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What's inside:

- From the Chief Editor's Desk.....
- JSA 31st Executive Committee
- Sectional Activities Section A
- Sectional Activities Section C
- ESG Investing in Sri Lanka - Beyond the Hype
- The Future of Artificial intelligent in Chemistry Education
- Navigating the Crisis: Extrication of the Complex Web of Antimicrobial Resistance
- Youth in the Digital Age: A Silent Struggle

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From the Chief Editor's Desk.....

It is with great pleasure that I present Volume 31, Issue 1 of the JSA Newsletter, marking the beginning of the 31st Annual Scientific Sessions of the Jaffna Science Association. This inaugural issue captures the details of the 31st executive committee, sectional activities, and contributions from our members. I sincerely thank all those who have dedicated their time and energy to bring this publication to life.

This platform stands as a source of inspiration for scientific thought, collaboration, and meaningful dialogue. Through the efforts we record today, we light a beacon for future generations, encouraging them to question, explore, and imagine a world shaped by science, innovation, and hope. In every word and idea, we plant the seeds of tomorrow's discoveries.

Ms. Grace H Hensman
Chief Editor, JSA

ESG Investing in Sri Lanka - Beyond the Hype

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In recent years, Environmental, Social, and Governance (ESG) investing has gained significant momentum globally. ESG refers to a set of criteria used to evaluate companies' sustainability practices and their impact on the environment, society, and corporate governance. While ESG investing has moved beyond a niche segment, it has sparked both excitement and skepticism, often labeled as "hype." Yet, the underlying premise of ESG investing, when examined beyond the noise, offers substantial opportunities for investors and companies alike, particularly in emerging markets such as Sri Lanka.

ESG investing integrates three key pillars into investment decision making, namely Environmental, Social and Governance factors. Environmental aspect evaluates a company's impact on the natural environment, considering elements such as energy consumption, waste management, carbon emissions, and the use of renewable resources. The Social dimension examines a company's relationships with employees, suppliers, customers and communities, focusing on workplace diversity, labour practices, community engagement, and product safety. Governance pertains to the internal structures and processes that guide business operations, including board composition, executive compensation, transparency, and shareholder rights. By incorporating ESG metrics into investment strategies, investors aim to achieve sustainable long term financial returns while promoting positive environmental and social outcomes.

Over the past decade, ESG investing has seen significant growth. According to the Global Sustainable Investment Alliance, sustainable investing assets have reached trillions of dollars, as investors increasingly prioritize ethical considerations alongside financial returns. This surge is driven by heightened awareness of climate change, social justice movements, and a growing body of research that suggests companies with strong ESG practices tend to outperform their peers.

However, some critics argue that ESG investing can be more about "green washing" where companies falsely present themselves as environmentally responsible or market trends rather than meaningful change. For some investors, this raises the question: is ESG investing simply a passing trend or a true paradigm shift?

The "hype" surrounding ESG investing often comes from two directions. On the one hand, there is a growing enthusiasm for ESG investing, driven by the belief that it aligns with the values of modern investors, particularly younger generations. On the other hand, ESG investments are sometimes criticized for their lack of standardization, inconsistent reporting, and potential for short-term market fluctuations.



Critics also highlight the risk that ESG metrics, which vary widely across regions and sectors, may not always reflect real corporate performance or risk. In many cases, companies with strong ESG scores may still be involved in controversial practices, leaving investors with questions about the real value of these metrics.

Sri Lanka, an emerging economy with a growing stock market, has increasingly embraced the principles of ESG investing. The Colombo Stock Exchange (CSE), while not as advanced as its global counterparts, has seen an uptick in discussions surrounding ESG practices. Many Sri Lankan companies are beginning to incorporate ESG factors into their business strategies, though the extent of adoption and implementation varies.

However, Sri Lanka is struggling with significant environmental challenges, including deforestation, pollution, and vulnerability to climate change. With an agricultural based economy and a reliance on natural resources, companies in sectors like agriculture, manufacturing, and construction are directly affected by their environmental footprint.

Sri Lanka has experienced a significant decline in forest cover over the past century, with forested areas shrinking from 44% in 1956, according to the Food and Agriculture Organization (FAO), to 34.06% in 2022, as reported by the World Bank. This ongoing deforestation has led to severe environmental consequences, including biodiversity loss, soil erosion, and increased vulnerability to climate change, posing long-term challenges to the country's ecological balance and sustainability.

Further, tea plantations, one of Sri Lanka's most important industries, face growing pressure to adopt sustainable farming practices. This includes addressing water usage, pesticide control, and waste management practices. For example, companies such as Bogawantalawa and Dilmah have already taken steps to position themselves as leaders in sustainability, focusing on ethical sourcing and environmental stewardship.

Sri Lanka has made significant progress in renewable energy, with hydropower contributing 40% of the country's electricity generation in 2020. In line with its commitment to sustainability, the government has set an ambitious target of achieving 70% renewable energy by 2030, as outlined in the Sri Lanka Energy Sector Development Plan. This transition aims to reduce dependence on fossil fuels, enhance energy security, and promote environmental sustainability.

The social aspect of ESG is particularly relevant to Sri Lankan companies, especially in sectors such as apparel, which is one of the country's largest export industries. The garment sector has faced scrutiny over labour practices, wages, and working conditions, which makes it an essential area for improving ESG performance. Leading companies like Brandix and Hemas Holdings have begun integrating more robust social initiatives into their operations, such as fair labour practices and community development programs.

Moreover, Sri Lankan companies in sectors such as tourism and healthcare are increasingly recognizing the importance of social responsibility, particularly in times of crisis and COVID-19 pandemic. Companies that engage positively with their communities, ensuring worker welfare and providing essential services, build stronger reputations that can translate into long-term value for shareholders.

Despite notable progress in poverty reduction, income inequality remains a significant challenge in Sri Lanka. The Gini coefficient, which measures income distribution, stood at 0.51 in 2019, reflecting a relatively high level of inequality and highlighting the need for more inclusive economic policies.

Corporate governance in Sri Lanka has historically been a point of contention, with concerns around transparency, board independence, and accountability. However, in recent years, there has been a significant push to improve governance standards across listed companies. The introduction of the Sri Lanka Code of Best Practice on Corporate Governance (2017) by the Institute of Chartered Accountants of Sri Lanka is a step in the right direction. Companies like John Keells Holdings and Cargills have embraced stronger governance practices, working toward more transparent reporting, enhancing board diversity, and improving shareholder rights. As investor demand for ethical governance grows, these companies are setting a precedent for others to follow.

ESG integration in Sri Lankan companies is still at an early stage, but it is improving. As global investors focus more on ESG factors, Sri Lanka's listed companies could attract more international investment by promoting sustainable and responsible business practices. The Colombo Stock Exchange (CSE) has actively promoted transparency and sustainability by encouraging listed companies to adopt ESG reporting. As a result, by 2023, more than 50% of CSE-listed companies had published sustainability reports, reflecting a growing commitment to responsible business practices. This shift aligns with global trends emphasizing corporate accountability and sustainable development. The CSE's efforts in fostering ESG disclosures enhance investor confidence and contribute to a more transparent and resilient capital market.

To advance ESG integration, a multi-faceted approach is essential. Policy and regulation play a crucial role, with the government needing to mandate standardized ESG reporting for all listed companies to ensure consistency and comparability. Additionally, tax incentives and grants for sustainable practices can accelerate ESG adoption. Capacity building is another key area, requiring increased awareness through education and training programs such as workshops, seminars, and certifications for corporate leaders and investors. Further, investment in research and development for sustainable technologies can drive innovation and enhance competitiveness. Stakeholder engagement is equally vital, with public-private partnerships fostering effective ESG implementation and addressing complex challenges. Additionally, involving local communities in ESG initiatives ensures that social and environmental benefits are both widely distributed and sustainable. By adopting these measures, Sri Lanka can create a more responsible and resilient business environment.

While the rise of ESG investing may seem like a trend, the fundamental principles behind it offer lasting value for both investors and the broader economy. For Sri Lankan listed companies, ESG is not just about aligning with global market trends, but about ensuring sustainable long-term growth that balances profit, people, and the planet. Moving beyond the hype, it is clear that embracing ESG principles will be pivotal in building resilient businesses that are prepared to navigate the challenges of the future.



As the world shifts toward a more sustainable future, Sri Lanka's companies have an opportunity to lead in the ESG space, demonstrating that responsible business practices are not only good for the planet and society but also for their bottom lines.

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Highlights from the 30th Annual Sessions



The Future of Artificial Intelligence in Chemistry Education

**Dr. Arumukham Manjeevan,
Department of Chemistry,
Faculty of Science,
University of Jaffna.**



Integrating Artificial Intelligence (AI) into chemical education is no longer a futuristic goal and it is happening now. Artificial intelligence has revolutionized education by enhancing how students learn, how educators teach, and how research is conducted. AI-powered personalized learning platforms are challenging traditional classroom education, while virtual laboratories are unlocking new possibilities, making chemical education more engaging, accessible, and effective.

AI-powered personalized learning adapts to individual students by identifying their strengths and weaknesses. AI tutors analyze students' difficulties and provide targeted exercises, instructional videos, and simulations to address specific learning gaps. Additionally, AI can predict learning challenges, explain underlying principles, and suggest alternative experimental approaches, enhancing the overall learning experience.

Virtual labs and simulations provide a safe, interactive environment for conducting experiments. Hands-on experiments are essential in chemistry education, but not all students have access to well-equipped laboratories. AI-powered virtual labs bridge this gap, ensuring that students regardless of their location or physical abilities can engage in experimental learning. By integrating theoretical and practical knowledge, AI fosters a deeper interest in chemistry. AI-powered tutoring systems offer sophisticated, interactive learning experiences. They answer students' questions, predict common misconceptions, and provide step-by-step guidance. Additionally, AI introduces gamification elements, such as interactive challenges, virtual chemistry tournaments, and chemical puzzles, making learning more engaging and motivating.

Beyond supporting students, AI also assists educators by streamlining grading and assessment, which are often time-consuming tasks. AI algorithms evaluate assignments, provide corrections, and offer constructive feedback. Furthermore, AI helps design lesson plans, generate model questions, suggest teaching strategies, and recommend resources tailored to individual learning goals. AI-driven platforms also overcome language barriers and geographical limitations, making chemistry education more inclusive.

AI technology significantly enhances research by automating tasks such as literature reviews, language editing, and data processing. AI tools can quickly scan databases to identify the most relevant papers, summarize complex studies and concepts, automate data extraction, recognize patterns, perform predictive analytics, and facilitate collaboration and communication.

As AI technology continues to evolve, it will provide even more interactive and personalized learning experiences. From virtual labs to intelligent tutors, AI is transforming how we teach and learn chemistry. The growing capabilities of AI are breaking down traditional barriers in education and paving the way for a new generation of scientists and innovators.

Navigating the Crisis: Extrication of the Complex Web of Antimicrobial Resistance

**Ms. Mathanki Sutharsan,
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Faculty of Medicine,
University of Jaffna.**



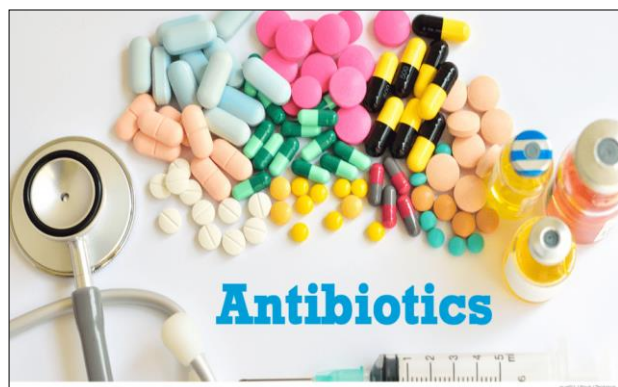
Antimicrobial resistance (AMR) stands as one of the gravest global health threats of our time, silently undermining the effectiveness of modern medicine. This crisis extends beyond hospitals and clinics, infiltrating agriculture, the environment, and communities worldwide. In this article, we unravel the intricate web of factors driving AMR, explore its far-reaching consequences, and spotlight the urgent need for coordinated action across disciplines. From the misuse of antibiotics to the gaps in policy and public awareness, we delve into the complex dynamics fueling resistance and examine potential pathways to mitigate this escalating threat.

What is AMR and Why Should You Care?

Antimicrobials – including antibiotics, antivirals, antifungals, and antiparasitics – are medicines used to prevent and treat infectious diseases in humans, animals, and plants. AMR occurs when infectious organisms no longer respond to antimicrobials. As a result of drug resistance, antimicrobial medicines become ineffective and infections become difficult or impossible to treat, increasing the risk of disease spread, severe illness, disability, and death.



AMR is a natural process that occurs over time through genetic changes in pathogens. AMR is a growing global health threat that compromises the treatment of infectious diseases and has the potential to undermine many advances in health and medicine by reducing the effectiveness of current antimicrobial agents." According to the World Health Organization (WHO), AMR is "an increasingly serious threat to global public health that requires action across all government sectors and society". WHO estimates that by 2050, AMR could lead to 10 million deaths per year and cost up to \$100 trillion in lost economic output. Lower respiratory infections such as Pneumonia, Bronchitis, Bronchiolitis, Tuberculosis (TB), and Influenza, etc. are particularly impacted, accounting for over 1.5 million AMR-associated deaths in 2019. WHO introduced two specific AMR indicators to its 13th General Programme of Work (2019-2023), ranking AMR as one of the top 10 global public health challenges facing humanity in 2019.



How Did We Get Here? The Root Causes of AMR

There are several factors leading to the development of AMR. One of the primary causes of AMR is the excessive and inappropriate use of antibiotics in healthcare settings. Antibiotics are frequently prescribed for viral infections, such as the common cold or flu, where they have no therapeutic effect. Patients often demand antibiotics, and

healthcare providers sometimes prescribe them unnecessarily to satisfy patient expectations. Additionally, improper dosing, failure to complete prescribed antibiotic courses, and self-medication contribute to the development of resistant bacterial strains.



Limited public awareness regarding the appropriate use of antibiotics and the dangers of AMR significantly contributes to the problem. In many regions, individuals consume antibiotics without prescriptions, depending on how strict regulations are, share medications with others, or stop treatment prematurely once symptoms improve. These behaviors create opportunities for bacteria to survive, adapt, and develop resistance. Public health campaigns are essential to educate communities on the responsible use of antimicrobials and to shift cultural norms around antibiotic

use.

Inadequate infection prevention and control (IPC) measures within healthcare and community settings further accelerate the spread of resistant bacteria. Overcrowded hospitals, poor hand hygiene practices, improper sterilization of medical equipment, and insufficient sanitation infrastructure all create an environment where resistant pathogens can thrive and spread. Strengthening IPC strategies and implementing rigorous protocols in healthcare facilities are critical steps in reducing the transmission and impact of AMR.

AMR has emerged as a multifaceted global health crisis, driven by a complex interplay of human behavior, healthcare system challenges, agricultural practices, and gaps in pharmaceutical innovation. Misuse and overuse of antibiotics among the general public, inadequate infection prevention measures in healthcare settings, routine use of antibiotics in food production, and a stagnating pipeline for new antibiotics have all accelerated the spread of resistant organisms. Addressing AMR requires a comprehensive, multisectoral approach that targets each of these key contributors. The following sections explore these dimensions in detail and highlight the urgent steps needed to counter this growing threat.

AMR in Agriculture: An Invisible Link

The widespread use of antibiotics in agriculture, especially in livestock, poultry, and aquaculture, significantly contributes to AMR. Antibiotics are often administered to animals for growth promotion and disease prevention rather than for treating infections. Resistant bacteria from animals can spread to humans through direct contact, food consumption, and environmental contamination. Restricting the use of antibiotics in food production and promoting alternative methods for disease prevention, such as improved hygiene and vaccination, are necessary steps to mitigate AMR.

Stalled Innovation in Antibiotic Development

The decline in antibiotic discovery and development has further worsened the AMR crisis. Many pharmaceutical companies have shifted focus away from antibiotic research due to the high costs and low profitability associated with new drug development. As a result, there are fewer effective treatment options available for resistant infections. Encouraging investment in novel antimicrobial agents, along with alternative therapies such as phage therapy and immunotherapy, is critical for addressing AMR.

Healthcare Professionals: The Frontline Defenders

AMR is a global health crisis that demands a multidisciplinary response, with healthcare professionals playing a pivotal role. Physicians, pharmacists, and nurses are at the forefront of prescribing and administering antimicrobials, and their adherence to evidence-based guidelines is critical in minimizing inappropriate use—a major driver of resistance. In addition to rational prescribing and infection prevention, healthcare workers are instrumental in educating patients about responsible antibiotic use.

Antimicrobial Stewardship Programs (ASPs): A Key Solution

ASPs are coordinated interventions aimed at promoting the appropriate use of antimicrobials, including antibiotics, to enhance patient outcomes, reduce antimicrobial resistance, and minimize adverse effects associated with antibiotic use. The primary goal of ASPs is to ensure the right drug, at the right dose, for the right duration, and through the right route of administration to achieve optimal therapeutic outcomes while preventing misuse and overuse. These programs are essential components in the global strategy to combat AMR, as they help optimize antimicrobial use, improve patient care, and reduce the prevalence of resistant pathogens. Key elements of successful ASPs, as outlined by the Centers for Disease Control and Prevention (CDC), include leadership commitment, accountability, drug expertise, action, tracking, reporting, and education. When effectively implemented, ASPs contribute significantly to lowering healthcare costs, reducing drug-related adverse events, improving clinical outcomes, and ultimately curbing the spread of antimicrobial resistance.

Sectional Activities (July 2024 – December 2024)

Section A

Webinar 1

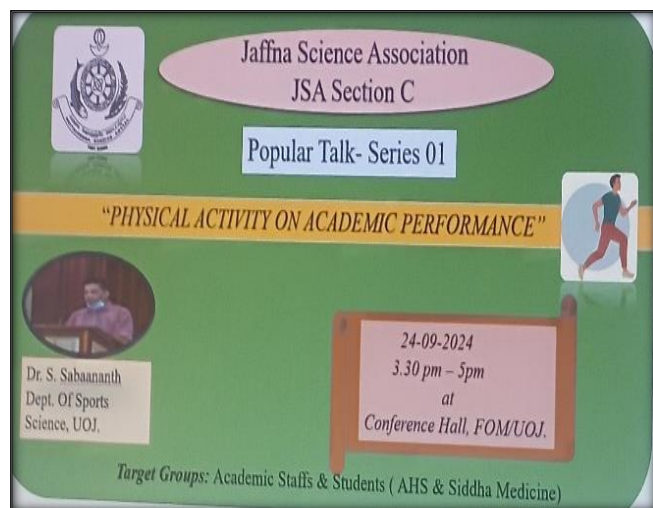
The Section A of JSA, successfully organized a webinar titled "Mastering Reference Management Using Mendeley" on 09 November 2024 at 7:00 PM. Prof. E.C. Jeyaseelan, Advisor, Mendeley community and Head, Department of Botany, University of Jaffna, Sri Lanka, served as the resource person. Dr. A. Manjeevan, Senior Lecturer in the Department of Chemistry, Faculty of Science at the University of Jaffna, moderated the webinar. Approximately 40 participants attended this informative session.

The poster is titled "Mastering Reference Management Using Mendeley" in red text on a blue background. It features the Jaffna Science Association logo on the left. In the center, a portrait of Prof. E.C. Jeyaseelan is shown next to his name and title: "Resource person Prof. E.C. Jeyaseelan (Advisor, Mendeley Community) Professor in Botany, Department of Botany, Faculty of Science, University of Jaffna, Sri Lanka". Below the portrait, a yellow starburst contains the date and time: "09th November 2023, At 7.00 pm (Sri Lanka)". To the right, a portrait of Dr. A. Manjeevan is shown next to his name and title: "Moderator Dr. A. Manjeevan Senior Lecturer Department of Chemistry Faculty of Science University of Jaffna". At the bottom left, contact information is provided: "Contact Person Chairperson/ Section A of JSA 0771906574". At the bottom right, registration information is provided: "Register before 07/11/2024 via following google form link https://forms.gle/9Hh16yUVuxHKJUBWA". The text "WEBINAR-01" and "Organized by Section A of JSA" is also present.

Section C

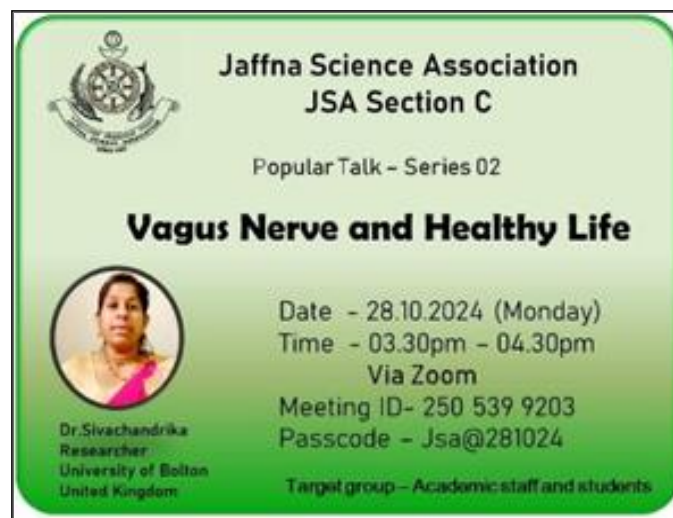
Popular Talk 01: Impact of Physical Activity on Academic Performance

The first session of the Popular Talk Series organized by the Section C of JSA was successfully held on 24 September 2024 from 3:30 PM to 4:30 PM via Zoom. Dr. S. Sabaananth, Senior Lecturer, Department of Sports Science, University of Jaffna, served as the resource person. He delivered an insightful talk on *"Physical Activity and Academic Performance."* Around 30 participants from the Faculty of Siddha Medicine and the Faculty of Allied Health Sciences benefited from this informative session.



Popular Talk 02: Exploring the Vagus Nerve for a Healthy Life

The second session of the Popular Talk Series organized by the Section C of JSA took place on 28 October 2024 from 3:30 PM to 4:30 PM. Dr. Sivachandrika, a researcher from the University of Bolton, United Kingdom, served as the resource person and presented an engaging talk on *"The Vagus Nerve and Healthy Living."* Approximately 30 participants from the Faculty of Siddha Medicine and the Faculty of Allied Health Sciences attended and gained valuable insights.



Popular Talk 03: Dengue Outbreaks and Control Strategies in Jaffna

The third session of the Popular Talk Series organized by JSA Section C was held on 23 January 2025 at 2:00 PM.

Dr. S. Sivaganesh, Consultant Community Physician at RDHS Jaffna, served as the resource person and delivered a talk on *"Dengue Outbreaks in Jaffna: Control Strategies and Challenges."* Academic staff and students actively participated in this highly relevant and timely session.



Youth in the Digital Age: A Silent Struggle

**Ms. Grace H Hensman,
Department of Marketing,
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University of Jaffna.**



In today's digital era, youth across Sri Lanka, including those in the Northern Province, are more connected than ever before. Smartphones, social media, and online platforms have become integral parts of their daily lives, offering opportunities for education, networking, and entertainment. However, beneath this surface of opportunity lies a growing concern: the impact of this "always-connected" culture on mental health. As of January 2025, Sri Lanka records over 12.4 million internet users, covering more than half of its population, with over 8.2 million active social media users. Facebook alone engages around 9.4 million Sri Lankans, with a significant portion falling within the 18–34 age bracket. Particularly in the Northern Province, where post-war recovery has fostered a strong adoption of digital tools for education and social connection, young people are increasingly exposed to the double-edged sword of digital life.

Recent studies indicate a worrying trend: the prevalence of significant mental health difficulties among Sri Lankan youth doubled from 2.9% in 2018–2019 to 6.1% in 2021–2022. "The silent epidemic of mental health issues is creeping into every corner of our youth's lives," notes a recent report. While national figures highlight a general increase, ground realities suggest that youth in the Northern Province face unique pressures. Having grown up in a post-conflict environment, many young individuals already grapple with trauma, economic uncertainty, and social rebuilding. The pervasive use of technology in this setting sometimes offers an escape but more often amplifies feelings of isolation, inadequacy, and anxiety, particularly through unfiltered exposure to globalized social media standards. A 2024 school survey conducted island-wide revealed alarming increases in depression, substance use, and suicidal tendencies among students. The Northern Province, with limited access to professional mental health services compared to the Western Province, is even more vulnerable, as schools and universities often lack trained counselors or structured support systems to address digital-related mental health challenges.

Moreover, the behavior of youth on digital platforms paints a clear picture of this dependency. A descriptive analysis of Sri Lankan young adults found that 91% access social media daily, mostly through smartphones,



with peak usage during early mornings and late evenings. Multitasking with digital devices during meals, study times, and travel has become normalized. While entertainment (85%) and education (82%) are cited as the main reasons for usage, the reality is that prolonged screen time and the pressure to maintain curated online personas significantly impact emotional well-being. Psychologists in Sri Lanka observe that "excessive digital immersion is leading to chronic loneliness and emotional fatigue among youth".

These patterns are increasingly reported by youth in Jaffna, Kilinochchi, and Mullaitivu, where social media is often the primary medium of connection but also a source of comparison anxiety and cyberbullying.

Another layer of complexity in the North is the rapid but uneven technological penetration. While urban centers like Jaffna city have seen faster internet infrastructure growth, rural areas still experience unstable connectivity. This unevenness creates a digital divide, where youth in rural Northern communities feel further marginalized, both socially and educationally, when compared to their urban counterparts. Additionally, while mobile device ownership is high, many Northern Province youth use low-cost smartphones with limited access to premium mental health apps or quality digital learning platforms, compounding their sense of exclusion and stress.

Addressing these challenges demands a multi-faceted approach. Firstly, there is a pressing need to integrate digital literacy programs into schools and universities, particularly in the Northern Province, to teach balanced technology use and critical evaluation of online content. Secondly, investment in mental health services from increasing the number of trained counselors in the region to setting up digital mental health support platforms in Tamil and Sinhala is crucial. Parents, educators, and community leaders must also actively engage in open conversations about the impact of technology on mental health, breaking the stigma around seeking help. Finally, more targeted research focusing on the Northern Province's youth and their digital experiences must be conducted to develop culturally sensitive interventions, as national averages often mask regional disparities.

The intersection of youth, technology, and mental health in Sri Lanka and even more so in the Northern Province is a complex landscape of opportunities and hidden costs. As we continue to embrace the benefits of digital connectivity, it is equally vital to recognize and address the unseen mental health consequences emerging from our increasingly virtual lives. Only through proactive and inclusive measures can we ensure that Sri Lanka's youth, especially those from regions still healing from conflict, navigate the digital age with resilience, purpose, and emotional well-being.

