial stiffness- pulse wave velocity, augmentation pressure, augmentation index in Pregnancy induced hypertension (PIH) cases than controls. We found accelerated hemodynamics in Pregnancy hypertension (PH) than Pregnancy normotensive (PN), Non pregnant normotensive (NN) group. Increased cardiac output is adaptation in PIH to perfuse stiffened placental circulation. Similarly aortic blood pressure is also accelerated indicating increased afterload on heart.

Conclusion: There is abnormal profile of central hemodynamics and arterial stiffness, independent of brachial blood pressure, in hypertensive disorder of pregnancy compared to normal. It indicates extra workload on the heart that can lead to complications and suggests early diagnosis and prompt treatment for the prevention.

AAPI-04-2023: Gut-brain axis interaction and effectiveness of microbiome in mental health disorders

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Introduction: After the COVID-19 pandemic, the prevalence of mental health disorders has burdened society, which has led The American Health care system to focus more on the efficacy of the gut-brain axis on mental well-being, there has been increased research on this over the last decade. Recent advances showed a connection between the cognitive and emotional processing of the brain with the gastrointestinal processes. This bidirectional interaction between the gut and brain occurs via endocrine, neural, immune, and humoral processes. Substantial research has pointed out this interaction and also has outlined strategies for prevention or treatment of neurodevelopment, neurodegenerative, and mental health illnesses (anxiety, mood stress, and depression). Therefore, there is a developing interest in how microbiota-targeted interventions can ensure better health. Besides these studies with varying degrees of success, there is yet a lot to be discovered regarding the pathophysiology, and implications of microbiota 4 . In this poster, we encapsulate the available evidence underpinning the bidirectional dynamics of the microbiota-gut-brain axis and the underlying mechanisms. It seeks to outline the role and side effects of supplemental probiotics, synbiotics, prebiotics, fecal microbiota transplant or healthy diet, or a combination of both in people with mental illness.

Methods: We retrospectively did a random effect, systemic analysis of English-language articles (2016 – 2023) using PubMed and Google scholar.

Results: Some studies showed positive outcomes with a healthy population/people with subclinical disease whereas others had a neutral/negative conclusion. These studies were made available to people with a clinical diagnosis. Despite some differences in assessment

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methods or psychobiotic formulations, the results were promising. Although we are still in the early stages of establishing a link between dysbiosis and inflammation. However, dietary interventions should be incorporated in the biopsychosocial treatment protocols. The pertinent question to be studied is whether probiotics can be used as a monotherapy for mental health disease or used as a combination to the current medications.

AAPI-05-2023: Prevalence and Risk Factors Associated with the Cognitive Impairment Among Type -2 Diabetes Mellitus Patients

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Background: Globally, diabetes mellitus is one of the major causes of increased morbidity. Diabetic nephropathy, retinopathy, and neuropathy are routinely screened among diabetic patients, whereas the cognitive decline associated with diabetes mellitus is not given much attention. Cognitive impairment can further develop into neurocognitive disorders. Along with raising diabetes prevalence, cognitive impairment would also increase. So, routine screening for cognitive decline should be done among diabetes mellitus patients.

Methodology: An observational cross-sectional study was conducted at the Department of Medicine, a tertiary care hospital for 2 months. The Montreal Cognitive Assessment (MoCA) test which consists of 30 questions was used to assess cognitive function. In-depth history, Clinical which includes BMI, HbA1c levels, duration of diabetes, and Blood sugar (fasting and postprandial) were also collected. Descriptive statistics was used, and the Chi-square test was used to determine the statistical significance. Pearson correlation coefficient was used to find out the relation between MoCA score and glycemic parameters.

Results: A total of 96 patients were included in the study. Mean HbA1c is 9.08 + 1.73 and Mean MoCA Score is 25.14 + 1.63. Mild Cognitive impairment (MCI) was noted in 56 % of patients. Attention was the most common cognitive domain defect found in all MCI patients - 100%. Delayed Recall and Memory was 2nd most common cognitive domain defect found - 92.5%. Higher HbA1c, High FBS, and Higher PPBS were found to be statistically associated with MCI ($P<0.05$). A negative correlation was found between HbA1c, FBS, and PPBS levels and MoCA scores.

Conclusion: More than half of our study participants reported mild cognitive impairment. It highlights the need for the implementation of routine cognitive testing for diabetes patients. There is a strong negative correlation between MoCA scores and parameters of glycemic control - higher levels of HbA1c, FBS, & and PPBS is seen in people with less MoCA score indicating mild cognitive impairment. Further studies were needed to evaluate whether improving the glucose levels helps in improving cognition or not.

AAPI-06-2023: The Mobile Dependency Conundrum: An Investigation into Nomophobia among Healthcare Workers in India

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Background: The "internet era" has diminished face-to-face communication while increasing our daily dependence on mobile phones. The term nomophobia is used to describe the worry, discomfort, or anxiousness that results from the fear of being without one's smartphone. We aimed to investigate demographic characteristics and the prevalence of nomophobia among healthcare workers (HCWs) in India.

Methodology: A web-based cross-sectional study was disseminated to HCWs in India from April-July 2023. We used the modified Nomophobia Questionnaire (NMP-Q) which included eight additional questions. Those questions explored the influence of smartphone usage on HCWs daily routines and the amount of time spent on cellular devices for both professional and personal purposes. The participants provided their implied consent by filling out the survey. The study implemented a pyramidal team structure, recruiting several tiers of collaborators using the hub-and-spoke method. The survey was distributed using multiple platforms, including LinkedIn™, WhatsApp™, Facebook™, Telegram™, X™, and emails. The study was IRB-exempt.

Results: Over a span of twelve weeks, a total of 1732 responses from 26 states and 6 union territories were collected from India. The top 3 states with the most responses included Maharashtra (N = 265), Uttar Pradesh (N = 144), and Punjab (N = 143). There were 52.7% female and 46.7% male respondents. 35.6%, 37.9%, and 15.4% of the cohort represented the 18-25, 26-35, and 36-45 age groups, respectively. The top 5 specialties (Figure 1) consisted of Internal Medicine (N = 134), Radiology (N =

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98), Dentistry (N = 96), Nursing (N = 59), and Surgery (N = 50). A total of 16.5% of respondents met the criteria for mild, 65% for moderate, and 18.1% for severe nomophobia. Additionally, 50.7% of HCP's reported spending 1-3 hours/day on the phone for work, while 51% spent 1-3 hours/day for personal use.

Conclusion: This is the largest study in the healthcare setting in India that explores the significance and impact of nomophobia among HCWs. Over eighty percent of participants met the criteria for moderate-severe nomophobia. Exploring the "phoneless-ness phobia" is pertinent for maintaining a healthy equilibrium between the needs of HCWs and the benefits of technology.

AAPI-07-2023: Topical Phenytoin Usage for the Treatment of Wounds - A Systematic Review

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Background: Phenytoin has demonstrated improved wound healing, as well as analgesic and antibacterial properties. Since the application of phenytoin in wound care is relatively uncommon, a systematic review may provide meaningful insights.

Methods: Cochrane Library, Pubmed, Pubmed Central, and Medline were searched to find all relevant studies. Secondary hand-searching of references listed in other relevant papers was done. Irrelevant papers were removed while screening titles and abstracts. Selected randomized controlled trials (RCTs) and non- randomized controlled trials (NRCTs) were assessed for quality using a revised tool for assessing risk of bias in randomized trials (RoB 2), and the Risk Of Bias In Non-randomized Studies - of Interventions (ROBINS-I) respectively. Data regarding the type of wounds studied, interventions, sample size, outcome measures, and reported adverse effects were collected and analyzed.

Results: A total of 17 RCTs and 8 NRCTs were included. The wounds under study were predominantly of a single etiology. A minority investigated wounds of multiple etiologies. Phenytoin was most often compared to inert controls such as normal saline, but there were trials with several other comparators including honey, silver sulfadiazine, Edinburgh University solution of lime, framycetin, and Aloe vera. The sample sizes of the included studies varied between 20 to 200 wounds, with a median of 62 wounds. Phenytoin was found to hasten wound healing in the majority of trials. In addition, granulation tissue proliferation was improved, greater analgesic effects were produced, and there was an inhibition of bacterial contaminants as well as a reduction in wound discharge, slough, and exudates. Adverse effects were uncommon, minimal in severity, and transient in duration. The most common adverse effect observed was a burning sensation at the time of application.

Conclusion: Our review suggests that phenytoin may be a potentially beneficial adjunct to standard wound care. The topical administration of phenytoin can most likely be considered safe in most patients. We believe further study is warranted to investigate the optimal dose, frequency, and vehicle for application as well as the effects of phenytoin on other types of post-operative wounds.

AAPI-08-2023: Comparing NICU Outcomes of Intramural and Extramural Neonates using the Modified Sick Neonate Score (MSNS)

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Objective: India contributes to one-fifth of the world's annual childbirths and one-fourth of the neonatal mortality burden, with rural areas having higher mortality rates. Studies have shown that transportation during the neonatal period can significantly impact a baby's health. Neonatal scoring systems have been used to independently predict neonatal outcomes in babies born outside (extramural) and inside(intramural) medical facilities. We used the Modified Sick Neonate Score (MSNS) to compare the outcomes in extramural and intramural neonates. The score considers eight parameters (birth weight, gestational age, axillary temperature, blood sugar, capillary refill time, heart rate, respiratory effort, and oxygen saturation) and quantitatively measures the neonates' status. This study aims to determine whether the MSNS effectively predicts mortality among the two study groups.

Methods: 410 neonates were considered for this prospective analytical study conducted at GMERS Hospital, Vadodara, a tertiary care center, over a period of 20 months. Each of the eight parameters was assigned a score of 0,1, or 2, and the total value was recorded as the MSNS. Neonates were followed over their NICU stay, and outcomes were correlated with the scores recorded within

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8 hours of admission. Patients getting discharged was a favorable outcome, whereas death was regarded as a poor outcome. Patients seeking leave against medical advice were excluded from the study.

Results: The intramural newborns had higher Modified Sick Neonate Scores than the extramural neonates (13 and 12, respectively, $p<0.05$). At an optimal cut-off of <11, MSNS has a sensitivity of 85.11% and a specificity of 75.76% in predicting neonatal outcomes. The AUC was 0.859 (95% CI:0.822 to 0.891) with a positive predictive value of 31.2%, a negative predictive value of 97.5%, and an accuracy of 76.83%.

Conclusion: The Modified Sick Neonate Score is a valuable tool in predicting mortality among intramural and extramural neonates. The score can be employed during transport and hospitalization to ensure an accurate prognosis. The ease of application and use of non-invasive parameters can prevent neonatal mortality and improve the standards of care, particularly in resource-limited settings.

AAPI-09-2023: Functional outcomes of fixation of metacarpal and phalangeal fractures with titanium mini plate and screw system in Indian rural population

Jabez Gnany MS DNB MRCS

Introduction: Metacarpals are most important structure of hand that forms arch and helps in making a grip. It accounts for approximately 30% of hand fractures. This fracture mainly occurs because of axial loading, direct fall or torsion. These fractures are generally treated conservatively by splint immobilization or casting. If it is unstable, intra-articular, angulated, segmental loss or with a rotated fragment requires fixation. Main purpose of fixation is to maintain or restore length, correct deformity, achieve adequate stability and initiation of early mobility. Open reduction may result in scarring, tendon adhesion and joint stiffness, but the advantages outweigh the risks. Fixation with titanium plate resists deforming volar pull of intrinsic muscles and buttresses thus provides good stability.

Aim: To assess clinical and radiologic outcomes of patients with metacarpal fractures, who are treated with ORIF (open reduction internal fixation) with mini titanium plates or screws.

Materials and Methods: 22 case with metacarpal or phalangeal fracture treated with titanium mini plates (1.5, 2.0 or 2.7 mm) or screws (of 1.2, 1.5, 2.0 mm diameter) between 1st June 2019 to 31st December 2020 at rural tertiary care medical hospital, Loni.

Results: Mean Age of patients were 34.1 years (19 to 50 years) and mean follow up period was 6 months (3 to 16 months). Total Range of motion was 256 degrees. Normal TAM for fingers is 260. Results decided as follows:-if TAM is 210 considered as good. Mean grip strength measured with dynamometers were 42(+/- 7.6) for operated hand and 43.7 (+/- 8.2) for normal hand. 78% patients were able to flex their digits to distal palmar crease. Mean quick DASH score was 2.9. Radiologic union was achieved in all patients.

Conclusion: In conclusion, we can say that mini plate or screw fixation is good option for treatment of unstable metacarpal and phalangeal fracture. Stable fixation allows early ROM and the patient can return to duty early. Patient selection, radiologic assessment, proper planning Preoperatively, precise dissection can further improve outcomes.

AAPI-10-2023: The Hidden Battle Within: Shedding Light on the Coexistence of Sarcopenia and Sarcopenic Obesity among Diabetic Patients in a Tertiary Care Hospital in India

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Background & Aim: Type 2 Diabetes Mellitus (T2DM) is characterized by chronic hyperglycemia due to abnormal insulin secretion and/or utilization. Currently, Sarcopenia has emerged as a new complication of T2DM, which increases the risk of physical disability, and even death. The study aims to estimate the prevalence of Sarcopenia and Sarcopenic obesity in diabetics as well as their association with various other factors related to T2DM.

Methodology: The study was an observational Hospital based Cross-sectional study conducted among diabetic patients who came to the Non-Communicable Diseases (NCD) clinic during the period of March to April, 2023. Adult patients pre-diagnosed with T2DM were included. Exclusion criteria consisted of those who didn't consent and with known risks which modulated the results of Sarcopenia assessment. A self-structured questionnaire

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was used to collect socio-Demographic, clinical, Anthropometric and bio-impedances data along with hand grip strength. Data analysis was done using SPSS software.

Results: In the study, 404 Participants participated. Their mean age was 55 ± 13.5 years and mean body fat (BF) % was 30 ± 7.4%. 260(64.4%) participants had BF% defined obesity. 362(89.6%) participants had possible Sarcopenia, 183 (45.3%) had Sarcopenia, and 124 (30.7%) had Sarcopenic Obesity. Age was statistically positively associated with Sarcopenia [with Odds ratio (OR) 2.6 ($p < 0.001$)] and Sarcopenic Obesity [OR = 2.4 ($p < 0.001$)]. Participants having diabetes for 3-6 years had OR = 2.0 ($p < 0.05$) and 5.8 ($p < 0.001$) and those with Diabetes for ≥ 7 years had OR = 7.5 ($p < 0.001$) and 18.9 ($p < 0.001$) for developing sarcopenia and sarcopenic obesity, respectively, when compared to those with diabetes for only 1-3 years.

Conclusion: Older age and longer duration of having diabetes are associated with an increased likelihood of developing Sarcopenia and Sarcopenic Obesity. Healthcare providers should prioritize regular screening for Sarcopenia to facilitate early detection and intervention.

AAPI-11-2023: The Effects of Variable Dose Opioid Analgesics in Total Knee Arthroplasty Patients on Enhanced Recovery Pathway

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Introduction: Enhanced Recovery (ER) guidelines are meant to provide effective post-operative recovery of patients undergoing elective procedures. Pregabalin and Opioid analgesics such as Oxycodone, Codeine and Morphine formed the major analgesics of this guideline in our Trust. However, it was noticed that many patients on this pathway did not get adequate pain relief and also developed various undesirable symptoms like tiredness and dizziness. This resulted in the wastage of nursing/medical/allied health manpower, material resources, delay in getting patients up to speed with their physiotherapy along with extended hospital stays. Our primary aim was to compare the analgesic effects of the half opioid dose regimen against the full dose regimen, and our secondary aim was to determine the impact of this opioid based enhanced recovery guideline on the length of stay of patients who developed adverse events against those who didn't. Our objective was to critically analyze the impact of opioid analgesics in peri-operative knee arthroplasty patients and thereby provide a quality improvement tool for centres like ours that are currently using opioids in their peri-arthroplasty analgesic armamentarium.

Materials and Methods: We retrospectively collected electronic and hard copy data on 289 patients who underwent Knee Arthoplasties at Wrightington Hospital, Wigan from 22/04/22 to 22/08/2022. The patients were divided into appropriate groups and their data was entered into an electronic template and assessed. Statistical tests were used to find out the significance between each group.

Results: Patients on the full dose opioid regimen had inadequate pain relief in comparison to the half dose regimen and this was statistically significant. 28 patients or rather, 10.45% of the study group were found to have developed adverse effects which included fainting, nausea, vomiting, confusion and tiredness. These patients had a significant length of stay in the hospital postoperatively.

Conclusions: The study helped us reveal the counterproductive effects of opioid analgesics recommended in our Enhanced Recovery guideline for primary knee replacement. Moving forward, this study will provide ground and evidence for the Trust to formulate a revised Enhanced Recovery analgesic guideline for knee arthroplasty patients.

AAPI-12-2023: The Role of Cardiac Biomarkers in the Evaluation of Takotsubo Cardiomyopathy

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Background and Objectives: Takotsubo cardiomyopathy (TTS) is an acute and reversible cardiac condition characterized by transient dysfunction in the movement of the left ventricle's walls, triggered by intense emotional and physical stress, often seen in post-menopausal women. Despite its discovery in 1990, Takotsubo cardiomyopathy remains an obscure condition due to its limited understanding. It has clinical features resembling acute coronary syndrome (ACS), leading to initial misdiagnosis and inappropriate and unnecessary treatment. This study investigates the role of cardiac biomarkers in improving the diagnosis of TTS, considering

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the challenges posed by the similarity between TTS and ACS, and the absence of dedicated diagnostic markers.
Methods: We conducted a systematic review following PRISMA guidelines, analyzing articles published between January 2013 and August 2023. Eight papers were selected for in-depth analysis, including established biomarkers like troponin, B-type natriuretic peptide (BNP), creatine kinase-MB (CK-MB), as well as newer biomarkers like copeptin and microRNAs.

Results: In the eight studies that we reviewed, a total number of 3,602 individuals were taken by the authors. Among these studies that included various biomarkers, troponin showed limited utility in distinguishing TTS from ACS. Conversely, BNP emerged as a valuable diagnostic tool, both individually and in combination with others. Combining BNP with troponin and CK-MB provided enhanced diagnostic accuracy. Emerging biomarkers like copeptin and microRNAs demonstrated promising results, opening up new possibilities for TTS diagnosis.

Conclusions: Our review acknowledges the efficacy of the earlier mentioned biomarkers in relation to TTS. The insights we gained from this study lay the groundwork for exploration of new paths, enabling the discovery of newer and more specific biomarkers capable of detecting takotsubo cardiomyopathy at its earliest stage. It also delved into the novel cardiac biomarkers, and different marker combinations which may potentially be more reliable than those presently available for establishing a diagnosis. Even so, further exploration into the usage of biomarkers for diagnosing takotsubo cardiomyopathy offers the possibility of earlier diagnosis and intervention, ultimately alleviating the patient's pain and discomfort.

AAPI-13-2023: Comparison of the Efficacy of Light's Criteria with Serum-Effusion Albumin Gradient and Pleural Effusion Glucose

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Introduction: While Light's criteria exhibit high sensitivity (98%) in detecting exudative pleural effusions, the capacity to rule out transudates is relatively limited. A previous study showed that approximately one-fifth of patients with congestive cardiac failure on diuretics also met the criteria for exudate. This study compares the diagnostic value of Light's criteria, the serum-effusion albumin gradient (SEAG) method, and pleural effusion glucose levels for accurately categorizing pleural effusion as transudate or exudate.

Methodology: We conducted this cross-sectional observational study in a tertiary care hospital in Ahmedabad, India. Two hundred patients with pleural effusion undergoing thoracentesis were included. Laboratory parameters measured in pleural fluid analysis included pleural fluid protein, pleural fluid lactate dehydrogenase (LDH), pleural fluid albumin, and pleural fluid glucose. Serum protein, serum LDH, and serum albumin were also collected. Mean values and standard deviations (SDs) were calculated for analysis.

Results: A significant difference was observed in the mean value of exudative and transudative effusions for each parameter (pleural fluid protein/serum fluid protein ratio, pleural fluid LDH/serum fluid LDH ratio, pleural fluid LDH, SEAG, and pleural fluid glucose) ($P < 0.001$). Light's criteria demonstrated the highest efficacy in diagnosing exudates (accuracy = 97.50%), while SEAG demonstrated the highest efficacy in diagnosing transudates (accuracy = 97.50%).

Conclusion: SEAG is an effective alternative diagnostic tool for identifying transudates misclassified by Light's criteria. Its use can contribute to prompt diagnosis and timely treatment of patients with pleural effusion, improving patient outcomes.

AAPI-14-2023: Gender as a Moderator between Adverse Childhood Experiences (ACEs) and Depression

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Introduction: It has been well-documented that females experience more depression and more Adverse Childhood Experiences (ACEs) than males. The goal of this study was to explore if gender moderates the relationship between depression and ACEs.

Methods: 482 participants that presented for treatment at the Albany Medical Center Outpatient Psychiatry Clinic completed the ACEs questionnaire to assess adverse childhood experiences and the Treatment Outcome Package questionnaire to assess depression.

Results: Consistent with hypotheses and previously noted data, results suggested that females report more depression than males, as well as more ACEs. Gender did not serve as a moderator between depression and total ACEs or between depression and the subscales ACEs of

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abuse and ACEs of household challenges. However, there was a statistical trend (p=0.056) to suggest that gender moderated the relationship between depression and ACEs of neglect. At low levels of ACEs of neglect, females reported more depression than males, but at higher levels of ACEs of neglect, males reported more depression.

Conclusion: This unique finding suggests that treatment seeking men experiencing depression may have experienced high incidents of childhood neglect warranting further assessment of childhood adversity.

AAPI-15:2023: Trends in COVID -19 Vaccination among HIV Positive Population- A Single Center Retrospective Observational Study.

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Introduction: The COVID-19 pandemic has posed significant challenges to public health systems worldwide. In this context, ensuring vaccination coverage among vulnerable populations like HIV is crucial. This study aims to investigate and analyze the trends in COVID-19 vaccine uptake among HIV- positive patients attending an infectious diseases clinic. Understanding the factors and trends among various demographics is essential to design targeted interventions and improve vaccination rates.

Methods: This retrospective observational study uses data collected from an infectious disease clinic. The dataset contains information on COVID-19 vaccine uptake among HIV positive patients including all three doses, monovalent and bivalent boosters. Data is stratified based on various demographic data like age, ethnicity, gender, and descriptive analysis using percentages was done to identify trends.

Results: Among study population of 174 patients (126-male, 47- female); males showed higher level of vaccination rates for the series (1 st dose- 88% vs 76.5%, 2 nd dose- 81% vs 68.1%, 3 rd dose- 58.7% vs 42.5%); monovalent booster (1 st booster- 26.1% vs 19.1%, 2 nd booster- 3.17% vs 2.1%); bivalent booster (1 st booster- 53.9% vs 42.5%). Both males and females showed higher vaccination for bivalent booster compared to monovalent booster. Non-Hispanic population initially showed slightly higher vaccination compared to Hispanic population (2 nd dose- 78.8% vs 77.41%) but rates of first monovalent (23.23% vs 29.03%) and bivalent booster vaccination (50.7% vs 51.61%) were higher among Hispanic population. Among different age groups, highest vaccination rates for all the doses were seen in above 65 years whereas the 25-34 years cohort showed least vaccination rates.

Conclusion: In conclusion, this study highlights notable differences in COVID-19 vaccine uptake among HIV-positive patients. Social determinants of health, such as limited transport access and inadequate medical leave for doctor's visits, are significant barriers to effective vaccination. Previous studies identified factors like lack of awareness about vaccine eligibility, availability, and perceived immunity as obstacles to vaccination. Addressing these issues is crucial to enhance vaccination rates. The CDC recommends robust vaccination, including bivalent or updated vaccines, for vulnerable populations. Tailored interventions that address demographic differences are essential to ensure equitable vaccine access and comprehensive protection in high-risk groups.

AAPI-16-2023: Medical Students' Perceptions on Large Language Models in Healthcare: A Global Cross-Sectional Study across 7 countries

Faiza Ejas, Sameer Khan, Amina Mujahid, Fatma AlJoker, Hans Mautong, Geovanny Alvarado-Villa, Abishek Kashyap, Umer Yasir, Kindie Woubshet Nigatu, Nethra Jain, Nandhini Iyer, Aman Sandhu, Aakanksha Singh, Priyal Mehta, Harpeet Grewal, Ivan Alfredo Huespe, Shahab Sharafat11, Sara Yahya, Mohamd Mahmoud Ghaly, Ibrahim Ibrar, Zara Arshad, Rahul Kashyap , Faisal A. Nawaz
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Background and Objectives: Takotsubo cardiomyopathy (TTS) is an acute and reversible cardiac condition characterized by transient dysfunction in the movement of the left ventricle's walls, triggered by intense emotional and physical stress, often seen in post-menopausal women. Despite its discovery in 1990, Takotsubo cardiomyopathy remains an obscure condition due to its limited understanding. It has clinical features resembling acute coronary syndrome (ACS), leading to initial misdiagnosis and inappropriate and unnecessary treatment. This study investigates the role of cardiac biomarkers in improving the diagnosis of TTS, considering the challenges posed by the similarity between TTS and ACS, and the absence of dedicated diagnostic markers.

Methods: We conducted a systematic review following PRISMA guidelines, analyzing articles published between January 2013 and August 2023. Eight papers were selected

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for in-depth analysis, including established biomarkers like troponin, B-type natriuretic peptide (BNP), creatine kinase-MB (CK-MB), as well as newer biomarkers like copeptin and microRNAs.

Results: In the eight studies that we reviewed, a total number of 3,602 individuals were taken by the authors. Among these studies that included various biomarkers, troponin showed limited utility in distinguishing TTS from ACS. Conversely, BNP emerged as a valuable diagnostic tool, both individually and in combination with others. Combining BNP with troponin and CK-MB provided enhanced diagnostic accuracy. Emerging biomarkers like copeptin and microRNAs demonstrated promising results, opening up new possibilities for TTS diagnosis.

Conclusions: Our review acknowledges the efficacy of the earlier mentioned biomarkers in relation to TTS. The insights we gained from this study lay the groundwork for exploration of new paths, enabling the discovery of newer and more specific biomarkers capable of detecting takotsubo cardiomyopathy at its earliest stage. It also delved into the novel cardiac biomarkers, and different marker combinations which may potentially be more reliable than those presently available for establishing a diagnosis. Even so, further exploration into the usage of biomarkers for diagnosing takotsubo cardiomyopathy offers the possibility of earlier diagnosis and intervention, ultimately alleviating the patient's pain and discomfort.

AAPI-17-2023: Comparative Assessment of Digital Therapeutic Approaches for Pediatric ADHD: Evaluating Efficacy and Potential

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Introduction: Technology is increasingly being harnessed to treat ADHD, with interventions like game-based digital therapeutic devices and smartphone apps designed to enhance attention and cognitive control. These tech-based approaches offer innovative alternatives that aim to mitigate ADHD symptoms and improve cognitive functioning. The disabling symptoms of ADHD, characterized by persistent inattention, hyperactivity, and impulsivity, can significantly hinder an individual's ability to focus, complete tasks, and manage responsibilities, thereby impacting academic, occupational, and interpersonal spheres of life. It is a complex condition influenced by genetic, neurological, and environmental factors.

Methods: The first FDA-approved game-based digital therapeutic device, EndeavorRx, targets inattentive or combined-type ADHD in pediatric patients aged 8-12 years. This device is designed to enhance attention through computer-based testing. Its primary recommendation is targeted at addressing inattentive or combined-type ADHD in individuals who exhibit challenges related to attention. Another investigational digital therapeutic, AKL-T01 aims to enhance attention and cognitive control through a video game-like interface, involving 25 minutes of at-home play per day, five days a week, for four weeks. This study evaluates the potential of AKL-T01 to improve attentional performance in pediatric patients with ADHD. It was a randomized, double-blind, parallel-group, controlled trial involving pediatric patients (aged 8-12 years) with confirmed ADHD and Test of Variables of Attention (TOVA) Attention Performance Index (API) scores of -1·8 and below. Participants were assigned either AKL-T01 or a digital control intervention in a 1:1 ratio.

Results: Mean change in TOVA API from baseline was 0·93 (SD 3·15) in the AKL-T01 group and 0·03 (SD 3·16) in the control group. No serious adverse events or discontinuations were reported. Mild treatment-related adverse events included frustration and headache. Patient compliance averaged 83% of the expected sessions.

Conclusion: While further research is warranted, this study suggests that AKL-T01 might enhance objectively measured inattention in pediatric patients with ADHD, with minimal adverse events. These findings underline the potential of digital therapeutic interventions in addressing ADHD-related cognitive deficits.

AAPI-18-2023: Environmentally Sustainable Gastroenterology Practice: A Systematic Review of Current State and Future Goals

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Background: The healthcare sector contributes 4.6% of global greenhouse gas (GHG) emissions, with gastroenterology playing a significant role due to the widespread use of gastrointestinal endoscopy. GI endoscopy contributes significantly to the carbon footprint, with the United States alone performing around 18 million endoscopic procedures annually. This results in an estimated carbon footprint of approximately 85,768

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metric tons of CO2 emissions per year, equivalent to the consumption of 9 million gallons of gasoline or the burning of 94 million pounds of coal. Each endoscopic procedure generates about 2.1 kg of disposable waste, with 64% going to landfills, 28% classified as biohazard waste, and 9% being recycled.

Methodology: A comprehensive search of PubMed, Embase, and Cochrane was conducted to explore the carbon footprint in gastroenterology practice, focusing on endoscopy. Clinical trials, and life cycle analysis (LCA) studies were identified and recommendations for mitigating the carbon footprint were derived.

Results: This systematic review analyzed 31 articles on the carbon footprint in GI endoscopy. Factors contributing to the carbon footprint in GI included excessive solid waste from plastic tools/accessories, limited recycling options, energy-intensive equipment, and single-use endoscopes. An estimated 56% of referrals for upper GI endoscopies and between 23% and 52% for colonoscopies were inappropriate. Some key reasons behind inappropriate procedures are unfamiliarity with guidelines, an uncertain etiology of symptoms. Inappropriate indications for upper GI endoscopy range from 5% to 49%. Endoscopic procedures for chronic scenarios such as endoscopy for simple dyspepsia and colonoscopy for constipation are of particularly low yield in guiding management. Additionally, the environmental impact and carbon footprint of endoscopy remains an area of limited research and data, highlighting a critical knowledge gap in the gastroenterology community.

Conclusion: GI endoscopy contributes to the carbon footprint through waste generation and energy consumption. To achieve environmental sustainability, measures should be taken to reduce waste from endoscopy, calculate institutional carbon footprints, and establish benchmarking standards. By implementing these strategies, healthcare practitioners, administrators, and policymakers can foster more environmentally responsible practices within the gastroenterology field, leading to cost savings, enhanced patient outcomes, and a more sustainable healthcare system.

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MSS-001-2024: Unveiling the Enigma: A Case of Hodgkin Lymphoma to Diffuse B-cell Lymphoma, Culminating in Hemophagocytic Lymphohistiocytosis

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Introduction: Hemophagocytic lymphohistiocytosis (HLH) occurring subsequent to Hodgkin lymphoma (HL) is a seldom encountered complication, with an estimated incidence of 8.9%. This case is a notable illustration of HL evolving into T-cell/histiocyte-rich large B-cell lymphoma before manifesting as secondary HLH. The rarity and variety of clinical presentations highlight the difficulty in making an accurate diagnosis and putting into practice effective treatment plans. The lack of literature on the best management strategies further exacerbates this problem, as approximately 66.8% of HLH patients pass away within a median period of 5.1 months.

Case report: A 36-year-old man came in with a history of recurrent nodular lymphocyte-predominant Hodgkin lymphoma that later changed into T-cell/histiocyte-rich large B-cell lymphoma and TB lymphadenitis in the lymph nodes in his armpit. He presented with symptoms of fever, vomiting, diarrhea, abdominal pain, and oliguria. On examination, the patient was febrile with marked hepatosplenomegaly, abdominal distension, bilateral pedal edema, and icterus. Laboratory findings showed elevated ferritin, decreased fibrinogen, elevated triglyceride level, elevated LFT, electrolyte derangement, and hyperuricemia. The USG abdomen found hepatosplenomegaly with multiple hyperechoic lesions. A peripheral smear showed pancytopenia, necessitating a BM biopsy, which revealed hemophagocytosis and no increase in blasts. Meeting 7 out of 8 criteria of the HLH-2004 protocol with an H-score of 288, we arrived at the diagnosis of HLH. We initiated treatment with cyclophosphamide, Mesna, dexamethasone, and rituximab. Infectious workup showed bacteremia necessitating the need for administering filgrastim with broad-spectrum antibiotics. The patient succumbed to AKI, presumably from TLS requiring CRRT, which was later discontinued and transitioned to hemodialysis due to improvements in TLS. Despite treatment, the patient succumbed to multisystem organ failure.

Discussion: HLH is characterized by the overactivation of cytotoxic T lymphocytes, NK cells, and macrophages, resulting in immune-mediated damage to multiple organs. This example highlights the intricate nature of HLH and its connection with underlying malignancies and infections. Delays in identifying and treating HLH patients are the main obstacle to treatment due to their rarity, varied nature, and need for more specificity in clinical and laboratory results. Treatment should be initiated for those with high clinical suspicion. Hematologists should see suspected patients immediately.

MSS-002-2024: Ignorance is Bliss- Case of MSSA Bacteremia from a Peripheral IV

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Case description: A 32-year-old male admitted for alcohol withdrawal and acute urinary retention from anti-cholinergic excess from dextromethorphan abuse suddenly developed rapid-onset fever of 101.6 F, tachycardic to 130's on admission day 3. Labs were entirely unremarkable. Subsequent workup for fever of unknown origin resulted in a normal procalcitonin, lactic acid, pneumonia PCR panel, ESR, and CRP. Physical exam was unrevealing for open wounds or any active signs of infection. Exercising caution, his foley and right-antecubital peripheral IV were removed with the IV site appearing mildly erythematous, initially thought to be irritation from readjustments. On the fourth admission day, his fever was unrelenting with a nadir of 103.1F while workup remained negative. Consequently, blood cultures were collected and he was placed on empiric antibiotics. Within 24 hours both cultures were positive for methicillin-sensitive staph aureus. TTE was unrevealing for any valvular vegetation. The patient's right antecubital fossa had become erythematous with minimal pus drainage at the site of initial peripheral IV placement. Ultimately, the patient responded well to Vancomycin and was de-escalated

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to cefazolin for four weeks total at the time of discharge.

Discussion: SAB infection from the peripheral line was first described in the literature by Dr. Watanakunakorn in 1977 who went on to also describe the deadly complication of IE that occurs in 32% of patients with SAB. His findings laid the foundation for the utility of echocardiogram in follow-up testing once blood cultures are positive for SAB and the selection of appropriate antibiotics and treatment duration.

Conclusion: This case was particularly challenging as the patient initially had no identifiable cause of his fever and often, any changes at the IV site are usually attributed to skin irritation. This case highlights critical infection control measures, diagnostic challenges and further precautions due to frequent associations of infective endocarditis.

MSS-003-2024: Project CHAI- Cardiovascular health among Asian Indians

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Background: Asian Indian (AI) immigrants have a high prevalence of overweight and abdominal obesity. Excess weight increases with time in the US, raising the risk for Type 2 diabetes mellitus (T2DM) and cardiovascular disease (CVD). Because AI immigrants have significantly higher rates of hypertension, T2DM and CVD than AIs living in India, we propose that acculturation stress may play a role in CV risk, through the scientific process known as allostatic load (AL).

Methods: In this study, we will: 1) Examine the relationship between social connectedness and truncal obesity; 2) Explore the relationships among family history, diet, physical activity, and acculturation stress on truncal obesity and cardiovascular (CV) risk; and 3) Utilize community engagement strategies to co-design a syndemic multicomponent intervention to address obesity and CV risk among AI immigrants. We will partner with Sai Datta Peetham, a Hindu temple in Edison, NJ to form a community academic partnership (CAP) for the study.

Results/ Descriptive findings: N = 83; 40% of sample were women and 60% were men. Mean time living in the US -3.28 years (range 1-6 years). 46% of the sample were from Southern India, 13.5% from Northern India and 21% from Mumbai region. Major concerns- mean BMI & waist circumference in obese category (women > men); mean total cholesterol & LDL abnormally high, HDL abnormally low and triglycerides markedly higher than recommended. Mean hemoglobin A1c in diabetes range. CV biomarkers were significantly higher in participants from Southern India, while blood pressure and acculturation stress scores were significantly higher in those from Northern India.

Conclusion: Preliminary findings from this study are consistent with previous work highlighting the risk for CVD among AI immigrants. Group concept mapping will now take place with members of the AI community to determine participants' perceptions of the most important actions to prevent CVD

MSS-004-2024: It's About Time! Paranoia and Self-Harm in Gender Minority Teens in India: A Case Report

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Background: In conservative social cultures, such as those in South Asia, societal norms often lead individuals to neglect or suppress the expression of their perceived gender identity if different from their birth assignment. Gender incongruence (GI) occurs when the gender identity of a person does not align with the gender assigned at birth. [1] If GI causes significant distress or problems in functioning lasting for at least 6 months, it is described as gender dysphoria (GD). [2] This case study contributes to understanding how gender dysphoria may result in personality disorders such as paranoid personality disorder in a conservative society. Removing societal taboos and accepting individuals with their perceived gender can lead to timely diagnosis and management of patients, preventing severe outcomes.

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Case Presentation: We present the case of a 24-year-old male who was presented to the emergency department by police when found on the sidewalk with a bleeding wrist. He was uncooperative during the physical examination and had to be restrained to administer Haloperidol for suturing. He displayed numerous lacerations and abrasions on his body in various stages of healing, mainly on the arms, chest, penis, and scrotum. Collateral from his family indicated that the patient never wanted to be a boy ever since a child and dressed like a girl and put on makeup. The boy was bullied by his peers and he felt too distressed about his feelings and had trust issues. He started to self-mutilate with a blade all over his body each time he felt someone was there to counsel him. He gradually decompensated into feeling paranoid towards others and started to feel the entire world conspired against him. He also started engaging in street fights and ended up in police custody a few times. A diagnosis of Gender Dysphoria and Paranoid Personality Disorder secondary to Gender Dysphoria was made.

Discussion: Paranoid Personality Disorder is characterized by a pattern of distrust and suspiciousness of others. Individuals who have the disorder tend to negatively interpret the intentions, words, and actions of others though there is little or no evidence for such suspicions. The main debate in society revolves around cultural beliefs regarding individuals who desire to change their assigned gender/sex. It is important to understand that suppressing one's identity can lead to a mental disorder. Developmental traumas, in which individuals are made to question the validity or reality of their experiences by caregivers, are believed to play a role in the eventual development of paranoia. If adequate support and understanding are not provided, children may begin to doubt their perceptions, making them vulnerable to developing mental health disorders later in life.

MSS-005-2024: Diabetes as a Determinant for Colorectal Cancer Screening Adherence

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Background: Colorectal cancer (CRC) is the third leading cause of mortality due to cancer among men and women. Among other known risk factors such as diet and exercise, Type 2 diabetes is considered as an independent risk factor for CRC. Despite this, there are no specific guidelines for diabetics with regard to CRC screening. Our study aimed to determine the association between diabetes and colorectal cancer screening (CRCS) in a nationally representative dataset among adults over the age of 40 years after adjusting for racial/ethnic differences, weight status measured by Body Mass Index [BMI], income to poverty ratio, smoking status, age, and family history of colon cancer. Our study hypothesis is that CRC screening rates are higher in adults over the age of 40 years with a diagnosis of diabetes than adults over 40 years of age without diabetes.

Methods: This study analyzed data from the 2010 National Health Interview Survey (NHIS), among individuals aged 40 to 80 years old (n=13691). We used SAS software and a multivariate regression model to do our analysis.

Results: The odds of getting screened for CRC (after adjusting for covariates in our study) among those who have diabetes over age 40 years is 1.16 times more than those who do not have diabetes. From our crude model, we found that the odds of getting screened for colorectal cancer among those who have diabetes over age 40 years is 1.53 times (CI 1.39 – 1.68) more than those who do not have diabetes.

Conclusion: CRC screening among diabetics over age 40 years is affected by age, gender, race/ethnicity, ratio of family income to the poverty threshold, smoking, BMI and family history of colon cancer. There is a need to develop guidelines to encourage diabetics to get screening for CRC.

MSS-006-2024: Temporal Trends of Age-Adjusted Mortality Rates for Rheumatic Heart Disease in Brazil From 2000 to 2021

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Background: Rheumatic heart disease (RHD) is a chronic cardiovascular condition stemming from an infectious origin, posing a substantial health burden in economically disadvantaged regions. Understanding the epidemiological landscape and socio-cultural factors influencing RHD in Brazil is crucial for developing targeted interventions aimed at mitigating its burden on individuals, families, and the healthcare system. Our study focuses on analyzing age-related mortality rates linked to ARF and chronic RHD (ARHD) in Brazil from 2000 to 2021, particularly examining gender disparities.

Methods: This retrospective cohort study utilized comprehensive nationwide data from Brazil spanning from 2000 to 2021 to assess trends in diverse age groups, among both sexes. Mortality data, extracted and categorized meticulously, were subjected to Joinpoint statistical analyses enabling comparative assessments, with average annual percent change (AAPC) and annual percent change (APC) serving as key metrics.

Results: The acute RHD (ARHD)-related mortality declined over the analyzed years supported by AAPC, with higher mortality reduction in females. The age-adjusted mortality rate for "males and females" decreased from 78 to 67 deaths/100,000 from 2000 to 2021. Female mortality dropped from 85 to 69/100,000, and male mortality decreased from 73 to 63/100,000 over the same period. For ARHD, male age groups (20-29, 60-69, 70-79, 80+) showed declining mortality, while the 30-59 age group exhibited an upward trend. Females AAMR for chronic RHD (CRHD) decreased across all age groups, with significant reductions in the 80 years and above age group from 2000-2002 (APC: -11.94*) and steadily from 2002 onwards (APC: -1.33).

Conclusions: Our study revealed an overall decline in mortality rates for both acute and CRHD across both sexes. Females consistently exhibited higher mortality rates and a more pronounced reduction compared to males in both acute and CRHD. In ARHD, males experience the highest mortality in the 50-59 age group, while females have a peak in the 40-49 age group. Conversely, the 20-29 age group displayed the lowest mortality in CRHD, and the 80-89 age group had the lowest mortality in ARHD.

MSS-007-2024: Augmentation of blood pressure with Norepinephrine in a normotensive patient, targeting SBP 180 for management of acute ischemic stroke: A case report

Abhishek Vadher, Taylor Graham, Sujata Kambhatla, Ramesh Madhavan

Introduction: Stroke is the leading cause of long-term disability in the USA. Blood pressure management is one of the key factors for acute management of stroke. While there are guidelines on lowering blood pressure in the management of acute ischemic stroke, the benefit of pharmacologically augmenting blood pressure to promote cerebral perfusion is not well known. We present a case in which norepinephrine was used to increase blood pressure in a case of acute ischemic stroke secondary to cerebrovascular large vessel disease and led to a favorable patient outcome.

Case presentation: This is a 71-year-old female who presented to the emergency department with altered mental status, slurring of speech and right sided hemiparesis with unknown last known well. The patient came back to her baseline mentation on presentation. Magnetic resonance imaging (MRI) of the brain showed patchy focal diffusion restriction with FLAIR hyper-intensity in the lateral left occipital and parietal lobes consistent with small subacute ischemic infarcts showing possible watershed infarction in left hemisphere middle cerebral artery distribution. On the next day, the patient became more somnolent and developed right sided weakness. Computed tomography (CT) of her head with CT Angiogram (CTA) and CT Perfusion was ordered. CTA showed complete occlusion of the proximal to distal left common carotid and internal carotid arteries with recanalized distal collateral flow to the supraclinoid left internal carotid artery. CT Perfusion showed an infarct volume of 48.7 milliliters and penumbra of 225.5 milliliters in the left cerebral hemisphere. The patient's symptoms were fluctuating and were blood pressure and blood volume dependent, thus not a candidate for acute endovascular intervention. Patient was transferred to ICU for hourly neuro-checks. Intravenous Norepinephrine was started with a target blood pressure goal of 160-180. The rationale was that the obstruction was chronic and patients had good collaterals and thus when the blood pressure drops to

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below 160, the cerebral blood flow reduces Thus, proper hydration and Norepinephrine support would help increase blood flow through the collaterals and relieve the symptoms. The patient was eventually discharged on oral Midodrine with follow up with Neurology.

Conclusion: Usually for management of acute ischemic stroke, we use permissive hypertension for the initial 24 hours followed by gradual control of blood pressure over the next 24-48 hours. But rarely, in patients with chronic occlusion and stenosis of carotid arteries with properly circulating collaterals, we can help cerebral perfusion of the penumbra with the help of augmentation of blood pressure for time being till intervention.

MSS-008-2024: Glucagon-like Peptide Receptor Agonists for Prevention of Type 2 Diabetes in Kidney Transplant Recipients with Pre-Diabetes - A Pilot Study

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Background: Post-transplant diabetes remains a significant complication in renal transplant recipients for which effective preventative measures are lacking.

Methods: We designed the prospective, randomized, controlled trial in kidney transplant recipients to determine whether exenatide extended-release (ER) prevents post-transplant diabetes (PTDM).Patients were randomized 2:1 to exenatide ER versus non-pharmacotherapy, along with the standard of care lifestyle advice at 4 months post-transplant. The primary endpoint was PTDM at 12 months post-transplant. Secondary endpoints included glucose control, allograft outcomes, safety, and tolerability at 24 months post-transplant. Enrollment was limited due to the COVID pandemic; therefore, an additional retrospective cohort with prediabetes (N=89) was identified and assessed for progression to diabetes to serve as a larger control arm.

Results: Nine participants were enrolled (6 treatment, 3 control). One subject from the control arm and one in the exenatide ER arm developed diabetes at 12 and 24 months, respectively. There was no difference in HbA1c and allograft outcomes between the groups. Tolerability was acceptable, with only one subject discontinuing the medication due to injection site irritation. In the retrospective "control" cohort, 28 (43%) recipients with prediabetes developed diabetes, with the majority within 2 years post-transplant. Patients who developed PTDM were older (63.9 versus 58.7 years; p<0.001), had higher BMI (29.8 versus 27 kg/m 2 ; p=0.01), and higher HbA1c at baseline (5.9% vs.5.8%; p=0.04)

Conclusion: Exenatide ER was safe and overall well-tolerated in kidney transplant recipients with prediabetes. More studies are needed to confirm efficacy of exenatide ER to prevent PTDM, targeting high risk groups.

MSS-009-2024: A Diagnostic Conundrum - A Case of Pulmonary Alveolar Proteinosis

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Introduction: Pulmonary alveolar proteinosis (PAP) is a rare chronic lung condition occurring in 0.2 cases per 100,000 individuals, characterized by aggregation

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of surfactant lipoproteins in the alveoli. It is commonly misdiagnosed, especially if the patient has superimposed acute pulmonary disease. We present a case of a 33-year-old male with a diagnostic workup for PAP.

Case Description: A 33-year-old male with a remote history of tuberculosis was initially admitted to the hospital for dyspnea and cough. High-resolution computed tomography (HRCT) chest showed diffuse interstitial infiltrates with ground-glass opacities consistent with a "crazy-paving" appearance. He was discharged with prednisone and antibiotics. Despite treatment, he continued to have persistent symptoms. Differentials were pneumonitis vs ILD vs infection. The PFTs demonstrated a moderately severe restrictive profile. Bronchoscopy with BAL performed at that time was positive for penicillium chrysogenum and he was treated with itraconazole. Even after completing treatment, respiratory symptoms worsened. Repeat HRCT chest now demonstrated worsening thickening of the interlobular septa near areas of ground-glass opacities again with a "crazy-paving" appearance with traction bronchiectasis. He was labeled as having interstitial lung disease and started on steroids. However, at follow-up, the patient continued to worsen and underwent testing with EBUS with fine-needle aspiration of the mediastinal lymph nodes which was negative for granulomatous disease. Subsequent BAL with bronchoscopy for suspected PAP demonstrated milky-appearing fluid with elevated total cell count (primarily macrophages) with positive periodic acid-Schiff stain. Therefore, a surgical lung biopsy was pursued from two separate lobes, which ultimately showed features consistent with PAP. His GM-CSF autoantibodies were also elevated indicating autoimmune-related PAP. The patient was treated with whole lung lavage and inhaled GM-CSF which improved his symptoms.

Discussion: This case report highlights the diagnostic challenges and therapeutic aspects of Pulmonary Alveolar Proteinosis (PAP). As our case had a multidimensional component due to the patient's complex pulmonary history which was worked up and treated along the way, it further emphasized the elusive nature of this condition. Nonetheless, early recognition, with a broad diagnostic workup and timely intervention, such as whole-lung lavage, can lead to improved outcomes for patients with PAP.

MSS-010-2024: Publications and Plastic Surgery: An Analysis of the Residency Applicant's Research Productivity from 2020 to 2023

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3 Bower's Neurosurgical Frailty Lab

Background: With recent changes in the application process of integrated plastic surgery residency, research productivity has increased in importance and has not been investigated per-resident. Analysis of trends in resident publications and demographic variables from 2020-2023 can provide insight into the new status quo.

Methods: The NRMP report identified residency spots and demographic information was acquired publicly. Variables of interest included sex, residency/medical school region, and PhD, DO, and MD degrees. Individual publication and first authorship counts were collected from PubMed, Research Gate, and GoogleScholar. All queries were run in 2023 and non-parametric analyses were conducted.

Results: 746 residents were majority female (n=403), northeast or southern medical students (31.2%, both), and in midwest residencies (28.4%). The median number of publications increased from 2020 (M=4, IQR:2-10) to 2021 (M=8, IQR:4-19, $p<0.001$), decreased in 2022 (M=5, IQR:2-10, $p<0.001$), and increased again in 2023 (M=7, IQR:3-15, $p=0.009$). First-author publications followed the same trend, averaging 3.5/resident across all years. IMG students published (M = 25, IQR 7-58) and were first authors (M=9, IQR:1-18) significantly more than applicants everywhere except the northeast ($p<0.001$). Males (M =6, IQR 3-15) had more publications than females (M = 5, IQR 3-13, $p = 0.045$).

Conclusions: Research is increasing in importance and IMG, northeastern, and male medical students are the most prolific. Further studies should be conducted to

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investigate the influence of COVID-19 and STEP 1 exam status on research productivity.

MSS-011-2024: Temporal Trends and Geographic Differences in Glioblastoma Multiforme Rates Within the United States

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Background: Glioblastoma Multiforme (GBM) is the most aggressive form of brain tumor in adults and its epidemiology is poorly understood. This study will analyze geographic variation and temporal trends of GBM incidence in the United States (US).

Methods: Age-adjusted GBM rates were extracted from the SEER research plus program for years 2000-2017 (N=75047). Rates were aggregated into states and subregions, which were categorized according to US Census Bureau definitions. Statistical analysis was conducted in Python (Python Software Foundation, Wilmington, DE).

Results: The annual GBM rate for each subregion is: Northeast=3.43, Midwest=3.29, West=2.95, and South=2.68. The differences between regions were statistically significant ($F=24.04$, $P<0.00001$). Statistically significant disparities were observed in all pairwise combinations between the four regions except between the Midwest and Northeast. The highest annual GBM rates were observed in Massachusetts (3.86), Iowa (3.79), and Connecticut (3.68), while the lowest rates were in New Mexico (2.49), Hawaii (1.96), and Alaska (0.89). These state-level differences in GBM rates were statistically significant ($F=46.10$, $p<0.001$). The annual GBM incidence rate across the US has been increasing over time ($F=49.05$, $p<0.0001$, slope=0.051). Similar trends were observed across subregions: Midwest (slope=0.059, $p<0.0001$), Northeast (slope=0.0623, $p<0.0001$), South (slope=0.0359, $p<0.0001$), and West (slope=0.0466, $p<0.0001$).

Conclusions: Observed increases in annual GBM incidence rates across the US and the geographic differences may be due to improvements in diagnostic capabilities, however these findings do not preclude additional factors such as environmental factors being involved in these differences.

MSS-012-2024: Pulmonary manifestations of granulomatosis with polyangiitis unmasked by COVID-19

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Introduction: Granulomatosis with polyangiitis (GPA) is a systemic disease characterized by small-vessel necrotizing vasculitis. It can present with acute necrotizing granulomas of the respiratory tract, glomerulonephritis, arthritis, skin lesions or neuropathy and be exacerbated by an acute infection. Here, we present a new diagnosis of GPA unmasked by COVID-19.

Case Description: An eighty-one-year-old woman with a history of mitral valve prolapse, IBS, and osteoporosis presented with fatigue, malaise and myalgias since she had COVID-19 one month prior. She denied cough, dyspnea, hemoptysis, or rash. Outpatient workup included a CT chest with multiple bilateral pulmonary nodules, PET scan showing multiple FDG avid lung masses and lung mass biopsy showing acute and chronic inflammation, foamy macrophages, organizing pneumonia and no malignancy. She denied a history of malignancy or tobacco use. On admission, a physical exam revealed decreased breath sounds in the left lower lobe. CT angiogram chest showed no pulmonary embolism, moderate left pleural effusion, and waxing and waning sizes of lung nodules suspicious for infectious or autoimmune etiology rather than malignancy. Labs showed elevated d-dimer, elevated CRP, normal CK, normal creatinine, no hematuria, and no proteinuria. Serum tests were positive for mycoplasma pneumoniae IgM, ANA, C-ANCA, and PR3. She was treated with azithromycin for mycoplasma pneumonia and prednisone 1 mg/kg/day for GPA. As

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an outpatient, rheumatology-initiated rituximab infusions and tapered prednisone. CT chest after two months of treatment showed decrease in the size of all lung nodules. Patient reported symptom improvement.

Discussion: The diagnosis of GPA depends on involvement of the respiratory tract, kidneys, skin or CNS, positive serology, chest imaging findings and tissue biopsy showing granulomatous inflammation. An acute infection such as COVID-19 may unmask previously undiagnosed rheumatic conditions such as GPA. It should be considered in the differential for a patient with an atypical presentation since delayed diagnosis can lead to preventable deaths.

MSS-013-2024: Trigeminal Nerve involvement in Neurosarcoidosis: Clinical and Radiographic Correlates

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Background: Cranial neuropathies are amongst the most common manifestations of neurosarcoidosis. While many forms of cranial neuropathy are well-characterized in neurosarcoidosis, particularly facial and optic neuropathies, trigeminal neuropathy is not, despite being present in 5-13% of patients in reported cohorts.

Methods: Patients with neurosarcoidosis were included if: 1) their sarcoidosis was pathologically-confirmed by biopsy, and 2) neuroimaging provided radiographic evidence for granulomatous inflammation involving the trigeminal nerve, its nucleus, or its ganglion.

Results: Fourteen patients were included, representing 5.7% of the total neurosarcoidosis cohort, including 5 patients with symptomatic trigeminal neuropathy and 9 patients with asymptomatic radiographic trigeminal nerve involvement. Average age of neurosarcoidosis onset was 48.0 years, and most were African American (11/14, 78.6%) and male (8/14, 57.1%). All symptomatic patients presented chronically with unilateral symptoms (numbness in the trigeminal distribution in 5/14, 35.7%, and trigeminal neuralgia in 2/14, 14.3%), either in isolation (2/5, 40%) or as part of a greater constellation of neurologic symptoms (3/5, 60.0%). The most commonly affected trigeminal structures on contrast MRI were the cisternal portion of the trigeminal nerve (9/14, 64.3%), Meckel's cave (7/14, 50.0%), and the cavernous sinus (5/14, 35.7%). At least one routine CSF parameter was abnormal in 10/12 (83.3%) tested patients. Four of the symptomatic patients were treated with corticosteroids, with 3/4 (75.0%) experiencing complete resolution or partial improvement of their symptoms. Twelve patients had follow-up MRIs after receiving treatment with trigeminal inflammation completely resolving in 9/12 (75.0%) and partially improving in 3/12 (25.0%). The average last mRS was 1.4 after an average follow-up period of 91.5 months.

Conclusions: Neurosarcoidosis more commonly affects the trigeminal nerve radiographically than clinically, and symptomatic patients may experience anesthesia dolorosa in the trigeminal distribution. This form of neurosarcoidosis responds very well to treatment, both clinically and radiographically.

MSS-014-2024: Morquio Syndrome

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Introduction: Morquio syndrome (MS) is a rare mucopolysaccharidosis type IV (MPS IV) disease. It is caused by two mutations: MPS-IVA, a mutation in Galactose-6-phosphatase (GALNS) on Chromosome-16, and MPS IVB, a mutation in beta-galactosidase (GLB1). There is accumulation of keratan sulfate and chondroitin-6-sulfate that causes the clinical symptoms of the disease. It has an autosomal recessive mode of inheritance. Epidemiology is between 0.22 and 0.14 per lakh births. This is a unique case of a five-year-old female with Morquio Syndrome.

Case description: The patient is a five-year-old female, fifth born to a third degree non-consanguineous marriage, that presented with syndromic features of a short stature, hypertelorism, bilateral epicanthal folds, low set ears, depressed nasal bridge, hypoplastic nasal bone and nasal alae, long philtrum, frontal bossing, pectus excavatum, kyphoscoliosis, contractures of the 4th and 5th fingers, cubitus valgus, genu valgum, and joint laxity. Pan-x-ray imaging showed dysostosis, oar shaped ribs, ileal

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flaring, metaphyseal widening, and kyphoscoliosis. A magnetic resonance imaging of the brain and spine showed decreased height of cervical vertebrae. Karyotype analysis was done showing 46, XX, del(19)t(19;?)(p13.2;?). Pure tone audiometry showed right ear mild conductive hearing loss. Given these findings, the patient was diagnosed with Morquio Syndrome (MS).

Discussion: MS is characterized by skeletal involvement present at approximately one year of age. Patients are seen with short stature due to shortened neck and trunk and joint laxity, dysostosis multiplex occur in early age, pectus carinatum (protuberant sternum), kyphosis, scoliosis, genu valgum and abnormal gait. They are also noted to have odontoid dysplasia with failure of ossification causing C1-C2 subluxation. Both types of MS can have severe or attenuated forms depending on the residual enzyme activity. In severe forms, linear growth is minimal after six or seven years of age. Death occurs in the third or fourth decade from cardiorespiratory failure.

MSS-015-2024: Takayasu Arteritis in Pregnancy

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Introduction: Takayasu arteritis, also known as “young female arteritis", is a chronic inflammatory disease of the large vessels. The disease mainly affects women of reproductive age. Patients with Takayasu arteritis who are pregnant have an increased risk of cardiovascular complications such as hypertension and congestive cardiac failure. This is a case of a patient with a history of Takayasu arteritis and her complications during pregnancy.

Case Description: This is a case of a 27-year-old gravida 2, para 1, 37 weeks and 3-days gestational age with a past medical history of previous vaginal delivery, chronic hypertension, and Takayasu Arteritis diagnosed 7 years ago on treatment, with a renal artery stent in situ, and with percutaneous transluminal angioplasty of the descending thoracic artery. The patient presented to the hospital during her first pregnancy with a severe headache for 1 week, after which work-up showed evidence of Takayasu arteritis prenatally. She was on treatment with steroids and immunosuppressants, but she was not compliant with treatment. The patient was counseled regarding contraception and disease complications, yet she conceived for the second time. In a previous pregnancy, the patient had an intrauterine death due to uncontrolled high BP recordings.

Discussion: Takayasu arteritis is a rare systemic large vessel vasculitis with female preponderance of reproductive age group, associated with high morbidity and mortality. The described incidence rate of Takayasu arteritis ranges from 0.3 to 3.3 per million per year and the prevalence ranges from 4.7 to 360 cases per million. Takayasu arteritis has the potential to cause severe maternal and neonatal complications such as chronic hypertension, superimposed preeclampsia, preterm labor, and intrauterine growth reduction. Preconception counseling is essential which will focus on dosage adjustment, cessation of cytotoxic drugs,folic acid supplementation, and optimal timing of pregnancy.

MSS-016-2024: Study of bacterial profile in peritoneal fluid in patient with VP shunt

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Background: Shunt infections can complicate the otherwise successful treatment of hydrocephalus, leading to increased healthcare costs, patient morbidity and mortality. The main cause being the shunt infections ranging to 27%. The most common intra-abdominal response to infection is sheathing of the peritoneal catheter.

Methods: A descriptive and observational study of the peritoneal fluid collected from patients with VP shunt related procedures was carried out at the Institute of Microbiology of a Tertiary care government hospital, India. The period of study was from April, 2019 to July, 2019. The peritoneal samples were collected from Neurosurgery and Pediatric patients using a sterile syringe. They were then stored in sterile containers in sterile conditions and were transported through a cold chain for microbiological investigations within 4 hrs. Further, the samples were processed to isolate and speciate the bacterial infectious agents from various clinical samples of peritoneal fluid collected from shunt tips of VP shunt patients, note the sensitivity pattern of the isolated organisms, and to

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detect the type of infection and further carry out the microbiological study so that in future infections can be prevented before their complication.

Results: The real incidence of infected shunts is higher than that of malfunctioning shunts. Early detection and management of shunt infection with appropriate antibiotic along with prompt removal is found to be effective. In our study the incidence of shunt infection was 27%. About 50% of the isolated microorganisms were found to be Klebsiella Pneumoniae followed by NFGNB (25%). The median age of the patients at the time of VP shunt revision was found to be 17yrs. The most common etiology was congenital conditions and the most common complaint headache.

Conclusion: Risk factors associated with the perioperative and operative period are of critical importance so that we can see reduction in shunt infections.

MSS-017-2024: Study of Clinical Profile and Outcome of Shock in Pediatric Intensive Care Unit of a Tertiary Care Hospital

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Background: Despite advances in pediatric care, shock-related morbidity and mortality continue to pose a threat, particularly when accompanied by mechanical ventilation requirements. Cardiogenic shock, for instance, holds a mortality rate as high as 88.9% in children, further exacerbated when comorbidities are present. Thus, comprehensive research into shock's clinical spectrum, epidemiological characteristics, early recognition, and management is imperative to reduce morbidity and mortality.

Methods: A prospective observational study was conducted on critically ill children aged 1 month to 12 years, admitted to PICU between April 2023 and June 2023, displaying clinical signs of shock. The objectives of the study were to categorize shock incidence in PICU based on their physiological state. Extensive clinical histories and laboratory investigations were performed. Various shock types were identified. SIRS criteria and PRISM score were assessed. Data collected from medical records were statistically analyzed using chi-square analysis and spss 21 software.

Results: The study consisted of 50 patients, with a higher proportion of non-survivors (62%) compared to survivors (38%). The occurrence of shock in the age range of 1 month to 1 year, constituted 42% of total admissions and the majority were male. Septic shock was the most prevalent type (56%), followed by hypovolemic shock (22%). Highest mortality was among those with Cardiogenic shock. The presence of Systemic Inflammatory Response Syndrome (SIRS) criteria was observed in 84% of shock patients. Patients who received ventilation within the PICU showed lower mortality (66.6%) compared to those intubated outside the PICU (85.7%). PRISM score showed significant correlation with mortality ($p=0.374$). 32 patients had a score greater than 10.

Conclusion: The findings of this study hold several clinical implications. They underscore the importance of early intervention, timely antibiotic administration, and the critical role of mechanical ventilation in improving outcomes. The variation in mortality rates across different age groups, genders, shock types, and clinical presentations highlights the need for personalized treatment approaches.

MSS-018-2024: Analyzing Mortality Variables in Heart Diseases: Multivariate Study Across Six New Jersey Counties

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Background: Heart disease comprises various heart conditions. This study seeks to establish connections

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between health-related risk elements and fatalities due to heart disease across six counties in New Jersey.

Methods: Each of the six counties was assessed for age-adjusted mortality rates per 100,000 individuals attributed to heart disease. These counties were categorized based on the lowest (Hunterdon, Somerset, Bergen) and highest (Cape May, Salem, Cumberland) rates of heart disease mortality. Data was further categorized into comorbidities, socioeconomic status (SES), and behavioral patterns. Subcategories within each main category provided additional insights into the impact of heart disease mortality in New Jersey. The study correlated the primary outcome of heart disease-related mortality in adults aged over 25 from 2010 to 2019 with 24 health factors, including comorbidities, behaviors, and socioeconomic factors. An R^2 value was computed to assess the correlation between each factor and heart disease mortality.

Results: Analysis of data spanning from 2010 to 2019 revealed significant correlations between hypertension (R^2 = 0.9957) and atherosclerosis (R^2 = 0.9266), highlighting their pivotal roles in cardiovascular pathogenesis. Childhood socio-economic status emerged as a precursor to heart disease, with indicators such as child poverty rates (R^2 = 0.9188) and single-parent households (R^2 = 0.8479) exhibiting notable correlations. Access to primary care, as reflected by the density of primary care physicians (R^2 = 0.8599), as well as socioeconomic factors like median household income (R^2 = 0.9636) and overall life expectancy (R^2 = 0.9851), further contributed to the complex landscape of heart disease mortality.

Conclusion: This study emphasizes the necessity for targeted interventions, acknowledging the intricate interplay of various factors. The findings offer nuanced insights into the multifaceted determinants of heart disease mortality, providing a basis for informed public health strategies tailored to meet diverse community needs.

MSS-019-2024: Tug of War between Clozapine and Inducers in the CYP450 arena: A Case Report

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Introduction: Schizoaffective disorder bipolar type poses significant challenges in treatment due to its complex nature. Antipsychotic medications, including clozapine, play a pivotal role in management, but individual responses vary, influenced by factors such as drug metabolism mediated by cytochrome P450 (CYP) enzymes. This report explores the interaction between clozapine and oxcarbazepine in a patient with schizoaffective disorder bipolar type, highlighting the importance of personalized treatment strategies.

Case Description: A 56-year-old Caucasian male with recurrent mood episodes and psychotic features presented with active suicidal ideation, delusions, and hallucinations. Despite prior treatment with various antipsychotics and mood stabilizers, his symptoms persisted, prompting a switch to clozapine. However, sub-therapeutic clozapine levels were observed despite dose adjustments, prompting further investigation.

Discussion: Understanding drug interactions is crucial in medicine, especially regarding metabolic enzymes like cytochrome P450 (CYP). These enzymes play a significant role in pharmacokinetics, often resulting in drug-drug interactions. While enzyme inhibition is commonly reported, induction can also occur, affecting treatment efficacy and safety. The case of our patient, stable for eight years on previous medications but deteriorating on clozapine, raised concerns about altered drug metabolism. Despite adjustments in clozapine dosage, subtherapeutic levels persisted, prompting a pharmacogenetic analysis. The patient's CYP1A2 *1F/*1F genotype, sensitive to induction, likely contributed to the suboptimal clozapine levels. Additionally, oxcarbazepine, a weaker inducer compared to carbamazepine, further impacted the patient's response to treatment. This case highlights the complexity of individualized treatment planning, necessitating consideration of pharmacogenetics and drug metabolism to better therapeutic outcomes and minimize adverse events.

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MSS-020-2024: Reviving an Antiquated Surgical Method: Managing Submucosal Fibrosis-Complicated Lingual Thyroid: A Case Report

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Introduction: Lingual thyroid, a rare condition where thyroid tissue is ectopically located in the tongue, poses a diagnostic and therapeutic challenge due to its infrequency. Its prevalence is estimated to be around 1 in 100,000 individuals, predominantly affecting females. The condition often remains asymptomatic but can lead to complications such as dysphagia, dysphonia, and airway obstruction, necessitating timely intervention. There is a dearth of information in the literature regarding the ideal therapeutic strategy for treating ectopic thyroid, particularly when oral submucous fibrosis complicates matters.

Case Description: A 45-year-old female patient presented with complaints of voice change, foreign body sensation in the throat, and difficulty opening her mouth for a year. The patient produced no history suggestive of hyperthyroidism or hypothyroidism. The patient exhibited a classical "hot potato voice," and a swelling was noted in the posterior one-third of the tongue. The investigation concluded subclinical hypothyroidism. The Computed tomography of the head and neck identified a hyperdense lesion at the base of the tongue with multiple nodules and ectopic nests of thyroid tissue with calcification. With video laryngoscopy, a smooth-surfaced swelling was seen in the middle of the back third of the tongue, pressing on the epiglottis. This was later identified as thyroid follicular epithelial cells mixed with a few mature squamous cells. The diagnosis was lingual thyroid with submucosal fibrosis and subclinical hypo-thyroidism. We did labiomandibular glossotomy and lingual thyroid removal. The patient received Ryle's tube feeding and was released with lifelong levothyroxine treatment.

Discussion: In general, the therapeutic approach entails the administration of thyroid hormone therapy to impede the proliferation of the lingual thyroid and reduce its dimensions. Surgical excision is only recommended in exceptional circumstances. At our facility, we were unable to use more sophisticated methods like trans-oral robotic surgery because the patient's OSF prevented her from opening her mouth. As a result, we had to rely on the traditional method of labio-mandibular glossotomy. Despite the progress made in surgical techniques, the continued reliance on conventional approaches underscores the importance of customizing treatments to accommodate the unique situation of each patient.

MSS-021-2024: Assessment of thyroid disorders and menstrual disorders in reproductive age group

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Background: Hypothyroidism is associated with a wide spectrum of reproductive disorders ranging from abnormal sexual development, menstrual irregularities, and infertility. The present study was conducted to assess thyroid disorders and menstrual disorders in the reproductive age group.

Materials and Methods: 84 women in the reproductive age group 15-45 years were divided patients into 2 groups of 42 each. Group I was with menstrual disorders and group II with other than menstrual disorders. Parameters such as parity, age of menarche, general physical examination along with pelvic examination was carried out in women with menstrual complaints. Routine investigation like Hb, Platelet count, TLC, DLC, ESR, ABO-Rh, and thyroid profile that includes T3, T4, TSH etc. was recorded.

Results: Age group 15-25 years had 22, 25-35 years had 36 and 35-45 years had 26 patients. Thyroid status was euthyroid seen in 58% in group I and 78% in group II, subclinical hypothyroid in 18% in group I and 10% in group II, overt hypothyroid seen in 16% in group I and 7% in group II, subclinical hyperthyroid in 4%in group I and 1% in group II and overt hyperthyroid in 8% in group I and 4% in group II respectively. There were 2 cases of Amenorrhea, 8 of Hypo/ Oligomenorrhea, 7 of Metrorrhagia, 22 of Menorrhagia and 3 of Polymenorrhea. Among 2

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Amenorrhea patients, each had subclinical hypothyroid and overt hypothyroid. Among 8 cases of Hypo/ Oligomenorrhea, euthyroid, subclinical hypothyroid, overt hypothyroid and subclinical hyperthyroid were seen in 3, 2, 2 and 1 respectively. Among 7 of Metrorrhagia, 2 had euthyroid, 1 had overt hypothyroid, 1 had subclinical hyperthyroid and 2 had overt hyperthyroid. Among 22 cases of Menorrhagia, euthyroid, subclinical hypothyroid, overt hypothyroid, subclinical hyperthyroid and overt hyperthyroid was seen in 18,3,1, 0 and 1 respectively. Among 3 cases of Polymenorrhea, euthyroid, subclinical hypothyroid, overt hypothyroid was seen in 1, 1 and 1 respectively.

Conclusion: There was a strong correlation of thyroid dysfunction with menstrual disorders.

MSS-022-2024: Potential for use of Raman Spectroscopy as a Non-Invasive Diagnostic for Sjogren's Syndrome

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Sjogren's syndrome is an autoimmune condition that primarily presents with sicca symptoms, such as xerostomia and keratoconjunctivitis. While Sjogren's syndrome affects approximately 4 million adults in the United States alone, diagnostic delay is common as a result of varying symptoms between patients and symptoms being common to other conditions. Although various diagnostic tools, such as blood tests and biopsies can be used to gather evidence for a Sjogren's diagnosis, there is no known non-invasive diagnostic measure. This study aims to evaluate Raman spectroscopy of salivary samples as a diagnostic tool for Sjogren's syndrome. Raman spectroscopy is a non-destructive technique that uses the scattering of monochromatic light to study the chemical composition of a sample. Spectral differences between two samples (i.e. a control and diseased sample) can vary depending on the presence of differing biomarkers. Raman spectroscopy has already been used as a successful tool for other pathologies, being used to diagnose cancers and osteoarthritis. The hypothesis of this project is that an effective, non-invasive diagnostic test for Sjogren's syndrome can be created by analyzing saliva samples via Raman spectroscopy. This will be done by collecting saliva from control, Sjogren's, and patients who received radiation at their salivary glands across Albany Medical Center. Saliva will be used as the diagnostic measure, as saliva is inexpensive, noninvasive, and contains a diverse set of compounds, such as electrolytes and enzymes. The de-identified samples will be analyzed at SUNY Albany using a Horiba Xplora Raman spectrometer with a spectral range of 400-1800 cm-1. Upon completion of this analysis, we will be able to determine if Raman spectroscopy is able to successfully differentiate the saliva Sjogren's patients from the control and radiation patients, therefore implying its use as a potential diagnostic tool.

MSS-023-2024: The link between alcohol withdrawal and hemochromatosis: Revelations from the National Inpatient Sample

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Background: The synergistic effect of alcohol and iron in the pathogenesis of cirrhosis is well studied. This could be due to oxidative stress and lipid peroxidation resulting in liver injury and interaction of alcohol with hepcidin and ferritin. However, the incidence and impact of alcohol withdrawal (AW) on the in-hospital outcomes of hemochromatosis is understudied. The higher inflammatory state in hemochromatosis can upregulate the stress hormones, increasing susceptibility to AW. Conversely, stress and anxiety in acute withdrawal upregulates inflammatory cytokines and catecholamines which can worsen outcomes. The prevalence and influence of AW on the in-hospital outcomes of hemochromatosis is estimated.

Methods: We queried the National Inpatient Sample database from 2016-2020 and used ICD-10 codes to identify hospitalized patients with hemochromatosis. Patients with and without alcohol use disorder were identified and the prevalence of alcohol use disorder in hemochromatosis was estimated. Impact of hemochromatosis on healthcare utilization was

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assessed using univariate analysis and multivariate logistic regression analysis was used to study the mortality of hemochromatosis in alcohol withdrawal hospitalizations after adjusting for relevant confounders and various hospital and patient characteristics.

Results: Out of 210,835 hemochromatosis hospitalizations, 18,730 developed alcohol withdrawal (prevalence 8.88%). Mean age of hemochromatosis patients who developed AW was 56.06 while those who didn't develop AW was 54.38. Among all alcohol withdrawal hospitalizations with hemochromatosis, 53.4 % were males. Multivariate regression analysis showed higher odds of mortality [Table 1], length of stay and total hospitalization charge in hemochromatosis hospitalizations with alcohol withdrawal [Table 2].

Conclusion: The prevalence of alcohol withdrawal is high in hemochromatosis hospitalizations and is associated with worse outcomes. This interplay between iron and alcohol can be generalized as a possible predictor for acute withdrawal in underlying liver disease due to hemochromatosis. Additional prospective research based on this hypothesis is needed to customize future treatment approaches in this population.

MSS-024-2024: Endobronchial Hemangioma in a Renal Cell Carcinoma Patient: An incidental Encounter

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Introduction: Endobronchial hemangiomas manifest incidentally or with symptoms such as hemoptysis, chest pain, or dyspnea. We present a case of endobronchial hemangioma incidentally detected through bronchoscopy in a patient treated for renal cell carcinoma.

Case description: A 54-year-old female with clear cell renal cell carcinoma status post-left nephrectomy was referred due to a non-hypermetabolic 1.3 cm lung nodule in the right lower lobe observed on PET-CT. She underwent bronchoscopy which revealed a right upper lobe endobronchial mass incidentally. Non-contrast CT imaging showed an apical segmental right upper lobe endobronchial occlusion extending into the right upper lobe bronchi. Subsequently, the mass was excised with a hot snare and debulked with a biopsy. Further investigations including FNAC, BAL, and cytology of the right lower lobe showed atypical cells not indicative of malignancy. An endobronchial biopsy of the right upper lobe revealed a well-defined polypoid lesion lined by respiratory epithelium with metaplastic squamous mucosa and vascular proliferation. There were no features suggestive of metastatic renal cell carcinoma which was further supported by negative PAX8 immunostains. Overall, the findings were consistent with the diagnosis of hemangioma.

Discussion: Capillary hemangioma is an exceptionally rare and benign tracheobronchial lesion in adults and can manifest on various mucosal surfaces. While the recurrence of skin and mucosal lesions is recognized after local therapy, malignant transformation remains unreported. The scarcity of hemangiomas, particularly of pulmonary origin, underscores diagnostic challenges, emphasizing the need for meticulous radiological and bronchoscopic assessments. This report suggests further exploration into potential associations between renal carcinoma and pulmonary hemangiomas. The coexistence of these two distinct pathologies underscores the complexity of cancer presentations and the need for a multidisciplinary approach to managing such cases.

MSS-025-2024: Enhancing ADR Awareness: A Pre and Post-Video Intervention Study Assessing The Knowledge Among Doctors

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Background: Adverse Drug Reactions (ADRs) pose a significant challenge in healthcare. Healthcare professionals play a crucial role in the reporting of ADRs.[1] This study investigates the prevalence of knowledge regarding ADR among doctors and enhances it with educational intervention.

Method: A Prospective cross-sectional interventional study was conducted over 1 month in private and public healthcare settings. Pre-video questionnaires were distributed, followed by a 5-minute educational video, providing overall knowledge regarding ADR reporting, followed by a post-video questionnaire to assess knowledge improvement. Two-way ANOVA analysis was used.

Results: Out of 120 doctors invited,104 doctors filled out the pre-video questionnaire and from them 98 doctors followed up on the video intervention and completed the post-video questionnaire. Pre-video questionnaire revealed that 95.2% were aware of the term ADR, but only 42.3% knew its definition. Following an educational video intervention, a post-video questionnaire demonstrated 94.9% (p value= <0.001) of participants now being aware of the definition and 100% familiar with its term. The study explored knowledge gaps regarding WHO causality assessment and ADR reporting form sections to validate ICSR (Individual case safety report). The video impacted knowledge levels rising significantly from 23.1% to 87.8% (p value=<0.00001) and 8.7% to 73.5% (p value= <0.00001) respectively. The study revealed a substantial increase in awareness of the WHO online database Vigibase from 16.3% to 80.6% post-intervention. Awareness of the pharmaco-vigilance program increased from 52.9% to 99%. Participants found the video helpful, with 100% expressing an intent to share knowledge within their communities, contrasting with the 37.5% who had done so pre-intervention.

Conclusion: This research underscores the efficacy of targeted video intervention in augmenting ADR awareness among healthcare practitioners. Findings advocate for the integration of similar educational strategies into professional development initiatives to foster a culture of proactive pharmacovigilance and ensure optimal patient safety.

MSS-026-2024: A COMPARATIVE STUDY OF EVALUATING TWO DIFFERENT DOSES OF INTRAVENOUS DEXMEDETOMIDINE IN SPINAL ANESTHESIA

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Background: Neuraxial anesthesia presents varied options for anesthesiologists, affording alternatives to general anesthesia. Subarachnoid block, notably with hyperbaric bupivacaine (0.5%), stands favored for its swift onset and sustained analgesia lasting 2-2.5 hours. Augmentation with adjuncts such as opioids and dexmedetomidine, known for sedation, anxiety mitigation, and postoperative comfort enhancement, is common practice. Intravenous dexmedetomidine extends spinal anesthesia duration, induces sedation, and augments postoperative analgesia, with minimal impact on cardiovascular and respiratory function. Our investigation explores the effects of intravenous dexmedetomidine co-administration with spinal anesthesia.

Methods: 40 ASA Grade I & II patients aged 20-50 undergoing lower abdominal and limb surgeries were allocated into two groups: Group D1 (Bupivacaine + Dexmedetomidine 0.5 mcg/kg) and Group D2 (Bupivacaine + Dexmedetomidine 1 mcg/kg). Preoperatively, patients observed nil by mouth status for ≥6 hours and received procedural education. Upon admission to the operating room, patients received intravenous access (18G or 20G cannula) and a lactated Ringer's solution preload (10-15 ml/kg). Standard monitoring (ECG, pulse-oximeter, BP cuff) was applied to record baseline vitals and respiratory rate. Dexmedetomidine was infused intravenously over 10 minutes pre-spinal anesthesia, with vitals recorded at 1, 5, and 10 minutes.

Results: Both groups achieved a sensory blockade level of T8. Group D2 exhibited prolonged time to two-segment regression ($p<0.001$) and a longer duration of motor blockade, although not statistically significant ($p>0.05$). Group D2 experienced deeper sedation and a significant delay in the need for rescue analgesia ($p<0.001$).

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Conclusion: Intravenous dexmedetomidine bolus pre-spinal anesthesia extended sensory and motor blockade duration without affecting onset or level. It also delayed the requirement for rescue analgesia and provided deeper sedation intraoperatively. These effects were more pronounced with 1.0 µg/kg compared to 0.5 µg/kg dexmedetomidine.

MSS-027-2024: Management of refractory heart failure with reduced ejection fraction– A case report

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Introduction: Heart Failure (HF) is a multi-faceted and life-threatening syndrome characterized by significant morbidity and mortality, poor functional capacity and quality of life. Although the majority of patients with heart failure with reduced ejection fraction (HFrEF) respond to optimal medical therapy, some patients do not improve or experience rapid and repetitive recurrences of symptoms. Specialized strategies for patients with refractory HFrEF include intravenous vasodilator and inotropic therapy, mechanical circulatory support, cardiac transplantation, and palliative care.

Case Description: A 61-year-old male was hospitalized with complaints of dyspnea on exertion and orthopnea, bilateral leg edema. He has history of ischemic cardiomyopathy severe EF <20%, coronary artery disease, status post coronary artery bypass graft /implantable cardioverter-defibrillator (ICD) upgrade to biventricular (BiV ICD)/Automatic ICD device, chronic kidney disease stage 3b, type 2 diabetes mellitus. The patient was managed with diuretics and quadruple therapy. The patient was found to be in acute on chronic congestive systolic and diastolic heart failure with EF 20%, right bundle branch block (RBBB) QRS 150 ms, atrial/ventricular fibrillation, progressive hypotension and acute kidney injury. Despite maximal guideline-directed medical therapy (GDMT) and the patient being pressor dependent, further discussion with the electrophysiology and critical care medical team. The patient was transferred to a higher center hospital for CHF/cardiac transplant program to assess the patient for ventricular assist device and possible transplant evaluation.

Discussion: HF is one of the main causes of morbidity and mortality. The management of HFrEF is complex, and current guidelines recommend implementation of HFrEF quadruple therapy within 6 months of diagnosis. This case report highlights a patient who has been maximal GDMT despite the patient was continued to be seen with refractory heart failure. Hence as the next best treatment for this patient, it was decided to assess the patient for a heart transplant evaluation.

MSS-028-2024: Systematic Review on Medication Event Reminder Monitors in TB patients

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Abstract: Background: The prolonged and complex treatment regimens for drug-susceptible TB (dsTB) and drug-resistant TB (drTB) have historically suffered from issues related to patient adherence, leading to unfavorable treatment outcomes and drug resistance. Various strategies have been employed to improve treatment adherence, including in-person directly observed therapy (DOT), incentives, enablers, education, reminders, and digital adherence technologies (DATs). The study aims to assess the impact of Medication Event Reminder Monitors

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(MERM) on medication adherence, clinical outcomes, and patient and healthcare provider (HCP) satisfaction.

Methods: All the studies published from inception till February 16, 2023 were screened. Inclusion criteria for the studies were cross-sectional studies, cohort studies, case control studies, randomized/ non randomized controlled/ uncontrolled trials, both blinded and open label qualitative studies. Search was conducted in databases namely PubMed, ScienceDirect, DOAJ, Embase, and Web of Science medical. The Cochrane bias assessment tool used for randomized control trials. The Newcastle Ottawa tool used for observational studies. All the papers were independently screened by at least 2 authors.

Results: Study selection process - 8 studies in the end - 3 clinical trials, 4 prospective studies, 1 cross-sectional; 76,811 participants; 24291 (31.62%) females. Findings from this systematic review suggest that MERM is a well-accepted and effective tool for electronically monitoring TB medication adherence. Age, gender, occupation, residency, TB diagnosis method, HIV status, handicap, and the differentiation between old and new TB diagnoses are some of the variables that affect how well MERM improves patient adherence. Knowing these factors can help develop strategies that are more effective at improving drug adherence. Countries with a high TB burden should develop DATs, such as ingestible sensors and SMS reminders. However, different studies have found different levels of success with these tools in raising adherence.

Discussions: Patients' opinions on MERM differ, with some accepting it and others rejecting it. Drug side effects, for example, can have an impact on acceptance. Studies have demonstrated that MERM, when compared to conventional DOT, can result in higher treatment success rates and lower loss to follow-up. There are still issues, and more study is required to properly comprehend how DATs like MERM affect TB therapy and patient outcomes.

MSS-029-2024: The Impact of Psychological Stress on the Gastrointestinal Health of Medical Students in Georgia: A Retrospective Cross-Sectional Study

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Background: Gastrointestinal issues affect a significant global population, resulting in substantial healthcare costs. Recent research emphasizes psychological stress as critical in the development and worsening of certain gastrointestinal diseases. Medical students and healthcare workers, facing academic and personal pressures, are notably vulnerable. This study aims to investigate stress's impact on their gastrointestinal health, focusing on its role in new-onset functional GI disorders like GERD and IBS.

Methods: Using an observational cross-sectional design, this 6-week study surveyed active medical students from various Georgia institutes. A questionnaire, integrating validated stress assessment tools (PSS), and GI disease measures (FSSG for GERD, GSRS IBS-SSS for IBS symptoms) were employed. Data underwent comprehensive analysis, employing descriptive statistics to evaluate stress's relationship with GERD and IBS. Pearson correlation assessed the strength and direction of these relationships, while Chi-Square testing explored gender and year of study impact on GERD and IBS symptoms' risks.

Results: We reviewed data on 144 medical students from Georgia and discovered that stress is extremely prevalent within this cohort; 89.58% reported moderate to high levels of perceived stress. Participants in clinical (4-6) years had significantly higher odds to experience stress, about 12.5 times more [X2 = 15.52, p = <0.0001, 95% CI = 2.96 to 57.05], while women were noted to be 5 times more [X2 = 8.758, p = 0.0031, 95% CI = 1.70 to 15.73] vulnerable to high stress. When comparing stress with GERD, we observed a strong statistically positive relationship between the two, (r) = 0.3069, [p = 0.00018, 95% CI = 0.1509 to 0.4480]. We also obtained a statistically positive relationship between high stress and increasing IBS burden, with (r) = 0.24 [p = 0.0032, 95% CI = 0.08332 - 0.3916]. We also found significant gender differences in stress-induced GERD or IBS. 64% reported increased symptoms during heightened academic stress, such as exams.

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Conclusion: Our study highlights stress's impact on GI health among Georgia's medical students, primarily Caucasian and South Asian. It confirms positive relationships between stress, GERD, and IBS, urging stress management integration into medical education for healthcare worker well-being.

MSS-030-2024: Effects of Green Tea Polyphenols on Motor Symptoms and in Huntington's disease model of Drosophila Melanogaster

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Huntington's disease (HD) is a neurodegenerative disorder characterized by motor dysfunction, cognitive decline, and psychiatric symptoms. This study aimed to investigate the potential neuroprotective effects of green tea polyphenols (GTP) on motor symptoms in a Drosophila Melanogaster HD model. We categorized flies into three groups: wild-type flies and two groups of If/CyO; UAS–hHTT50Q flies crossed with GAL4RapGap1 flies. One HTT-expressing group received GTP intervention, while the other served as a control. GTPs were administered by incorporating a concentration of 27.76 g/mol green tea into the standard Drosophila food medium. Three main procedures were conducted: GTP food preparation, climbing assay, and locomotion assay. Motor function was assessed using locomotion and climbing assays. Results revealed significant enhancements in motor function in the GTP-treated groups compared to controls. Larvae receiving the GTP intervention displayed improved locomotor activity ($p < 0.001$), and flies in the GTP treatment group demonstrated faster climbing speeds ($p = 0.026$). Overall, the GTP treatment group displayed significantly better motor outcomes than wild-type Drosophila, suggesting potential neuroprotective effects against HD-associated motor symptoms. However, the lack of a successful HTT-expressing control cross necessitates further investigation to validate these findings. Future studies should focus on replicating the experiment with an untreated HTT-expressing group and explore the quality of movements in HD models to gain a more comprehensive understanding of disease progression.

MSS-031-2024: Incidence of Infective Endocarditis Post TPVR: A Systematic Review & Meta-Analysis

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BACKGROUND: Endocarditis has become a significant concern among patients with congenital anomalies affecting the Right Ventricular Outflow Tract (RVOT) and those with prosthetic valves, emerging as a prominent adverse outcome. The aim of our study is to evaluate the incidence of infective endocarditis post Transcatheter Pulmonary Valve Replacement (TPVR).

METHODS: We conducted a comprehensive search on PubMed, Scopus, Science Direct, and Clinicaltrials.gov to identify relevant studies, incorporating subject headings and keywords related to "TPVR" and "Endocarditis." Inverse Variance was used to estimate the incidence of IE in patients who underwent TPVR with respective 95% confidence interval (CI). Analysis was performed with RevMan 5.4.1 (Cochrane 2020). A p-value ≤ 0.05 was considered statistically significant.

RESULTS: We included 18 studies with 3270 patients under TPVR. The incidence rate of IE post TPVR is 5.84% [95% CI 3.91%-7.71%; $p \leq 0.00001$]. However, when subdivided based on the type of the valve used, TPVR with MELODY valve had a higher incidence [6.99%; 95% CI 4.99%-8.99%; $p \leq 0.00001$] of IE when compared to the SAPIEN valve [3.29%; 95% CI 0.53%-6.06%; $p \leq 0.0004$].

CONCLUSION: The incidence of IE post TPVR is lower with the SAPIEN valve compared to the MELODY valve. Future research has to be done to examine the reasons behind the differential incidence rates since such insights are essential in optimizing patient outcomes and guiding clinical decision-making.

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MSS-032-2024: Differing views of vaccine hesitancy among medical and non-medical students: A cross-sectional study

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Background: Vaccine hesitancy is a complex phenomenon influenced by social, cultural and economic factors. It is the delay in acceptance or refusal of vaccines, despite the availability of vaccine services, often fuelled by misinformation, mistrust, or fear of vaccines,(1) and is a growing concern in the wake of the COVID-19 pandemic. This poses a threat to not only one's life but also others surrounding them. Vaccine hesitancy is indirectly related to vaccine coverage, and is therefore important to reduce it by finding out its prevalence and root cause. We aim to find the burden of vaccine hesitancy in students and reasons for it in non-medical students and compare it with medical students.

Methods: A cross sectional study was carried out via the help of google forms. The forms were forwarded to medical and non-medical students through various social media platforms, the results taken over a period of 3 months. The data obtained was exported to SPSS version 17.0 statistical software for analysis in our college Deccan College of Medical Sciences.

Results: 55.9% of students had taken COVID-19 vaccine while the remaining either refused to take the vaccine (23.2%) or agreed to take it at a later date (20.8%). Although the majority (76.3%) believed that the best way to beat COVID-19 effects and complications is vaccine, hesitancy in taking the vaccine arose due to doubts in its effectiveness (51.4%) and possible side-effects (71%).

Conclusion: 64.4% of non-medical students were hesitant to receive the vaccine, which is 2.5 times more than medical students. This was attributed to the fear of side effects of the vaccine and its effectiveness due to supposably rushed trials. Addressing vaccine hesitancy requires a multifaceted approach by healthcare providers, community leaders, and governments.

MSS-033-2024: Sildenafil-Induced Acute Pancreatitis

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Introduction: Acute pancreatitis (AP) refers to inflammation of the pancreas and can be caused by gallstones, alcohol, ERCP, trauma, hypercalcemia, drugs, etc. However, AP secondary to Sildenafil has not been described previously.

Case Presentation: A 22-year-old male presented with epigastric pain and anorexia for 20 days. There was no history of insect bites, trauma, procedure, chronic illness, and alcoholism. He reported starting Sildenafil. TLC was 20,600 cells/mm3 with 84% neutrophils. SGOT, SGPT and ALP were 108.0 IU/L, 93.3 IU/L, and 184.9 IU/L respectively. Serum amylase was 342.5 IU/L and serum lipase was 448.1 IU/L. Serum ionized calcium, triglycerides, procalcitonin and CRP were 3.19 gm/dL, 133.42 mg/dL, 3.57 ng/mL and 140.24 mg/L respectively. CECT was suggestive of AP. Blood cultures were sterile. Given the history and CECT finding, he was diagnosed with Sildenafil-induced AP and was managed with fluid resuscitation and withdrawal of the precipitating factor. Serum amylase and lipase decreased with the treatment and he improved clinically.

Discussion: Badalov et al. (2007) classified AP: Class I - ≥1 case report describing a recurrence of AP with a rechallenge with the drug, Class II - demonstrate a consistent latency in 75% or more of the reported cases, Class III - ≥2 published case reports but without a rechallenge and a consistent latency period, Class IV - similar to class III but only 1 case published report [3]. The pathogenesis of drug-induced AP includes (1) Direct toxicity (2) Accumulation of toxic metabolites (3) Immune response (4) Hypersensitivity reaction [4]. Management of Sildenafil-induced AP is similar to that of any other AP i.e. with intravenous fluid resuscitation, analgesia and nutritional support followed by management of the underlying cause such as ERCP, cholecystectomy or withdrawal of the

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offending agent. Monitoring for complications such as pancreatic pseudocyst is essential.

MSS-034-2024: Unmasking Rarity: A Thought-Provoking Case Report on Bannayan-Riley-Ruvalcaba Syndrome

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Introduction: Bannayan-Riley-Ruvalcaba Syndrome (BRRS) is a congenital disorder caused by a germline mutation in PTEN, a tumor suppressor gene. Although there are no specific diagnostic criteria, the disease may present with macrocephaly, mental retardation, raised birth weight, intestinal hamartomas, lipomas, macules and more.

Case Description: A 14-year-old male presented with gradually progressive left-sided hemihyperplasia. History revealed elevated birth height and weight. He exhibited subnormal intelligence (IQ = 86) (WISC V Classification). Facial asymmetry and left-sided hemihypertrophy (more in the limbs) were observed. Muscular discrepancies included increased muscularity in the left arm, greater girth in the left thigh, and the left foot surpassing the right in size. The abdominal examination showed no organomegaly but mild tenderness at the umbilicus and left lumbar region. The enlargement of the testes and scrotal sac, dilated veins on the thigh, and skin hemangiomas on the body were noted. The laboratory results were remarkable for microcytic hypochromic anemia and a TLC of 3,000 cells/mm3. CT scans were unremarkable in light of hemihyperplasia. Doppler studies of lower limb arteries and veins ruled out significant abnormalities. Genetic testing and karyotyping revealed a PTEN mutation at 10q23.3 and confirmed BRRS. A colonoscopy revealed multiple small nodules in the terminal ileum, confirmed as hamartomatous polyps through biopsy.

Discussion: The typical triad for BRRS includes mega-encephalopathy, gastrointestinal polyposis and genital pigmentation. Medical history may demonstrate birth weight, birth length and head circumference above the 97th percentile. Gastrointestinal polyposis could be responsible for chronic blood loss and anemia. Lipomas and skin lesions such as vascular malformations may aid in diagnosis [2]. BRRS can be confirmed with PTEN genetic analysis. Management involves multidisciplinary care and screening for neoplasms. Annual testing for hemoglobin levels should be done. BRRS is more common in males and presents during infancy unlike Cowden's Syndrome.

MSS-025-2024: Streptococcus Gordonii: A Rare Cause of Infective Endocarditis in a Young Immunocompetent Male

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Background: Infective endocarditis (IE) carries significant morbidity and mortality, ranging from 15% to 30%. This case outlines a unique case of Streptococcus gordonii (S. gordonii) IE in an aortic valve of a young immunocompetent male without prior dental procedure history.

Case: A 38-year-old male presented with a fever of 101.7 F, diarrhea, nausea, vomiting, generalized abdominal pain, arthralgia, bilateral finger swelling, and a 20-pound weight loss over a month. The patient denied IV drug use or recent dental interventions. Physical examination didn't reveal a cardiac murmur. Labs showed neutrophilic leukocytosis (WBC: 15 L/uL, Neutrophils: 79.5%), elevated CRP (14.90), ESR (82), and a procalcitonin level of 0.53. Tests for HIV and Hepatitis were negative. Blood cultures grew S. gordonii. An echocardiogram revealed a tricuspid aortic valve with an echogenic density on its right coronary cusp. A four-week course of IV Ceftriaxone resulted in significant patient improvement.

Discussion: S. gordonii, an alpha-hemolytic, gram-positive bacterium, is typically an opportunistic pathogen responsible for apical periodontitis. It infrequently triggers systemic diseases, such as IE, septic arthritis, and others. The modified Duke criteria,

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the recognized standard for IE diagnosis, stratify patients as: definite IE, possible IE, or rejected IE based on clinical and pathological indicators. Our patient met two major (vegetation on heart valves, positive blood cultures) and one minor criterion (temperature > 100.4 F), classifying his condition as a possible IE diagnosis.

Conclusion: IE, with its potentially lethal nature and varied clinical presentations, should always be a differential in feverish patients—even in young, immunocompetent individuals without apparent risk factors or history of dental interventions.

MSS-026-2024: Differentiating Tocophobia from Specific phobia of Vaginal penetration: A literature review

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Background-Fear of childbirth (FOC) is a prevalent concern among expectant mothers, affecting nearly 80% of pregnant women worldwide. When FOC escalates to an extreme level, it is clinically recognized as Tocophobia, characterized by a pathological fear of pregnancy and childbirth, with an estimated prevalence of 14%. Tocophobia can prompt women to either avoid pregnancy entirely or opt for elective C-sections without medical necessity. During our investigation, we encountered a rare case highlighting the distinction between Tocophobia and specific phobia of vaginal penetration (SPVP), a condition with limited information available. This prompted us to delve deeper into the nuances of Tocophobia and its differentiation from SPVP.

Methodology-To elucidate these concepts, we conducted a systematic literature review on PubMed spanning from 2014 to 2024, employing key search terms such as "tocophobia," "specific phobia of vaginal penetration," and "prenatal care." Out of the 28 articles identified, 6 studies met the eligibility criteria for review and analysis, encompassing systematic reviews, meta-analyses, and case reports.

Results-As our examination progressed, we observed that Tocophobia bears resemblance to obsession rather than phobia. Unlike phobias, which entail fear of external stimuli that diminish upon avoidance, Tocophobia entails recurrent and persistent internal fears such as the anticipation of labor pain, loss of control, and concerns about maternal and fetal health. It is diagnosed using tools like the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ), which evaluates cognitive antepartum expectations. A score exceeding 85 on the W-DEQ suggests the presence of Tocophobia. In contrast, SPVP manifests through avoidance behaviors towards vaginal penetration such as choosing sanitary pads over tampons, declining pelvic exams, avoiding vaginal intercourse, and is diagnosed using the diagnostic criteria outlined in the DSM-5.

Conclusion-Healthcare professionals should be able to differentiate complex cases with similar presentations and be aware that pregnant women presenting with Tocophobia, particularly regarding vaginal delivery, may not necessarily fear pain or obstetric complications. Obstetricians should consider psychiatric evaluation when patients exhibit severe emotional distress or avoidance behavior and ensure overall positive birth experience.

MSS-027-2024: An Unusual Case of Seizures in a Patient with Concomitant Autoimmune Hypoparathyroidism and Coeliac Disease

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Our case report highlights the importance of considering a broader spectrum of differential diagnoses, including celiac disease and hypoparathyroidism, in patients presenting with epilepsy and malabsorption symptoms. Our patient experienced multiple seizure episodes that were refractory to anti-epileptic drugs. Comprehensive

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evaluation and investigations revealed symptoms of malabsorption, including iron deficiency, which provided the initial indication of celiac disease. The diagnosis of celiac disease was subsequently confirmed through a duodenal biopsy and serological findings of IgA anti-tissue transglutaminase antibodies. Upon the initiation of a gluten-free diet and the treatment of concomitant hypocalcemia with calcium and vitamin supplements, the patient demonstrated significant clinical improvement. The presence of malabsorption symptoms in tandem with epilepsy often prompts consideration of underlying conditions, with coeliac disease emerging as a noteworthy concern. Epilepsy, a neurological disorder characterized by recurrent seizures, often presents a diagnostic challenge due to its diverse etiologies. In conjunction with epilepsy, malabsorption symptoms can raise suspicions of underlying conditions such as coeliac disease and hypoparathyroidism, both of which contribute to the intricate web of autoimmune and endocrine dysregulations. This case report explores the intersection of epilepsy, coeliac disease, and hypoparathyroidism shedding light on the significance of considering this intricate interplay in the diagnostic process. Our case report highlights the importance of considering a broader spectrum of differential diagnoses, including coeliac disease and hypoparathyroidism, in patients presenting with epilepsy and malabsorption symptoms. Our patient experienced multiple seizure episodes that were refractory to anti-epileptic drugs. Comprehensive evaluation and investigations revealed symptoms of malabsorption, including iron deficiency, which provided the initial indication of coeliac disease. The diagnosis of coeliac disease was subsequently confirmed through a duodenal biopsy and serological findings of IgA anti-tissue transglutaminase antibodies. Upon the initiation of a gluten-free diet and the treatment of concomitant hypocalcemia with calcium and vitamin supplements, the patient demonstrated significant clinical improvement.

MSS-028-2024: Cerebral Vasculitis in Pneumococcal Meningitis - A Feared Complication

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Introduction: Cerebral vasculitis is a life-threatening consequence of pneumococcal meningitis. Appropriate neuroimaging and laboratory tests are needed to quickly establish the diagnosis and etiology. We present a case of pneumococcal meningitis complicated by cerebral vasculitis.

Case Description: A 38-year-old gentleman presented with fever with chills, headache, vomiting, right sided weakness, and altered mental status for two days. On examination, he had Glasgow Coma Scale score 7/15, right hemiparesis and neck stiffness. Magnetic Resonance Imaging (MRI) of the brain showed multifocal subcortical infarcts, microhemorrhages and leptomeningeal enhancement involving bilateral frontal, posterior temporal and parieto-occipital lobes. Magnetic Resonance Angiography (MRA) showed irregular right M2 segment of middle cerebral artery and A1 segment of right anterior cerebral artery. Cerebrospinal Fluid analysis showed elevated leukocytes and protein with low glucose. Empirical antibiotics and acyclovir were initiated. Dexamethasone was added for associated vasculitis. CSF culture and PCR were positive for Streptococcus pneumoniae. Repeat MRI of the brain on day 28 showed resolving lesions. His neurological status improved gradually with rehabilitation.

Discussion: Streptococcus pneumoniae is a common cause of bacterial meningitis, in which stroke secondary to cerebral vasculitis is increasingly reported. Vasculitis should be suspected by focal deficits and radiologic findings of infarcts or hemorrhages in multiple arterial territories and confirmed by arterial wall thickening or enhancement and luminal narrowing. Vasculitis can occur at any stage, including as a delayed complication when the patient appears to be recovering. Although evidence supports the use of corticosteroids in patients with bacterial meningitis in high-income countries, adjunct corticosteroids are not routinely used in treatment of acute bacterial meningitis in low income countries, but may have a role in vasculitis. Larger prospective

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studies are needed to evaluate the safety and efficacy of high dose and prolonged course of steroids in pneumococcal meningitis complicated by vasculitis.

MSS-029-2024: Postpartum Gonadal vein, Renal vein, and Inferior Vena-cava Thrombosis

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Introduction: Pregnant or postpartum women have a fivefold increase in thromboembolism risk compared to nonpregnant women. African American women have three times higher pregnancy-related mortality ratio as compared to Caucasian women. Pregnancy related death occurs up to one year postpartum. We present a case of a 34-year-old African American postpartum female who presented with right flank pain and was subsequently found to have Inferior vena-cava, renal vein, and gonadal vein thrombosis with no known thrombophilia during this admission.

Case Description: The patient is a 34-year-old African American female who is three weeks postpartum with no known past medical history. She presented with right-sided flank pain, nausea, and vomiting for one day. She underwent a cesarean section three weeks ago with no complications. Doppler ultrasound of left lower extremity showed sluggish flow suggestive of venous stasis but no deep vein thrombosis (DVT) and took aspirin 81 milligrams daily for a brief period. The patient underwent a Cesarean-section due to fetal intolerance to labor after spontaneous membrane rupture at 40-week gestation. The patient has a history of previous miscarriage at 12 weeks.

Pertinent laboratory tests showed elevated creatinine at 1.36 µmol/L and alkaline phosphatase at 113 U/L. Urinalysis was not suspicious of urinary tract infection with 3+ protein, 3+ blood, and 1+ ketones. CT abdomen/pelvis showed findings suggestive of right gonadal vein thrombus with thrombus present in IVC and right renal vein, hypo enhancing right kidney with right perinephric fluid superimposed infection not excluded. Renal ultrasound showed an echogenic right kidney likely related to suspected renal vein thrombosis.

Discussion: Patients with postpartum thrombosis should get a hypercoagulable workup to rule out underlying etiology. Imaging with CT is usually sufficient for diagnosis. Patients with postpartum thrombosis remain at increased risk of future thrombosis. Treatment consists of anticoagulation for variable duration depending on the etiology.

MSS-030-2024: Increasing Participation and Diversity in the National Bone Marrow Donor Registry

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Background: Bone marrow transplants, crucial for treating blood-based cancers, face challenges in matching donors across diverse racial and ethnic backgrounds. While previous research indicates that altruism, self-esteem, and other personality traits influence charitable behaviors, the specific roles of altruism and self-esteem in donor decisions remain underexplored.

Methods: This study aims to examine the relationship that self-esteem and altruism have on the intentions and motivations of college students to join the National Bone Marrow Donor Registry (NBMR). 361 students (72.3% female, mean age=21.13) from the Rutgers Camden Psychology Participant Pool completed the Rosenberg Self-Esteem scale and the Altruism measures through an online survey.

Results: The participants displayed average self-esteem (M=16.97, SD=2.62) and low altruism (M=29.94, SD=11.85). Of the participants, 39.1% indicated they would register with the NBMR. Self-esteem [t (361)=1.67, p=0.093] was similar between groups who agreed to register with the NBMR and those who would not register. Altruism [t (361)=2.51, p=0.016] was different between groups, as individuals who were more altruistic agreed to register with NBMR. There was no difference in intentions to register by sex [χ2(2,N=361)=1.58, p=0.454], identifying as Hispanic or Latinx [χ2(3,N=361)=1.42, p=0.701], and religious affiliation [χ2(1,N=361)=3.57, p=0.059]. Age [t (361)=1.87, p=0.063] was not significant in the likelihood to register for the NBMR.

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Conclusion: This study reveals that altruism, not self-worth, motivates individuals to register with the NBMR. Higher altruism leads to a greater willingness to help others through registration. Further research is necessary to identify factors affecting registration, aiming to improve recruitment strategies. These findings are crucial for understanding what drives people to join the NBMR.

MSS-031-2024: A Rare Case of Hyperglycemic Hyperosmolar Nonketotic Syndrome (HHNS)

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Introduction: Non-ketotic hyperglycemia (NKH) epileptic seizures are an uncommon side effect of uncontrolled diabetes mellitus. Criteria includes blood sugar level greater than 200 mg/dL (11 mmol/L), hyperosmolality, ketosis absence, dehydration, and seizure control following blood sugar normalization. Presentation of seizures in elderly patients with NKH poses several diagnostic challenges. Elderly individuals often present with atypical clinical features, and the manifestations of hyperglycemia may be subtle or masked by concurrent comorbidities. Here we present a case of seizures in a nonagenarian with nonketotic hyperglycemia.

Case Description: A 92-year-old male patient with a history of diabetes mellitus presented to the emergency department complaining of jerky movements of his extremities for about 20 seconds associated with sudden rolling back of eyes witnessed by family. Following this episode, he was tired and confused for an hour. Laboratory findings were negative for ketones. Blood glucose level showed 247 mg/dL and HbA1c was found to be 7.7%. Head CT and MRI brain were negative. He was aggressively treated in ICU with fluids and insulin. Patient was discharged without any seizure-like activity and anti-seizure medication, while having good glycemic control.

Discussion: The American Diabetic Association states that between 1% and 3% of people with diabetes mellitus experience hyperglycemic nonketotic seizures. Our case report of hyperglycemic nonketotic seizures emphasizes the significance of careful blood glucose monitoring, especially for individuals with diabetes mellitus. Though uncommon, these seizures have the potential to be fatal, so it is important to recognise them right away and start management.

MSS-032-2024: Clinical Profiles and Angiographic Characteristics of Coronary Artery Disease in Women: Insights from a Tertiary Care Center in Eastern India

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Background: Due to the lack of awareness and attention to women's health, coronary artery disease (CAD) not only remains a formidable health problem for women in India but also is an under-diagnosed, under-treated, and under-researched disease worldwide. There is a paucity of studies elucidating the angiographic prevalence and pattern of CAD in women, especially from developing countries. This study aimed to characterize the clinical profile and angiographic features of women with CAD at a tertiary care center in Eastern India.

Methods: A hospital-based observational study was conducted over a period of 1.5 years. A total of 111 female patients above 18 years, diagnosed with CAD by electrocardiogram, cardiac biomarkers, and/or coronary angiogram, were included. Demographics, clinical features, and angiographic data were collected.

Results: The mean age of presentation was 55.8 years. 89.2% of patients reported chest pain. The most frequent presentation was stable ischemic heart disease followed by ST-elevation myocardial infarction. Among angiographic findings, normal coronaries were observed in 26.1%, while single-vessel disease (SVD), double-vessel disease (DVD), and triple-vessel disease (TVD) were found in 22.5%, 21.6%, and 18% of patients, respectively. Left anterior descending artery (LAD) involvement was most common (40.8%), followed by right coronary artery (RCA) (29.6%) and left circumflex artery (LCX) (27.5%). SVD was the most common type of CAD in younger

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women, whereas in elderly women, SVD and DVD were more frequent.

Conclusion: The mean age of CAD in females in this part of India was younger compared to Western studies. Angina as a presenting symptom is less predictive of CAD in women; 26% of women presenting with symptoms of anginal pain had angiographically normal coronaries. LAD artery was the most involved vessel. In women with normal coronary arteries, a myocardial bridge was found to be one of the common causes of anginal pain

MSS-033-2024: The need for medication reconciliation: A case of a newer DPP IV inhibitor-induced rash in a Diabetic

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Introduction- Diabetes Mellitus is well known to be associated with multiple complications including skin and mucous membrane manifestations. Dipeptidyl Peptidase IV (DPP IV) Inhibitors are widely used oral agents for reaching age-appropriate HbA1c goals.

Case Description - A 62-year-old female with a known history of Type 2 Diabetes Mellitus; diagnosed 15 years ago presented to the clinic with a chief complaint of generalized skin rash for 3 weeks. The diffuse erythematous pruritic cutaneous rash involved the patient's chest, extensor surface of bilateral legs and arms and back. The patient was prescribed Alogliptin 6 months ago along with her previous regimen of Metformin and Ertugliflozin. The patient had no history of any allergic disorder and after ruling out infectious or allergic etiologies, Alogliptin was held secondary to strong clinical suspicion. On a follow-up after 5 weeks of drug discontinuation, the rash completely resolved with no symptoms or residual pigmentation.

Discussion - The major agent-specific disadvantage of Dipeptidyl peptidase-4 inhibitors is immune-mediated dermatologic effects. Aloglipin being a newer DPP IV inhibitor to be approved by FDA has no reported case of a generalized cutaneous rash while delayed immune-mediated and generalized hypersensitivity reactions secondary to other DPP4 inhibitors are reported, though rare. Patients immediately tend to benefit from stopping the drug as seen in this case. A cross-reactivity between different DPP IV inhibitors needs to be investigated. Lastly, a high suspicion of dermatological manifestation caused by these agents should be kept when prescribing or managing a patient on a DPP4 inhibitor even with a timeline of several months of prescribing the drug.

MSS-034-2024: Bibliometric trends in endophthalmitis

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Background: Endophthalmitis continues to be a heavily researched topic in the field of ophthalmology. We performed a bibliometric analysis to investigate the trends in articles published on endophthalmitis.

Methods: The WebofScience database was queried for all published works excluding abstracts on the topic ""endophthalmitis"" from January 2000 to December 2022. VosViewer software was utilized for analysis. Data on authors, organizations, journals, countries, and keywords were extracted.

Results: 8,254 articles on endophthalmitis were published in English between 2000 and 2022, with progressively increasing frequency of publications every year. Of these, 258 articles (3.1%) have had at least 100 citations since 2000. The Journal of Cataract and Refractive Surgery published the highest number of articles on the topic of endophthalmitis (465) and had the second highest number of citations (11,561). The United States (US) (2,539) and India (781) published the highest numbers of articles on endophthalmitis, while the most total citations were observed from articles published in the US (84,730) and the United Kingdom (12,383). The University of Miami in the US (257) and the LV Prasad Eye Institute in India (211) published the most articles on this topic. Likewise, the top cited articles came from the University of Miami (13,484). Some of the most

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common key words recorded included the terms "risk-factors" (553 occurrences) and "prophylaxis" (452 occurrences).

Conclusions: These findings suggest an increasing trend in publications on endophthalmitis over time, with a majority of the articles published and highly cited from the US institutions. Key word findings also may be representative of increased importance being placed on prevention of endophthalmitis, a trend which may continue into the future.

MSS-035-2024: Outcomes of Early Versus Late Irrigation and Debridement of Pediatric Open Long Bone Fractures

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Background: The purpose of this study is to identify whether early irrigation and drainage (I&D), within 8 hours, versus late, between 8 and 24 hours, for pediatric open long bone fractures impacts the rate of surgical site infection.

Methods: Using retrospective data review from the National Trauma Quality Improvement Project (TQIP) of 2019, there were 390 pediatric patients with open long bone fractures who were included in the study. After completing propensity score matching, we had 176 patients in each category, I&D within 8 hours and I&D between 8 and 24 hours.

Results: We found no significant differences between each group for the rate of deep surgical site infections which was 0.6% for patients who received surgical I&D within 8 hours and 1.1% for those who received it after 8 hours (Adjusted odd ratio [AOR] 0.5, 95% CI; 0.268 to 30.909, P>0.99). For the secondary outcomes studied, in terms of length of hospital stay, patients who received I&D within 8 hours stayed for an average of 3.5 days, and those who received it after 8 hours stayed for an average of 3 days, with no significant difference found, and there were also no significant differences found between the discharge dispositions of the patients.

Conclusion: Our findings support the recommendation for managing open long bone fractures from the American College of Surgeons: complete surgical irrigation and debridement within 24 hours.

MSS-036-2024: Analyzing the Quality and Readability of Online Hyaluronic Acid Knee Injection Resources

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Background: We analyzed the quality of information about Hyaluronic acid (HA) knee injections for osteoarthritis using DISCERN, a tool that grades the quality of websites. We also analyzed readability with Flesch-Kincaid grade reading levels (FKGRL).

Methods: Lists of the top ten included sites from Google searches about HA injections were evaluated using DISCERN to determine their quality. Additional variables collected were site category, Health on Net (HON) certification, search result rank, and FKGRL. DISCERN scores were compared and grouped by these variables.

Results: Most sites were measured as fair in quality. Greater DISCERN scores were produced from searches using general terminology, sites with HON labels, and academic journal publications.

Conclusion: This study indicates information quality for HA injections online is fair. The data also indicates that patients can best educate themselves using HON labels, general search terms, and information from academic journals when possible.

MSS-037-2024: Evaluating Readability of Generative Artificial Intelligence Treatment Recommendations for Common Pediatric Orthopedic Procedures

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Background: With the emergence of publicly available conversational artificial intelligence (AI), patients are increasingly accessing resources such as ChatGPT-3.5 to answer medical questions. Assessment of the accuracy and readability of AI-generated patient education material, particularly in pediatric orthopedics, may provide insight to the utility or drawbacks of conversational AI.

Methods: Four pediatric orthopedic conditions were selected: clubfoot, osteochondroma, elbow fracture, and developmental hip dysplasia. The corresponding treatments were identified on the American Academy of Orthopaedic Surgeons (AAOS) and Pediatric Orthopaedic Society of North America (POSNA) webpages. ChatGPT-3.5 was queried in three separate attempts for surgical, non-surgical, and other treatment options for each condition. All responses were cross-referenced with AAOS and POSNA webpage treatment information to assess for accuracy and reliability. Responses were assessed for readability using the Automated Readability Index (ARI), Flesch Reading Ease Score (FRES), Flesch-Kincaid Grade Level (FKGL), Gunning Fog Readability Score (GFR), Coleman-Liau Readability Index (CLRI), SMOG Index, and Linsear Write Readability Formula (LWRF). Results were analyzed using Kruskal-Wallis ANOVA followed by Dunn's Multiple Comparison Test.

Results : All readability indices reporting scores as grade-level (ARI, FKGL, GFR, CLRI, SMOG, LWRF) were averaged for each condition. For clubfoot, scores were 11.46 (AAOS), 7.48 (POSNA), and 9.11 (ChatGPT-3.5). For osteochondroma, scores were 10.21 (AAOS), 9.09 (POSNA), and 9.59 (ChatGPT-3.5). For elbow fracture, scores were 10.21 (AAOS), 9.09 (POSNA), and 9.59 (ChatGPT-3.5).For developmental hip dysplasia, scores were 8.38 (AAOS), 8.33 (POSNA), and 9.09 (ChatGPT-3.5). Kruskal-Wallis ANOVA revealed significant differences between scores of clubfoot ($p=0.008$), and subsequent Dunn's Multiple Comparison Test revealed the difference was between AAOS and POSNA scores. No other significant differences were reported.

Conclusion: Information produced by ChatGPT-3.5 was accurate and demonstrated similar readability scores as AAOS and POSNA patient resources for four common orthopedic pathologies. ChatGPT-3.5 does not currently support integrated graphic content and fails to report references, detracting from its utility. In comparison to AAOS and POSNA patient education materials, ChatGPT fails to provide added benefit for informing patients on treatments of common pediatric orthopedic pathologies.

MSS-038-2024: Kounis Syndrome After Wasp Stings: A Case Report and Literature Review

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Background: Kounis syndrome (KS), also known as "allergic myocardial infarction", is an uncommon clinical entity constituted by the acute coronary syndrome (ACS) due to mast cell degranulation associated with allergic hypersensitivity and anaphylactic or anaphylactoid reactions, first described by Kounis and Zavras in 1991. Triggers such as antibiotics and insects' bite can activate inflammatory responses which can lead to acute coronary spasm. In this article, we present a case of Kounis syndrome in a patient after wasp stings.

Case: 46-year-old previously healthy male presented to the emergency room around 40 minutes after multiple wasp stings on face, neck, trunk and right hand. Patient was working on a farm and was attacked by numerous wasps. On presentation, he had retrosternal pain, swelling and burning sensations at wasp sting sites, tachycardia and hypertension. ECG showed tachycardia, T-wave inversion in lead I, and ST-depression in leads V4, V5, and V6. Troponin-I level was 9682.0 ng/L. Patient was treated with IV fluids, hydrocortisone, pheniramine, aspirin, clopidogrel, atorvastatin and LMW heparin. Patient denied PCI and echocardiogram. Patient showed improvement in symptoms gradually during his hospital stay. On day three of hospitalization, ECG

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showed normal sinus rhythm without ST/T-wave changes with symptom resolution and was discharged with follow up advice.

Discussion: Kounis syndrome is a unique disease entity leading to acute coronary events triggered by allergic reactions. Three reported variants are: Type-I KS includes coronary artery vasospasm; Type-II KS includes ACS, such as myocardial infarction due to coronary artery plaque erosion or rupture; Type-III KS involves coronary artery stent thrombosis. Management focuses on myocardial revascularization while concomitantly treating allergic reactions. Prompt, appropriate treatment favors a good prognosis with complete recovery in most patients of KS. Further high-quality research will help us understand this complex disease and shed light on novel therapeutic strategies.

MSS-039-2024: Monitoring of Stool Deposition and Gut Health Dynamics with Microbial Diversity Alterations

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Background: Dysbiosis or altered gut microbiome (decrease in commensal bacteria, increase in opportunistically pathogenic bacteria), is a contributing factor in pathogenesis of Inflammatory bowel diseases (IBD) and irritable bowel syndrome (IBS). Analysis of human fecal samples is reflective of gut microbiome diversity, and gut health.

Methods: Shotgun metagenome sequencing of consecutive samples illustrated microbiome differences within single defecation when polar sides of one fecal sample were tested. Fecal samples from an IBS volunteer over 48 hours were analyzed for microbial diversity changes. We divided each fecal deposition into proximal (P) and distal end (D) for analysis. The first day of sample collection was day 0. Intensity of color change on myeloperoxidase assay qualitatively accounted for sample-associated inflammation associated (darker color: more inflammation).

Results: Remarkable pinpoint differences due to specific bacterial species (e.g., Bacteroides plebeius, Lachnospiraceae bacterium 1_1_57FAA) in polar ends of single fecal deposit were noted. OneCodex® (transnetyx) generated statistical data. Over 48 hours, specific bacterial species were enriched/ deficient at distal end (1D) of fecal deposition collected on day 1 compared to proximal end of same sample (1P). This also contrasted with samples collected on day 0 (0P, 0D). The 1D sample showed abundance of Bacteroides plebius and decreased population of Lachnospiraceae bacterium 1_1_57FAA compared to the proximal end of the same sample, or samples from day 0. Myeloperoxidase assay demonstrated that 1D had least inflammation of all samples (0P, 0D, 1P, 1D) indicating that microbiome shift correlated with inflammation and with symptoms of donor who felt worse on day 1.

Conclusion: Gut microbiome is a measure of gut health. Microbiome rapidly shifts over short intervals influenced by external factors such as diet, stress correlating with gut inflammation and with gut-associated symptoms: diarrhea, constipation, bloating [2-4]. Therefore, fecal transplantation from healthy donors may help IBS/IBD symptoms by restoring microbial homeostasis.

MSS-040-2024: Analysis & Future Directions of the "NJ Empower To Prevent Program" to address High Risk of Type 2 Diabetes in South Asians

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Introduction: With South Asians (SA) having a 2-fold higher prevalence of Type 2 Diabetes Mellitus (T2DM), a higher incidence of new onset T2DM, and a higher prevalence of metabolic syndrome and insulin resistance compared to non-Hispanic whites in the US, effective prevention strategies tailored to this population are imperative. New Jersey boasts the third largest statewide population of South Asians in the country, making it a critical location for interventions addressing T2DM risk reduction. The CDC's National Diabetes Prevention Program (NDPP)

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has demonstrated significant efficacy in preventing T2DM among diverse populations, but its applicability to South Asians needs further exploration.

Case Description: Over the course of five cohorts (3 completed, 2 in progress), the NJ Empower To Prevent Program witnessed a substantial influx of South Asian participants, comprising 30% of the total enrollment. Quantitative analysis of physical activity and weight loss outcomes alongside qualitative assessments of participants' behaviors and attitudes towards healthy habits were conducted. Our findings reveal a need for cultural tailoring of the NDPP curriculum to better resonate with South Asian participants, indicating potential barriers and preferences unique to this population.

Discussion: South Asians in the United States face a disproportionately high risk of T2DM, necessitating targeted interventions to mitigate this burden. The NJ Empower To Prevent Program demonstrates promise in engaging South Asian participants, yet modifications to the curriculum are essential to optimize its effectiveness. Culturally tailored approaches that address dietary habits, physical activity preferences, and socio-cultural factors are imperative for achieving meaningful outcomes in T2DM prevention among South Asians. This study underscores the importance of culturally competent interventions in addressing health disparities within ethnic minority populations and highlights the need for further research and refinement of diabetes prevention strategies tailored to the South Asian community.

MSS-041-2024: A Community-Academic-Faith Based Organization Partnership for Addressing the High Risk of Type 2 Diabetes in South Asians

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Introduction: South Asians in the United States face a disproportionately high prevalence of Type 2 Diabetes Mellitus, necessitating culturally tailored interventions. This study describes a community-academic partnership that modified the CDC's National Diabetes Prevention Program curriculum to address T2DM risk among South Asians in New Jersey,

Case Description: The community-academic partnership established with a Faith-based organization, involved collaboration between Rutgers Medical School's South Asian Total Health Initiative (SATHI), Rutgers Cooperative Extension (RCE), and Sai Datta Peetham (SDP). An advisory group comprising SATHI and SDP members, South Asian community leaders, a registered dietitian (RD), and an endocrinologist was formed. Utilizing community-based participatory research principles, advisory group feedback guided the modification of 12 modules of the CDC's National Diabetes Prevention Program curriculum to reflect South Asian culture and practices. Pilot testing of two modified modules with South Asian community members yielded positive results, leading to final approval of the culturally appropriate curriculum by the advisory group.

Discussion: The successful adaptation of the National Diabetes Prevention Program curriculum demonstrates the potential of community-academic partnerships in addressing health disparities among ethnic minority populations. The modified curriculum offers a culturally sensitive approach to T2DM prevention tailored to the unique needs of South Asians. This initiative not only enhances the effectiveness of diabetes prevention efforts but also fosters community engagement and empowerment. Future plans involve piloting the culturally appropriate NDPP curriculum with a South Asian cohort and expanding the community-academic partnership model to address other health disparities within the South Asian community.

MSS-041-2024: Anti Hcv Antibody Merits Proper Interpretation- a prospective study

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Background: Chronic Hepatitis C Virus (HCV) infection, a leading cause of liver cirrhosis, causes significant morbidity and mortality and has become

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an important indication for liver transplantation. all over the world. The initial treatment was with Pegylated. Interferon and Ribavirin but later on wide availability of oral Directly Acting Antiviral (DAA) drugs has led to attainment of high sustained virological response (SVR), as evidenced by absence of HCV virus from blood after 12 weeks of completion of treatment. The anti HCV antibody can remain positive for many years even after attainment of SVR which are analyzed wrongly by many patients, relatives and physicians as failed treatment.

Methods: This was a prospective study done at Medical Gastroenterology Department, PGIMS, Rohtak on confirmed cases of chronic hepatitis C who successfully completed their treatment and attained SVR from 31.08.2013 to 31.08.2019.

Results: Out of total 2500 patients in our study group who have already attained SVR after successful completion of treatment, majority i.e. 2470 patients (99.8%) had anti HCV antibody positivity, at least three to seven years after attainment of SVR. Only 30 patients (1.2%) has become anti HCV antibody negative after three to seven years of SVR.

Conclusion: The anti HCV antibody can persist for a very long period after attainment of SVR and should be interpreted wisely to avoid any confusion regarding successful treatment and future course of action.

MSS-042-2024: QI STUDY- Disparities in HPV Vaccination among HIV patients at a Rural federally funded HIV clinic

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Background- Our study aimed to evaluate HPV vaccination rates among racial minorities of HIV patients at a rural Federally funded HIV clinic.

Methods- A retrospective QI study with 143 samples was conducted at a rural non- academic Ryan White clinic in rural Pennsylvania. The population was categorized into White Hispanics WH (n=16), White not Hispanics WnH (n=73), Black Hispanics BH (n=2), Black not Hispanics BnH (n=40), and Others (unknown/not reported) (n=12). Proportions and chi-square tests were used and $p \leq 0.05$ was considered significant.

Results- Our sample included a majority of BnH (n=40, 27.97%) and WnH (n=73, 51.05%). Additionally, 8.39% representation in the Other category. Our sample comprised 83.22% males and 16.78% females. Vaccination acceptance was highest among WnH (Vaccinated 40% vs Unvaccinated 56.99%, p=0.107) and lowest among BH (4% vs 0%, 0.107). Vaccinated males (86% vs 81.72%, 0.514) were higher than females (14% vs 18.28%, 0.514). Among WnH (n=16), the vaccinated males were higher than that of females (87.5% vs 12.5%). Among BH (n=2), the vaccination rates for males and females were similar (50% vs 50%). In the BnH (n=40), vaccinated males were higher than that of females (68.75% vs 31.25%).

Conclusion- Our study highlights significant variations in vaccination acceptance across different racial and gender categories. Among the racial minorities, vaccination acceptance was lowest in Hispanics. Females had lower vaccination acceptance compared to males in all the racial groups. Gender-based and racial differences in vaccination acceptance were limited due to the low sample size. Additionally,

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non-disclosure among racial minorities needs to be considered. Future studies that determine factors associated with vaccine hesitancy and implement strategies to improve vaccine acceptance are needed.

MSS-043-2024: Predictors of Mortality in Myelodysplastic Syndrome Patients with COVID-19: A 2020-2021 National Study

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Background; We aimed to evaluate mortality predictors in Myelodysplastic syndrome who were admitted for COVID-19 (MDSCov) using the Healthcare Cost and Utilization Project.

Methods: A cross-sectional study was conducted using the NIS database on adults (≥18 years) admitted for MDSCov (n=769). We identified 151 nonsurvivors among MDSCov. Variables were assessed using t-tests and chi-square tests, with p≤0.05 significance.

Results: MDSCov had longer average length of stay and higher total charges compared to patients without COVID-19 (7.9±SE0.3 vs 5.1±SE0.0 days, p=0.0000 & $85,059.6±5566.6 vs $66887.8±36.3, 0.0001 respectively). Patients ≥65 years and males exhibited higher mortality rates (90.1% nonsurvivors vs 88.2% survivors, p=0.5107 & 64.9% vs 53.9%, 0.015 respectively). We observed higher association with stroke (2% vs 0.3%, 0.0227), sepsis (17.9% vs 0.6%, 0.0000), ARDS (21.8% vs 1.3%, 0.0000), acute respiratory failure (66.9% vs 49.5%, 0.0001), sudden cardiac arrest (10.6% vs 0.2%, 0.0000), and vasopressors usage (9.3% vs 0.2%, 0.0000) among nonsurvivors. Among these, stroke (adjusted odds ratio [aOR]=4.7,95%CI1.2-18.41,p=0.0.026), sepsis (9.1,2.87-28.91,0.000), ARDS (28.94, 10.67-78.55,0.000), acute respiratory failure (3.93,2.28-6.78,0.000), and sudden cardiac arrest (51.28,5.98-439.79,0.000) were associated with higher odds. While males (p=0.076), AKI (p=0.326), and vasopressors (p=0.081) did not reach significance.

Conclusion: Our study lacked information on disease severity and laboratory evidence. However, our study has identified several complications as independent predictors of mortality and GDMT is needed to lower mortality rates.

MSS-044-2024: The utility of beta-D-glucan testing in HIV patients with pneumocystis pneumonia

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Introduction: Pneumocystis pneumonia (PCP) is a leading cause of AIDS-associated morbidity and mortality, particularly in individuals who are not diagnosed with HIV until they are profoundly immunosuppressed. The diagnosis can be made by microscopic exam of bronchoalveolar lavage (BAL) or use of non-invasive methods like serum 1,3-beta-D-glucan (BDG) assay. Here, we discuss a case of PCP in a newly diagnosed HIV patient with a negative BDG assay.

Case Presentation: A thirty-nine-year-old man presented with a one-month history of fatigue, weight loss, fever, dry cough, and dyspnea. Chest x-ray showed diffuse bilateral nodular radiopacities, greater in the lower lungs. CT chest revealed diffuse bilateral ground glass opacities concerning fungal or mycobacterial infection. He was started on

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ceftriaxone and doxycycline for community acquired pneumonia. Labs showed positive HIV test, viral load 131000 copies/ml, CD4 count 3.5 cells/uL. He had negative TB quantiferon gold, negative sputum AFB smear, negative BDG and high LDH. He had recurrent fevers to 103F, tachycardia, tachypnea and then became hypoxia with oxygen saturation 89% on room air. Due to suspicion for PCP, he was empirically started on trimethoprim-sulfamethoxazole and prednisone. Patient underwent a bronchoscopy. Cytology from the BAL and lung biopsy showed round and oval cysts morphologically consistent with Pneumocystis organisms. Patient's respiratory status improved after a week of continued treatment.

Conclusion: The traditional way to diagnose PCP is by microscopic examination of BAL samples. Since it can be risky to do an invasive procedure such as bronchoscopy in patients with respiratory distress, recent literature has focused on noninvasive methods like BDG assay on blood samples. Interestingly, patient had two negative BDG tests. PCP diagnosis was later confirmed from lung biopsy. The objective of this case is to question the screening potential of the less expensive BDG test for PCP and recognition that false negatives can lead to a missed diagnosis.

MSS-045-2024: Hashimoto Thyroiditis Following COVID-19: A Case Report

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Introduction: Hashimoto thyroiditis is an autoimmune condition affecting the thyroid gland, leading to hypothyroidism due to the destruction of hormone-producing cells. In the changing post-pandemic landscape, COVID-19 continues to be associated with various pathological conditions in different organs. This emphasizes the importance of considering potential links and early recognition of post-COVID-19 sequelae. We present a case report to highlight the development of Hashimoto thyroiditis following COVID-19 infection in one of our clinical encounters.

Case Description: A 31-year-old male, who had two previous COVID-19 infections, presented with cold intolerance, weight loss, fever, and sore throat. He denied family history of thyroid disease and other symptoms like hair loss, limb swelling, constipation, or mood disturbances. Physical examination revealed dry skin. Thyroid profile showed elevated TSH (10.910uIU/mL), low T3 (1.33 ng/mL), and T4 (8.80 ug/dL). Positive Anti-thyroid peroxidase and Anti-Thyroglobulin antibodies with hypoechoicity of both the lobes of the gland with coarse echotexture on thyroid ultrasound indicated Hashimoto's thyroiditis. He was then started on Levothyroxine 50mcg once daily. After 3 months, his symptoms resolved, and TSH normalized to 3.870uIU/mL. Subsequent follow-ups showed consistent improvement with TSH at 2.430uIU/mL, and he remained symptom-free and compliant with medication.

Discussion: This case highlights a link between COVID-19 and Hashimoto thyroiditis.Through our literature search in pubmed based journals, we narrowed down to 19 relevant articles and case reports that highlight a similar association, and encompass possible mechanisms such as the virus's affinity for ACE receptors on the thyroid gland, an inflammatory cytokine storm following the infection, or damage to the hypothalamus-pituitary-thyroid axis. Recognition of this association is critical to the institution of early diagnosis, appropriate therapy and prevention of further complications.

MSS-046-2024: PSEUDO-MICROANGIOPATHIC HEMOLYTIC ANEMIA DUE TO B12 DEFICIENCY– A CASE REPORT

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Introduction: Vitamin B12 (cobalamin) is a crucial vitamin for blood precursor production, particularly erythrocytes. Its deficiency can lead to complications like severe anemia (Hb < 6 mg/dL) in 2.5% of patients and intramedullary hemolysis in 1.5%.[1] This case report aims to describe a rare presentation of pseudo microangiopathic hemolytic B12 deficiency anemia in a 55-year-old male.

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Case Description: A 55-year-old diabetic male presented with long-standing abdominal pain, nausea, decreased appetite, malaise, fatigue, and tongue pain worsening over two weeks. Examination revealed scleral icterus, reddish-brown urine, decreased sensation on bilateral soles, abnormal gait, and no focal neurological deficits. On admission, hemoglobin was 5.6 mg/dL, MCV 119fL, RDW 79fL, platelets 82000/uL, WBC 7100/uL, LDH 3611 U/L, and haptoglobin <30mg/dL. Peripheral smear showed decreased RBCs, and macrocytic normochromic anisopoikilocytosis, including schistocytes, tear drop cells, hypersegmented neutrophils, and elliptocytes. Further blood workup revealed Total bilirubin 6.2mg/dL, Direct bilirubin 0.8mg/dL, S. creatinine 0.4mg/dL, S. methylmalonic acid 42294nmol/L, S. homocysteine 71nmol/L, and S.B12 <100pg/dL with elevated intrinsic factor antibody >96, suggesting intramedullary hemolysis due to B12 deficiency against TTP. The patient received 3 units of packed RBCs, improving Hemoglobin to 9 g/dL. Intramuscular B12 daily for 4 days significantly improved the symptoms. She was discharged with weekly intramuscular B12 for 4 weeks, MCV was 98fL, and Total Bilirubin was 1.5mg/dL.

Discussion: This case highlights the importance of considering B12 deficiency in patients with atypical manifestations, such as concurrent hemolytic and megaloblastic anemia. It can be a significant differential for microangiopathic hemolytic anemias like HUS/TTP. Timely intervention including intramuscular B12 supplementation improved the clinical symptoms and hemoglobin levels. Severe B12 deficiency should be considered a cause of hemolytic anemia to optimize patient outcomes.

MSS-047-2024: DENGUE MENINGITIS: A RARE AND CRITICAL COMPLICATION- A CASE REPORT

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Introduction: Dengue, a flavivirus disease, is recognized as one of the most important mosquito-borne human infections of the 21st century [1] Apart from the typical manifestations, the virus can elicit atypical complications. Among these complications, dengue meningitis stands out as a clinical rarity. This abstract introduces a case report focusing on the distinctive intersection of dengue and meningitis.

CASE DESCRIPTION: A 24-year-old male presented with a 10-day history of high-grade fever, accompanied by chills, rigor, and headache, which responded to analgesics. Subsequently, he developed altered sensorium, speech difficulties, drowsiness, and irritability over 3 days. Physical examination revealed nuchal rigidity and positive Kernig sign. Cerebrospinal fluid (CSF) analysis showed clear CSF with elevated protein (166mg/dL), elevated lactate (3.8mmol/L), and normal glucose levels (39mg/dL), with no white or red blood cells detected. CSF gram stain was negative for microorganisms. MRI revealed leptomeningeal enhancement in bilateral frontal-parietal-occipital lobes and pachymeningeal enhancement along both limbs of the tentorium cerebelli, indicative of meningitis. [Figure 1] Blood workup showed leukocytosis and low mean platelet volume. Capture ELISA confirmed the presence of Dengue IgM antibodies. On admission, the patient was treated with intravenous ceftriaxone, acyclovir, vancomycin, dexamethasone, and supportively for 14 days, with CSF follow-up after 7 days. On the fourth day of admission, he experienced an episode of convulsion characterized by uprolling of eyes, and clenching of teeth, followed by postictal drowsiness, necessitating administration of intravenous levetiracetam and midazolam. His condition was monitored and managed with ongoing treatment. On follow-up after 7 days, his condition improved without neurological deficits.

DISCUSSION: This case underscores the clinical spectrum of dengue infection, including its potential to manifest neurological complications like meningitis. It emphasizes the importance of considering arboviral etiologies in the differential diagnosis of CNS manifestations, as well as the complexities involved in their diagnosis and management.

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MSS-048-2024: The National Sex and Gender Health Collaborative Initiative- A Necessity in Present-Day Medical Education

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Background: Sex-and gender-based medicine (SGBM) addresses disparities that exist based on biological sex and gender and how it impacts the prevalence, presentation, diagnosis, and treatment of a disease. A survey of 128 US allopathic medical schools depicted that medical students believe that SGBM education is inadequate.[1] In another survey, 16.8% of schools reported that they had implemented SGBM into their curriculum.[2] The Sex and Gender Collaborative (SGHC), a committee in the American Medical Women's Association (AMWA), aims to target existing disparities in SGBM education.

Methods: A team of over 200 pre-medical students, medical students, and graduates, recruited from the AMWA network, wrote over 50 factsheets on the variation between each sex and their risk factors, prevalence, prevention, presentation, epidemiology, diagnosis, screening, and treatment. Then, the AMWA network of physicians mentors reviewed and approved the content of these factsheets.

Results: According to our data, 50.84% of medical students reported that SGBM was not part of their curriculum- 41.67% of whom indicated that it's "mostly not" a part of their syllabus. This emphasizes the need for SGBM to be included into the medical education system since 96.6% of them recognized its importance even though SGBM was not in their curriculum. After participating in the SGHC and creating factsheets, 66.19% of participants strongly believed their knowledge about SGBM had improved and 93% of them recommended this project to others. Furthermore, five cognitive interviews revealed that medical students, with no prior SGBM knowledge, believed that the factsheets gave them a more comprehensive understanding of SGBM.

Conclusion: Our findings demonstrate the need for SGBM to be incorporated into the medical curriculum. This can enhance patient care and improve patient-physician relationships and communication by enabling them to provide more holistic medical advice through incorporating sex and gender factors.

MSS-049-2024: Disparities in Broadband Internet Use for Older Adults

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Access to broadband internet is crucial for accomplishing many daily tasks, such as education, housing searches, family communication, and healthcare. Older adults residing in living facilities have suffered the worst effects of the COVID-19 pandemic, facing severe lockdowns, increased health risks, and exacerbated mental health issues. The ongoing digital divide has hindered efforts to address these challenges, limiting internet access for social networking and telemedicine. In addition to the lack of broadband access, older adults also emphasize a lack of digital literacy skills required to use today's technologies. To mitigate this digital divide, our study seeks to gather data about broadband access in Gloucester County, New Jersey, and older adults' perceptions of their need for available internet access. Collecting this data from the senior population will inform us of ways to improve older adults' access to broadband and digital skills. Initial demographic data from Gloucester County revealed that the older population was more likely to live alone, have lower income status, lower employment status, and increased widowed rates, all exacerbating their ongoing isolation. Federal Communications Commission Broadband Deployment data shows a general limitation in providers offering sufficient speeds for telecommunication or video conferencing. Interviews with seniors in living facilities shed light on the importance of internet access to them. They expressed a desire to use telehealth access, online portals, and health apps but have faced obstacles due to the digital divide. Many showed interest in learning more about technologies to improve access to these

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services, suggesting the need to implement digital literacy programs in senior living centers. Beyond ongoing research, our project advocates for data-driven funding to address broadband inequities and empower older adults with the knowledge to navigate internet-based health services and online communication tools for their well-being.

MSS-050-2024: How does application of Low-Intensity Ultrasound Improve Peripheral Nerve Regeneration?

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Background: Peripheral nerve injuries (PNIs) are a common condition that can result in debilitating motor and sensory deficit. Patients rarely receive complete functional recovery post-PNI, which imposes a need for therapies that promote faster regeneration and reinnervation. Low-intensity ultrasound (LIU) is a novel therapeutic with increasing evidence for its regenerative potential across various fields, with more recent investigation in peripheral nerve regeneration. It is unclear how axonal regeneration benefits from LIU after peripheral nerve injury; which fibers (myelinated or unmyelinated) benefit from LIU treatment. Furthermore, there is no current understanding of the molecular effect of LIU on inflammation. We hypothesize that post-injury application of LIU enhances axonal regeneration.

Methods: We utilized a sciatic nerve crush model in mice as a basic model for peripheral nerve injury, then applied a daily application of LIU (300 mW/cm2, 20% pulsed at 1 MHz for 5 minutes) for 7 or 20 days post injury. Distal injured nerves were processed for electron microscopy, immunohistochemistry, or cytokine assay.

Results: We demonstrate that LIU accelerates axonal regeneration of myelinated fiber after peripheral nerve injury. However morphometric analysis of nerve ultrastructure and unmyelinated axons did not reveal any alteration of unmyelinated fiber organization, suggesting that LIU is primarily affecting motor/myelinated fiber rather than unmyelinated fibers. Second, we show that the application of LIU does not affect the expression of cytokines or the number of macrophages infiltrating the nerve post-injury, thus suggesting that inflammation is not a primary mechanism for the beneficial effect of LIU after nerve injury. More recent data from the laboratory has shown that application of LIU increases the production of nerve growth factors, which could support the beneficial effect of LIU.

Conclusions: Our findings provide evidence for the novel therapeutic potential of LIU in promoting axonal regeneration post-injury, along with emerging support for its underlying molecular mechanisms facilitating repair.

MSS-051-2024: Screening Exam to Determine Hip Etiologies of Chronic Pelvic Pain

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Background: Chronic pelvic pain is a widespread phenomenon experienced by an estimated 4-27% of women in the United States. This pain can be debilitating and significantly impair one's quality of life.

Methods: A video screening exam was created for non-orthopedic surgeons to recognize the inter-relationships between the hip and the pelvis in order to screen for hip, spine, pelvic and core pathologies of chronic pain. This exam is aimed at examining the anatomy and biomechanics of the hip through maneuvers demonstrable through physical examination. The maneuvers are conducted in the standing, sitting, supine and lateral positions, with each maneuver in each position aimed at revealing the pathology causing the pain.

Results: The video is viewable in this link:
https://www.dropbox.com/scl/fi/lbbrefj006wnwksk25xrk/Dr.-Hal-David-Martin-Physical-Exam.mp4?rlkey=z7lrzsstk6m497jm879gz6u9d&dl=0

In the standing position, gait can be examined normally and with longer strides to test for gait accommodations and hip impingements at end range extension. Twisting and rotating the shoulders can indicate spinal stenosis or SI joint dysfunction if pain elicited. In the seated position, Internal and external

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rotation of the lower leg can test for abnormalities with femoral torsion. The slump test is performed seeking disc herniation or neural tension. In the supine position, the flexion, adduction and internal rotation maneuver can test for CAM deformity. In the lateral position, passive hip extension can identify premature osseous abutment. Hip abduction strength can be assessed for pelvic floor over-activity.

Conclusions: A brief hip exam focused on pain at end-range motion can identify patients with orthopedic contributors to pelvic pain. Correct diagnosis allows for physical therapy interventions including stabilization and accommodation and, if necessary, orthopedic consultation, targeting the cause.

MSS-052-2024: GROWTH CURVE ANALYSIS TO EXAMINE VESICULAR STOMATITIS VIRUS REPLICATION IN VIRUS RESISTANT AND SENSITIVE HUMAN PROSTATE CANCER CELLS.

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Vesicular Stomatitis Virus (VSV), a negative sense RNA virus, is currently in clinical trials for use as an oncolytic agent. This type of cancer therapy relies on the discovery that many human cancers lack parts of their innate immunity and can therefore be easily infected and killed by viruses. In cells that are sensitive to VSV infection the Matrix (M) protein blocks transcription of the Interferon beta (IFN-β) in infected cells, which prevents the cell from mounting a successful antiviral response. We have previously shown that mutations in the M protein result in NF-kβ activation and production of IFN mRNA and protein in mouse L929 cell lines. Many human cancers are sensitive and therefore killed by VSV, however some cancers are resistant to VSV because poorly defined aspects of their innate immune response remain intact. The goal of our research is to understand why some cancer cells resist VSV oncolysis. To begin, we performed multiple step growth curves to quantitate the replication efficiency of VSV in sensitive and resistant prostate cells. We infected LNCaP (VSV-sensitive) and PC3 (VSV-resistant) cells at a low multiplicity of infection with a panel of VSV variants that encode a wild type or mutant M protein and monitored virus replication via plaque assays. We found that there was greater viral replication in LNCaP cells compared to PC3 cells, supporting the conclusion that PC3 cells resist VSV infection. As expected, our findings indicate that the origin of the virus (laboratory strain, naturally occurring virus, or a recombinant virus created using molecular techniques) affected replication efficiency; however, mutations in the M protein did not.

MSS-053-2024: Trigeminal Autonomic Cephalalgia masquerading as Facial Cellulitis

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Introduction: Trigeminal autonomic cephalalgias (TACs) are rare primary headache syndromes characterized by trigeminal pain distribution and ipsilateral autonomic symptoms, affecting 0.1% of the population. Conversely, cellulitis is a common bacterial skin infection causing inflammation, typically presenting as poorly demarcated erythema, warmth, edema, and tenderness.

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Case presentation: An 81-year-old female with a history of head and facial injury after a fall presented with worsening right-sided facial swelling, redness, pain, fever, and chills, and was diagnosed with Streptococcus pyogenes bacteremia secondary to facial cellulitis. She was treated with IV Antibiotics and then discharged on oral Cefuroxime. Despite being on antibiotics, she returned to the clinic with new complaints of severe, stabbing headaches and episodic facial swelling needing more antibiotics. She was readmitted to the hospital with severe debilitating episodic headaches, with nausea and photophobia, conjunctival injection, facial pain, and swelling, unresponsive to antibiotics.. All workups for orbital cellulitis came back negative and Neurology was consulted. She was eventually diagnosed with TAC post-workup. Gabapentin was initiated, leading to symptom resolution on a tapered regimen.

Discussion: While facial cellulitis and TAC are typically not considered differentials for each other, this case is unique. The patient was initially diagnosed with facial cellulitis but was unresponsive to a prolonged antibiotic regimen despite improvement seen in lab values and CT imaging. Additional severe cluster headaches and conjunctival injection led to a diagnosis of TAC and her symptoms resolved after she was started on Gabapentin. TAC is a short-lasting unilateral headache with at least one autonomic ipsilateral symptom to the headache, such as lacrimation, nasal congestion, edema, conjunctival injection, or aural fullness. In cases of post-traumatic facial injury with symptoms manifesting in a trigeminal distribution, considering TAC in the differentials of Facial cellulitis due to potential trigeminal sensitization is important.

MSS-054-2024: Characterization of gait impairment in a mouse model of Spinocerebellar Ataxia Type 1 (SCA1)

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Background: Spinocerebellar ataxia 1 (SCA1) is an autosomal dominant neurodegenerative disease characterized by purkinje cell death in the cerebellum leading to loss of coordination, muscular atrophy, dysarthria, and death. CAG characterizes the disease repeats in the ATXN1 gene leading to an aggregation of misfolded ataxin-1 proteins in the nucleus of the cell and eventual misfolded polyglutamine peptides. Our lab acquired a transgenic 154Q/2Q knock-in mouse model mirroring SCA1 with over-expression of approximately 150 CAG repeats in the ATXN1 gene. However, characterization of ataxia symptomology in a longitudinal study has only just started in the lab.

Methods: This study aimed to assess the severity of this SCA1 transgenic mouse model through gait, hindlimb clasping (HLC) behavior, and weight analysis as female and male SCA1 mice aged over weeks to months. We hypothesize that transgenic SCA1 mice will show increased gait variation, HLC behavior, and muscular atrophy compared to wild-type mice. Gait metrics include paw angle, gait speed, and hindpaw stance, which were measured weekly using a treadmill apparatus and analysis software for the lifetime of the mice along with HLC analysis and mouse weights. HLC analysis was blinded and a rating scale was employed from 0-4 to semi-quantify the severity of the disease at specific time points.

Results and conclusions: Our preliminary data revealed differences in severity in the aforementioned metrics between the two mouse strains with greater severity in SCA1 symptoms emerging as mice aged. We specifically see an increased hindlimb clasping score in SCA1 mice over time. Moreover, wild type mice are able to run at greater speeds as SCA1 mice develop more significant disease characteristics including decreased weight from neuromuscular atrophy and visible kyphosis. Subsequent studies will attempt to better understand the neurological differences between SCA1 and wild type mice using electrophysiology recordings.

MSS-055-2024: Neonatal Abstinence Syndrome: The importance of considering non-opioid etiologies

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Background: Neonatal Abstinence Syndrome (NAS), a withdrawal disorder that results from chronic in-utero drug exposure followed by abrupt exposure cessation at birth, is most commonly, but not exclusively, caused by opioids. We aim to determine the impact of underemphasis of causative-agent etiology on administrative coding and (across the US) in case definitions, reporting, and surveillance guidelines. We explore how non-opioid drugs can influence diagnostic, assessment, monitoring, and treatment practices.

Methods: We performed an exploratory survey of the biomedical literature, as well as an in-depth analysis of the International Classification of Diseases, Revision 10, Clinical Modification (ICD-10-CM) for withdrawal-related diagnoses.

Results: Numerous publications conflate NAS with Neonatal Opioid Withdrawal Syndrome (NOWS): ignoring non-opioid causes results in precision loss during the literature search. In contrast to the fine granularity of non-neonatal substance use/withdrawal-related diagnoses, ICD-10 ignores causative agents in neonates, making analyses of administrative data less useful. Across US states, NAS case definitions and requirements for diagnosis confirmation vary widely, due to inconsistent emphasis on etiology. Case reports or reviews related to non-opioid NAS describe atypical clinical presentations that often necessitate modification of assessment and treatment strategies.

Conclusions: Underemphasis on NAS etiology may result in simplistic and hence suboptimal approaches to NAS diagnosis, monitoring, and treatment when non-opioid agents are involved, either by themselves or in combination with opioids. We suggest possible remedies for this problem.

MSS-056-2024: Comparing the Efficacy of Ventral Pallidum and Anterior Thalamus Deep Brain Stimulation in Enhancing Seizure Relief

Sohil Dharia, Elizabeth Dybas, Dominick Corona, Aliyah Audil, Damian Shin

Thirty-three percent of individuals with epilepsy are refractory to treatment with those specifically with generalized seizures bearing the greatest mortality and comorbidities in the epileptic cohort. Moreover, there is a seven-time increase in mortality and at least a two-time increase in comorbidities for those with refractory epilepsy. In addition, despite making up a minority of the epilepsy population, refractory epilepsy makes up seventy-five percent of the total epileptic patient cost. For these individuals, neuromodulation is a viable therapeutic approach to achieve generalized seizure relief. However, current FDA-approved stimulation approaches such as anterior thalamus deep brain stimulation (ANT-DBS) provide seizure reduction in a large number of people with epilepsy but few experience seizure freedom. In this study, we investigate whether ventral pallidum deep brain stimulation (VP-DBS) is more efficacious in providing seizure control than ANT-DBS in a rat model of acute seizures. To do so, we inserted stimulating electrodes bilaterally into the VP or ANT and assessed how it affected seizure duration and number induced by pilocarpine to induce secondarily generalized seizures. We found that VP-DBS caused a greater reduction in seizure number (VP: 4.2; ANT: 10.3) and duration (VP: 116.6; ANT: 407.5 s) than ANT-DBS after stimulation was turned on after generalized seizures first emerged. To see how differences in efficacy arose with VP-DBS vs. ANT-DBS, we then implanted stimulating electrodes along with twelve additional recording electrodes in key brain areas that exhibit electrographic seizures and examined how seizure termination patterns occurred with each DBS approach. Notably, VP-DBS caused a synchronous seizure termination with all recorded sites whereas ANT-DBS resulted in asynchronous seizure termination. Taken together, VP-DBS may offer efficacious treatment for refractory epilepsy, but future research is needed to see if VP-DBS can prevent seizures in a chronic epilepsy rat model.

MSS-057-2024: Assessment of Salivary pH, Glucose Concentration, and Oral Microflora : A Comparative Study in Diabetic and Non-diabetic Individuals

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Background: Diabetes can significantly impact oral health, including alterations in the oral microflora. The oral microflora is crucial in maintaining oral health. Poorly controlled Diabetes often results in elevated blood sugar levels creating an environment conducive to the growth of certain pathogenic bacteria, leading to various oral and systemic diseases. This study aimed to compare the salivary pH, glucose concentration, and oral microflora in diabetics and non-diabetics and to correlate that elevated salivary glucose can lead to oral and systemic infections.

Method: This study involved 20 diabetics and 20 non-diabetics aged 18 years and above. Saliva samples collected from patients of both groups were subjected to biochemical and microbial analysis. In biochemical analysis, the pH and glucose concentrations were monitored. In microbial analysis, routine and PCR-based assays were used to isolate and identify the significant organisms from the saliva samples from both groups.

Results: The average pH of the non-diabetic individuals was higher, towards the neutral range; however, in diabetic individuals, the range was towards acidic. The salivary glucose estimation results showed that the average glucose concentration in the non-diabetic group was less than in the diabetic group. The microbial analysis revealed that the diabetic group had more bacteria inhabitation than the non-diabetic group. The significant bacteria isolated were Enterococcus spp., Actinobacillus actinomycetemcomitans, Streptococcus mutans, Lactobacillus spp, Streptococcus anginosus, Streptococcus salivarius, Streptococcus gordonii and Streptococcus pyogenes.

Conclusion: The oral microbiological profile of diabetic patients differed from those of non-diabetics, where the number of bacterial colonies was significantly higher in diabetic individuals. This can be attributed to the reduced pH of saliva and elevated glucose levels. Managing Diabetes through effective blood sugar control, maintaining good oral hygiene practices, and addressing oral health issues promptly are essential strategies to prevent and manage oral health in diabetic patients.

MSS-058-2024: Connecting the Dots: Sleep Apnea Severity and Inflammatory Biomarkers in Obstructive Sleep Apnea Patients

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Background: Obstructive sleep apnea (OSA) has been increasingly linked to cardiovascular and cerebrovascular diseases. Ongoing inflammatory responses play an important role in this association. C-reactive protein (CRP) is regarded as a significant serum marker of inflammation, synthesized in the liver and primarily under the regulation of interleukin-6 (IL-6). Both CRP and inflammatory cytokines such as IL-6 and tumor necrosis factor-alpha (TNF-a) are important risk factors for atherosclerosis and coronary heart disease. In the present study, we examined serum levels of CRP, IL-6, TNF-a and the effect of nasal continuous positive airway pressure (nCPAP) in patients with obstructive sleep apnea syndrome (OSAS).

Methods: Forty-four obese (body mass index, BMI>27 kg/m2) men with newly diagnosed OSAS (apnea-hypopnea index, AHI >/= 5) and age- and BMI-matched 23 obese non-apneic male controls (AHI<5) were enrolled in this study. To confirm the diagnosis, all patients underwent standard polysomnography and were classified according to the AHI. Serum samples were taken at 08:00 hours in the morning after overnight fasting. Serum levels of CRP , IL-6 and TNF-a were investigated. The effects of 1 month of nCPAP were studied in patients with moderate to severe OSAS.

Results: Levels of CRP, IL- 6 and TNF-a were significantly higher in patients with OSAS than obese control subjects (CRP P<0.001, IL-6 P<0.05, TNF-a (P<0.05). In patients with OSAS, the primary factors influencing levels of CRP were severity of OSAS and body mass index and those influencing levels of IL-6 and TNF-a were body mass index and nocturnal hypoxia. nCPAP significantly decreased levels of CRP (P<0.0001), IL-6 (P<0.001) and TNF-a (P<0.001). There

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was no significant correlation between CRP, serum IL-6, TNF-a levels and AHI in controls.

Conclusion: The link between cardiovascular morbidity and OSAS may be explained by coexistence of other cardiovascular risk factors such as CRP, circulating IL-6 and TNF-a levels.

MSS-059-2024: Analysis and Integration of PERMA in Patients with Cognitive Decline

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Background: A common feature of aging and neurological diseases is cognitive impairment, which affects 1 in 9 people. Researching the complex aspects of cognitive health goes beyond clinical trials and investigates psychosocial variables that could slow down deterioration. Positive emotions, engagement, relationships, meaning, and accomplishment are all encapsulated in the Martin Seligman-created PERMA framework. A holistic paradigm change that acknowledges the interdependence of cognitive, emotional, and social well-being is marked by the inclusion of PERMA in studies on cognitive decline.

Methods: In addition to a negative emotion, loneliness, and general health questionnaire in English, we have developed an observational, questionnaire-based study with 23 questions to evaluate the five essential components of PERMA. Higher scores indicate higher levels of well-being. Each item will be rated on a Likert-type scale from 0 to 10. The verification of participant eligibility, data completeness, and avoidance of duplicate data entry are among the quality assurance tasks that will be carried out. ANOVA will be used to compare variations in the five PERMA elements and demographic factors.

Results: This thorough study incorporates the PERMA paradigm, a quantifiable indicator of well-being through Likert-type scale. This study helps providing patient centered care and help in checking the risk of depression which is common in patients with cognitive decline. By using ANOVA for analysis, we can identify differences in PERMA components and improve our comprehension of the relationship between psychosocial and cognitive aspects.

Conclusions: This study explores the subtle integration and analysis of PERMA (Positive Emotions, Engagement, Relationships, Meaning, and Accomplishment) against the background of cognitive decline. This study aims to uncover the potential therapeutic impact of fostering positive psychology in individuals navigating cognitive challenges at the same time screening for potential depression. Examining these aspects advances our knowledge of holistic strategies for enhancing the quality of life for individuals with cognitive impairment.

MSS-060-2024: WHEN LEUKOCYTOSIS IS NOT LEUKEMIA OR LEUKEMOID REACTION!

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INTRODUCTION: Leukocyte adhesion deficiency (LAD) is a rare primary immunodeficiency disorder characterized by impairment of leukocyte migration and neutrophilic adhesion during an inflammatory response resulting in recurrent bacterial and fungal infections and depressed inflammatory responses despite striking blood neutrophilia.

CASE DESCRIPTION: A 17-year-old female presented with hyperpigmented leg lesions and a history of recurrent hospitalizations, including pneumonia, URTI and dental infections. The skin lesions started as small blebs and grew to significant sizes, with associated burning pain over the right lower limb and left calf . On further enquiry, her mother also mentioned a H/O delayed separation of the umbilical cord. Blood tests revealed anemia, neutrophilic leukocytosis, rest of the biochemical parameters were normal. In view of the significant history of recurrent infections, neutrophilia and lack of pus formation, possibility of primary immune disorder was considered. LAD1 analysis revealed significant CD18 deficiency (11% expression). Skin biopsy confirmed Pyoderma Gangrenosum. Treatment with antibiotics, steroids, and cyclosporine led to lesion regression, scarring, and hypertrophy after 3 months. This case

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underscores the importance of considering primary immune disorders in patients with recurrent infections and peculiar skin manifestations, necessitating timely diagnosis and appropriate management.

DISCUSSION: Leukocyte adhesion deficiency type-1 (LAD-1) stems from mutations in the ITGB2 gene, affecting neutrophil function, leading to severe bacterial infections like septicemia and bronchopneumonia, with potential fatal outcomes. Skin and mucosal infections can manifest as necrotic lesions, often recurring and spreading systemically. Symptoms typically arise in infancy, such as delayed umbilical detachment, similar to the patient's history. Gingivitis, periodontitis, and impaired wound healing are common. Absence of pus formation signifies leukocyte migration issues. Severe LAD-1 carries high mortality rates due to sepsis, necessitating prompt hematopoietic stem cell transplantation. Disease severity correlates with CD18 deficiency levels; our patient's mild deficiency may explain survival until 17 years. However, severe cases have poorer prognosis, highlighting the need for early intervention.

MSS-061-2024: Prevalence of risk factors of non-communicable diseases among the health care professionals of a tertiary care hospital of South Gujarat, India

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Background: High burden of risk factors such as tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets all contribute to increasing the risk of dying from Non Communicable diseases (NCD). Aims and objectives: To study the prevalence of risk factors of Non Communicable diseases among the Health Care professionals (HCP).

Methodology: hospital based cross-sectional study conducted among Health Care professionals (Nurses and Doctors) of tertiary care hospitals of South Gujarat from 25th June - 6th July 2018. Total 120 participants are purposely selected using random number generator, (doctors-51 and nursing staff- 69). Data was collected in a pretested, semi structured proforma based on WHO STEP approach by one-to-one interview after a verbal Informed consent. The questionnaire was translated into the Gujarati language and tested prior to actual data collection. Physical measurements such as height, weight, blood pressure measurement taken.

Results: 5.8% prevalence of addiction to either alcohol/tobacco was found among HCP. > 30% had BMI above the normal range. 32% spends time on physical activity for 30 min on working day. > 30% had a family history of NCDs. On clinical examination >50% of participants had either prehypertension or stage 1 hypertension as per JNC-8 classification.

Conclusion: the prevalence of risk factors such as high BMI, dietary habits, physical inactivity, family history and tobacco addiction is high among Health care professionals and need interventions such as lifestyle modifications and early diagnosis of NCDs.

MSS-062-2024: Spontaneous carotid artery dissection in a young female without risk factors

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Background: Carotid artery dissection is a major cause of stroke in patients younger than 40 years old, accounting for up to 25% of ischemic cerebral events that lead to a long-term disability and a large economic burden. The clinical picture of this condition varies widely, thus, the disease may be easily misdiagnosed.

Case Presentation: A 29-year-old female presented to our clinic with the presumptive diagnosis of first manifestation of migraine, complaining of moderate unilateral headache, involving the left half of the head and neck, including periorbital region, exacerbated by physical activity. However, the clinical presentation of migraine was atypical, including the absence of aura, persistent character of pain, inadequate response to therapy. Carotid ultrasonography revealed a hypoechoic thrombus, completely occluding the lumen of the left internal carotid artery, arising from posterior aspect of the left common carotid artery

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bifurcation. On color doppler, blood flow in the internal carotid artery was not visualized. MRI of the brain revealed dissection of the left carotid artery with the false lumen that has been completely clotted. A true lumen, 2 mm in diameter, also contained thrombus. The patient started anticoagulant therapy, and the symptoms were resolved completely. The patient was followed up in 6 weeks and the blood flow in the artery was restored due to complete recanalization of the thrombus.

Discussion: In young adults, carotid artery dissection may occur spontaneously, thus, may be missed or misdiagnosed as other more common conditions, such as migraine, cluster or tension headache. Carotid artery dissection should be included into differential diagnosis of headache, as it may cause serious complications, including TIA, stroke, or one-sided blindness. Early diagnosis is imperative to initiate anticoagulant or antiplatelet therapy that improves patients' prognosis. More studies are needed to improve diagnostic approach and outcomes in this group of patients.

MSS-063-2024: Fahr Syndrome and Pseudohypoparathyroidism: A Rare Case Report

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Pseudohypoparathyroidism (PHP) is a rare endocrine disorder characterized by resistance to parathyroid hormone (PTH), resulting in low calcium levels and high phosphate levels. Fahr syndrome, marked by bilateral basal ganglia calcification, is an uncommon manifestation often associated with PHP.

We present the case of a 23-year-old male with progressive neurological symptoms, including weakness, tingling, pain, rigidity, abnormal movements, and epilepsy. Examination showed positive Chvostek and Trousseau signs, prompting tests that revealed low serum calcium, high phosphate, and elevated parathyroid hormone levels suggestive of pseudohypoparathyroidism. Imaging confirmed abnormal hyperdensity in the bilateral Basal Ganglia, confirming Fahr syndrome with underlying pseudohypoparathyroidism. The patient's course during hospitalization was asymptomatic. He was treated with oral calcitriol and calcium carbonate and was discharged on the mentioned medication after his calcium and phosphate levels returned to normal.

The presented case highlights a rare association between pseudohypoparathyroidism (PHP) and Fahr syndrome in a young adult. PHP, characterized by resistance to parathyroid hormone, was diagnosed based on hypocalcemia, hyperphosphatemia, and elevated parathyroid hormone levels. Fahr syndrome, evidenced by bilateral basal ganglia calcifications, was identified through imaging. This association underscores the complexity of neurological manifestations in PHP and highlights the need for multidisciplinary management. Treatment focuses on symptomatic relief, but further research is warranted to understand the underlying mechanisms and optimize therapeutic strategies.

MSS-064-2024: Unveiling the Link: Screen Time and Pediatric Obesity in Kashmiri School Children - A Review

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Introduction: Childhood obesity is an escalating public health concern worldwide, with significant implications for both physical and mental health. This review delves into the existing literature to investigate the potential association between screen time and pediatric obesity in Kashmiri school children, a specific population facing unique challenges. Increased screen time, dietary shifts towards processed foods, and limited access to safe outdoor spaces present a complex interplay of factors contributing to the rise in pediatric obesity in Kashmir. While research suggests a possible link between screen time and obesity, further studies are needed to fully understand the specific dynamics within the Kashmiri context. Addressing this issue necessitates a multifaceted approach encompassing raising awareness, promoting healthy lifestyles, and addressing underlying socioeconomic factors.

Methods: A comprehensive search of electronic databases (e.g PubMed, MEDLINE, Embase) was

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conducted using relevant keywords including "screen time," "obesity,""children," "Kashmir," and "pediatric". The search was limited to studies published in English and focused on children between the ages of 5 and 16 years. Database searches were carried out by two independent reviewers and any discrepancies were resolved via discussion.

Results: The evidence synthesized from studies in multiple countries, shows strong association between screen time and pediatric obesity. Further studies are crucial to fully understand the complex interplay of factors within the specific context of Kashmir valley. Unique challenges faced by this population, including the ongoing conflict and cultural influences on diet and physical activity, necessitate a nuanced approach. By continuing research efforts and implementing recommendations of this review study, we can help in creating a healthier future for Kashmiri children.

MSS-065-2024: Comparing the Efficacy of Epidural Monotherapy to Combined Epidural Pulsed Radiofrequency in Mitigating Chronic Lower Back Pain At 1 Month: A Systematic Review and Pooled Analysis.

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Background: Using transforaminal epidural steroid injection (TFESI) has been the standard treatment in the alleviation of chronic lower back pain (CRPS). Recent studies utilizing pulsed radiofrequency (PRF) have shown potential in alleviating lower back pain. There have yet to be any systematic reviews comparing the administration of TFESI alone against utilizing TFESI in combination with PRF to mitigate chronic lower back pain at the 1-month mark. We hypothesize that TFESI + PRF therapy could be beneficial due to their additive effects, as TFESI reduces inflammation, while PRF modulates pain signal transmission.

Methods: The systematic review and pooled analysis followed the 2020 PRISMA guidelines. Seven online databases were surveyed (Pubmed, Embase, Scopus, Rowan-Virtua School of Osteopathic Medicine Library, Cochrane, Web of Science, Google Scholar). The analysis included randomized controlled trials (RCTs) in which patients received TFESI alone or TFESI and PRF. Pain level was measured using the visual analog scale (VAS) or the numeric rating scale (NRS). Three RCTs fit the inclusion criteria for the review, yielding 193 distinct evaluations. VAS and NRF were analyzed for 1-month post-treatment in the two groups.

Results: There was no statistical significance ($p = 0.37$) between utilizing TFESI alone, or in combination with PRF. However, the results may be clinically significant as there was a notable difference in mean effect size with a difference of Cohen's $d = 0.79$, in favor of TFESI + PRF.

Conclusion: TFESI utilizing PRF provided statistically similar pain reduction compared to TFESI alone, but there still may be potential in this combinatorial treatment. A limitation of our study is the relatively small sample size of 193 patients. To solidify our findings, there is a need for additional RCTs with larger sample sizes, to better determine statistical significance of such a treatment. Reducing pain recurrence in these patients may lower opioid prescriptions from family medicine physicians, lowering the possibility of patient opioid dependence. This will ultimately reduce the burden on family medicine physicians.

MSS-066-2024: LEFT VENTRICULAR OUTFLOW TRACT OBSTRUCTION FOLLOWING SUBLUXATION OF A MECHANICAL MITRAL VALVE

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Introduction: Left ventricular outflow tract obstruction (LVOTO) following cardiovascular surgery may occur from several etiologies. Typically, a late presentation of LVOTO in this population is related to a subvalvular membrane formation. We describe a case of subluxation of a mechanical mitral prosthesis into the LVOT leading to LVOTO requiring Multi-modality

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imaging for diagnosis and complex surgical management.

Case Presentation: A 61-year-old female with medical history of pediatric rheumatic mitral valve disease, mechanical mitral valve replacement (20 years prior), and atrial fibrillation presented for work-up of elevated transaortic gradients and New York Heart Association III symptoms. Her transthoracic echocardiography revealed a mean transaortic gradient of 53 mmHg and a peak velocity of 4.8 m/s. Transesophageal echocardiography at our hospital showed mild aortic stenosis with an aortic valve area by planimetry of 1.70 cm2. A sub-valvular narrowing of the LVOT was observed with turbulence and appeared to likely be the source of her elevated transaortic gradients. Pulse wave imaging showed aliasing below the aortic valve annulus and above the sub-valvular narrowing. A cardiac catheterization confirmed a fixed LVOTO with a peak gradient of 79 mm Hg. Next, multi-detector computed tomography (MDCT) was performed, which revealed the mechanical mitral valve had partially separated from the aorto-mitral curtain abutting into the LVOT. The patient was brought for surgical intervention.

Discussion: LVOTO is a known but rare complication of mitral valve interventions. An early LVOTO may be caused by a mispositioned valve or by systolic anterior motion (SAM) of a preserved anterior mitral valve leaflet (AML). Late or delayed LVOTO typically occurs as a result of the formation of an obstructing membrane leading to subaortic stenosis. Pannus formation that forms on the anterior portion of a mitral prosthesis may also abut into the LVO. Although LVOTO has been well described in the literature following mechanical MVR, mechanical mitral valve dehiscence into the LVOT is a unique and rare cause of LVOTO. Our patient was initially referred for elevated transaortic gradients of unknown etiology. Multi-modality imaging was required to make an accurate diagnosis. TEE and cardiac catheterization localized the source of elevated transaortic gradients (the LVOT) and MDCT was required to determine the etiology (subluxation of the mechanical mitral valve).

MSS-067-2024: Assessment and comparison of left ventricular function in anemic patients versus healthy subjects by 2D Speckle tracking

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Background: Anemia is characterized by reduced blood oxygen-carrying capacity due to low hemoglobin, affects diverse organs, notably the heart.1 Understanding anemia-associated left ventricular (LV) function changes aids early detection and management. Utilizing 2D speckle tracking enables precise LV mechanics assessment2, facilitating comparative analysis between anemic individuals and healthy counterparts.

Methods: This was a cross-sectional study conducted at the All-India Institute of Medical Sciences, Patna. The participants were selected into two distinct cohorts: an Anemic group and a Healthy group.
Anemic group: Participants with hemoglobin levels <13 g/dL in males and <12 g/dL in females were included. Individuals with any other comorbidities were excluded. Non-probability consecutive sampling was employed for participant selection. Healthy group: A roster of hospital staff members without any comorbidities was compiled and organized numerically. Age- and sex-matched comparison groups were then chosen. For each anemic patient, two age- and sex-matched healthy adults were selected from the existing list. 2D echocardiography with speckled tracking was used to obtain LV global longitudinal strain (GLS).

Results: A total of 90 individuals were included in the study, comprising 30 participants in the anemic group and 60 in the healthy group. The mean age of participants in the anemic and healthy groups was 41.6 and 31.1 years, respectively, with corresponding mean ejection fractions of 54 ± 1.94% and 59 ± 1.60%. Additionally, a statistically significant difference ($p < 0.01$) was observed in the mean LV GLS score between anemic patients (-13.4 ± 2.38%) and healthy subjects (-18.7 ± 0.70%). The linear regression model

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showed significant positive associations between hemoglobin (coefficient: 0.57, p < 0.01) and gender (male-female) (coefficient: 1.22, p = 0.005) with LV GLS (r2 = 0.55).

Conclusion: Anemia may reduce LV GLS, reflecting impaired myocardial function. Therefore, 2D speckle tracking in echocardiography can detect early LV dysfunction, improvising treatment plan and improving prognosis in anemic patients.

MSS-068-2024: Establishing Reference Values for Pulse Wave Velocities in Young, Healthy Individuals of Indian Origin

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Introduction: Cardiovascular diseases (CVDs) are the leading cause of morbidity and mortality globally. Although rare, several childhood risk factors persist into adulthood, increasing CVD development risk. Pulse wave velocity (PWV) is a non-invasive, gold standard method for measuring arterial stiffness, which reflects the collective impact of these factors on blood vessels walls. However, there are very few studies in India for the reference values of PWVs, which can vary significantly across different populations. Defining reference values is crucial for accurately assessing arterial stiffness and guiding prevention and treatment strategies.

Methods: A Cross sectional study was conducted on 114 healthy (57 males, 57 females), asymptomatic individuals aged 15-25 years, with normal BMI, to measure arterial stiffness using four PWV parameters. Height, weight, blood pleasure, pulse pressure, mean arterial pressure and Arterial PWVs were measured using PeriScope. Data obtained was expressed in Mean ± SD with 95% confidence intervals. Difference in PWVs between genders was calculated using unpaired-t test.

Results: The normalized values of arterial stiffness measured in terms of PWVs in mm/sec were : baPWV (1039.25±139.28), cfPWV (617.99±120.61), hbPWV (301.64±41.81) and haPWV (446.09±50.68). Although mean values for both baPWV and cfPWV were higher in males compared to females, the difference was statistically significant only for haPWV (p < 0.05).

Conclusion: This study provides essential reference values for PWVs in young, healthy Indian individuals, serving as valuable benchmarks for cardiovascular risk assessment and forming tailored prevention and treatment strategies.

MSS-069-2024: A Rare Case of Renal Cell Carcinoma With Inferior Vena Cava Invasion: A Life-Threatening Complication

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Introduction: Renal cell carcinoma (RCC) arises from the renal tubular epithelial cells and comprises a group of heterogeneous renal tumors. It often results from smoking and drug exposure and can metastasize to involve almost any body organ, the common being lung, liver, bone, etc accounting for 2% of all malignancies. It may invade the inferior vena cava (IVC).

Case presentation: A 60-year-old ex-smoker with diabetes and hypertension presented with progressive right-sided flank pain, gross hematuria, anorexia, nausea, and morning fatigue for two months. The lab tests were unremarkable except for anemia. On physical examination, a palpable mass in the right flank region was noted. On Contrast enhanced MRI with venography, a complex renal

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mass with hydronephrosis and a right renal upper polar mass lesion extending into the vein, compressing the IVC. Contrast-enhanced MR angiography indicated extensive venous collaterals and an exophytic neoplasm component. PET-CT scans showed a heterogeneously enhancing mass in the right kidney, suggestive of renal cell carcinoma with metastasis to the left lung. Following oncology consultation, a right complete nephrectomy was performed, involving venotomy and thrombus extraction from the IVC. Histopathology confirmed RCC with clear cytoplasm and distinct cell membranes, extending into the renal capsule without invading perirenal fat. Post-surgery, the patient commenced on pazopanib and erythropoietin, responding well to scheduled follow-ups.

Discussion: Renal Cell Carcinoma is a malignancy of kidney tubular cells, with less than 10% incidence and often metastasizing to the lungs, lymph nodes, and liver. A rare manifestation includes RCC spreading to the IVC, observed in 4-10% of cases, where it invades the IVC and forms a venous thrombus, indicating advanced disease and poor prognosis. CT scans are preferred for diagnosis and detecting lung metastases, while MRI is superior in identifying IVC invasion. Surgical resection remains the only curative treatment, with a 5-year survival rate of 50-60%, significantly lower in cases of IVC invasion. The Mayo staging system categorizes IVC thrombotic mass levels, essential for surgical planning and prognosis. Surgery's complexity increases with IVC wall invasion, potentially requiring prosthetic replacement. Preoperative imaging and planning are crucial for optimal outcomes and patient awareness.

MSS-070-2024: Deep-Learning Reconstruction Methodology on the Diagnosis of CNS Inflammatory Demyelinating Diseases

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Background: Acute disseminated encephalomyelitis (ADEM), neuromyelitis optica (NMO), and multiple sclerosis (MS) are demyelinating diseases that manifest with similar MRI findings, including lesions in the brain stem. While differential diagnosis can be achieved by neuroradiologists, accurate interpretation can be challenging. Proper diagnosis is crucial as these conditions present separate treatment approaches. With the emergence of machine learning, deep learning reconstruction (DLR) has emerged as a promising tool to enhance reading accuracy and efficiency. Thus, this literature review seeks to assess the current ability of DLR in correctly diagnosing these demyelinating disorders.

Methods: An overview of the literature synthesizing information of relevant topics was conducted. Several databases were utilized, such as Medline-Pubmed, Medline-EBSCO, and NIH. Keywords include "deep learning MRI," "brain stem lesions," "multiple sclerosis," "NMO," and "ADEM."

Results: Current detection methods focus on morphological changes between the three diseases in conventional MRI (3). Neuroradiologists were able to detect additional MS brain stem lesions from MRI with DLR than conventional MRI interpretation (1). Furthermore, deep learning models have been developed in aiding differentiation of NMO from MS in FLAIR brain MRI (2,4). To date, there have been no studies evaluating the efficacy of DLR in the context of ADEM or in distinguishing between these three demyelinating diseases.

Discussion: The capability of machine learning in aiding medical interpretation is evolving with ongoing advancements. Although substantial progress has been made with deep learning algorithms in diagnosis of demyelinating disorders, further research is necessary to explore its effectiveness, especially concerning ADEM.

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Portrait of Hippocrates (1787), by the Majorat of Setúbal.
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Science is the father of knowledge, but opinion breeds ignorance.
- Hippocrates