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- The Scope of Artificial Intelligence (AI) in Healthcare Delivery in Pacific Small Island States (PSIDS)
- Leptospirosis in Fiji - Early Developments
- Cardiovascular Complications of Energy Drinks

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Contents

Editorial

The Scope of Artificial Intelligence (AI) in healthcare delivery in Pacific Small Island States (PSIDS)

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AI holds immense potential to transform healthcare delivery in PSIDS. Addressing the challenges in regulatory compliances, data privacy concerns and the digital divide to ensure equitable access to AI-driven healthcare innovations across the diverse island communities remains mandatory. Collaborations inter-governmentally, healthcare providers, technology companies and community stakeholders will be critical to realizing the full benefits of AI in improving healthcare regulated outcomes in PSIDS. The scope of AI in healthcare delivery in PSIDS will be significant, offering various opportunities to complex challenges.

The unrealized regional political commitments to developing comprehensive, interlinked "digital technology" (DT) would underpin the process, if healthcare is to benefit from AI. This paper addresses the scope of regulated regional AI introduction with the downside and risks associated against the current unregulated AI which challenges the region. That meaningful preliminary dialogue be undertaken at all levels in society and governance.

The seven most important areas to address for regulated AI development remain as follows.

Remote Healthcare Services: Small Island States often face challenges in accessing specialized healthcare services due to geographical constraints. AI can help bridge this gap by enabling remote healthcare services through telemedicine platforms. AI-powered chatbots and virtual health assistants can provide initial diagnoses, medication reminders, and general healthcare information, thereby improving inequities of healthcare within the remote island populations.

Disease Detection and Surveillance: AI algorithms can analyse large volumes of health data, including electronic health records, medical imaging, and wearable device data, to detect patterns indicative of disease outbreaks. This early detection can enable prompt responses from healthcare authorities, helping to prevent the spread of diseases in small island communities.

Personalized Medicine: AI-driven predictive analytics can help healthcare providers in PSIDS deliver personalized treatment plans based on individual patient data, including genetic information, lifestyle factors and medical history. This approach can improve patient outcomes and reduce healthcare costs by avoiding unnecessary treatments or hospitalizations.

Healthcare Resource Management: AI can optimize healthcare resource allocation in by analysing patient flow, hospital bed occupancy rates and staff scheduling. Predictive analytics can forecast demand for healthcare services helping authorities make informed decisions about resource allocation whilst ensuring that healthcare facilities are adequately equipped to meet the needs of their populations.

Health Monitoring and Chronic Disease Management: AI-powered wearable devices and mobile health applications can continuously monitor vital signs, tracking health metrics for individuals with chronic conditions such as diabetes, hypertension or cardiovascular disease. These technologies can alert patients and their healthcare providers to potential health issues in real-time, enabling early intervention and proactive management of chronic diseases.

Medical Imaging and Diagnostics: AI algorithms can enhance the accuracy and efficiency of medical imaging interpretation, particularly in areas where access to radiologists may be limited. Automated image analysis tools can assist healthcare providers in diagnosing conditions such as cancer, fractures, or neurological disorders, leading to faster treatment decisions and improved patient outcomes.

Health Education and Behavioural Intervention: AI-driven educational platforms and health behaviour change interventions can empower individuals in Small Island States to make healthier lifestyle choices and adhere to medical recommendations. Chatbots and virtual health coaches can deliver personalized health advice, answer questions, and provide ongoing support to help individuals achieve their wellness goals.

Introducing "unregulated" AI in Small Island States will pose several downsides and risks:

To mitigate these downsides, PSIDS should prioritize the development and implementation of robust regulatory frameworks, ethical guidelines, and governance mechanisms to ensure the responsible and equitable use of AI in healthcare. Collaboration with international (multilateral and bilateral) partners, capacity-building initiatives of developers, societal stakeholder engagement will help the States and their regional representatives Secretariat of the Pacific Communities (SPC) and Pacific Islands Forum (PIF) to navigate the complex challenges associated with AI adoption while maximizing its potential benefits for improving healthcare delivery and outcome. The support of UN organizations especially World Health Organization "(WHO) cannot be underscored. WHO document" Ethics and Governance of AI for Health. Guidance on Large Multimodal modes." Remains important foundational reading to understand Generative AI, a subset which remains a major AI healthcare tool (1). The seven areas which need attention are as follows:

Data Privacy and Security Concerns: Unregulated AI may lead to inadequate safeguards for sensitive healthcare data, increasing the risk of data breaches and privacy violations. Small Island States may lack robust regulations and enforcement mechanisms to protect individuals' health information from unauthorized access or misuse, potentially erodings trust in healthcare systems and technology providers.

Bias and Discrimination: Unregulated AI algorithms may inadvertently perpetuate biases present in healthcare data, leading to unequal treatment or disparities in healthcare outcomes for marginalized populations. Without proper oversight and accountability measures, AI systems may reinforce existing societal prejudices, exacerbating healthcare inequalities in PSIDS.

Quality and Safety Risks: AI applications in healthcare, especially those without regulatory oversight, may lack rigorous testing and validation processes, increasing the risk of errors or inaccuracies in diagnosis, treatment recommendations, or medical decision-making. Poorly designed or implemented AI systems could compromise patient safety and undermine the quality of healthcare services delivery.

Lack of Accountability and Transparency: Unregulated AI may operate without clear accountability frameworks or transparency requirements, making it difficult for patients, healthcare providers, and regulators to understand how AI-driven decisions are made or to challenge potentially erroneous or biased outcomes. This lack of transparency can undermine public trust in AI technologies hindering efforts to address algorithmic biases or errors.

Ethical and Legal Implications: Unregulated AI in healthcare may raise complex ethical dilemmas, such as issues related to consent, autonomy, and the responsible use of AI in decision-making processes. PSIDS may lack clear legal frameworks or ethical guidelines to govern the deployment of AI technologies in healthcare, leaving stakeholders vulnerable to potential ethical and legal challenges.

Dependency on External Providers: Without regulatory oversight, PSIDS may become dependent on external AI technology providers, potentially compromising their sovereignty and ability to tailor healthcare solutions to local needs and priorities. Reliance on foreign AI vendors could also pose challenges related to data sovereignty, intellectual property rights, and technology transfer agreements.

Inequitable Access and Digital Divide: Unregulated AI deployment may exacerbate existing disparities in access to healthcare services and digital technologies. Marginalized communities, rural populations, or those with limited technological literacy may be disproportionately excluded from benefiting from AI-driven healthcare innovations, widening the digital divide and exacerbating health inequalities.

Does AI outsmart Human professional and clinical decision making?

AI and human decision-making each have their strengths and weaknesses, particularly in the context of professional and clinical decision-making:

SPEED AND EFFICIENCY:

AI: AI systems can process vast amounts of data and generate insights or recommendations rapidly, potentially outperforming humans in tasks that require processing large datasets or performing repetitive analyses.

Human: Human decision-making often involves intuition, creativity, and contextual understanding, which can lead to flexible and adaptive responses in complex situations. However, humans may be slower than AI in processing large volumes of data or performing repetitive tasks.

ACCURACY AND CONSISTENCY:
AI: AI algorithms can exhibit high levels of accuracy and consistency when trained on large, diverse datasets. Once trained, AI systems can consistently apply learned patterns and rules without being influenced by emotional or cognitive biases.

Human: Human decision-making can be influenced by various biases, cognitive limitations, and subjective interpretations, which may introduce errors or inconsistencies in decision-making. However, humans can also incorporate contextual factors, empathy, and ethical considerations into their decisions, which AI may struggle to replicate.

COMPLEXITY AND CONTEXT:
AI: AI excels in processing complex datasets and identifying patterns or correlations that may not be apparent to humans. AI algorithms can analyse data from diverse sources, including medical imaging, genetic information, and patient records, to assist in diagnosis, treatment planning, and disease prediction.

Human: Human decision-making is often guided by clinical expertise, intuition, and contextual understanding, allowing healthcare professionals to consider nuanced factors such as patient preferences, social determinants of health, and ethical considerations. Human clinicians can integrate diverse sources of information and exercise judgment in complex and uncertain situations.

INTERPRETABILITY AND EXPLAIN-ABILITY:
AI: AI models such as deep learning neural networks may lack transparency and interpretability, making it challenging to understand how they arrive at specific decisions or recommendations. This "black-box" nature of AI can raise concerns about trust, accountability, and potential biases in AI-driven decision-making.

Human: Human decision-making is typically transparent and explainable, allowing clinicians to articulate the rationale behind their decisions, consider alternative approaches, and engage in shared decision-making with patients. However, humans may also struggle to explain intuitive or subconscious aspects of their decision-making process.

ADAPTABILITY AND LEARNING:
AI: AI systems can continuously learn and improve over time through feedback loops and iterative training processes. With access to updated data and feedback from real-world outcomes, AI algorithms can adapt to evolving healthcare challenges and refine their predictive accuracy and decision-making capabilities.

Human: Human clinicians undergo extensive education, training, and professional development to continuously improve their clinical skills and knowledge. While humans may not learn as rapidly as AI algorithms from large datasets, they can apply critical thinking, clinical judgment, and learning from experience to adapt to new clinical scenarios and challenges.

AI and human decision-making each have unique strengths and weaknesses, and their optimal integration in healthcare depends on factors such as the specific clinical task, available data, patient preferences, and ethical considerations. Effective collaboration between AI systems and human clinicians, leveraging the complementary strengths of both approaches, holds promise for enhancing healthcare delivery and improving patient outcomes.

The current state of regulations on AI globally is rudimentary.
In January 2022, the regulation of AI varies significantly across different countries and regions. While some jurisdictions have implemented comprehensive frameworks to govern the development, deployment, and use of AI others are still in the process of formulating regulatory approaches.

European Union (EU):
The EU has been at the forefront of AI regulation with the introduction of the European Commission's proposal for the Regulation on Artificial Intelligence (AI Act) in April 2021. The AI Act aims to establish a harmonized regulatory framework for AI systems, focusing on high-risk applications, transparency, accountability, and fundamental rights protection. It categorizes AI systems into four risk levels: unacceptable risk, high risk, limited risk, and minimal risk. The European Parliaments document “AI in Healthcare-applications, risks and ethics and societal Impacts” remains foundational reading as it delves into the controversies of AI and seeks collective mitigative options for the 54 States of the European Union (EU) (2).

United States:
In the United States, AI regulation is still evolving, with various federal agencies, such as the Federal Trade Commission (FTC) and the National Institute of Standards and Technology (NIST), issuing guidelines and principles for AI development and deployment. However, there is no comprehensive federal

legislation specifically focused on regulating AI. Some states have proposed or enacted their own AI-related regulations, particularly in areas such as facial recognition technology and automated decision-making in hiring and lending.

China:
China has prioritized AI development and innovation through various national strategies and initiatives, but regulatory efforts have primarily focused on specific sectors such as data privacy, cybersecurity, and AI governance. The Chinese government has issued guidelines and standards for AI ethics, data security, and algorithmic transparency, but comprehensive AI legislation is still in the early stages of development.

Canada:
Canada has taken steps to address AI governance and ethics through initiatives such as the Canadian AI Strategy, the Pan-Canadian Artificial Intelligence Strategy, and the National AI Ethics Framework. While Canada does not have specific AI regulations, existing laws governing privacy, data protection, and human rights apply to AI systems and applications.

Other Countries and Regions:
Several other countries and regions, including the United Kingdom, Japan, South Korea, Australia, and India, have also introduced or are considering AI-related regulations, guidelines, or strategies to address ethical, legal, and societal implications of AI technologies. These efforts vary in scope and approach, reflecting diverse regulatory priorities and policy contexts.

Overall, the regulatory landscape for AI remains fragmented and rapidly evolving, with ongoing debates and discussions surrounding issues such as risk assessment, accountability, transparency, and human rights protection. As AI technologies continue to advance and permeate various sectors of society, policymakers face the challenge of balancing innovation and regulatory oversight to promote responsible AI development and deployment while mitigating potential risks and harms which are largely unregulated by States and their governments.

How does AI and digital technology (DT) interweave in healthcare settings?
AI and DT are increasingly interwoven in healthcare settings, transforming various aspects of healthcare delivery, patient care, and medical research. The intersection of these two entities are as follows: DT underpins AI.

Data Collection and Management:
Digital technologies such as electronic health records (EHRs), wearable devices, and IoT sensors collect vast amounts of patient health data. AI algorithms can analyse these data sources to extract valuable insights, identify patterns, and predict health outcomes. For example, AI can analyse EHR data to identify patients at risk of developing chronic diseases or adverse drug reactions.

Diagnostic Imaging and Medical Imaging Analysis:
AI algorithms can analyse medical images such as X-rays, MRIs, and CT scans to assist radiologists in detecting abnormalities, tumours, or other medical conditions. Digital imaging technologies enable the capture, storage, and transmission of medical images, while AI enhances the accuracy and efficiency of image interpretation, leading to faster diagnoses and treatment decisions.

Clinical Decision Support Systems (CDSS):
Digital technology enables the integration of diverse data sources and real-time access to decision support tools at the point of care. There-after AI-powered clinical decision support systems integrate patient data, medical literature, and clinical guidelines to assist healthcare providers in making evidence-based decisions. These systems can flag potential medication errors, recommend treatment options, or alert clinicians to patient-specific risk factors.

Telemedicine and Remote Patient Monitoring:
Telemedicine platforms leverage digital communication technologies to facilitate remote consultations between patients and healthcare providers. AI-driven virtual health assistants can triage patient inquiries, schedule appointments, and provide follow-up care remotely. Remote patient monitoring solutions utilize wearable devices and IoT sensors to track vital signs, medication adherence, and disease progression, enabling proactive management of chronic conditions and reducing the need for in-person visits.

Precision Medicine and Personalized Treatment:
Digital technologies enable the storage, sharing, and analysis of large-scale genomic and clinical datasets, facilitating the development of personalized medicine approaches and targeted therapies. AI algorithms analyse genomic data, biomarkers, and clinical phenotypes to tailor treatment plans to individual patients' genetic makeup, disease characteristics, and treatment preferences.

Healthcare Operations and Resource Management:
Digital technology platforms enable real-time monitoring of healthcare metrics, performance indicators, and quality measures to support data-driven decision-making and continuous improvement initiatives. AI and digital technologies optimize healthcare operations, resource allocation, and patient flow within healthcare facilities. Predictive analytics models forecast patient demand, optimize staff scheduling, and allocate resources such as hospital beds and operating rooms efficiently.

Health Education and Patient Engagement:
Digital health platforms provide access to educational resources, symptom tracking tools, and peer support communities, empowering patients to actively participate in their healthcare journey and make informed decisions about their health. AI-driven chatbots, mobile applications, and virtual health coaches deliver personalized health education, behaviour change interventions, and self-management support to patients.

In conclusion, the integration of AI and digital technology in healthcare settings holds promise for improving patient outcomes, enhancing clinical decision-making, and optimizing healthcare delivery processes. In several of our PSIDS Health ministry's inclusive of Fiji, endorsement of DT has been undertaken but implementation is still operationally delayed. By leveraging the complementary strengths of AI and digital technology, healthcare stakeholders can drive innovation, efficiency, and accessibility in healthcare delivery while addressing complex challenges and transforming the future of medicine.

Reference:
WHO: Ethics & Governance of AI for Health. Guidance on Large Multi-Modal Modes. 2024.
License: CC BY-NC-SA-3. OIGO
European Parliament: AI in Healthcare. Applications/ Risks & Societal Impacts. June 2022

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Original Article

Harnessing the Power of Artificial Intelligence for the Fiji Health System.

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Abstract:
The integration of Artificial Intelligence (AI) into healthcare systems holds immense promise for revolutionizing patient care and administrative processes globally. This article delves into the applications of AI in Fiji's healthcare landscape, exploring how it can enhance patient experiences, optimize diagnoses, and streamline healthcare delivery. Drawing on global examples, we discuss specific AI implementations tailored to Fiji's unique challenges and opportunities, while also addressing current limitations and outlining collaborative strategies to overcome them.

Introduction:
Fiji's healthcare system is at a crucial juncture, facing challenges ranging from personnel shortages to infrastructure limitations. Embracing the AI revolution offers a transformative path forward, promising to enhance efficiency, accuracy, and accessibility in healthcare delivery. This article explores the potential applications of AI in Fiji's context, aiming to catalyze discussions and actions toward leveraging AI for the betterment of healthcare services in the nation.

AI in healthcare encompasses the utilization of cutting-edge technologies such as machine learning, natural language processing, and deep learning to elevate the interactions between healthcare providers and patients. By harnessing the data-processing prowess and predictive capacities of AI, healthcare professionals are empowered to optimize resource allocation and adopt a proactive stance towards diverse healthcare challenges. In essence, AI is revolutionizing and revitalizing contemporary healthcare by endowing machines with the ability to anticipate, comprehend, adapt, and execute actions.

Understanding AI in Healthcare:
AI encompasses a spectrum of technologies, including machine learning and natural language processing, designed to augment healthcare delivery. These technologies enable faster and more accurate diagnoses, efficient data management, and personalized treatment recommendations. In Fiji, AI holds the potential to address longstanding healthcare challenges by leveraging data-driven insights and predictive capabilities.

Applications of AI in Fiji's Health System:
Practice Reception or Hospital Entrances:
Practice reception or hospital entrances are prime locations for implementing AI to enhance patient experiences. By incorporating digital communication systems, such as appointment reminders and personalized health tips, patients can benefit from streamlined interactions. This could be facilitated through clinic apps or platforms provided by the Ministry of Health and Medical Services. Chatbots equipped with touch screens at reception areas can guide patients who are new to the institution, offering information on available services, directions, in-patient visiting hours, clinic schedules, appointment rescheduling, and feedback submission. It's not surprising that receptionist roles face automation risks due to their repetitive tasks, like message-taking and appointment booking. As technology advances, chatbots may increasingly replace human receptionists for these duties. However, it's essential to acknowledge the importance of human emotional aspects in patient interactions, ensuring that any AI implementation complements rather than replaces human touch.

Special Outpatient Clinics:
Special outpatient clinics can greatly benefit from the implementation of AI technologies, revolutionizing patient visits by enhancing both the speed and accuracy of diagnoses, ultimately leading to faster and more personalized care. Introducing phone applications specifically tailored to special outpatient services can streamline the appointment process, provide detailed information, facilitate the completion of investigation request forms, and deliver blood test results along with normal ranges and potential explanations. This integration is particularly valuable in busy clinics where patients often ask repetitive questions and struggle to retain information provided during their visit given the ever-increasing patient load in our specialist clinics. The traditional practice of using paper appointment cards is all too familiar, underscoring the need for modernization in healthcare delivery. Furthermore, AI holds promise in managing large caseloads, reducing human errors, and improving disease prediction and diagnosis efficiency, thereby optimizing patient care outcomes in both outpatient practices and hospitals.

Enhancing Radiology Practices with AI Technology
AI offers invaluable assistance in expediting and refining the image interpretation process for radiologists. By providing support in image segmentation and quantification, AI technology enables radiologists to allocate more time and attention to the nuanced interpretation of images. The escalating caseload in radiology departments, particularly in clinics, has resulted in delays in reporting, impacting patient care and exacerbating resource constraints in tertiary hospitals. These delays not only contribute to patient frustration but also increase the likelihood of repeat visits to the clinic. Additionally, AI serves as a complementary tool to radiologists, functioning as a second set of eyes to identify areas of interest or incidental findings that may have been overlooked. This collaborative approach between AI and radiologists enhances diagnostic accuracy and efficiency, ultimately improving patient outcomes and optimizing resource utilization in healthcare facilities.

Pharmacy:
Pharmacy operations stand to benefit significantly from the integration of AI technologies, which can streamline various processes including drug dispensing, labeling, patient information dissemination, and managing repeat prescriptions. Implementing AI to bridge the gap between clinics and pharmacy points of dispensing promises to reduce queuing and waiting times while providing real-time data availability. Such innovations facilitate smoother medication procurement processes and help mitigate shortages, both at hospital and sub-divisional levels. Moreover, for private practitioners, AI software equipped with medication databases and potential pharmacy interfaces could alleviate patients' efforts in sourcing their required medications.

Ward Management: When discussing inpatient patient care and the incorporation of AI, it's important to consider various aspects where AI can play a significant role in improving outcomes, efficiency, and patient satisfaction.

Bed Management and Patient Allocation: AI can optimize bed allocation by analyzing real-time data on patient admissions, discharges, and transfers. By predicting patient flow patterns and bed availability, AI systems can ensure that beds are efficiently

utilized and patients are allocated to appropriate units based on their medical needs.

Clinical Decision Support Systems (CDSS): AI-powered CDSS can assist healthcare providers in making informed decisions about patient care. These systems analyse patient data, medical literature, and treatment guidelines to provide personalized recommendations for diagnosis, treatment plans, and medication selection. This can help reduce medical errors, improve clinical outcomes, and enhance patient safety.

Monitoring and Early Detection of Complications: AI-enabled monitoring systems can continuously analyse patient data, such as vital signs, laboratory results, and medical imaging, to detect early signs of complications or deterioration. By alerting healthcare providers to potential issues in real-time, these systems enable proactive interventions, leading to better patient outcomes and reduced length of hospital stays.

Medication Management: AI can streamline medication management processes by optimizing medication orders, dosage calculations, and drug interactions. AI-powered systems can also assist in medication reconciliation, ensuring that patients receive the correct medications at the right time, thereby reducing medication errors and adverse drug events.

Patient Engagement and Education: AI-driven patient engagement platforms can provide personalized health information, treatment reminders, and educational resources to patients during their hospital stay. By empowering patients to take an active role in their care, these systems can improve adherence to treatment plans, enhance patient satisfaction, and facilitate smoother transitions of care upon discharge.

Operational Efficiency and Resource Optimization: AI can optimize hospital operations by predicting patient admission rates, resource utilization, and staffing needs. By analysing historical data and current trends, AI systems can help hospitals allocate resources more effectively, minimize wait times, and improve overall operational efficiency.

Hospital in the Home and Follow-up Apps:
Hospital in the Home (HITH) programs and follow-up apps represent innovative approaches to patient care that leverage AI-enabled platforms to enhance home-based recovery and monitoring. By integrating with mobile devices and wearables, these platforms enable remote tracking of patient progress, facilitating early discharge from hospitals and ensuring smoother transitions through the healthcare system. While our current efforts in managing stroke and surgical patients at home are commendable, the incorporation of AI-powered modalities within existing frameworks would provide real-time data and establish a direct communication channel between patients and their treating physicians. This not only improves patient outcomes by enabling timely interventions but also enhances patient engagement and satisfaction by empowering them to actively participate in their recovery process.

Current Limitations and Challenges
Despite the potential benefits of integrating AI into Fiji's healthcare system, several challenges must be addressed to realize its full potential. These challenges stem from limitations in personnel, financial resources, technological expertise, and the unique characteristics of Fiji's population, particularly the geriatric age group, remoteness of our islands and technological literacy for remote rural village communities.

Personnel and Technological Expertise: One of the primary barriers to implementing AI-driven solutions in Fiji is the shortage of healthcare professionals with expertise in AI technologies. Training existing staff and recruiting new talent with the necessary skills pose significant challenges, especially in a resource-constrained setting. Additionally, the rapid pace of technological advancements requires continuous education and upskilling of healthcare workers to effectively utilize AI tools and platforms.

Financial Resources: The adoption of AI in healthcare often requires substantial investments in infrastructure, equipment, and software licenses. In Fiji, limited financial resources and competing priorities within the healthcare sector may hinder the acquisition and implementation of AI technologies. Securing funding for AI initiatives and ensuring their sustainability over the long term remain significant challenges for healthcare administrators and policymakers.

Limited Technological Infrastructure: Fiji's healthcare system may face infrastructure challenges, including inadequate internet connectivity, outdated hardware, and limited access to digital technologies in remote areas. These limitations can impede the seamless integration of AI solutions across healthcare facilities and hinder the delivery of quality care to underserved

populations. Addressing infrastructure gaps and improving digital connectivity are essential steps towards harnessing the full potential of AI in Fiji's healthcare landscape.

Challenges with Geriatric Patients: Fiji's aging population presents unique challenges for the adoption of AI in healthcare. Elderly patients, particularly those residing in rural or remote areas, may have limited access to digital technologies and may face difficulties in navigating AI-driven platforms. Furthermore, age-related health conditions and cognitive impairments among geriatric patients may require specialized AI solutions tailored to their needs. Ensuring inclusivity and accessibility of AI technologies for all segments of the population, including the elderly, is critical for equitable healthcare delivery in Fiji.

Addressing Challenges and Moving Forward

Overcoming the aforementioned limitations requires a multifaceted approach involving collaboration between government agencies, healthcare providers, technology vendors, and community stakeholders. Investments in workforce development, infrastructure upgrades, and targeted interventions for vulnerable populations are essential to building a robust AI ecosystem in Fiji's healthcare sector. By addressing these challenges proactively, Fiji can leverage the transformative potential of AI to improve healthcare outcomes and enhance the well-being of its population.

Short-term Remedies and Long-term Vision

In the short term, Fiji's health system can adopt AI-driven solutions to address immediate challenges, such as improving patient experiences, optimizing diagnoses, and streamlining administrative processes. These initiatives can lead to tangible benefits, including enhanced efficiency and better patient outcomes.

Looking ahead, Fiji's health system should embrace a long-term vision for integrating AI into every facet of healthcare delivery. This involves fostering a culture of innovation, investing in AI infrastructure and talent, and collaborating with global partners to stay at the forefront of AI-driven healthcare advancements.

Conclusion:

Fiji's healthcare system stands on the brink of transformation, with AI poised to revolutionize care delivery and improve patient outcomes. By embracing AI technologies tailored to Fiji's unique needs and challenges, stakeholders can pave the way for a more efficient, equitable, and resilient healthcare system.

While I may not be an expert in AI technologies, I have endeavoured to provide a glimpse into how AI could potentially revolutionize Fiji's health system. By exploring various applications of AI in healthcare, from streamlining administrative processes to improving patient care and outcomes, it becomes evident that AI has the potential to address many of the challenges faced by our healthcare system.

However, it is essential to recognize that the successful implementation of AI in healthcare requires collaboration among stakeholders, careful consideration of ethical and privacy concerns, and ongoing evaluation of its impact on patient care. As we continue to explore the possibilities that AI offers, let us remain committed to harnessing its potential to enhance the delivery of healthcare services in Fiji and beyond.

References:

1. "Artificial Intelligence in Healthcare," Built In. [Online]. Available: https://builtin.com/artificial-intelligence/artificial-intelligence-healthcare

2. "Will ChatBots Steal My Receptionist Job?" AI Whim. [Online]. Available: https://aiwhim.com/will-chatbots-steal-my-receptionist-job

3. "10 Real-World Examples of AI in Healthcare," Philips. [Online]. Available: https://www.philips.com.au/a-w/about/news/archive/standard/news/articles.

4. "AI in Healthcare: Uses, Examples and Benefits," Built In. [Online]. Available: https://builtin.com/artificial-intelligence/artificial-intelligence-healthcare

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The possible roles of Integrative AI technology in healthcare delivery.

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Integrative AI technology in healthcare delivery refers to the use of AI to integrate, streamline, and enhance various aspects of healthcare services. Here are some possible roles of Integrative AI technology in healthcare delivery:

1. **Clinical Decision Support Systems (CDSS)**:

Integrative AI can power CDSS to assist healthcare providers in making evidence-based clinical decisions. By analysing patient data from electronic health records (EHRs), medical imaging, genetic information, and other sources, AI algorithms can provide personalized treatment recommendations, alert clinicians to potential medication errors or adverse events, and suggest follow-up care plans based on clinical guidelines and best practices.

2. **Population Health Management**:

Integrative AI technology can aggregate and analyse population health data from diverse sources, including EHRs, public health databases, social determinants of health, and environmental factors. By identifying at-risk populations, predicting disease outbreaks, and stratifying patients based on their health needs, AI-driven population health management platforms enable healthcare organizations to implement targeted interventions, allocate resources effectively, and improve health outcomes at the community level.

3. **Telemedicine and Remote Monitoring**:

Integrative AI facilitates remote patient monitoring and telemedicine by combining digital health technologies with AI-powered analytics and virtual health assistants. Wearable devices, IoT sensors, and mobile health applications collect real-time health data from patients, which AI algorithms analyse to detect changes in health status, predict exacerbations of chronic conditions, and trigger alerts for clinical intervention. Telemedicine platforms powered by AI enable virtual consultations, remote diagnostics, and follow-up care, enhancing access to healthcare services and enabling continuous monitoring of patients outside traditional healthcare settings.

4. **Healthcare Operations and Resource Optimization**:

Integrative AI technology optimizes healthcare operations, resource allocation, and capacity planning within healthcare facilities. Predictive analytics models forecast patient demand, optimize staff scheduling, and allocate resources such as hospital beds, operating rooms, and medical supplies efficiently. AI-driven workflow automation streamlines administrative tasks, reduces wait times, and improves the overall patient experience, while also enabling proactive maintenance of medical equipment and infrastructure.

5. **Precision Medicine and Personalized Treatment**:

Integrative AI enables precision medicine approaches by integrating genomic data, biomarkers, clinical phenotypes, and treatment outcomes to tailor therapies to individual patients. AI algorithms analyse complex datasets to identify genetic predispositions, predict treatment responses, and stratify patients into subgroups based on their molecular profiles or disease characteristics. Integrative AI platforms support shared decision-making between patients and clinicians, facilitating the selection of personalized treatment options and the monitoring of treatment effectiveness over time.

6. **Health Education and Patient Engagement**:

Integrative AI technology enhances health education and patient engagement by delivering personalized health information, behaviour change interventions, and self-management support to patients. AI-driven chatbots, virtual health assistants, and mobile applications provide interactive educational content, answer patient inquiries, and deliver timely reminders for medication adherence or preventive screenings. Integrative AI platforms leverage machine learning algorithms to tailor interventions to individual preferences, learning styles, and health literacy levels, fostering greater patient empowerment and adherence to treatment plans.

Overall, Integrative AI technology plays a pivotal role in transforming healthcare delivery by leveraging data-driven insights, automation, and personalization to improve clinical outcomes, enhance patient experiences, and optimize resource utilization across the continuum of care. By

integrating AI into existing healthcare workflows and systems, healthcare organizations can unlock new opportunities for innovation, efficiency, and collaboration in the delivery of patient-cantered care.

Establishing Integrative AI into healthcare delivery will require major financial overheads. What are some possibilities in an uneven economic environment, but there are several possibilities to overcome financial constraints, particularly in an uneven economic environment:

1. **Public-Private Partnerships (PPPs)**:

Governments can collaborate with private sector partners, including technology companies, research institutions, and healthcare providers, to jointly fund and implement Integrative AI initiatives in healthcare delivery. PPPs leverage the resources and expertise of multiple stakeholders to develop sustainable AI-driven solutions that address healthcare challenges while sharing financial risks and rewards.

2. **Grants and Funding Opportunities**:

Governments, philanthropic organizations, and international agencies can provide grants, subsidies, and funding opportunities to support the adoption and integration of AI technology in healthcare settings. These funding mechanisms can target specific priorities such as research and development, pilot projects, infrastructure upgrades, and capacity-building initiatives, particularly in underserved or resource-constrained areas.

3. **Technology Partnerships and Collaborations**:

Healthcare organizations can establish partnerships and collaborations with technology vendors, start-ups, and academic institutions to access AI solutions at reduced costs or through alternative pricing models such as subscription-based services, revenue sharing agreements, or performance-based contracts. By pooling resources and expertise, healthcare providers can accelerate the adoption of Integrative AI technology while managing financial risks.

4. **Open Source and Shared Resources**:

Open-source AI platforms, libraries, and frameworks offer cost-effective alternatives for healthcare organizations to develop and deploy Integrative AI solutions. By leveraging open-source software and shared resources, healthcare providers can reduce development costs, accelerate innovation, and collaborate with a global community of developers, researchers, and experts to address common challenges and advance the field of AI in healthcare.

5. **Capacity Building and Training**:

Investing in capacity building and training programs for healthcare professionals, data scientists, and IT personnel is essential for maximizing the value and impact of Integrative AI technology in healthcare delivery. Governments, academic institutions, and industry partners can offer subsidized training programs, workshops, and certification courses to build AI competencies and expertise within the healthcare workforce, enabling them to effectively leverage AI tools and techniques in their clinical practice and research activities.

6. **Incremental Implementation and Scalability**:

Healthcare organizations can adopt a phased approach to integrating AI into healthcare delivery, starting with pilot projects or proof-of-concept initiatives in select departments or clinical areas before scaling up implementation across the organization. By prioritizing high-impact use cases, demonstrating tangible benefits, and gradually expanding AI deployment over time, healthcare providers can manage upfront costs, mitigate implementation risks, and achieve sustainable long-term improvements in patient care and operational efficiency.

7. **Outcome-Based Financing Models**:

Outcome-based financing models, such as pay-for-performance agreements or value-based reimbursement schemes, align financial incentives with desired healthcare outcomes and quality metrics. Integrative AI solutions that demonstrate measurable improvements in clinical outcomes, patient satisfaction, and cost savings may attract investment from payers, insurers, and healthcare investors, creating opportunities for sustainable funding and long-term viability in an uneven economic environment.

By leveraging these strategies and approaches, healthcare organizations can overcome financial constraints unlocking the transformative potential of Integrative AI technology to enhance healthcare delivery, improve patient outcomes, and drive innovation in the face of economic challenges.

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Historical Research Paper

LEPTOSPIROSIS IN FIJI – EARLY DEVELOPMENTS.

Author: *Dr. Parshu Ram*

This article covers the first two decades of developments activities against leptospirosis since the initial locally diagnosed case in 1969. It is based on earlier unpublished observations, activities, experiences, and involvements. Some sections from previous publications either in more detail or in an abridged form are also included.

I was appointed consultant physician in 1969 being the first local to this post during the colonial administration. The duties included inpatient care of 40 bed men's medical Sukuna Ward, five outpatient clinics (hypertension, medical, renal, diabetes and neurology) a week, teaching medical students and colleagues, serving on several committees, on call duties on alternate weeks and the development of medicine.

In late 1969 we admitted a 29-year-old who was diagnosed as the first local case of leptospirosis. This was published previously and is reproduced!

FIRST SEROLOGICALLY CONFIRMED CASE IN FIJI

A 29-year-old man was admitted with a three-day history of fever, headache and pain in both lower limbs. He was anorexic, nauseated and had vomited a few times. The day before admission his legs felt so weak that he had difficulty in walking.

There was no significant past or family history. He was employed as a labourer, the work mainly involving grass cutting for a municipal body.

On admission he was toxic. The blood pressure was 100/60, pulse 128/min and regular and the temperature 101OF. The chest and abdomen were normal. The heart sounds were dual and no murmurs were heard. The lower limbs were painful and tender to touch; power was decreased and reflexes depressed. There was no evidence of meningeal irritation, confusion, cerebellar signs or sensory deficit. He walked with a shuffling gait. The Haemoglobin was 12.4G/100mls, WBC 14600/cmx3 with 88% neutrophils, 12% lymphocytes, and ESR 55mm/Hr. The urinalysis and chest x-ray were normal. Lumbar puncture revealed normal cerebrospinal fluid.

On the fifth day of the illness, he became icteric but the fever had subsided. However, his condition gradually deteriorated; the jaundice became deeper and transient oliguria was noted on the seventh day. On the tenth day bleeding from gums occurred, and conjunctival suffusion and photophobia were marked. Muscle tenderness was marked, mainly in the lower limbs and in the biceps. He was not able to walk. On the thirteenth day petechiae appeared on the trunk and he developed microscopic haematuria. The bleeding and clotting times were normal; prothrombin index 75% and platelet count 160,000/cm3. The Denco IM test was negative. No spirochaetes were seen in the blood on dark ground microscopy. The serum bilirubin was 11.0mg/100mls (direct reacting), alkaline phosphate 30 K.A. units, thymol turbidity 8 units, zinc sulphate turbidity 11 units S.G.O.T. 10 units/ml and S.G.P.T. 46 units/ml. The electrolytes were normal but the blood urea had risen to 300mg/100mls. The Hess test was positive.

The urine output remained between 600-1500mls/day after the seventh day of the illness. At the beginning of the third week (15th day) he was drowsy and deeply jaundiced. The serum bilirubin was 26.0mg/100mls, blood urea 400mg/100ml, S.G.O.T. 119 units/ml. S.G.P.T. 140 units/ml, and electrolytes were normal. The laboratory did not have any serological test or a suitable culture media for leptospirosis.

From the sixteenth day his condition gradually improved and he made an uneventful recovery. The blood urea was normal at the end of the fourth week, and the jaundice cleared by the fifth week.
In this case the leptospirosis was suspected and the possibility was raised with Professor Miles, Professor of Microbiology, University of Otago, New Zealand, who was visiting the Welcome Virus Lab at the C.W.M Hospital. On his return he took the blood samples and had these tested in his laboratory and confirmed it was to be leptospirosis.

The leptospiral microscopic agglutination test revealed antibodies to L. Ictero-haemorrihagiae AB (Copenhageni) in 1/2400 dilution in the specimen from the twelfth day of the illness, rising to 1/3200 dilution in the second specimen of the eighteenth day of the illness.

BECAME A MAJOR HEALTH ISSUE

No case of leptospirosis was diagnosed in 1970, four diagnosed in 1971 (two in Suva and two Levuka), 25 in 1972 (Suva 11, Levuka 5, Savusavu 5 and Labasa 4)

and 57 in 1973 (Suva 41, Lautoka 6, Levuka 6, Savusavu 3 and Labasa 1).

The laboratory introduced L.biflexa (Patocl) agglutination test at set dilution performed once a week. Positive sera were sent in batches to the nearest WHO laboratory in Brisbane for serotyping Leptospira. This obviously caused delay in getting the results. There was only one dark ground microscopy available in Suva, used mainly for syphilis diagnosis and less often available for leptospirosis.

It was realised early that this zoonosis was becoming a major health issue and the most common cause of acute renal failure. I developed a keen interest in this disease. This was largely due to my commitment in developing renal medicine after having a year (1968-69) of training in nephrology at the two leading institutions in London, St. Bartholomew's Hospital (oldest hospital in London, established in 1132) and the Royal Postgraduate Medical School at Hammersmith, the major postgraduate institute in England.
Early 1970 was a period of considerable change from colonial administration to an independent country. There was a decrease in the number of expatriate doctors and a corresponding increase in the promotion of local doctors. The maintenance, improvement and the development of medical services became the responsibility of locals specially more on senior doctors.

As I was in senior post and had to take major responsibility in the control of leptospirosis. I included leptospirosis in my research topics which also included renal disease, diabetes mellitus and cardiovascular epidemiology.

DEVELOPING ACTIVITIES AGAINST LEPTOSPIROSIS

With the emergence of this new and unfamiliar disease for which there had been no undergraduate teaching, no previous exposure or experience and no readily available literature one had to develop several actions and these included:

Self Education

The first, essential and the most important action was to become well versed and remain updated on the development of the disease. This was started soon after the first diagnosis. In my undergraduate medical lectures at the Otago medical school New Zealand (1959-60), a brief mention of leptospirosis was made by a lecturer who had spent some time in Indonesia and had seen some cases.

Early medical textbooks had very limited information on this topic. The local libraries at the CWM hospital and the Fiji School of Medicine were underdeveloped and had no information on this topic. One depended on overseas resources specially Australia and some assistance from self subscription of leading journals The New England Journal of Medicine, Disease a Month, North American Medical Journal, British Medical Journal and American Journal of Medicine.

With continued interest, effort and commitment, over a time one gained considerable expertise which greatly helped in early detection, diagnosis, treatment, prevention, education and research.

Keeping a detailed record
Minding Administrators

In the independence period the first local permanent secretary of health was Dr. Dharam. Singh. He was a dedicated, hardworking, farsighted senior clinician and an experienced administrator having been medical Superintendent of Lautoka Hospital for several years. On being reminded about this emerging zoonosis he took two actions. He requested a lecture on leptospirosis to the staff of the Head Office and District Medical Officers and soon to be held annual meeting. The lecture was well appreciated, was probably first such lecture to the administrators. The Permanent Secretary also requested the World Health Organisation for assistance.

Increasing awareness and educating health care professionals

The most important step was to increase awareness and educating health care professionals. This was done largely by lectures and medical publications.
Several early lectures were given at the weekly hospital rounds, followed by six lectures at the postgraduate committee meetings (this replaced hospital rounds in 1980). Five lectures were given at the annual conference, and western and central branch meetings of the Fiji Medical Association. A lecture was given at the Labasa Hospital.

Two lectures were given to overseas audiences - one at the Department of Veterinary Medicine, Massey University, Palmerston North, NZ in 1976 (while on short visit to NZ on leptospirosis) and the other to Kuring-Gai District Medical Association, NSW meeting in 1970 in Sigatoka.

Over two decades we published 20 articles on leptospirosis, all except two were in local journals: - Fiji Medical Journal (17 articles) and Science Journal (one article).

The topics covered included history, epidemiology, clinical aspects including uncommon and unusual features, diagnosis, complications, treatment, prevention, mortality and autopsy findings etc. The details are in the reference 2-21.

The article "Unusual electrocardiographic abnormality in leptospirosis" was published in Angiology and abstract is reproduced: -

"Unusual EGG changes of marked ST segment elevation in leads V1- V3 are reported in four cases with severe leptospirosis for the first time. These changes normalised rapidly with the initiation of therapy and recovery in three patients. One patient died within hours of admission. The cause of these changes is not clear"

In two patient the ECG changes were very similar to what was described several yeas later and came to be known as Brugada Syndrome.

The above activities were very effective in increasing awareness. A very senior doctor in the Ministry of Health writing about zoonosis in Fiji Medical Journal stated *"most medical officers in Fiji are well aware of this condition and the need for urgent treatment" 22.*

ESTABLISHING CONTACT WITH VETERINARY PATHOLOGY LABORATORY

Leptospirosis is primarily a disease of animals. Renal carrier state can lead to urine contaminated environment and human exposure and can cause disease in men. Thus, leptospirosis is a problem both in veterinary and human medicine.
We established early contact and association with the Veterinary pathology laboratory. In 1960s the country had only one such laboratory in Koronivia, Nausori. I visited on few occasions in early 1970s, met veterinarians and had discussions about leptospirosis in humans.

We were updated about the disease in animals and their research since 1960 - the details have been published in detail previously! In 1978 Munro summarised the results of leptospiral serology for1970s 23.

In a major serological survey in 1984 Collings tested sera from domestic and wild animals using compliment fixation test for antibody to 12 leptospiral serovars 24.

Antibody was detected in 27.5% of 480 cattle, 17.1% of 70 sheep, 10.3% of 252 pigs, 57.0% of 100 dogs, 55.8% of 34 rats and 53.1% of 32 mongoose, 40.6% of 10 mice. The survey indicated that cattle, dogs, rats, mongoose and mice were probably the most important maintenance hosts.

Regular contact with Veterinary Laboratory was maintained. The staff of the Veterinary Laboratory gave a lecture on Leptospirosis in the animals to the 1984 Annual Conference of the Fiji Medical Association and contributed three articles: -

- *Leptospirosis in the animal population in Fiji (1978) [23]*
- *Leptospirosis in man and animal (1982) [10]*
- *"Further observations on the epidemiology of Leptospirosis in Fiji (1982)" in the*
- *Fiji Medical Journal[23]*

WHO CONSULTANT ADVICES THE MINISTRY OF HEALTH

In response to the Ministry of Health's request the World Health Organisation provided the services of a consultant Dr. S. Faine, Professor and chairman of Department of Microbiology, Monash University, Melbourne in January 1974.

In a month's consultancy he was to assist in upgrading the laboratory procedures for leptospirosis, advice on the possibility of a survey on the incidence of leptospirosis and to make recommendations for treatment and preventive measures.

He reviewed previous studies, spent considerable time with CWM Hospital Pathology Department, had discussions with doctors, veterinarians, public health officers, staff of the Fiji School of Medicine and larger hospitals. I had several discussions with him about the history, our studies, updated him on the current situation and provided details of first 45 cases, previously unpublished. This he included in his report and is reproduced.

After discussion with the World Health Organisation, he carried out a survey. For this he travelled widely and obtained 852 blood samples from rural and urban areas, both major ethnic groups, both sexes and across all age groups. Serological study of anti-leptospiral antibodies using agglutination of L. biflexa Patoc 1 to the titre of 1:10 – 1:100 was carried out in Melbourne. The result showed that antibodies were widespread.

His recommendation included upgrading diagnostic facilities, training of laboratory staff, surveillance and

epidemiology, more facilities for dialysis and further support from the World Health Organisation.

In his report he acknowledged the assistance and cooperation of the World Health Organisation, the Medical and Veterinary Departments of Fiji and our contribution (details are in the section of contacts and comments by colleagues).

CLINICAL DATA OF FIRST 45 PATIENTS WITH LEPTOSPIROSIS IN FIJE 1968-1973

A. Clinical picture

a)	Febrile illness	2
b)	Aseptic meningitis	7
c)	Bilateral Uveitis	1
d)	Hepatorenal failure	34 (7 mainly hepatic)

B. Age group

a)	20	9
b)	20-29	10
c)	30-39	12 (youngest 12)
d)	40-49	8 (oldest 73)
e)	50-59	3
f)	60-69	2
g)	70	1

C. Sex and race

	Fijians	Indians	Tongan
Males	30	6	1
Females	6	2	-

D. Occupation

a)	Villager	13
b)	Labourer	9
c)	Domestic duties	4
d)	Prisoners	4
e)	Students	4
f)	Carpenters	3
g)	Unemployed	4
h)	Others	4 (Barber, painter, clerk, photographer)

E. Serogroups

a)	Icterohaemorrhagiae	29
b)	Australis	11
c)	Pomona	1
d)	Autumnalis	1
e)	Hebdomadis	1
f)	Awaiting serogrouping	2

F. Drainage area

a)	Suva	25 (Lami Village 3, Naboro Prison 3)
b)	Tailevu-Naitasiri	11
c)	Rewa	8
d)	Namosi	1
e)	Levuka	1
f)	Rakiraki	1

The commonest cause of death in leptospirosis is renal failure. Rarely death may result from hepatic failure, myocarditis, toxaemia, adrenal haemorrhage or toxaemia.

Twenty-seven (60%) of the patients had renal failure. Eighteen were managed conservatively. In nine peritoneal dialysis had to be carried out. There were two deaths – one due to myocarditis and the other due to toxaemia. Leptospirosis is the commonest cause of acute renal failure at present.

CONTRIBUTIONS TO THE WHO GUIDELINES FOR THE CONTROL OF LEPTOSPIROSIS

In August 1979 I received a request from the World Health Organisation for contributions to the above guidelines. Sections of self-explanatory letter is reproduced: -

"The World Health Organisation wishes to promote a policy leading to the control of leptospirosis throughout the world, especially in the developing countries where this zoonosis in prevalent and a problem in both human and veterinary medicine. A volume of 'guidelines' is proposed, which should be practical, concise guide to the recognition, diagnosis and the control of leptospirosis. It is designed for use by those who are not already expert or even knowledgeable about leptospirosis.

I have been given supervising editorial responsibility and am writing to ask whether you would agree to write a section of proposed text. A number of experts are to contribute the various sections. I do hope you will be able to help in lending your expertise to this important co-operative effort" (Professor S. Faine, Professor of Microbiology, chairman, Taxonomic Subcommittee on Leptospirosis, ICSB IAMS).

This request was a pleasant surprise and a major responsibility and would enhance the reputation and prestige of the Colonial War Memorial Hospital and the country. I agreed to the request and contributed three sections requested:

- How to recognise leptospirosis clinically in man.
- The acute infection in man.
- Clinical and Pathological aspects – and submitted 28 pages on the above topics.

This was peer reviewed and largely accepted for final publication. The guideline was published in 1982. The reviewer comments on the guideline was:

"This book is veritable mine of practical information on leptospirosis. This is the most thorough account of a topic which is usually covered in a guide cursory fashion in medical textbooks. The 55 pages that

comprise Section B and include the bulk of the information of interest to clinicians are excellent. This is a book of wide appeal and not just to Third World countries. Physicians, veterinarians, microbiologists and medical students will find these guidelines valuable" (K.King, Acting Editor, Medical Journal of Australia, May 14, 1983)

A correspondence from the World Health Organisation in 1983 stated that the Guidelines have been well accepted throughout the world with a great demand for their distribution (T. Fujikura, Veterinary Public Health, Division of Communicable Diseases).

CONTACTS AND COMMENTS BY COLLEAGUES

With my involvement in Leptospirosis for two decades I had been in contact/communicated with several international leptospirologists and these included:

- Dr. L. H. Turner England
- Dr. S. Ramachandran Sri Lanka
- Dr. D. K. Blackmore New Zealand
- Dr. R. B. Marshall New Zealand
- Professor S. Faine Australia

A NUBMER OF COMMENTS BY COLLEAGUES

"Last, but most important were many discussions of great benefit with Dr. Parshu Ram, to whose knowledge, energy and interest, the recognition of leptospirosis as a problem in Fiji must be credited"

Professor S. Faine, Assignment report on Leptospirosis
WPRO 2902 (Fiji) (ICP/ESO/01), 1974

"Acute Renal Failure is relatively common, due to high incidence of Leptospirosis in Fiji. There can be few physicians whose experience is the management of this condition can match Dr. Ram; he has evolved an efficient peritoneal dialysis system"

Dr. R.B.I Morrison, NZ, Nephrologist of International Reputation
Assignment Report on Renal Disease to Ministry of Health, Fiji, 1974

"Thank you once again for your contribution the volume is one to which I feel sure you will be proud to be a contributor"

Professor S. Faine, Melbourne, regarding Guideline for the control of
Leptospirosis, 1982
"He is undoubtedly an expert of world class on Diabetes in tropics, leptospirosis etc"

Professor Harry Lander, Head Fiji School of Medicine, 1987
In a letter to the Permanent Secretary, Ministry of Health, Fiji

SUMMARY

This article covers the development of activities against leptospirosis in the first two decades following initial locally diagnosed cases in 1967. The major activities were self-education, keeping an accurate record of all confirmed cases, increasing awareness and educating administrators and health professionals. This was through series of lectures and 20 publications. From very early we developed and continued associations with the Veterinary Pathology.

It also includes contributions to the visit of WHO consultant on leptospirosis and three sections in the WHO publication "Guidelines for the control of leptospirosis".

References

1. Ram P, Raju R, Leptospirosis in Fiji 1950-9090; Recognition, early studies and experiences. *The Pharmatimes* 2017; 14:2: 4-10
2. Ram P, Leptospirosis. *Fiji Med. J.* 1974; 2: 171-175
3. Ram P, History of Leptospirosis in Fiji. *Fiji Med. J.* 1978; 2: 68-69
4. Ram P, Epidemiology of Leptospirosis in Fiji. *Fiji Med. J.* 1978; 6: 70-72
5. Ram P, Leptospira Ictero-haemorrhagiae infections. *Fiji Med. J.* 1978; 6: 73-78
6. Buadromo S, Hawley VG, Ram P, Leptospiral Uveitis. *Fiji Med. J.* 1981; 9: 86-89
7. Ram P, Sub-arachnoid haemorrhage in leptospirosis. *Fiji Med. J.* 1981; 9: 113-114
8. Ram P, Karim I, Severe psychiatric changes in leptospirosis. *Fiji Med. J.* 1981; 9: 115-117
9. Ram P, Schramm M, Pregnancy and leptospirosis. *Fiji Med. J.* 1981; 9: 160-162
10. Ram P, Collins DF, Leptospirosis in man and animals. *Fiji Med. J.* 1982; 10: 66-70
11. Ram P, Collins DF, Further observations on the epidemiology of leptospirosis in Fiji. *Fiji Med. J.* 1982; 10: 71-75
12. Ram P, Leptospiral meningitis. *Fiji Med. J.* 1982; 10: 76-78
13. Ram P, Treatment of leptospirosis. *Fiji Med. J.* 1982; 10: 78-81
14. Ram P, Mortality in human leptospirosis. *Fiji Med. J.* 1982; 10: 84-86
15. Ram P, Mataika J, Metcalfe RV and Bettelhem K, Antibody levels to brucella abortus, toxoplasma gondii and leptospira serogroups in sera collected from healthy people in Fiji. Comparative Immunology, Microbiology and Infectious Disease. 1982, 5: 397-403
16. Ram P, Lal V. First isolation of leptospira from human case, *Fiji Med. J.* 1982; 10: 81-82

17. Ram P and Chandra S, Unusual electrocardiographic abnormality in leptospirosis, *Case Reports, Angiology* 1985; 36 (7) 477-482
18. Ram P, Beg MF, Kapadia V, Ram B, Rao G. Acute renal failure in leptospirosis. *Fiji Med. J.* 1985; 13: 150-157
19. Singh KP, Seruvatu LM, Ram P, Autopsy finds in human leptospirosis. *Fiji Med. J.* 1986; 14: 17-19.
20. Ram P, Leptospirosis, *Science Journal*. 1986; 1:12-14
21. Ram P, Mohan L, Leptospirosis in Fiji: a literature survey. *Fiji Med. J.* 1986; 14: 205-208
22. Pennington AH, The Zoonoses, *Fiji Med. J.* 1980; 8(9): 598-601
23. Munro R. Leptospirosis in the animal population in Fiji. *Fiji Med. J.* 1975 6(4) 19-80
24. Collings DF, Leptospira interorgan infection in domestic and wild animals in Fiji. *NZ vet J.* 1984; 32: 21-24

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CASE STUDIES

1. ECTOPIC PREGNANCY. EARLY RECOGNITION CAN SAVE LIVES.

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INTRODUCTION

An ectopic pregnancy is one that grows outside the uterus. In the UK, 1 in 90 pregnancies (just over 1%) is an ectopic pregnancy. (1) Women who have had a previous ectopic pregnancy are at higher risk. A pregnancy cannot survive in these situations and it can carry serious morbidity and mortality risks.

In a normal pregnancy, the fertilized egg traverses from the fallopian tube into the corpus of the uterus. If this does not happen, the fertilized egg may implant and start to develop outside the uterus, leading to an ectopic pregnancy.

An ectopic pregnancy can be life-threatening because as the pregnancy advances it will rupture, causing severe pain and internal bleeding. Ectopic pregnancy and miscarriage have an adverse effect on the quality of life of many women. Approximately 20% of pregnancies spontaneously abort. Miscarriages can cause considerable emotional and physical distress. Early pregnancy loss accounts for over 50,000 admissions in the UK annually. The rate of ectopic pregnancy is 11 per 1000 pregnancies, with a maternal mortality of 0.2 per 1000 estimated ectopic pregnancies.

Approximately, about two thirds of these deaths are associated with substandard care. Women who do not access medical help readily (such as women who are recent migrants, asylum seekers, refugees, or women who have difficulty reading or speaking English) are particularly vulnerable. Improvement in the diagnosis and management of early pregnancy loss is therefore of vital importance, in order to reduce the incidence of the associated psychological morbidity and avoid the unnecessary deaths of women with ectopic pregnancies. (2) Approximately 85-90% of ectopic pregnancies occur in multigravida women.

In the US the rates demonstrate a significant ethnic variation, viz a viz is twice as high in women of other races compared with white women. Relevant Fijian data is not available, however anecdotally the ectopic rates vary in the various ethnic groups in Fiji. The background rated of pelvic infections underpins the ethnic difference possibly. This remains areas of future research.

CASE PRESENTATION

This is a case report of an ectopic pregnancy seen at the emergency department of a divisional hospital in 2023. This 43-year-old iTaukei female Gravida 6 Para 5 presented to Emergency Department (ED) with complaints of lower abdominal pain which had intensified over a period of 1 week. She had been seen in the general outpatient's department on two separate occasions for her symptoms. She had described the pain as sharp in nature, worsens on breathing or movement. She denied any shoulder tip pain and loss of consciousness, no history of fever, no nausea and vomiting. Patient was currently having some vaginal spotting.

Obstetrics and gynecology history;

LNMP 23/11/22 3 days minimal bleeding. Her usual periods are regular and lasts 5- 7 days with use of 2 pads per day, partially soaked. She had bilateral tubal ligation done 8 years ago

All 5 of her deliveries were normal vaginal deliveries. Pap smear done 4 years was normal.

On examination she was a pale looking female in some distress, however able to converse well in full sentences. Oriented in time, place and person with a GCS of 15/15. Her vitals were BP 103/67 P 100 T 37.2 CBG 6.5 SPO2 in RA- 98%. She had obvious conjunctival pallor and dry oral mucosa. Abdominal examination revealed tenderness with guarding at right lower quadrant and no rebound tenderness was elicited. Pelvic examination revealed a closed cervical os. Some blood was noted on gloves and cervical excitation test was positive. Patient had good volume pulses but was tachycardiac.

Investigations

A full blood count showed a hemoglobin of 9.1, platelets of 180000 a white cell count of 10500. A transabdominal ultrasound scan revealed an ET 1.4cm, no intrauterine pregnancy with free fluid in Pouch of Douglas and hepatorenal pouch. A urine Pregnancy test was Positive.
A clinical diagnosis of ruptured ectopic pregnancy was made**.**

Management plans of action

After a thorough explanation of the current working diagnosis, the patient and her partner, informed surgical consent was taken. After having cross-match blood the patient was prepared for an emergency laparotomy.

Intra op findings were as follows;

Hemoperitoneum of 1500mls with a ruptured right tubal pregnancy. Estimated blood loss of 1800mls. Patient was given 2 units of blood.

Follow up plan

Patient and partner explained on intra-op findings. She was discharged on day 3 post op with Hb of 10.3 with a planned review in the clinic.

DISCUSSION: Some of the Risk factors are as follows:

- Previous ectopic pregnancy
- Previous tubal surgery or documented tubal pathology
- Previous genital infections (PID, Gonorrhea, chlamydia)
- Women becoming pregnant after sterilization
- IUCD use

Some of the Signs and symptoms that's we should keep in mind;

- Abdominal pain
- Amenorrhea
- Vaginal bleeding

Unfortunately, **only 50% of women present with these 3 symptoms.**

- Early pregnancy symptoms (Nausea &Vomiting and/or breast fullness)
- Weakness
- Syncope
- Abdominal rigidity, guarding, severe tenderness
- Evidence of shock
- Findings of a bulky, slightly enlarged uterus
- CET, adnexal mass

Therefore, identifying these women remains vital. The risk of ectopic pregnancy is 6-16%. Average time for Beta HCG clearance is 2-3 weeks but can take up to 6 weeks. In some cases.

Conclusion

"Rarely do women present with collapse and shock; most women present with nonspecific symptoms not too dissimilar to miscarriage. Therefore, clinical suspicion remains paramount. The early diagnosis of ectopic pregnancy in clinically stable women with transvaginal ultrasonography is not only potentially lifesaving, but may decrease the number of operative procedures" (3)
A greater awareness of risk factors, the use of urine hCG, serial testing for serum Beta subunit hCG, consideration to a transvaginal ultrasound examination enables GPs in the first trimester to clinch the early diagnosis reducing mobility and mortality by an early referral.

References

1. *Ectopic pregnancy* (2016) *RCOG*. Available at: https://www.rcog.org.uk/en/patients/patient-leaflets/ectopic-pregnancy/ (Accessed: 10 January 2024).
2. (2012) *Ectopic pregnancy and miscarriage*. Available at: https://ranzcog.edu.au/wp-content/uploads/2022/05/Ectopic-pregnancy-and-miscarriage.pdf (Accessed: 10 January 2024).
3. Condous, G. (2006) *Ectopic pregnancy Risk factors and diagnosis*. Available at: https://www.racgp.org.au/getattachment/27cd845c-181e-4968-9322-868259b0a0e1/attachment.aspx (Accessed: 10 January 2024).

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2. CARDIOVASCULAR COMPLICATIONS OF ENERGY DRINKS

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History of Present illness:
CG is a 14 yr. old Fijian National, and the youngest in his family with no past medical illness ofsignificance, no allergies and not on any medications. He had been fully vaccinated using the Fijian Immunization Schedule. His Birth Weight is good and had a normal delivery. He is of slim physique and a fair skinned male child. With weight and height adjustment, he is close to ideal body weight.

He has been raised in a good and respected family with excellent family support systems in Fiji and abroad. This is seen on a day-to-day basis in both face to face and on the digital platform. He is a physically active boy child and plays school rugby at his secondary school in Nadi. He borders on hyperactive lifestyle and quite adventurous with good academic records.

Rather unexpected and with no warning, he collapsed at their family residence and was found by his father lying on the tiled floor with cold sweats, weak with loss of energy, rapid breathing and anorexic. He was rushed to a number of General Practitioners in Nadi and at day 3 after fainting he was booked at the Heart International, in Nadi. A 12 lead ECG and a range of blood tests wasordered by the physician at the Facility. At the Heart International the 12 lead ECG showed 2nd degree AV Block (Mobitz 1) with sinus rhythm, borderline prolonged QT interval, prolonged PR interval, Trivial TR, mild AR, borderline prolonged QTinterval. The cardiac chambers were all good and no sign of PHTN, aortic abnormalities or gross valvular lesions. ASOT was elevated with increased CRP and ESR. He had normochromic normocytic anemia with high monocytes, basophil and eosinophil with leukocytosis.

On Examination:

I saw him 2 days after being under medical care in Nadi, when parents were not happy with his health condition and when he was not improving clinically at home despite the various medical regimens. When seen at Bakshi Medical Clinic, CG was very pale, hypotensive (BP90/70), HR 100/min regular, weak with dry mouth and reduced skin turgor. He has no issues with amnesia or memory loss. or incoordination or tremors or mood swings or drug dependence. He is well orientated in time, place, and person. No signs of color blindness as well. No previous COVID-19 infections. Pa02 is 95%. Temp is 36.3 deg C and is normal. Both heart sounds are heard, no murmurs and chest isclinically clear. ENT and higher functions are good.

Extremities are unremarkable. Peripheral pulses are normal with normal plantar reflexes. Visual are good with VAR 6/6 and VAL 6/6. No color blindness. No organomegaly on abdomen and hernia orifices are good. Coordination and ocular movements are normal and no signs of visual loss. Muscle power and tone are low and no deformities of limbs. Plantar reflexes are unremarkable.

A repeat ECG on the next day with second medical opinion excluded RHD as the Primary Diagnosis. His blood tests on 23/10 was reviewed. And then a more drilling history taking, revealed that he has been on hype with the newly labelled energy drink "Prime" on the market. He is a heavy YouTube user and experiments with exotic foods on YouTube. I reasoned that he has a dysregulatory immune response to this energy drink and researched beyond the labels to tie in the ECG, bloods and clinical findings for him.

Management Plan of Action:

IV infusion with 4L Hartman's, IV Iron infusion with IM Diclofenac were the management priority line of actions. A BP tracker showed his BP started to stabilize in 1 week and there was normalization of PR interval with absent AVblock 1/52 thereafter with 12 lead ECG. Sinus rhythm noted with reduction of ST elevation. ESR returned to normal while ASOT was still positive. Alternative medical regimens were Chewable Vit C 2GM twice a day after foods, Tabs Coenzyme Q10 150 mg daily, Tabs Magnesium 175mg daily and Caps Omega 3FA 3-6-9 1000mg twice a day. Highly fermented nutrition with complete ban on fizzy drinks and fast foods.

Clinically he is living his better health and just being monitored on elevated ST wave on ECG. He was medically certified for overseas travel on a family vacation today.

Follow Up:

CG will have a second cardiology opinion while in Australia to exclude any other missed cardiac pathologies. He will be reviewed by us again in Jan 2024.

Discussion:

The global volume of energy and sports drinks of the non-alcoholic sector are projected to increase by 10.63% (2.9 billion liters) between 2023 and 2027 (1). In Fiji, there is an observed trend where energy drinks are used by school children for energy

boosting and used as "chaser" in kava drinking sessions.

They provide an extra boost in energy with the legal stimulants in the drinks to increase alertness, attention, energy, blood pressure, heart rate and breathing (2). Red Bull, Mother, Vico, Solar Power, XTC, Monster, and Prime are some of the growing brands in Fiji.

References:

www.statista.com Energy and Sports Drink revenue worldwide 2022.

www.cdc.gov/healthy - CDC Healthy Schools – Energy Drinks 2023

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3. Diagnosing and Managing Rheumatoid Arthritis in General Practice.

Author: *Dr. Kavish Maharaj*

Introduction

Rheumatoid arthritis is defined as a chronic inflammatory disease of the small joints. Characterized by morning stiffness and trademark deformities like swan-necking, z form, ulnar deviation, bunion-ing of the toes. There are extra-articular features of rheumatoid arthritis as well. The disease affects the lungs, heart, kidneys, and nerves. It has also been associated with an increased risk for cancer as well. Thus, making the disease an important one to diagnose and treat early. Arthritis exists in multiple forms and affects a variety of patients. Often, it's difficult to distinguish which type it is and often more than one type is present in a patient. The worldwide prevalence of RA is 0.03%. There is a void in terms of local research on the prevalence rates in Fiji, however considerable portion of the population being of Indian descent, prevalence rate amongst sub-continent Indians can be applied to the local cohort. The prevalence amongst them being; 0.05% which is slightly higher. There are hematological markers that are used to help the clinician establish the diagnosis of RA, there is no gold standard for the disease however. The radiological findings such as bone erosions which are specific to the disease are only present in advanced disease. Early disease can have masquerading features as well, the deformities are present in late disease, two types of joint disease can be present in one, all these are contributing factors towards misdiagnosis and mismanagement of Rheumatoid arthritis not only in Fiji but as this article will uncover worldwide.

Case

57-year-old Mrs. S has had several presentations to the outpatient department with knee pains and swelling. She has had hyperuricemia and is on gout medication; colchicine 0.5mg PO OD and Allopurinol 100mg PO OD. She is now re-presenting with knee pain but also is now experiencing toe pain and swelling. There is some noted early morning stiffness of the toes, her parents both had arthritis but she is unaware of the diagnosis just labeled as joint pain by her. Physical exam shows normal vitals and no pallor or jaundice, chest is clear and heart has regular rhythm abdomen soft and not tender. Her toes show bunion deformity of the great toe of the left foot. X-rays done show reduced joint space of the knee and erosions on the tip of the Metatarsal of each great toe. She had bloods done which included a CRP and Rheumatoid factor and ESR, CRP- 17 mg/dl RF- 214 u/ml ESR- 57, all indicative of RA and high amounts of inflammation. She was put on non-steroidal anti-inflammatory drug Indomethacin 50 mg and a corticosteroid betnesol 0.5 mg per oral, for pain relief. She was also started on hydroxychloroquine 200 mg PO OD as the choice of DMARD's.

Discussion

Diagnosing: the etiology of any disease is important to understand 2 disease can generate the same symptoms, but the management will be different given that, diseases generate similar symptoms using different pathways. Symptomatic management aside the treatment of underlying condition Modifies the disease progress compared to just blanket treating symptoms. Hence, it's useful that the correct cause for joint pain be identified. Almost half the cases diagnosed with RA, are actually suffering from other types of arthritis. Most commonly Osteo-arthritis (Gomez, et al 2015). Several of these patients were on Disease Modifying anti-rheumatoid Drugs. As mentioned in the introduction of the disease there is no exact test that

can be used to diagnose the disease, hence there is a probability of misdiagnosis. Without an exact test and varying symptoms, to establish diagnosis of RA a set criterion needs to be followed. There is a criterion for establishing the diagnosis of Rheumatoid arthritis. Developed by the American Collage of Rheumatism in conjunction with European league Against Rheumatism, in 2010 illustrated by the following table:

Criteria	score
Swelling and tenderness of joint	
1 medium-large joint	0
2-10 medium to large joints	1
1-3 small joints	2
4-10 small joints	3
>10 small joints	5
Serology	
Neither RF or ACPA positive	0
One low positive titer on one test	2
One high positive titer on one test	3
Duration of synovitis	
Less than 6 weeks	0
6 weeks or longer	1
Acute phase reactant	
ESR and CRP normal	0
ESR and CRP abnormal	1

Two essential preconditions must be met before the 2010 criteria can appropriately be brought to bear in diagnosing RA in the clinic. First, the patient has to have at least one swollen joint; joint pain without swelling isn't sufficient. Secondly, any alternative diagnoses that might better explain an individual's synovitis must first be ruled out.

Under the 2010 criteria, a score of 6 or more out of a possible 10 based upon these four elements is deemed definite RA. Of note, erosions on x-ray and rheumatoid nodules are no longer part of the criteria as in the 1987 one. This coming from the fact that though these are highly specific for rheumatoid arthritis, however cannot be used to diagnose the disease. This are late stage disease manifestations, by the time these are presented the time for treatment is clearly passed.

A higher CRP and RF have been shown to indicate a quicker progression and severity of the disease. A higher Rheumatoid Factor and Anti-citrullinated peptide antibody has shown to be linked with a similar progression. These two pairs of markers are often high without the other pair.

Often ignored part locally in Fiji is the chronicity factor and the presence of pure Arthritis vs Arthralgia the joint can be painful but there needs to be swelling. Only arthralgia gives a lower score on the criteria developed in 2010.

Management:

Radiology and Serology

Though not included in the diagnosis any more x-rays play a vital part in the management of the disease. A baseline x-ray of the joint on diagnosis helps understand the extent of which the joint has progressed into the disease. These can be then used on follow up. Imaging is part of the 1987 criteria developed by ACR in 1987 and it has been shown by studies to correctly pick out long-term RA in patients (agelii et al 2022). There is a proven link between high titers of connected serology and disease severity and quick progression.

These are the parameters through which long-term effects of the disease can be assessed, and need to be part of overall disease management.

Pain relief

The major symptom from which patients want relief from is pain, true for many diseases, but definitive for RA. Defined as a chronic autoimmune inflammatory disease, the best pain relief is brought about by anti-inflammatory drugs. NSAID's and steroids often prescribed side by side for the relief of pain, have been noted to provide best pain relief. Locally, there is a growing demand for steroidal and non-steroidal combined injections, as our population carries believe that injections provide healing quicker. Perhaps, the demand is well suited, anecdotally, one dose of a 75mg diclofenac and 4 mg dexamethasone is less detrimental in terms side effects compared to a course of NSAID's and oral steroids. Intra-articular injections are also an commonly enquired mode of treatment as patients have been informed by fellow patients, about it being a better form of symptom relief. However, there are several studies that show intra-articular injection of steroids and intramuscular injection of steroids have equal 6-week effect.

Non-pharmacological treatment

Exercise weight loss, physiotherapy and good muscular tone have been known to reduce the overall burden of not only rheumatoid arthritis but several other forms of arthritis. Also, relatively new is the usage of supplement in the treatment of the disease. There are various supplements which physicians use to treat the disease but the most potent supplement is omega3 fish oil known to reduce inflammation throughout the body this supplement reduces pain sufficiently. Glucosamine is another supplement that is shown to be effective as well. Locally there is a preference for vitamin d and

calcium supplements. Of the non-pharma supplements available to treat joint disease Vitamin D ranks outside of the top 10. Making it the most common expensive and needless medication, prescribed in Fiji for joint disease.

Disease modifying anti rheumatoid drugs

These drugs are the only type of drugs used by physicians to alter the course of the disease. The most commonly prescribed drug in this category is methotrexate. Several studies evaluating the efficacy of DMARD's against each other show that there is not much disparity between them. The choice of methotrexate is sprouting from the convenience of the patient just needing to take one tab per week, and physician's tendency to believe in the drug. Methotrexate is safe and effective, however we live in the age of information, simple google searches will find the side effects and the frequency (77.5%) at which a patient may experience them. Like Metformin, Methotrexate is another drug that is gaining a misinformed stigma around it rapidly. As physicians, we have choice either to continue with methotrexate or to change our choice to hydroxychloroquine.

Conclusion

Each disease has two main components in the outpatient, under which everything encompassing healthcare for the disease can be placed; diagnosis and management. It is very important to establish the diagnosis well before proceeding to treatment. As research shows, many a times patients were on DMARD's even when they in-fact did not have RA. Growing into the physician world, you tend to learn that correct treatment is also worthless if the patient has no belief into your prescription. It just takes a few of these patients developing side effects to DMARD's and realizing that they were not supposed to be on them anyway, because of a misdiagnosis, to develop the stigma required to severely diminish the belief in the medications. If stigma around the side-effects can happen to vaccines it can happen to any medical treatment. The needless prescription of expensive vitamin d supplements is also something that can rebound severely onto us. These are 2 practices that can be changed around management of RA in Fiji. Diagnosis needs to be closely adherent to the criteria established by ACR & EULAR.

Care needs to be taken around the diagnosis of RA and the prescription of drugs surrounding the disease.

Reference:

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Opinion/Update

Understanding Cervical Cancer Screening

Arthor: *Dr. Neil Sharma*

Introduction:
Cervical cancer screening is a crucial preventive measure for women to detect abnormalities in the cervix early, allowing for timely intervention and treatment. This brief aims to provide you with essential information about cervical cancer screening, including its importance, recommended screening methods, and frequency.

What is Cervical Cancer Screening?
Cervical cancer screening involves testing for abnormalities in the cervix before symptoms develop. The primary purpose is to detect precancerous changes or early-stage cancer, which can be treated effectively.

Recommended Screening Methods:

1. Pap Smear (Pap Test): A Pap smear involves collecting cells from the cervix to examine for any abnormalities. It is a simple and quick procedure performed during a pelvic exam. Pap smears can detect precancerous changes in the cervix, allowing for early intervention.

2. HPV Test: Human papillomavirus (HPV) is a common sexually transmitted infection linked to
cervical cancer. HPV testing involves checking for the presence of high-risk HPV strains that may lead to cervical cancer. This test can be done alone or in combination with a Pap smear.

Frequency of Screening:
The recommended screening frequency varies based on age and previous screening results. Generally, guidelines suggest:

- Women aged 21-29: Pap smear every three years.
- Women aged 30-65:
- Pap smear alone every three years.
- HPV test alone every five years.
- Pap smear and HPV test together (co-testing) every five years.
- Women over 65: Screening may be discontinued if previous results have been consistently normal.

Importance of Screening:
Regular cervical cancer screening is vital for early detection and treatment. Detecting abnormalities early increases the likelihood of successful treatment and reduces the risk of cervical cancer progression. Screening can save lives by identifying precancerous changes before they develop into cancer.

Conclusion*:*
Cervical cancer screening is a critical aspect of women's health care. By undergoing regular screening according to guidelines, you can significantly reduce the risk of developing cervical cancer or detect it at an early stage when treatment is most effective. Talk to your healthcare provider about the best screening schedule for you based on your age, medical history, and risk factors. Your proactive approach to screening can protect your health and well-being.

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Review Article

Reprint British Health Forum: The governance and ethics of interaction: Sugar-sweetened beverages, non-communicable diseases and the limits of self-regulation in Fiji. Public health and the food and drinks industry:

Authors: *Dr. Melissa Mialon & Dr. Neil Sharma*

Abstract

Non-communicable diseases (NCDs) account for 80% of all deaths in Fiji, an archipelago of just over 330 islands in the Pacific region. Globally, increasing consumption of processed food products, including sugar-sweetened beverages (SSBs), has been an important contributor to the high rates of obesity and NCDs. In 2009, the Minister of Health in Fiji initiated a public-private initiative (PPI) with the food industry and the Ministry for Industry and Trade, with the aim of improving the food supply, and, ultimately, public health outcomes.

This case study provides a reflective and narrative description of the former Minister's experience, from 2009 to 2014, while engaged in the development and implementation of this PPI. The ethical issues of conflicts of interest of the food industry were never discussed, and the SSB subgroup, made up of five major industry actors in that sector, was allowed to work on matters of marketing policy, reformulation and practice re-modelling alongside public health advocates and health officials. The industry engaged early by participating in regular meetings. Consultations with food industry members were held to discuss and agree targets, standards, marketing and product availability. However, major ethical dilemmas emerged when trade and national development were given precedence over public health concerns. For example, the industry tried to shift the blame away from SSBs, by focusing on physical activity promotion. It also used self-regulation to rebut efforts by the Ministry of Health to move forward with legal, regulatory controls on marketing of unhealthy products to children. In addition, members of the industry lobbied senior officials in other government departments, while avoiding further engagement with the Ministry of

Health. Governance was another issue, and regular non-attendance, changes of representatives and a lack of involvement from the Ministry for Industry and Trade became logistical obstacles to effective policy development.

In Fiji, since 2013, there have been no reductions in SSB marketing or availability, a new product with alternates ie. sweeteners made available but with distinct cardiac risks, introduced. There is no evidence of any plans by the industry to address this potential risk. The self-regulation approach has not been as successful as it was expected to be.

In this case study, we discuss a PPI with the SSB industry and its associated ethical challenge.

Introduction

Non-communicable diseases (NCDs) account for 80% of all deaths in Fiji, in part driven by the consumption of unhealthy diets, which have contributed to high rates of obesity, with 30% of the population being obese (World Health Organization, 2014). Globally, increasing consumption of processed food products, including sugar-sweetened beverages (SSBs), has been an important contributor to the escalating NCD crisis (Nestle, 2015).

In 2007, during the 7th Pacific Health Ministers meeting in Vanuatu, it was agreed that national food summits would be organized annually across the different countries of the Western Pacific region and would include, as standard practice, all stakeholders (World Health Organization Western Pacific Region, 2010). In Fiji, these consultations started in 2009 and were attended by representatives of the government in agriculture, health, industry and trade, and education, along with key food importers, wholesalers, manufacturers and exporters of fresh and locally processed foods (The Fijian Government, 2009). Development partners with a regional office based in Fiji were also invited to the consultations. These included the Pacific Community, the World Health Organization (WHO), the United Nations Children's Fund (UNICEF) and the Food and Agriculture Organization of the United Nations (FAO). The Consumers Council of Fiji, a not-for-profit, also participated in these consultations. Fiji's National Food and Nutrition Centre (NFNC), the NCD team at the Ministry of Health, the Pacific Research Center for the Prevention of Obesity and Non-Communicable Diseases (C-POND) from Fiji National University, and the Australian Agency for International Development (Aus AID) oversaw the organization, communication and follow-up of these events.

Neil Sharma, one of our authors and then Minister of Health in Fiji, initiated a public-private initiative (PPI) with the food industry, with the aim of improving food supply and public health outcomes through several measures, including salt and sugar reduction in food products, healthier cooking oil options, and educational programs in schools (Ministry of Health, Fiji, 2009). One of the specific objectives was to inform and collaborate with the food industry to curtail public consumption of SSBs and facilitate greater availability of healthier alternatives, alongside supply changes for other categories of food products.

The decision, by the Ministry of Health, to include all stakeholders in the PPI was made in an open and transparent manner, anticipating a good working relationship, as is usually the case in the Pacific cultures, where public health would be at the centre stage in all discussions. The PPI was to be a test case for the regional small islands territories to emulate at their own paces. In addition to the stakeholders' consultations with the Ministry of Health, the National Food and Nutrition Centre conducted regular meetings with individual industry actors with the same objectives.

In this case study, we discuss a PPI that involved the SSB industry in Fiji, and its associated ethical challenges. We provide a reflective and narrative description of the former Minister's experience, from 2009-2014, while engaged in the development and implementation of this PPI.

Case

The industry engaged early, and actively participated in the national and individual consultations. Because the industry was supportive and open to discussion, the planning and implementation of this PPI, led by the Ministry of Health, did not involve any assessment of potential ethical or related issues. However, by 2010-2011, some subtle ethical challenges started to emerge, including a lack of transparency from the food industry, and failure to progress and/or to report on progress by the food industry. Regular non-attendance, changes of representatives and a lack of involvement from the Ministry for Industry and Trade also became logistical obstacles to effective policy development.

These challenges became apparent when, in 2013, some food industry actors formed the Fiji Beverage Group, in response to calls during the consultations for industry to collaborate in sector-specific groups to improve health. This group was made up of five major actors: Coca-Cola Amatil Fiji/Coca-Cola Oceania (Beverage Group Representative); Frezco

Beverages Ltd; Motibhai Group of Companies; Pinto Industries Ltd; and The Tappoo Group of Companies. They developed a Memorandum of Understanding (MOU) in August 2013, which they had initially intended to be signed with the Ministry of Health, but was finally approved by the members of the group only (The Fiji Beverage Group, 2013). This MOU made a number of commitments for new products, package size reductions, and limits on marketing to children, and voluntarily committed to report to the Ministry of Health annually on its progress. Public health advocates suggested that the group used this MOU to rebut efforts by the Ministry of Health to move forward with controls on the marketing of unhealthy food products to children, in line with the WHO recommendations (Mialon et al, 2016; World Health Organization, 2010). The most significant weakness of this MOU, in comparison with the proposed legislation on marketing, apart from its self-regulatory nature, was that it included only a small number of food industry actors. This would then leave the majority of industry actors to continue with their current marketing practices, including those targeting children. In 2015, public health advocates noted that, since the launch of this MOU, no evidence of its implementation was provided, despite requests from the Ministry of Health (Mialon et al, 2016). It therefore appears that most commitments made early on by the SSB industry were not followed.

In parallel, the SSB industry immediately started to employ corporate political strategies, when they began to shift the blame for NCD and obesity away from SSBs and onto physical inactivity and energy balance (Mialon et al, 2016). For example, Coca-Cola organized the Fiji Secondary Schools Athletics Competition, a major annual event held in the capital city (Makaba, 2015). The campaign on physical activity from the SSB industry was supported by overseas industry consultants and experts, particularly from transnationals (Neil Sharma, personal communications and meetings; records of these meetings are not available in the public domain). These tactics were further complicated by an emphasis on personal responsibility. All these messages were widely advertised (Mialon et al, 2016).

The SSB group was made aware that, if compliance to the PPI was not forthcoming, SSB taxes could be recommended by the Ministry of Health (Neil Sharma, personal communications). The industry started lobbying high-ranking officials to avoid these taxes, focusing on its work to promote physical activity (and how this would balance energy intake from SSBs) and on its employment of local people (Neil Sharma, personal communications). The Coca-Cola group threatened to relocate their operations to another island territory, Western Samoa, whilst the suppliers of Pepsi-Cola threatened not to proceed with developing their new plant in Fiji, withdrawing employment opportunities for Fijians (Neil Sharma, personal communications).

Around 2013, no progress was made with the PPI, and the Ministry of Health started developing tax proposals and a call for marketing restrictions. The Ministry was transparent throughout in its dealings with the industry, sharing the draft proposals at the consultations (Neil Sharma, personal communications and meetings). Nevertheless, heavy lobbying by the industry to the Ministry for Industry and Trade, without the involvement of the Ministry of Health or any other sector, resulted in an inconsistent response from the government to the industry calls and demands (Neil Sharma, personal communications; records of these meetings are generally not circulated). The lack of transparency from the industry in the planning and outcomes of these meetings, and additional meetings between individual companies, further added to the problem.

The general elections took place in 2014, resulting in a change of health leadership and some reduction in the budgetary funding for NCDs.

It is important to note that, in parallel to the PPI, several not-for-profit organizations worked collectively, and offered an unprecedented level of support for these taxes and marketing restrictions. The Alliance for Healthy Living – led by Diabetes Fiji and the Consumer Council of Fiji, along with faith-based organizations, women's groups and other social clubs with health advocacy interests – was formed and formally endorsed by the Ministry of Health in 2014. However, following some initial consultation forums and a high media profile, the activities of the group waned, mainly due to a lack of time, leadership (which could have shaped a strategic direction), as well as funding challenges.

In conclusion, in Fiji, since 2009 and the launch of the PPI mentioned in this case study, there have been no reductions in SSB marketing or availability, no new lower-sugar products made available, and no evidence of any plans by the industry to make this happen. The PPI and self-regulation approach have not been as successful as they were expected to be. This highlights the ethical issues of conflict of interest in this PPI, driven by the profit orientation of the SSB industry.

Alternative scenario

From this case study, it became clear that a concerted approach by the government wherein

different ministries worked in close consultation was needed, with strong buy-in and understanding from all sectors.

In areas where public health was at stake, ethical issues should have been addressed, and an ethics committee should have been consulted, well before and during the consultations with the industry. In addition, officials were probably not technically prepared to handle the interaction with the industry.

At that period, Fiji was in political transition, with an interim government in place, and public participation in politics was quite limited. In a different political context, wide public consultation may have helped. In addition, funding challenges faced by not-for-profit organizations could have been tackled with a stronger leadership and involvement of development partners (including funding agencies), and could have ensured that all stakeholders were represented in the policy-making process.

There could have been a formal evaluation and monitoring of the PPI to ensure that the industry was meeting the planned objectives.

Mialon et al (2016) have proposed a list of policies and measures that, if developed and shared in the public domain, could help increase the transparency and accountability of the government and the food industry in Fiji. For the specific case study described here, these could have included:

•a list and content of the submissions to public consultations from the food industry on issues related to diet and public health

• a list of meetings between food industry representatives and Ministers, officials and/or representatives of the government, and minutes of those meetings (and other reports), and all correspondence (including emails) between food industry representatives and officials and/or representatives from the government.

With more strategic planning initially, the Ministry of Health and its partners might have foreseen the likely considerable opposition to its approaches, and mounted a more strategic and proactive approach to rebutting the countermoves of the industry.

Discussion

Case questions

1. Should the terms and conditions of engagement between the government and the industry in this public-private initiative have been discussed with an ethics committee prior to that engagement?
2. Could consultation with the SSB group have been tackled differently with greater public health impact?
3. What is the role of self-regulation by the SSB industry in an urgent public health issue?

Fiji was ahead of many other countries in actively pursuing a PPI with the food industry and addressing the NCD crisis. Wide consultations with the food industry were initiated with considerable time and resource investments by the Ministry of Health, and involved a diverse range of stakeholders. Despite initial buy-in from industry and a seemingly transparent and positive relationship, the concerted response by industry to undermine the approach of the Ministry of Health was overwhelming.

Similarly, to the tactics employed by the tobacco industry decades ago, the SSB industry is rejecting the evidence that links its products with obesity and NCDs. More work is needed globally to develop tools, which can be applied nationally, to engage with the industry, helping especially low- and middle-income countries to take matters forward. Taxation and other regulatory approaches are a globally recommended strategy to support the prevention and control of NCDs. The food industry could play an active role, mostly during the implementation phase of the policy process.

The development impact of NCDs in middle-income countries such as Fiji is a mammoth challenge given the limited fiscal and healthcare resources available. When the international food industry takes on a totally 'for-profit' approach with corporate political strategies directed mostly to economic gains, public health seems to be the victim. National development cannot take place without public health concerns being factored in to any short- to medium-term national strategic plan.

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History of the College

General Practice's Memory Lane with Dr. Ram Raju– (Part 5 & 6)

Author: *Dr. Ram Raju*

Part 4
Addendum
Dr Karam Singh (now in Sydney) started the first private lab services in Suva but his laboratory got burned down by arsonists as he was a strong NFP/Labour man. He migrated to Sydney soon after *and never* looked back.

Part 5
Fiji's economy was in complete tatters or on the verge of collapse . The 2 coups caused the economy to go into free fall. International trade embargo, Tourism grounded and Sugar production unpredictable but Rabuka had other ideas to stimulate economic growth and productivity.

Thirteen yrs of Tax Free Zones were created in most parts of Fiji which spurred the growth of the Garment Industry and Textiles. Thousands got employed in many of these factories, many of whom were women, and soon exports accounted for 30 % to NZ, Australia and USA. The export of textiles and garments almost matched that of sugar and the earnings exceeded that of Tourism and Sugar combined.

The Fijian Dollar that was at that time stronger than the US dollar was suddenly devalued by 30% which led to the Tourism Industry to bounce back rather strongly and quickly.

"Normalcy" soon dawned upon us and we once again combined with FMA Western Branch (Peni Rika and Raghwa Narayan were still holding fort) to have joint meetings and seminars.

Part 6
1989-1992
Late Dr Sefanaia Tabua was soon installed as the President of WPMPA. He was a Rabuka supporter and we often prompted Sefanaia to get permissions to have our mini seminars as well as meetings to once again look at the College inauguration or the National Body of GP's. I continued as the Secretary and literally did all the ground work.

Sunday Observance Decree came into force soon after the second coup (25/09/1987) which stayed until Oct 1995. Rabuka did not agree with the outcome or resolutions of the ***Deuba Accord, hence he executed the second coup.***

The Sunday Observance Decree prohibited any trade, business, public meetings and sporting activities. All the essential services were allowed to operate including GP's for emergencies only. Pharmacists were also allowed to open but they needed permission from the respective police stations and the DO's (District Officers).

Dr Tabua was a very well known Obstetrician Gynecologist who was the Consultant at Ltk Hospital until he retired to go into Private Practice whose clinic and residence was just opposite Churchill Park, Ltk . He was the first Gynecologist in the West (at least) who was allowed access to Ltk Hospital for deliveries etc. Dr Tabua was also the President of Family Planning Association of Fiji and it was during his time of Presidency that Fiji recorded the first case of AIDS in Fiji. Dr Tabua was quoted in the Fiji Times that Fiji could see more cases of AIDS due to sexual promiscuity in young age groups.

Late Dr Subarmani Govendar took over as President of WPMPA in 1990/91 and on Saturday 5th Dec 1992 we dissolved WPMPA renaming it **FCGP Western Faculty.**

The meeting was held at the Warwick Resort, Kokolevu, in conjunction with FMA Western and Central Branches (5th-6th Dec 92).

Central based PMPA unfortunately were not prepared to dissolve their organization or change the name. They were skeptical and doubted motives and objectives and were not convinced about the idea of the College or the National Body of GP's.

Another set of officials were elected who believed otherwise to lead the Central Faculty notably John Fatiaki, Neil Sharma, Sachida Mudaliar, J K Marolia and Nelle Van Buuren Inoke.

PMPA continued to exist even after the College was officially inaugurated in Feb 1993 but a couple of years later they folded up and eventually more members applied.

Meeting at Hideaway Resort
The interim committee meeting at the Hideaway Resort attended by reps from the west and central was the final get together before the grand inauguration. The following members were present:

1. Sachida Mudaliar

2. John Fatiaki
3. Neil Sharma
4. Nelle Van Buuren Inoke
5. Ponsamy Gounder
6. Saras Nandan
7. Ram Raju
8. Kamlesh Dass

Ponsamy Gounder was elected as the interim President of the College, Ram Raju as the Secretary and Neil Sharma as the Treasurer Ram Krishna of law firm of Ram Krishna and Associates (Ltk) was endorsed as the legal firm to draft our constitution as recommended by a team of 3 – Ram Raju, Nelle Van Inoke and Dr Ponsamy Gounder as Chairman.

A special application form was designed for all GP's/PP's to apply with a subscription fee of 100.00 and everyone were invited to become the foundation members of the College. A copy of the membership form is appended. Any GP/PP was eligible to become a member if they were in practice for more than 3 yrs and those less than 3 yrs were accepted as Associate members.

Close to 60 GP's had applied to become members of the College, special membership gowns, certificates and Presidential Chain was ordered from Wellington (Ponnu had contacts there). This still exists today.

President of Fiji, late Ratu Sir Kamisese Mara accepted our invitation to be the Chief Guest and became the first Patron of the College. Rabuka Govt on the other hand failed to respond to our invitation. Ratu Mara was unduly supportive of the College and he was quite versed with medical politics as a former medical student at Otago University. He also mentioned to me that all Colleges overseas started in a similar vein and regretted that Rabuka failed to support.

FCGP Constitution

Dr Ponsamy Gounder took up this task of formalizing a constitution for the College based on RNZCGP, RACGP and RCGP (UK) constitutions. Basically borrowed or married bits and pieces from the 3 Royal Colleges that was formalized to some extent with the help of Ram Krishna in drafting the constitution. This was adopted in the first official AGM prior to the inauguration of the College, from 10am on 20th Feb 1993.

We were no longer "interim". Dr Ponsami Gounder confirmed as the first President of the College, myself as the Secretary, Dr Neil Sharma Treasurer and Dr Parshu Ram as the first Censor-in-Chief.

The Inauguration 20/02/1993

Held at the Sheraton Fiji Resort, grand ball room attracted close to 120, half of whom were invited guests as well as many politicians notably late Mr S M Koya. All the Consultants from Lautoka Hospital were present including the MS Dr Michael Sorokin (retired GP in Adelaide) who were all supportive of our College. Notable guests from Suva were late Drs Jim and Mere Samisoni and Pro Vice Chancellor of USP.

We had reps from RNZCGP, RACGP and RCGP (UK).

We had all the messages and printed in a special Souvenir Magazine (as well as some advertisements to pay for the magazine). Unfortunately we have not been able to trace a single copy of the inaugural issue.

I lost a conservable amount of literature in the devastating flood of 2009 in Nadi Town.

Monash University was well represented by late Prof Neil Carson, John Murtagh and Leon Pitterman all of whom were custodians of Dept of GP/Family Medicine and Primary Health Care.

They introduced Certificate, Diploma and Masters in Family Medicine Courses for FCGP members that attracted 6 GP's to sign up immediately. A special discounted rate was offered for the Diploma and Masters courses

Some notable achievements in the early yrs worth mentioning included:

- Official office to be located at Bayly Clinic, Ltk where President Dr Gounder worked from.
- A part time secretary was hired for the College.
- Subs for members of 100.00 was confirmed at the AGM.
- The 2nd Annual Conference of the College was organised by the Central Faculty of the College at Travelodge in Suva.
- The annual subs was increased from 100.00 to 200.00 since we needed funds for the office space at Bayly Clinic at Lautoka and the office staff.
- Dr Parhsu Ram resigned as the CIC that was taken over by Dr Surend Singh but the position became vacant a year later as Surend migrated to Australia.
- Dr Neil Sharma also resigned as the Treasurer and Dr Dinesh Chagan Lal was elected as the new Treasurer.

Part 7

Final Chapter in next issue of the Journal.

SOME PICTURE FROM FCGP ARCHIVES

Left-Right:

- Late Gopal Naidu of Lautoka
- Late Ratu Sir Kamisese K. T. U Mara
- Late Mr. S. M. Koya

Left-Right:

- Mrs. Shakuntla Raju
- Late Dr.A. C. Naidu
- Mrs. Lata Naidu
- Late Ratu Sir Kamisese K. T. U. Mara
- Late Dr. Sharda Nand

Late Ro Lady Lala Mara presenting Membership Certificate to one of the members.

MC Dr. Ram Raju at the podium.

Abstracts

1. Sharon Mclennan and Cristine Werle
   Human Resources for Health (2023): We are the ones who will have to make the change – Cuban Health co-operation and the Integration Cuban Medical Graduates into Practice in the Pacific. 21:36
   http://doi.org/10.1186/ss12960-023-00822-8

2. Sharma Navneel, Sharma Neil and Sharma Nashika
   Medical AI Diagnosis tools in SIDS and its legal considerations
   International Journal of Arts Humanities and Social Science
   Vol. 05; issue No. 04; April 2024
   ISSN2693-2547(Print), ISSN2693-2555(online) DOI;10.56734/ijahss

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OBITUARY

Dr. Janice Brown her brief CV

As a practitioner of General and Family Medicine for the last 19 years I have gained experience and skills to holistically assess health issues and help patients make genuine improvements to their quality of life.

I am very passionate about my job and appreciate that it is a continuingly evolving profession and I approach it with a very open mind.

Bulk of my services is managing lifestyle diseases. Specialist consultations in determining Whole Person Impairments due to workplace injuries. Minor surgical procedures. Environmentalist and Humanitarian.

Specialist interest in Diabetology and Gastroenterology.

WORK EXPERIENCE

2005-2006	**Lautoka Hospital** Internship & Postgrad
2006-2008	**Tavua Hospital, MOH** Medical Officer, GOPD | Maternity
2008-2011	**Mid City Medical Clinic** General Practitioner, Locum
2011-ongoing	**Family Health Clinic** General Practitioner, Own Practice
2010-ongoing	**Ministry of Employment, Productivity and Industrial Relations** Medical Assessor
2008-2010	**New Zealand Immigration Services** Medical Assessor
2020-current	**Dr. Naidu's Private Medical Practice** Resident Physician
2023-ongoing	**Australian Immigration Panel** Empanelment

EDUCATION

2004	MBBS – FSM
2005	Emergency Obstetrics
2006	Rheumatic Heart Disease Assessment
2010	Evaluation on Permanent Impairment Phase 1
2017	Evaluation on Permanent Impairment Phase 2
2022	Certificate in Diabetes Nutrition
2024	Certificate Remission of Type 2 Diabetes and Reversal of Insulin Resistance with Lifestyle Medicine

AFFILIATIONS

Fiji College of General Practitioners, Fiji Medical Association, South Pacific Society of Lifestyle Medicine, WONCA.

It is with deep sorrow we would like to announce the untimely and sudden passing away of our very dear Colleague and member, ***Dr Janice Brown****, wife of Dr Iane Penjueli. Dr Janice Brown was practicing at Dr Krish Naidu's Practice in Nadi and was a very respected, caring and compassionate doctor.*
We all are very shocked and saddened by this loss and our thoughts and prayers are with Dr. Iane and his family.

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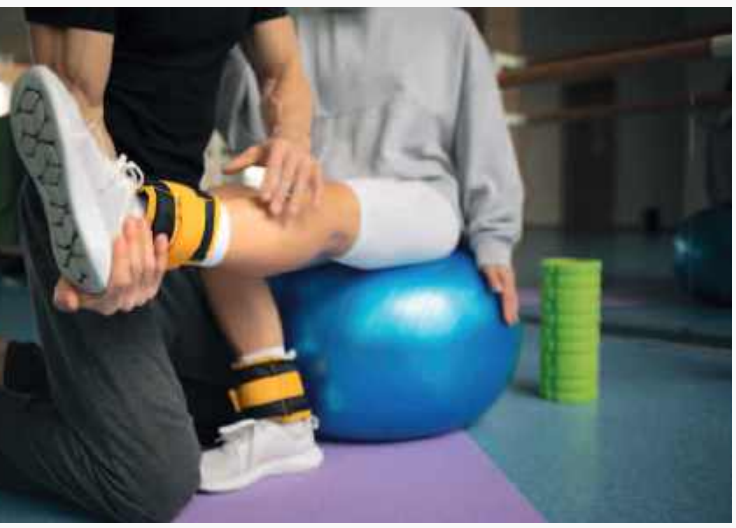

PHYSIOTHERAPY

Physiotherapy uses physical interventions to improve movement, reduce pain and stiffness and increase quality of life.

SERVICES

- CONSULTATIONS
- SOFT TISSUE MUSCLE RELEASE
- NECK & SHOULDER PAIN RELEASE
- STROKE REHABILITATION
- WORKPLACE & SPORTS INJURY REHABILITATION
- UPPER & LOWER BACK PAIN TREATMENT
- CHEST PHYSIOTHERAPY
- LAMAZE CLASSES
- STRETCHES FOR TENSION & TIGHTNESS

LOCATIONS & CONTACTS

Nadi
1 Legalega Rd, Nadi (opp. Nadi Airport)
(679) 672 1022 or 892 2241

Suva
107 Foster Road, Walu Bay, Suva, Fiji
(679) 331 0022 or 892 2266

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