Environmental & Occupational Health

ENOCH

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UNIQUE FORUM FOR INDUSTRIAL PHYSICIANS AND SAFETY PERSONNELS

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CELEBRATING

100

ISSUES

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UNIQUE FORUM FOR INDUSTRIAL PHYSICIANS AND SAFETY PERSONNELS

IN THIS ISSUE

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This e-Magazine is in continuation of ENOCH - OCCUCLAVE - (e-Magazine), 100th issues of which were successfully published by the **ENOCH Initiatives**

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Editorial

Thanks Readers... ENOCH is Celebrating 100th Issue.

Occupational Hazards in the Timber Industry

Forests cover nearly one-third of the Earth's land surface and provide direct employment to approximately 33 million individuals engaged in forestry and timber-related activities. The timber industry, a fundamental component of the global bioeconomy, supports millions of livelihoods and supplies indispensable raw materials for contemporary society.

Empirical evidence consistently indicates that the timber sector experiences disproportionately high rates of occupational injuries and fatalities. Forestry workers frequently encounter accident rates significantly exceeding those observed in other industries, with fatality rates in certain regions far surpassing national averages. Such findings underscore the intrinsically perilous nature of timber operations and highlight the urgent need for sustained attention to worker safety.

A principal factor contributing to these hazards is the inherently demanding and unpredictable working environment. Timber workers typically operate in remote and often inaccessible forest terrains, frequently under adverse climatic conditions. Their work involves the use of heavy machinery and specialised tools, including chainsaws and skidders, which present substantial risks. Hazards such as falling trees, unstable ground, and mechanical malfunctions are ever-present. Moreover, workers are routinely exposed to physical stressors, including excessive noise, vibration, wood dust, and exhaust emissions, all of which may result in chronic health conditions. Ergonomic challenges — particularly repetitive tasks and non-neutral working postures — further exacerbate the likelihood of musculoskeletal disorders.

In addition to environmental risks, human and organisational factors play a critical role in shaping occupational safety outcomes. Research suggests that human error, inadequate training, and misperception of risk are significant contributors to workplace accidents. Workers may perceive hazards as unavoidable or underestimate their severity, thereby increasing the propensity for unsafe practices. The remoteness of logging sites compounds these issues, limiting access to immediate medical assistance and structured safety training programmes.

Socioeconomic determinants further intensify occupational vulnerabilities within the timber industry. A considerable proportion of workers are employed on a contractual or self-employed basis, often lacking adequate access to formal training, personal protective equipment, and insurance coverage. Migrant workers, in particular, encounter additional barriers, including linguistic challenges, precarious employment conditions, and limited awareness of occupational rights. These factors not only heighten exposure to hazards but also contribute to the underreporting of occupational injuries and illnesses.

Nevertheless, there are grounds for cautious optimism. Evidence indicates that the implementation of robust safety management practices — such as leadership development, systematic hazard identification, and effective communication — can substantially mitigate workplace risks. The integration of modern technologies, including mobile-based training platforms, offers innovative means of delivering safety education in remote settings. Furthermore, fostering a strong organisational safety culture can positively influence worker behaviour and enhance adherence to established safety protocols.

Dr. Biplab Jamatia
(Associate Editor, ENOCH e-Magazine)

100 ISSUES

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World No Tobacco Day

31 May 2026

Unmask the appeal – countering tobacco and nicotine addiction

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Tobacco and nicotine industries design their products to get young people stuck in a cycle of addiction.

The grip of tobacco and nicotine addiction can be broken.

#TobaccoExposed

15 million adolescents (aged 13–15) worldwide already use e-cigarettes.

In countries with available data, adolescents are on average nine times more likely to vape than adults.

40 million adolescents (aged 13–15) worldwide use tobacco.

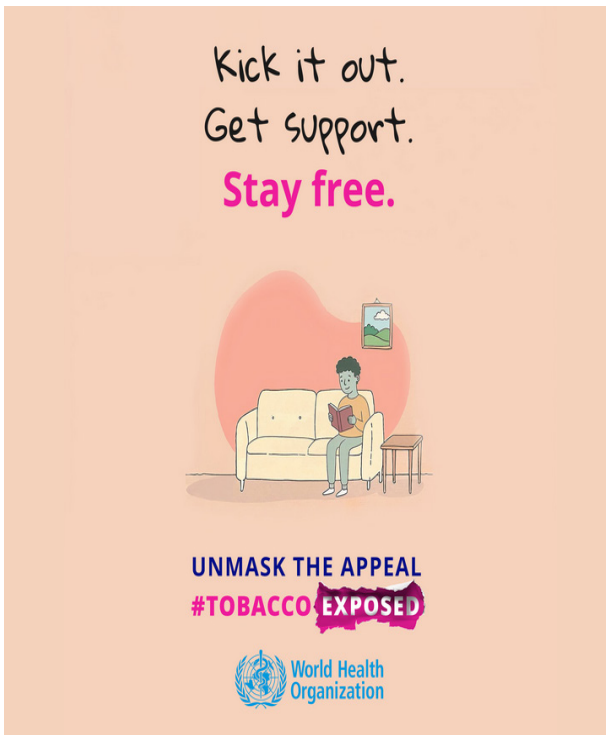
This yearly celebration informs the public on the dangers of using tobacco, the business practices of tobacco companies, what WHO is doing to fight the tobacco epidemic, and what people around the world can do to claim their right to health and healthy living and to protect future generations.

The Member States of the World Health Organization created World No Tobacco Day in 1987 to draw global attention to the tobacco epidemic and the preventable death and disease it causes. In 1987, the World Health Assembly passed Resolution WHA40.38, calling for 7 April 1988 to be a "a world no-smoking day." In 1988, Resolution WHA42.19 was passed, calling for the celebration of World No Tobacco Day, every year on 31 May.

In light of decades of progress in reducing tobacco use, the tobacco industry's tactics remain relentless. Companies are aggressively marketing new and emerging nicotine products

such as e-cigarettes, nicotine pouches, and synthetic nicotine devices – often disguised as "innovation" – to sustain addiction and recruit new users. These strategies threaten to reverse hard-won gains in tobacco control and public health.

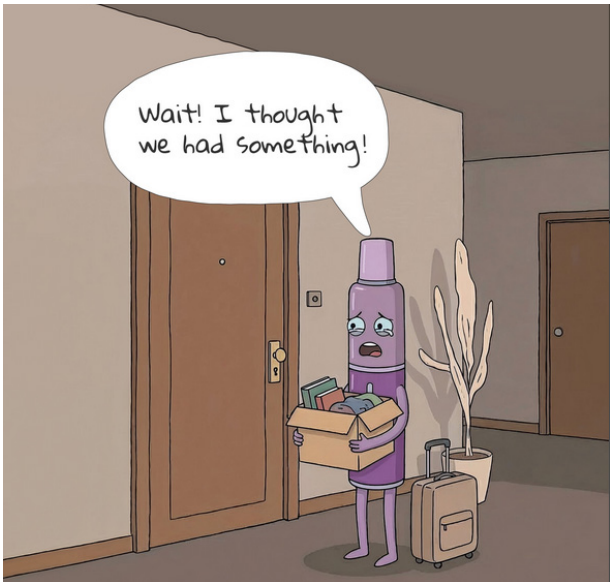
Startling new data reveal the scale of the crisis: at least 40 million children aged 13–15 globally report current use of at least one tobacco product. Of these, 20 million smoke cigarettes and 10 million use smokeless (oral/nasal) tobacco. Also, at least 15 million adolescents aged 13-15 years are already using e-cigarettes, and in countries with data, children are on average nine times more likely than adults to vape.

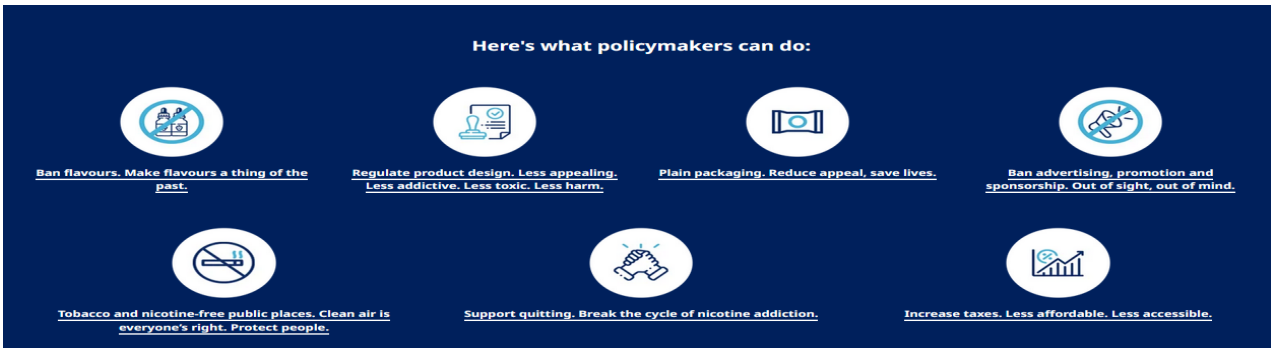


"Young people are being targeted by design," said Vinayak M Prasad, Head of the No Tobacco Unit, WHO. "Flavours, slick packaging, and deceptive marketing are being used to make highly addictive and harmful products seem fashionable. The result is a cycle of addiction threatening to undo years of tobacco control progress."

The 2026 campaign aims to:

- **raise awareness** of the tobacco and nicotine industry's evolving strategies, including the use of synthetic nicotine, nicotine salts, and analogues to increase addiction potential while appearing technologically advanced;





- advocate for stronger policy action to protect youth through bans on flavours, advertising and promotion (including on digital and social media), and regulation of packaging and product design that increase appeal; and
- prevent addiction and reduce demand by equipping the public – especially youth – with the knowledge and tools to resist industry manipulation and access evidence-based cessation support.

Building on the momentum of the 2025 campaign, World No Tobacco Day 2026 highlights WHO's continued commitment to exposing industry tactics and advancing policies to protect young people and communities from nicotine addiction.

The campaign calls on governments, partners, and civil society to strengthen regulation, close policy gaps, and safeguard future generations from the harms of tobacco and nicotine products.

Each year on 31 May, World No Tobacco Day unites governments, health organizations, civil society, and youth voices under a shared mission: to end the tobacco epidemic and secure a tobacco – and nicotine-free future for the next generation.

Headaches – A Silent Killer of Productivity at Workplace

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It's not just about absenteeism. Presenteeism – when employees work while unwell – leads to significant productivity loss, especially for migraine sufferers battling pain, light sensitivity, nausea, and more.

In 2025, IndianOil organised an insightful program on 'Understanding Your Headaches, their triggers and management strategies.'

Workforce may suffer from various types of headaches like tension-type, migraines, and cluster headaches.

Common headache triggers are lifestyle factors constipation, stress, increased screen time, dietary choices, disturbed sleep patterns.

Common migraine triggers at the office:

- Stress and anxiety
- Bright lights
- Bright screens on devices such as monitors, laptops, or mobile phones
- Long hours at the desk or workplace
- Lack of proper nutrition and sleep

Despite being present at the workplace, an employee suffering from a headache may experience a lack of concentration, fatigue, tinnitus (ringing or buzzing in one or both ears), anxiety or depression, and an inability to work long hours, thereby impacting their productivity.

The hidden costs of headaches at work:

1. **Absenteeism:** Missed workdays due to s vere or frequent headaches.
2. **Presenteeism:** Reduced productivity despite being physically present.
3. **Efficiency drop:** Lower performance during headache episodes.
4. **Career & financial impact:** Job security, opportunities, and workplace relationships

can all take a hit.

8% people function normally with headache, 39% shows some impairment in work and 53% people have severe impairment which affects their productivity and increase sick ness absenteeism leading to loss of work hours.

What makes the impact worse?

- Migraine severity & type of headache• Frequency & duration of episodes
- Individual pain tolerance & comorbidities
- Stressful, unsupportive workplace environments

How can workplaces help?

1. Educate teams & reduce stigma around migraines
2. Make ergonomic adjustments for comfort
3. Offer flexible work options
4. Provide access to treatment & management tools
5. Foster a supportive and understanding culture

We need to create awareness about headaches amongst workforce and their potential link to serious neurological conditions.

No headache should be overlooked, and persistent headaches require medical attention and need to be investigated.

Prevention, early detection and management of headaches is the key to enhance workplace Safety and Productivity.

Headaches don't just hurt – they hold back potential.

Let's create workplaces that recognise, support, and empower employees to thrive despite these challenges.

An Occupational Health and Quality Approaches in 2030: From Prevention to Predictive Safety

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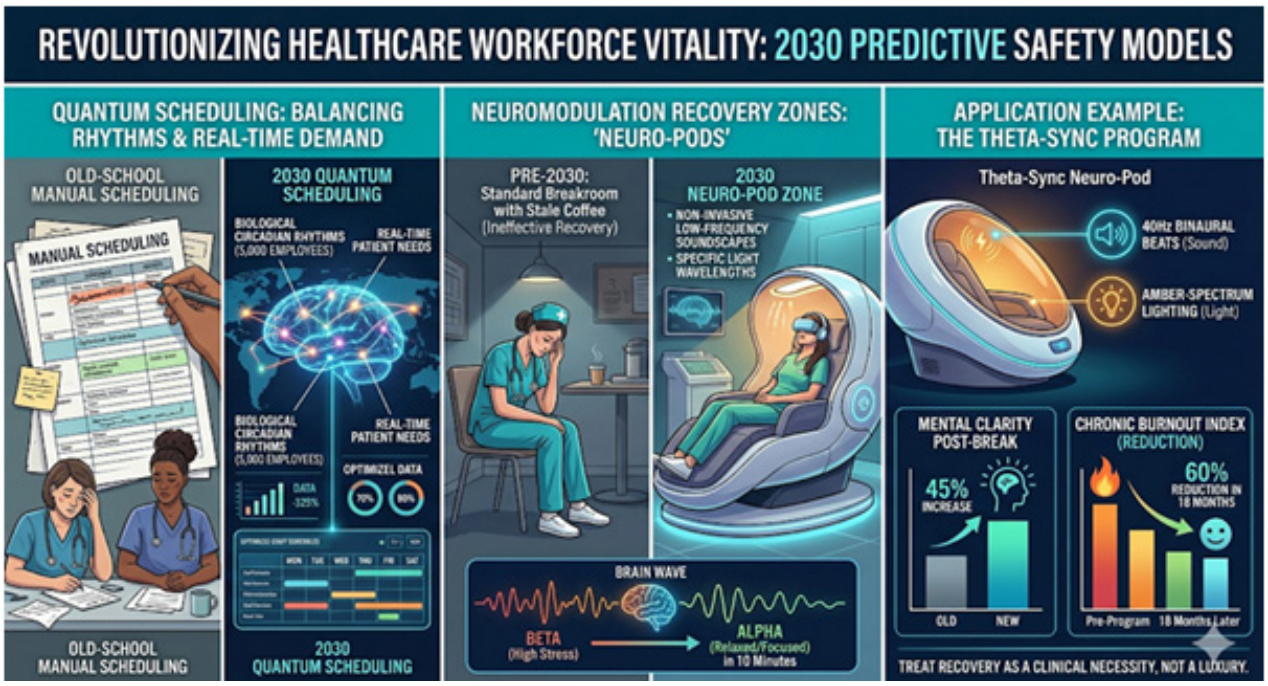
The medical landscape of 2030 is no longer defined by the reactive "accident report." We have moved beyond the era of simply preventing harm into an era of **Predictive Safety,** a world where the environment itself anticipates danger before a human can even perceive it. In this special edition, we explore how the fusion of quantum computing, regenerative design, and neuro-ergonomics has transformed the healthcare workplace from a high-stress hazard zone into a high-performance sanctuary.

"The evolution of safety is moving from the 'absence of negatives' to the 'presence of capacities.' We are no longer just stopping errors; we are engineering resilience."

*— **Dr. Aris Thorne,** Director of the Global Institute for Predictive Safety.*

From Static Prevention to Quantum Risk Analytics

In the 2020s, "prevention" was about building fences. In 2030, predictive safety is about removing the cliff entirely. Old-school prevention was a static approach: wear your mask, wash your hands, and use proper lifting techniques. Today, we utilize **Quantum Risk Analytics.** By processing trillions of data points from facility sensors, patient acuity scores, and even local weather or traffic patterns, a hospital's central



AI can predict a "safety breach window" hours before it manifests

The **Sentinel AI** within the Neo-Health System recently identified a high probability of a "Code Blue" fatigue error in the Cardiology ward between 02:00 and 04:00 AM. Instead of waiting for a lapse in judgment, the system automatically deployed autonomous Relief-Bots to handle routine vitals-monitoring.The result was a recorded zero medication errors during that traditionally high-risk window. As the Chief Risk Officer at Neo-Health Systems puts it: "We don't look in the rearview mirror to drive safety; we use a digital lighthouse to see through the fog of clinical complexity."

Furthermore, healthcare organizations have replaced the standard breakroom withNeuromodulation Recovery Zones. These "Neuro-Pods" use non-invasive, low-frequency soundscapes and specific light wavelengths to accelerate the brain's transition from a "Beta" (high stress) state to an "Alpha" (relaxed/focused) state in just 10 minutes.

The Theta-Sync program, which utilizes 40Hz binaural beats and amber-spectrum lighting, has led to a 45% increase in mental clarity post-break.

Hyper-Personalized PPE: The Bio-Digital Second Skin

In the past, Personal Protective Equipment (PPE) was "one-size-fits-all," leading to discomfort and non-compliance. In 2030, PPE is Bio-Digital and 3D-Graphed. Upon joining an organization, every clinician undergoes a high-resolution 3D body scan. Their masks, gowns, and ergonomic exosuits are 3D-printed to their exact anatomical specifications.

The Rise of the Healthcare "Centaur"

The 2030 healthcare worker is a "Centaur", half human intuition, half robotic precision. We have evolved from simple delivery robots to Clinical Microsuits and Soft-Robotic Cobots that act as force multipliers.

The Exo-Spine 5.0 suit allows a 55kg nurse to safely reposition a 130kg bariatric patient, a task that previously required four staff members and carried a high risk of lumbar injury. Now, it is a one-person task with zero physical strain recorded on the nurse's bio-sensors.

Managing Cyber-Kinetic Risk and Living SOPs

In a hyper-wired world, a system crash is a physical danger. To manage this, we have implemented Distributed Ledger Safety Protocols (Blockchain) and "Air-Gapped Manual Overrides." Every movement of a robotic surgical arm or automated drug dispenser is verified by a decentralized network.

Furthermore, we no longer rely on static manu-

als. Living SOPs (Standard Operating Procedures) use Generative AI to rewrite safety protocols in real-time. Staff receive Augmented Reality (AR) Overlays that guide them through emergencies.

When an unknown chemical spill occurred in a pathology lab, AR glasses projected "Safe Paths" and highlighted the specific decontamination kit needed, synthesizing a new protocol based on the chemical's molecular signature in seconds.

The Bio-Digital Pathogen Shield and the Wellness Dividend

Modern hospitals have moved away from manual surface wiping to Atmospheric Intelligence. Far-UVC 222nm Light Grids integrated into ceilings kill pathogens instantly while remaining completely safe for human skin and eyes. In the "Zero-Aerosol Wards," these grids, combined with Bio-Polymer coatings, have reduced the incidence of hospital-acquired influenza among staff to zero. The environment acts as an active immune system.

This shift has profound fiscal implications. The Wellness Dividend model tracks how safety drives the bottom line:

- Retention over Recruitment: Preventing burnout saves millions in turnover costs.
- Litigation Shielding: Predictive analytics move litigation from "blame-seeking" to "system-refining."
- Efficiency: A safe worker is a faster, more accurate worker.

Future-Health Corp reported that for every $1 invested in predictive safety tech, they saw a $4.50 return in reduced insurance premiums and increased productivity.

The Human Safety Valve and the Transition Ritual

To avoid "Automation Bias," medical students now undergo AI-Dissent Simulations. They must identify when a 95% accurate AI "hallucinates." This ensures the "human-on-the-loop" remains the ultimate safety valve. Quality exists in the narrow space between machine data and human context.

The most vital shift, however, is the "Transition Ritual." As a clinician leaves, they pass through a Bio-Decompression Corridor. This provides a 30-second localized ultrasonic "scrub" and a mobile "Shift Synthesis." The system confirms their performance, stress recovery, and physical strain levels, providing the psychological closure necessary to prevent work-life bleed-over.

The 2030 Vision

The journey from Prevention to Predictive Safety is a journey from fear to empowerment. By embracing quantum analytics and soft robotics, the healthcare organization of 2030 has finally solved the age-old dilemma: how to care for the world without breaking the healer.

Reader Inquiry: Where Does Your Health care Facility Stand?

- Does your organisation still treat safety as a 'report' rather than a 'forecast'?
- Are your clinicians being supported by 'Co-bots' or are they still the primary beasts of burden?
- Is your PPE a passive plastic shield or an active bio-sensor?

Take home message:
The future is no longer coming; it is here. It's time to move from preventing the past to predicting the future.

Medical Surveillance under the Factories Act, 1948 and the Occupational Safety, Health and Working Conditions (OSH) Code, 2020: Evolution, Practice, and the Way Forward

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Ergonomics, Preface: Historical Context and the Case for Change

India's occupational health framework has evolved alongside its industrial journey. The **Factories Act, 1948** emerged in the early years of independence, drawing from colonial-era factory laws and the need to protect a rapidly growing industrial workforce. Its primary orientation was toward safety, welfare, and basic health safeguards, reflecting the realities of post-war industrialization.

Over time, industrial disasters — most notably the **Bhopal Gas Tragedy** — exposed critical gaps in occupational health preparedness, emergency response, and long-term medical monitoring. This led to significant amendments in 1987, introducing provisions for hazardous processes and medical surveillance.

However, the fragmented nature of labour laws, limited sectoral coverage, and a largely compliance-driven approach necessitated reform. The **Occupational Safety, Health and Working Conditions (OSH) Code, 2020** was thus introduced to consolidate multiple laws and shift toward a preventive, risk-based, and systems-oriented framework. The transition reflects India's aspiration to align with global standards while addressing contemporary workplace risks, including chemical exposure, ergonomic strain, and psychosocial stress.

Industrial growth has consistently presented a dual challenge — economic advancement alongside occupational health risks. From toxic exposures to repetitive strain injuries and mental stressors, workplaces significantly influence health outcomes. Medical surveillance — defined as the structured and continuous monitor-

ing of workers' health — has therefore become a cornerstone of occupational health practice.

In India, this concept has progressed from a regulatory requirement under the **Factories Act, 1948** to a broader, integrated strategy under the **OSH Code, 2020**. This article revisits both frameworks, analyzing their provisions, practical challenges, and future directions.

Understanding Medical Surveillance

Medical surveillance is a systematic process designed to monitor and protect workers exposed to occupational hazards. It typically includes:

- Pre-employment (pre-placement) health assessments
- Periodic medical examinations
- Biological monitoring (e.g., toxin levels in blood or urine)
- Maintenance of individual health records
- Early identification of occupational diseases

Unlike routine health check-ups, medical surveillance is **job-specific, exposure-linked, and preventive in intent**, aiming to detect early deviations before they progress into disease.

Medical Surveillance under the Factories Act, 1948

The Factories Act, 1948 established the initial legal structure for occupational health in India. Although primarily focused on safety and welfare, it incorporated important elements of medical surveillance, particularly after subsequent amendments.

1. Pre-Employment Medical Examination

The Act requires that workers — especially those assigned to hazardous operations — undergo pre-placement medical examinations:

- Conducted by a designated Certifying Surgeon
- Determines fitness for specific job roles
- Particularly important for adolescents and vulnerable groups

This step ensures appropriate job allocation and minimizes the risk of exposing medically unfit individuals to harmful conditions.

2. Periodic Medical Examination

Routine health monitoring forms a central component of surveillance:

- Workers in hazardous processes are typically examined every six months
- Frequency varies depending on the level and type of exposure
- Includes both general clinical evaluation and targeted investigations

These examinations enable early detection of occupational illnesses such as respiratory diseases, heavy metal toxicity, and hearing impairment.

3. Special Provisions for Hazardous Processes

Provisions introduced post-1987 strengthened safeguards for hazardous industries:

- Mandatory health surveillance for exposed workers
- Provision of protective equipment
- Removal or reassignment of affected workers

These measures emphasize early intervention and worker protection.

4. Health Registers and Documentation

The Act mandates systematic documentation:

- **Maintenance of Health Registers** recording medical findings
- Tracking of sickness, absenteeism, and occupational disease
- Submission of records to regulatory authorities

Such documentation supports regulatory compliance and long-term monitoring.

5. Role of Factory Medical Officer

In larger establishments, appointment of a Factory Medical Officer (FMO) is required:

- Conducts examinations and certifies fitness
- Advises on occupational hazards and preventive measures
- Maintains health data and coordinates with inspectors

The FMO acts as a bridge between management, workers, and regulators.

6. Occupational Health Surveys

Authorities are empowered to conduct independent health surveys:

- Workers must participate in medical examinations
- Time spent is treated as paid working time

This provision enables external oversight and epidemiological assessment.

Limitations of the Factories Act Approach
Despite its strengths, several limitations have been observed:
- Predominantly compliance-oriented rather than preventive
- Restricted coverage limited to factories
- Variability in enforcement across states
- Limited integration with broader healthcare systems

Medical Surveillance under the OSH Code, 2020

The OSH Code represents a major reform, consolidating multiple labour laws into a unified structure and redefining occupational health practices.

1. Expanded Coverage
The Code extends beyond factories to include:
- Mines
- Plantations
- Construction and infrastructure
- Transport and other sectors

This ensures wider protection for diverse categories of workers.

2. Institutional Role of Medical Officers
The Code formalizes the role of qualified medical professionals:
- Conduct health examinations and certify fitness
- Monitor occupational illnesses
- Provide medical supervision in hazardous settings

This strengthens professional accountability in occupational health.

3. Integrated Medical Surveillance
A key shift is toward integration with overall safety systems:
- Medical surveillance linked with hazard control measures
- Focus on early detection and prevention
- Alignment with risk management frameworks

4. Risk-Based Monitoring
Unlike uniform schedules under earlier laws, the OSH Code promotes:

- Surveillance based on risk assessment
- Customization of examination frequency
- Use of advanced diagnostic tools

5. Digitalization and Record-Keeping
The Code encourages modernization:
- Standardized health records
- Potential adoption of digital systems
- Improved tracking and analytics

6. Worker Participation and Rights
Worker-centric provisions include:
- Access to health information
- Participation in safety committees
- Protection from hazardous exposure

Practical Implementation: Ground Realities

1. Compliance vs Commitment
Many organizations continue to treat surveillance as a **regulatory obligation,** rather than a strategic health initiative.

2. Resource Limitations
- Shortage of trained occupational health professionals
- Limited access to specialized diagnostic facilities

3. Underutilization of Data
Health data is often collected but not translated into actionable insights, reducing its preventive value.

Emerging Trends in Medical Surveillance

1. Integration with Wellness Programs
Surveillance is increasingly linked with:
- Lifestyle disease screening
- Mental health support
- Employee assistance programs

2. Technology-Driven Monitoring
- Wearables for exposure tracking
- AI-based predictive analytics
- Electronic health records

3. Inclusion of Mental Health
There is growing recognition of psychosocial risks as part of occupational health.

4. Preventive Orientation
Organizations are focusing on:
- Hazard elimination
- Engineering controls
- Behavioural interventions

Role of Medical Professionals

Medical practitioners, particularly those trained

in occupational health, play a pivotal role:

- Early diagnosis and reporting of occupational diseases
- Workplace hazard assessment
- Advisory role in policy and program design
- Integration with public health systems

Pros and Cons of the Two Frameworks

Factories Act, 1948

Pros:

- Established foundational occupational health provisions
- Clear requirements for medical examinations
- Strong focus on hazardous processes

Cons:

- Limited sectoral coverage
- Rigid and compliance-driven approach
- Inconsistent enforcement
- Minimal integration with modern health systems

OSH Code, 2020

Pros:

- व्यापक coverage across sectors
- Emphasis on prevention and risk-based surveillance
- Formalized role of medical professionals
- Scope for digital transformation

Cons:

- Implementation still evolving
- Dependence on subordinate rules for clarity
- Potential variability in enforcement
- Limited on-ground capacity in smaller establishments

What More Could Have Been Incorporated?

While the OSH Code marks significant progress, further enhancements could strengthen medical surveillance:

1. **National Occupational Disease Registry**
   A centralized system to track and analyze occupational diseases across industries.
2. **Standardized Surveillance Protocols**
   Uniform guidelines for different sectors to reduce variability.
3. **Mandatory Mental Health Surveillance**
   Inclusion of structured psychosocial risk assessment.
4. **Integration with Public Health Systems**

   Linking occupational health data with national health programs.
5. **Capacity Building Initiatives**
   Training programs for occupational health professionals and FMOs.
6. **Stronger Enforcement Mechanisms**
   Regular audits and accountability frameworks.
7. **Worker Education Programs**
   Enhancing awareness about occupational risks and rights.

Conclusion

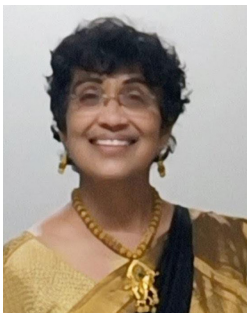
Medical surveillance in India has transitioned from a statutory requirement under the Factories Act, 1948 to a broader, integrated framework under the OSH Code, 2020.

This shift reflects a deeper understanding of occupational health as a **preventive, data-driven, and worker-centric discipline**.

However, the effectiveness of these frameworks depends not merely on legislation but on **implementation, capacity, and cultural change within organizations**. Moving forward, the focus must be on leveraging data, strengthening systems, and embedding health into the core of industrial operations.

When effectively implemented, medical surveillance becomes more than compliance – it becomes a strategic tool for **sustainable workforce health and productivity**.

Workplace Bullying and Violence: Prevention Begins with Clarity, Not Crisis



Dr. EVELINA MUJUMDAR
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Workplace bullying is rarely loud in the beginning. It does not announce itself as aggression or hostility. More often, it begins subtly – dismissive remarks, selective exclusion, disproportionate scrutiny, or a quiet undermining of credibility. By the time it becomes visible, it has already shaped the environment.

Violence in the workplace, whether verbal, psychological, or physical, is not an isolated act. It is usually the endpoint of a culture that has, over time, allowed smaller deviations to go unchecked.

Understanding the Spectrum

Bullying and workplace violence exist on a continuum:

- **Micro-level behaviors:** sarcasm, eye-rolling, withholding information, passive exclusion
- **Intermediate patterns:** repeated humiliation, public criticism, deliberate overloading or sidelining
- **Severe manifestations:** threats, intimidation, harassment, or physical aggression

What is often overlooked is that the early stages are not harmless. They are formative.

Why it Persists

Most workplaces do not lack policies. They lack implementation with intent.

Bullying persists because:
It is normalized as “personality” or “management style”

Targets hesitate to report due to fear of retaliation or trivialization

Bystanders remain silent to avoid involvement

Leadership intervenes only when escalation becomes unavoidable

Silence, in this context, is not neutral. It is permissive.

The Cost of Inaction

The impact is not limited to the individual. It affects the entire system:

- Reduced morale and productivity
- Increased absenteeism and attrition
- Higher incidence of stress-related health issues

Erosion of trust in leadership

In healthcare and high-responsibility settings, the consequences can extend further – to errors, compromised decision-making, and patient safety.

Prevention: A Structural Approach

Prevention is not achieved through occasional workshops or reactive committees. It requires consistent structural alignment.

1. **Clear Definitions and Boundaries**
   Ambiguity allows misuse. Organizations must clearly define unacceptable behaviors – not just extreme acts, but everyday patterns that constitute bullying.

2. **Accessible Reporting Mechanisms**
   Reporting systems should be simple, confidential, and non-intimidating. Complexity discourages use.
3. **Early Intervention**
   Addressing concerns at the first sign prevents escalation. Waiting for "proof" often means waiting too long.
4. **Leadership Accountability**
   Culture follows leadership behavior. A leader who overlooks subtle bullying cannot credibly address overt aggression.

5. **Protection Against Retaliation**
   Employees must feel safe to speak. Without this, policies remain theoretical.

6. **Training with Context**
   Training should move beyond awareness to practical scenarios – how to identify, respond, and de-escalate.

The Role of Individuals

While systems are critical, individuals shape daily culture.

- **For targets:** Document patterns, seek support early, and avoid internalizing the behavior as personal inadequacy.
- **For bystanders:** Acknowledge what you see. Even quiet support alters dynamics.
- **For leaders:** Listen without defensiveness. Dismissal at first disclosure often closes the door permanently.

A Culture of Quiet Strength

Healthy workplaces are not those without conflict. They are those where conflict is addressed with clarity and respect.

Prevention of bullying and violence is not about creating a "soft" environment. It is about creating a stable one – where dignity is not negotiable, and accountability is consistent.

In such spaces, escalation becomes the exception, not the norm.

Prevention of Non-Communicable Diseases in the Workplace: A Dual Perspective from Malaysia and India

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Non-communicable diseases (NCDs) such as diabetes, hypertension, obesity and dyslipidemia are rapidly becoming the leading cause of mortality and morbidity globally. In countries like Malaysia and India, where the young population are being increasingly exposed to lifestyle risks, the burden of NCDs is mounting alarmingly.

According to the World Health Organization, there is an enormous burden due to all NCDs in both Malaysia and India. NCDs account for approximately 73% of deaths in Malaysia and 60% of deaths in India. These diseases primarily arise due to modifiable risk factors such as poor diet, physical inactivity, poor sleep, tobacco use, and excessive alcohol consumption.

The workplace, where adults spend a significant portion of their waking hours, has been identified as both a contributor to and solution for addressing these risk factors among the workforce.

This article explores the impact of NCDs in the workplace, with data from both Malaysia and India, besides outlining effective prevention strategies that can be implemented in the workplace settings.

Rising NCD Burden in Malaysia and India

In Malaysia, the National Health and Morbidity Survey (NHMS) done in 2023, revealed that 15.6% of adults have diabetes and 54.4% of adults are overweight or obese. One in three adults in Malaysia have either hypertension or high cholesterol.

Meanwhile, in India, the population is experiencing a dual burden. While undernutrition is concerning in rural populations, urban and

semi urban areas are witnessing an explosion on lifestyle diseases, primarily driven by over-consumption of unhealthy, processed foods. The ICMR-INDIAB study, conducted from 2008 to 2020, reported an overall diabetes prevalence of 11.4%, affecting approximately 101.3 million people in India. According to the 2015–2016 National Family Health Survey-4, 21% of women and 19% of men aged 15–49 years were classified as overweight or obese. In addition, prevalence of tobacco use remains high in both countries, contributing to chronic respiratory diseases.

Both nations are facing the challenge of rising healthcare costs, declining workforce productivity, and increased work absenteeism due to NCDs. NCD prevention is not only a public health priority, but it is also imperative to be addressed in order to improve both nations' socio-economic statuses. Left unaddressed, these chronic conditions contribute to long-term disability, early retirement, higher insurance and social security pay-out, impacting employers and organizations directly.

Workplace Environment: A Double-Edged Sword for NCDs

Our workplace has a unique role in influencing health behaviours and facilitating early interventions. Unfortunately, many working environments in Malaysia and India are conducive to NCD development due to sedentary jobs with prolonged sitting, limited access to healthy food options or time constraints in preparing healthier foods.

Stressful work cultures take away from us the time and motivation for exercise. To add insult to injury, lack of awareness regarding regular health screenings and exposure to tobacco and excessive alcohol use, especially among workers in informal sectors, further contribute to the development of NCDs. However, these same settings when utilised wisely, can be transformed into platforms for health promotion and disease prevention.

Prevention Strategies for NCDs in the Workplace

1. Making Healthier Food Choices

Workplaces should take the initiative to replace sugary drinks with healthier beverages and fried snacks with fruits. For instance, replacing carbonated drinks with water during work meetings can lead to measurable decrease in total daily sugar intake and improved post lunch alertness among employees. Another move that can empower employees to make better food decisions is by providing nutrition information labelling at pantries and cafeterias.

2. Encourage Physical Activity

Providing access to fitness facilities or subsidize gym memberships are good moves to encourage physical activity. A multinational organisation in the semiconductor industry in India organised a 21-day step challenge, during which employees collectively walked over 40 million steps in 2024. The initiative, which included all departments and teams, not only improved physical activity levels but also lifted spirits among employees. Globally, the same organisation hosts health weeks and provide wellness infrastructures to support a healthy work culture.

3. Health Education and Support Groups

Measures to equip employees with relevant tool and knowledge to empower them to manage their health can transform workplace cultures. One exemplary model is the Diabetes Employee Resource Group by a global leading Continuous Glucose Monitoring (CGM) manufacturer in Penang, Malaysia. This employee-led network helps fosters empathy and understanding around chronic

diseases and increases awareness on preventable NCDs.

4. Tobacco and Alcohol Control

Effective control of tobacco and alcohol in the workplace requires a combination of policy enforcement, supportive culture and awareness. This hugely benefits employee health and maintains workplace harmony besides boosting productivity. By integrating legal policies, awareness building and supportive services, both Indian and Malaysian workplaces can significantly curb tobacco and alcohol harms. These efforts are not only the global best practices but also build employee trust, reduce health and safety risks at workplace and enhance organizational culture.

5. Routine Health Screenings

Annual health screenings are recommended for those aged more than 30 years old. Regular health screenings are crucial in aiding early detection and management of various NCDs. Annual assessments that include blood pressure, blood glucose, cholesterol, BMI, eye checks, and mental health screenings can identify employees at risk before complications set in.

Early detection not only improves prognosis but also reduces long-term healthcare costs and employee absenteeism. Organizations can support this by offering employee benefits that include dedicated health screening allowances through partner hospitals or clinics. Using the data from the health screening results, doctors may be able to plan and design targeted wellness programs and health awareness activities for the employees. By encouraging routine health screenings in employee benefit structures, companies demonstrate their commitment to employee wellbeing. This will greatly boost employee's morale and retention rates among workers.

Conclusion

NCDs are a silent epidemic threatening not just the health of individuals, but also the vitality of organizations and economies globally. With the majority of working adults spending a significant part of their lives at work, the workplace presents an extraordinary opportunity for primary and secondary prevention measures. Despite their unique geographical, demographic and socio-economic contexts, Malaysia and India share a common challenge and a common solution in managing NCDs among employees.

Organizations can empower workers to prevent NCDs by embedding wellness into workplace culture and operations. By fostering sustainable and intentional preventative measures in the workplace, we can produce healthier employees, more productive organizations, and ultimately, a more resilient and economically stable society. ■

Tele-Emergency Medicine: Redefining Access and Response in Occupational Health

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The emergency room has always been the pulse of modern medicine – fast, unpredictable, and deeply human. Yet, for every well-equipped hospital emergency department, there are countless industrial sites, rural health centers, and peripheral clinics that stand on the edge of access. When an accident occurs at a construction site or a cardiac arrest strikes an office worker in a remote town, the distance between the incident and the emergency physician can decide the outcome.

This is where Tele-Emergency Medicine – or Tele-ER – is changing the narrative. It is not just technology; it is presence without proximity, expertise without delay, and compassion transmitted through a screen. In the broader landscape of occupational health, Tele-ER bridges the space between the workplace and the emergency department, ensuring that help truly arrives the moment it is needed.

Occupational Health: The Expanding Frontier

Occupational health is no longer limited to annual health checks and factory safety drills. Modern industries operate across hazardous terrains – oil rigs, highways, mines, and high-rise towers – where medical access is not a guarantee. The health risks have evolved too: cardiac events among desk workers, chemical exposure in manufacturing, stress-related hypertension in corporate environments, and heat-related illness among field workers.

In this dynamic ecosystem, waiting for physical transport to an emergency department can be fatal. What organizations need is instant connectivity to emergency expertise. Tele-

errors have been associated with worsening burnout, depressive symptoms, and reduced quality of life, indicating a bidirectional relationship between medical errors and psychological distress.

Burnout has also been linked to an increased risk of motor vehicle accidents among physicians, even when accounting for fatigue. Other consequences include absenteeism, low organizational commitment, high turnover of skilled staff, and increased patient dissatisfaction.

Mental health struggle

Healthcare workers often face ethical dilemmas and moral injury while providing care in challenging healthcare settings. Moral injury refers to the psychological distress that arises when actions or inactions conflict with an individual's moral or ethical beliefs. It captures the feelings of guilt and internal conflict experienced when decisions or actions do not align with personal values. Often described as an invisible epidemic among healthcare providers, moral injury can arise in situations such as determining which patients receive life-saving oxygen or ventilator support when resources are limited.

Moral injury is not a mental illness, but those who do develop moral damage are likely to see themselves negatively, question their actions and experience feelings of guilt and shame. These negative thoughts may contribute to the development of mental illness issues like depression, suicidal ideation, and post traumatic stress discorder (PTSD), as well as thoughts about leaving one's professsion.

Another concept of vicarious traumatization, also known as secondary traumatic stress, has garnered increasing attention in recent decades. This condition arises from healthcare workers empathetic responses to individuals experiencing primary trauma, leading to various psychological disturbances. Common symptoms include loss of appetite, fatigue, irritability, difficulty concentrating, emotional numbness, sleep disturbances, fear, and despair. These symptoms are often accompanied by trauma responses and interpersonal conflicts but typically remain at subclinical levels.

WELLNESS: A PREVENTIVE APPROACH

Implement national and local evidence-based programs to support the long-term health and well-being of frontline healthcare workers. Utilize the expertise of health, wellness, and behavioral science professionals to guide execution, ensuring clear evaluation, analysis, and iterative improvements. Share and distribute these resources across healthcare organizations, partner networks, patients, and other stakeholders.

- Develop national knowledge hubs containing information, tools, and resources to enhance resilience and well-being for healthcare workers and their leaders during crises, recovery, and rebuilding phases.
- Maintain adequate healthcare staffing levels and ensure fair compensation for workers.
- Promote help-seeking behaviors and provide accessible mental health resources for frontline healthcare workers experiencing distress.
- Actively combat the stigma surrounding frontline healthcare workers and intensify efforts to normalize mental health conversations across society.
- Foster a broader, actionable dialogue on workplace mental health.
- Involve frontline healthcare workers in political decision-making and the co-creation of new policies.
- Reallocate research funding to explore strategies for improving future preparedness and support for frontline healthcare workers.
- Leverage digital technology and other innovative solutions to enhance access to effective training, ongoing support, and guidance for both frontline workers and the broader healthcare workforce.

Standardized protocols: Clear clinical pathways for common occupational emergencies : trauma, electrocution, cardiac arrest, toxic exposure, and heat stroke.

Defined roles: Clarity on responsibilities between remote physicians, on-site staff, and transport teams.

Training and simulation: Regular mock drills that include virtual command guidance and tele-communication etiquette.

Legal and ethical clarity: Adherence to the Telemedicine Practice Guidelines (India, 2020) and institutional consent frameworks.

Quality assurance: Periodic audits of response time, documentation, and outcomes.

When these pillars align, Tele-ER becomes not just a service but a safety culture.

Environmental and Economic Dimensions

Beyond clinical care, Tele-ER contributes to sustainability. By reducing avoidable transfers and unnecessary admissions, it cuts fuel consumption, emissions, and costs. In large industrial zones, this reduction is measurable ; hundreds of kilometers of ambulance travel saved each month translate directly into environmental and financial gains.

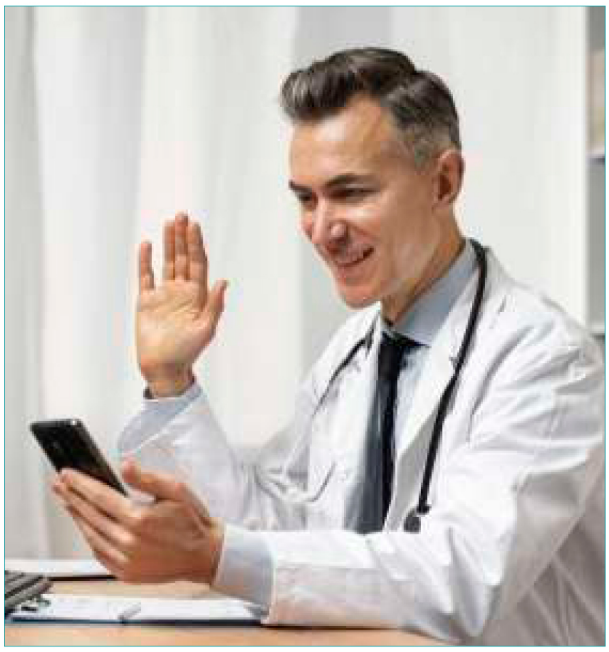
Additionally, digital emergency services reduce the need for full-time specialist deployment at every site, enabling equitable distribution of expertise across regions. For developing countries with physician shortages, this is not just cost-effective : it's transformative.

Challenges and the Way Forward

The success of Tele-ER rests on three factors: connectivity, credibility, and continuity.

Connectivity: Reliable broadband or satellite communication must be prioritized as critical infrastructure, just like oxygen or electricity in hospitals.

Credibility: Tele-ER consultations must maintain the same clinical rigor and accountability as in-person care, supported by legal protection and institutional endorsement.



Continuity: Systems should ensure follow-up and feedback loops between the Tele-ER team and occupational health officers to close the care cycle.

With rapid digitization in India's healthcare sector and increasing adoption of electronic health records, the stage is set for Tele-ER networks to integrate into national emergency response systems.

Conclusion:

Redefining Emergency Access

The philosophy of Emergency Medicine has always been simple – time is tissue. Every second saved is a life extended. Tele-ER makes this philosophy operational beyond hospital walls, bringing emergency expertise to factories, farms, corporate parks, and rural communities alike.

As occupational health evolves from prevention to preparedness, Tele-ER will define the next decade of industrial safety. It ensures that no matter where a worker collapses or a hazard unfolds, an emergency physician is virtually at the scene – guiding, stabilizing, and saving.

In an age of digital transformation, Tele-Emergency Medicine represents not a replacement of human care, but its amplification. It carries the heartbeat of the emergency room into every corner of the working world – immediate, intelligent, and profoundly human. ■

Beyond Earplugs: Advancing Occupational Noise-Related Hearing Disorder Prevention Through IoT Technology

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Occupational Noise-Related Hearing Disorder (ONHRD) remains one of the most persistent occupational health problems in high-noise sectors across Asia. Despite decades of regulatory development, routine noise assessments and established Hearing Conservation Programs (HCPs), workers in Malaysia, India and other countries continue to experience preventable, irreversible hearing loss. This contradiction raises an essential question: why do workers continue losing their hearing even when all mandatory elements of an HCP appear “in place” on paper?

The answer lies in a gap between administrative compliance and actual protection. Many HCPs remain fragmented, PPE-centred and reactive rather than behaviourally grounded, culturally embedded or supported with technology. Earplugs are distributed, posters displayed and audiograms collected, yet the core challenges, human behaviour, leadership consistency and dynamic noise patterns are insufficiently addressed.

This article discusses these limitations using updated Malaysian and Indian evidence and highlights how emerging digital tools, including Internet of Things (IoT)–enabled monitoring, can modernise occupational hearing protection.

The Illusion of Compliance

Many workplaces appear fully compliant: workers receive hearing protection devices (HPDs), attend annual noise-awareness briefings, and undergo periodic audiometric testing. Supervisors sign checklist forms confirming PPE use, and safety officers generate yearly reports documenting completed HCP activities.

Yet, when observing day-to-day operations, common gaps become visible:

- Earplugs inserted only partially, significantly reducing attenuation
- HPDs removed for communication or troubleshooting
- Earmuffs worn loosely due to heat and discomfort
- Worn-out cushions on earmuffs reduce sealing
- Workers viewing noise as "part of the job" and hearing loss as unavoidable

These behavioural and cultural gaps weaken the protective value of even the best-designed HCP.

Malaysian Case Study: Palm Oil Mills in Selangor

A recent cross-sectional study conducted in 2024 among palm oil mill workers in Selangor showed a high prevalence of occupational noise-induced hearing loss despite the presence of standard HCP components (Mutthumanickam et al., 2024). Workers exposed for more than ten years in high-noise zones were most affected.

Interviews revealed workers frequently removed earplugs during conversations, while others described discomfort wearing HPDs for long hours in hot, humid environments. Some attributed hearing problems to "normal ageing," normalising early symptoms and delaying intervention (Mutthumanickam et al., 2024).

Indian Case Study: Construction Workers in Puducherry

A 2024 study in Puducherry involving 500 construction workers reported a 13.2% prevalence of noise-induced hearing loss, with many demonstrating permanent threshold shifts on audiometry (Ramalingam et al., 2024). Workers reported inconsistent PPE use, noting that earplugs interfered with communication, especially when guiding vehicles or coordinating with crane operators.

Noise control was often deprioritised, overshadowed by more immediate hazards such as falls, electrical risks and confined-space entry. Subcontractor variability further weakened HCP enforcement (Ramalingam et al., 2024).

Why Traditional HCPs Still Fall Short

The Malaysian and Indian case studies reflect broader systemic weaknesses across the region. Many workplaces over-rely on PPE rather than prioritising engineering solutions such as acoustic barriers, quieter machinery, or equipment maintenance. In high-noise industrial settings, earplugs alone cannot sufficiently offset outdated or poorly insulated machinery.

Audiometric surveillance is frequently underutilised. Annual tests may meet regulatory requirements, but results are often filed instead of being analysed for early threshold shifts. A lack of timely follow-up delays intervention until hearing loss becomes irreversible.

Leadership inconsistency also plays a major role. Supervisors who do not model proper HPD use send an implicit message that noise protection is optional. Conversely, in workplaces where leaders enforce standards respectfully and consistently, compliance improves dramatically.

IoT and Smart Monitoring: Emerging Tools for ONHRD Prevention

Advances in digital and IoT-based monitoring offer promising solutions to longstanding HCP limitations. These tools support proactive, real-time hearing conservation.

Key IoT technologies emerging in Asia include:

- Wearable noise dosimeters: Real-time exposure monitoring devices streaming data to dashboards.
- Smart HPDs: Bluetooth-enabled earplugs or earmuffs that track wear time and detect improper usage.
- IoT environmental sound sensors: Fixed monitors mapping noise hotspots and alerting supervisors.
- AI-assisted early warning systems: Algorithms predicting ONHRD risk before threshold shifts occur.

Real-World IoT Evidence in Asia

1. Singapore – IoT Noise Sensors in Shipyards
Shipyards deployed IoT acoustic sensors across welding and steel-cutting zones to map

noise heat patterns. Targeted engineering interventions achieved 4–6 dB(A) reductions in hotspot areas.

2. India – AI-Enabled Smart HPDs in Mining
Mining operations piloted smart hearing protection integrated with wearable sensors. Workers received instant alerts during peak exposure events, reducing overexposure incidents significantly.

3. China – Predictive Maintenance with IoT Noise Monitoring
Factories in Shenzhen and Guangzhou used IoT noise sensors to detect abnormal machine acoustics linked with bearing failure. Early intervention reduced noise by 7–10 dB(A) and prevented worker overexposures.

Implications for Business and Policy

ONHRD poses both safety and economic risks. Workers with hearing impairment may misinterpret instructions or miss alarms, leading to productivity loss and increased accident likelihood. Policymakers in Malaysia and India continue shifting toward performance-based enforcement, encouraging engineering controls, IoT adoption, and supervisor accountability.

Conclusion:

ONHRD remains prevalent because many Hearing Conservation Programs focus on administrative compliance rather than effective, behaviour-centred implementation. Evidence from Malaysia and India shows that inconsistent HPD use, cultural norms and limited surveillance undermine protection despite formal HCP components.

Integrating IoT technologies offers a more proactive approach by enabling real-time exposure monitoring, early hazard detection, and data-driven interventions. When paired with strong leadership, targeted training and consistent supervisory oversight, IoT-supported strategies can significantly enhance hearing conservation outcomes. Strengthening HCPs through behavioural reinforcement and digital innovation is essential to sustainably reduce ONHRD in modern industrial settings. ■

References :

1. Chaudhary, R. & Kaushik, P. (2023) 'Industrial IoT frameworks for worker safety and health monitoring', IEEE Internet of Things Journal, 10(8), pp. 6742–6754.
2. Kumar, M. & Singh, A. (2022) 'Internet of Things-based exposure surveillance for industrial workers: A comprehensive review', Journal of Industrial Information Integration, 28, 100325.
3. Madahana, M.C.I., Ekoru, J.E.D., Sebothoma, B. & Khoza-Shangase, K. (2024) 'Development of an artificial intelligence-based occupational noise-induced hearing loss early warning system for mine workers', Frontiers in Neuroscience, 18, 1321357.
4. Mutthumanickam, G., Supramanian, R.K. & Lim, Y.C. (2024) 'Prevalence and factors associated with occupational noise-induced hearing loss among palm oil mill workers in Selangor, Malaysia', Cureus, 16(8), e66077.
5. Rahman, S. & Qureshi, M. (2023) 'Machine learning and IoT approaches for predicting noise-induced health risks', International Journal of Environmental Research and Public Health, 20(11), 6032.
6. Ramalingam, A., Davis, P., Ganesan, P. & Velayutham, P. (2024) 'Prevalence of noise-induced hearing loss among construction workers in Puducherry, India', Cureus, 16(4), e72804.
7. Wearable Sensors for Industrial Workers Review Group (2024) 'Wearable sensors for healthcare of industrial workers: a scoping review', Electronics, 13(19), 3849.

Health Hazards Faced by Pithu Carriers During the Kedarnath Yatra: An Overlooked Occupational Burden

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The Kedarnath Yatra is one of India's most spiritual and challenging pilgrimages, attracting thousands of pilgrims each year. Yet, behind the scenes, pithu carriers – workers who manually transport pilgrims and their luggage across steep and treacherous mountain trails – face immense physical, environmental, and mental health challenges. Despite playing a vital logistical role, the occupational health risks they endure often remain invisible.

Pithu carriers are typically locals or migrant workers who ferry people or their belongings in wicker baskets or on their backs during the pilgrimage. They walk 16-18 kilometers on rocky, sloping trails, sometimes at altitudes exceeding 3,500 meters. The loads they carry often exceed 50 kg, and they do so repeatedly, with limited breaks, protection, or medical support.

The demands placed on pithu carriers are extreme. Constant load-bearing causes a range of musculoskeletal injuries – chronic back pain, joint damage, herniated discs, and ligament sprains. The strain on the spine and knees is especially significant, worsened by inadequate footwear and lack of ergonomic equipment. Environmental hazards add to the burden. Sudden weather changes – ranging from icy winds to heavy rains – expose carriers to hypothermia, frostbite, and respiratory infections. The risk of falls and physical injuries from slips on steep paths is high.

Many carriers operate in high-altitude, low-oxygen zones without proper acclimatization,

Pithu carrying a pilgrim on a steep trail with heavy load distribution.

putting them at risk of altitude-related illnesses such as Acute Mountain Sickness (AMS) or even High-Altitude Pulmonary Edema (HAPE). Exposure to fine dust and pollution along the trails can exacerbate chronic bronchitis or asthma, conditions left largely untreated due to limited access to healthcare.

Beyond physical strain, pithu carriers face psychological stress due to long work hours, economic insecurity, and isolation. Many of

them work under high pressure, needing to complete multiple trips per day to earn a sustainable income. Lack of social support, awareness, and stigma about mental health prevents them from seeking help. Anxiety, fatigue, and emotional exhaustion are common, though often unspoken.

Nutritional deficiencies are a major concern. With little time or access to balanced meals, many carriers rely on low-cost, carbohydrate-rich diets that lack essential vitamins and protein. This poor nutrition impairs muscle recovery and immunity. Combined with excessive physical exertion, it results in chronic fatigue and reduced work capacity.

Healthcare facilities along the pilgrimage route are sparse. In cases of injury, exhaustion, or altitude sickness, pithu carriers often lack immediate access to medical attention. There are few emergency evacuation options for them, unlike the better-prepared provisions for pilgrims. Financial constraints and absence of insurance further prevent timely care.

In one case, a young male pithu carrier developed a large pressure ulcer at the base of his neck from carrying a heavy doli (palanquin) for long hours. Another carrier reported recurrent episodes of chest tightness and breathlessness while working in freezing temperatures, likely an undiagnosed respiratory condition aggravated by high-altitude hypoxia. While some guidelines exist – such as limiting load weights and suggesting rest breaks—these are poorly enforced. Many pithu carriers are compelled to exceed safe limits to meet daily wage targets. Few are provided protective gear or receive formal training in safe load-carrying techniques.Health screening and insurance coverage remain unavailable to most carriers. Even though first-aid stations are established for pilgrims, equivalent resources for carriers are minimal. The informal nature of their employment also means there's no structured grievance redressal or welfare support.

Most pithu carriers come from economically marginalized communities. With few other livelihood options, they accept dangerous working conditions for meager pay. The seasonal nature of the pilgrimage means that their employment is temporary and

Pressure ulcer on the nape of a Pithu carrier due to prolonged rope friction.

Multiple Pithus transporting pilgrims through narrow paths with minimal rest or support.

unregulated, pushing them to maximize earnings at the cost of their health.Poverty, lack of education, and social exclusion further compound their vulnerability, making it harder for them to demand better conditions or access healthcare and social services.

Addressing the plight of pithu carriers requires a comprehensive, multi-pronged approach:

- **Health Screenings & Medical Camps:** Set up regular health check-ups and medical posts dedicated to carrier welfare along the Yatra route.
- Workload Regulations: Enforce strict limits on carrying loads and ensure mandatory rest breaks.
- Protective Equipment: Provide back supports, padded harnesses, and proper footwear.
- Nutritional Support: Ensure access to affordable and nutritious food throughout the route.
- Insurance & Compensation: Offer medical insurance and compensation for injuries sustained on duty.
- Training Programs: Educate carriers about safe load-handling and signs of altitude illness.
- Mental Health Support: Create awareness and facilitate access to psychological counseling.
- Policy Framework: Recognize pithu carriers formally under labor laws to guarantee rights and benefits.

Conclusion

Pithu carriers are indispensable to the success of the Kedarnath Yatra, enabling thousands to complete their pilgrimage each year. Yet, they do so at the cost of their own health, dignity, and safety. As society honours the spiritual journey of the Yatra, it must also recognize the physical and emotional journey of those who carry it – literally – on their backs.

Improving the health and working conditions of pithu carriers is not only a moral imperative but a necessary step toward ensuring a safer, more inclusive, and humane pilgrimage experience for all. ■

Healthcare and Wellness: A Holistic Approach to a Better Life

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Healthcare and wellness go hand in hand in ensuring a high quality of life. While healthcare focuses on diagnosing, treating, and preventing diseases, wellness emphasizes proactive measures to maintain physical, mental, and emotional well-being. In recent years, the mental health needs of healthcare providers have become a significant public health concern and a potential threat to the quality of care. Healthcare professionals face numerous stressors in their work, which can negatively impact their physical, mental, and emotional well-being.

The primary goal is to highlight the increased risk of stress, burnout, moral injury, and mental health challenges faced by healthcare workers.

Stress, burnout, and mental health struggles among healthcare professionals

Stress

Various factors contribute to heightened stress among healthcare workers, such as demanding workloads, extended shifts, fast-paced environments, limited physical or psychological safety, ongoing patient care demands, ethical dilemmas, concerns about job security, workplace bullying, and insufficient social support. This psychological strain can result in burnout, depression, anxiety, sleep disorders, and other health issues. Work-related stress can diminish healthcare providers' professionalism, care quality, efficiency, and overall well-being. Thus, identifying and mitigating these occupational risks is crucial to protecting their mental health and overall wellness.

Burnout

Burnout among healthcare workers can also negatively impact patient care. Multiple cross-sectional studies have linked burnout to suboptimal care practices a twofold increase in medical error risk, and a 17% higher likelihood of being named in a malpractice lawsuit. Additionally, self-reported major medical

errors have been associated with worsening burnout, depressive symptoms, and reduced quality of life, indicating a bidirectional relationship between medical errors and psychological distress.

Burnout has also been linked to an increased risk of motor vehicle accidents among physicians, even when accounting for fatigue. Other consequences include absenteeism, low organizational commitment, high turnover of skilled staff, and increased patient dissatisfaction.

Mental health struggle

Healthcare workers often face ethical dilemmas and moral injury while providing care in challenging healthcare settings. Moral injury refers to the psychological distress that arises when actions or inactions conflict with an individual's moral or ethical beliefs. It captures the feelings of guilt and internal conflict experienced when decisions or actions do not align with personal values. Often described as an invisible epidemic among healthcare providers, moral injury can arise in situations such as determining which patients receive life-saving oxygen or ventilator support when resources are limited.

Moral injury is not a mental illness, but those who do develop moral damage are likely to see themselves negatively, question their actions and experience feelings of guilt and shame. These negative thoughts may contribute to the development of mental illness issues like depression, suicidal ideation, and post traumatic stress discorder (PTSD), as well as thoughts about leaving one's professsion.

Another concept of vicarious traumatization, also known as secondary traumatic stress, has garnered increasing attention in recent decades. This condition arises from healthcare workers empathetic responses to individuals experiencing primary trauma, leading to various psychological disturbances. Common symptoms include loss of appetite, fatigue, irritability, difficulty concentrating, emotional numbness, sleep disturbances, fear, and despair. These symptoms are often accompanied by trauma responses and interpersonal conflicts but typically remain at subclinical levels.

WELLNESS: A PREVENTIVE APPROACH

Implement national and local evidence-based programs to support the long-term health and well-being of frontline healthcare workers. Utilize the expertise of health, wellness, and behavioral science professionals to guide execution, ensuring clear evaluation, analysis, and iterative improvements. Share and distribute these resources across healthcare organizations, partner networks, patients, and other stakeholders.

- Develop national knowledge hubs containing information, tools, and resources to enhance resilience and well-being for healthcare workers and their leaders during crises, recovery, and rebuilding phases.
- Maintain adequate healthcare staffing levels and ensure fair compensation for workers.
- Promote help-seeking behaviors and provide accessible mental health resources for frontline healthcare workers experiencing distress.
- Actively combat the stigma surrounding frontline healthcare workers and intensify efforts to normalize mental health conversations across society.
- Foster a broader, actionable dialogue on workplace mental health.
- Involve frontline healthcare workers in political decision-making and the co-creation of new policies.
- Reallocate research funding to explore strategies for improving future preparedness and support for frontline healthcare workers.
- Leverage digital technology and other innovative solutions to enhance access to effective training, ongoing support, and guidance for both frontline workers and the broader healthcare workforce.

Wellness, on the other hand, takes a more proactive approach. It includes healthy lifestyle choices such as:

- **Balanced Nutrition** – Eating a diet rich in fruits, vegetables, and lean proteins.
- **Regular Exercise** – Engaging in physical activities to boost cardiovascular health and overall fitness.
- **Mental Health Care** – Practicing mindfulness, stress management, and seeking therapy when needed.
- **Adequate Sleep** – Ensuring 7-9 hours of rest to support bodily functions.
- **Preventive Care** – Regular screenings and check-ups to detect potential health issues early.

By integrating both healthcare and wellness into our daily lives, we can prevent chronic illnesses, enhance mental well-being, and improve our overall quality of life.

PRIORITIZING SELF-CARE AND MAKING INFORMED HEALTH DECISIONS IS THE KEY TO A HEALTHIER FUTURE.

Conclusion

Healthcare workers across various health systems and disciplines face significant stress, burdens, and mental health challenges due to the nature of their work. This is especially true for those on the front lines during public health emergencies, as well as those working in low-resource or high-stigmatization environments. The COVID-19 pandemic has served as a stark reminder of the essential and invaluable contributions of frontline workers and healthcare professionals, while also exposing critical weaknesses in healthcare systems worldwide.

It is imperative to implement and sustain evidence-based interventions to safeguard the mental health and well-being of healthcare workers, not only during public health crises but in their everyday roles. The policy recommendations and measures outlined in this article represent just a few of the many impactful strategies that can help mitigate the long-term psychological toll on healthcare providers in the wake of COVID-19 and beyond.

Healthcare workers deserve respect and recognition for their vital role in maintaining public health, making it our collective responsibility to address their psychological needs and enhance their overall well-being.

The authors remain hopeful that the increased acknowledgment and appreciation for healthcare professionals will become lasting and institutionalized. Strengthening empathy, transparency, open communication, and mutual support among healthcare leaders, providers, patients, and other stakeholders will foster a collaborative healthcare environment focused on improving experiences and well-being for all.

World leaders and policymakers must recognize the fundamental importance of investing in the mental health and well-being of the healthcare workforce at individual, organizational, and societal levels. Such investments not only benefit the individuals involved but also yield significant economic and social advantages. Let us learn from past experiences and honor our essential healthcare workers by advocating for meaningful and lasting reforms in our healthcare systems. The cost of inaction is simply too great. ■

Resetting Health: Yoga-Based Lifestyle and the Cross-Talk Between Metabolism and Autonomic Balance

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A In an era where lifestyle-induced chronic diseases are surging, understanding the intricate interplay between metabolic syndromes, autonomic dysfunction, and environmental stressors becomes vital. My work at the intersection of diabetic retinopathy, fibromyalgia, and yoga-based lifestyle interventions sheds light on a transformative approach toward disease mitigation rooted in integrative physiology. Chronic disorders such as diabetes mellitus, metabolic syndrome, and fibromyalgia exhibit deeply entrenched autonomic dysregulation and systemic inflammation – both of which are profoundly modifiable by lifestyle medicine, especially when guided by a clinical physiologist.

The Environmental and Occupational Backdrop

Urbanization, sedentary work patterns, poor air quality, circadian rhythm disruption, and psychological stress form the modern environmental and occupational backdrop for disease. Office workers, healthcare professionals, and industrial laborers alike are exposed to stressors that impair homeostasis. Repetitive strain, poor ergonomic conditions, noise pollution, and long-term screen exposure lead to sympathetic overactivation, insulin resistance, and sleep disturbances, forming the pathophysiological foundation for cardiometabolic and neuromuscular syndromes.

Occupational health risks also include irregular eating schedules, insufficient movement breaks, and poor stress-coping strategies. These lifestyle gaps accelerate the onset of metabolic disorders by sustaining low-grade inflammation and sympathetic overdrive. In such settings, preventive

strategies anchored in yoga and integrative physiology are not merely supportive but essential.

Autonomic dysfunction: A silent culprit

Heart rate variability (HRV), a non-invasive measure of autonomic nervous system (ANS) activity, has become a critical marker for metabolic resilience. In diabetes and fibromyalgia, reduced HRV indicates dominant sympathetic tone and vagal withdrawal. This imbalance impairs glycemic control, endothelial function, and pain perception. HRV analysis, encompassing the full spectrum of sympathetic and parasympathetic parameters, offers a comprehensive window into autonomic function.

Yoga intersects this pathophysiology as a bridge between chronic stress and autonomic imbalance. Through physical postures (asanas), controlled breathing (pranayama), and meditative awareness (dhyana), yoga activates vagal afferents and recalibrates the hypothalamic-pituitary-adrenal axis. This results in enhanced parasympathetic tone, better emotional regulation, and improved metabolic outcomes.

Evidence of improvement

Regular yoga training has been shown to increase parasympathetic tone and improve time-domain HRV metrics. Controlled breathing, especially at six breaths per minute, supports physiological coherence and emotional regulation. These autonomic gains translate to better metabolic control, improved sleep, and lowered cardiovascular risk.

A study on yoga practitioners with metabolic syndrome reported significant improvements in SDNN, RMSSD, and HF power. These results were paralleled by reductions in fasting glucose, waist circumference, and systolic blood pressure. Fibromyalgia patients have also exhibited improvement in HRV, pain scores, and fatigue through consistent yoga and breathwork routines.

Body composition and cellular health

Bioelectrical Impedance Analysis (BIA) offers insights into muscle mass, hydration, and fat distribution. Among its metrics, phase angle (PhA) reflects cellular membrane integrity. In diabetic populations, low PhA correlates with poor glycemic control and muscle wasting. Yoga interventions, combined with nutritional support, enhance muscle mass, reduce central obesity, and improve PhA – indicating better cellular vitality and metabolic function.

A yoga-based regimen for 12 weeks has shown not only a decline in visceral fat but also an increase in muscle quality and total body water content, both of which contribute to higher PhA values. These cellular changes align with better glucose uptake and mitochondrial efficiency, crucial for diabetic populations.

Functional Tests from Home

Simple assessments like the sit-and-reach test and forward/lateral spinal flexion give early signals of musculoskeletal resilience or restriction. These tests, feasible at home, improve with consistent yoga practice that promotes spinal mobility, fascial release, and postural alignment. Fibromyalgia patients especially benefit from such routines, gaining both flexibility and a sense of physical empowerment.

Additionally, functional reach tests, wall-sit endurance, and single-leg balance time are practical tools that allow individuals to assess strength, stability, and neuromuscular control.

Clinical physiologists often use these markers to monitor the effect of interventions and adapt programs in real time.

The Clinical Physiologist's Role

In Integral Health and Wellness Clinics, clinical physiologists bridge diagnostics and intervention via a range of interventional toolkit:

- HRV-based autonomic profiling
- BIA-guided body composition tracking
- Flexibility and functional movement tests
- Nutrition and circadian rhythm optimization

These professionals design personalized yoga and breathwork prescriptions anchored in measurable outcomes. Their role extends beyond exercise prescription to guiding cir-

cadian alignment, stress adaptation, and sleep enhancement. They foster a feedback-rich model that encourages patients to actively participate in their healing.

Correlation mapping and predictive profiling
Integrated analysis reveals:

- Lower HbA1c correlating with higher phase angle
- Better flexibility associated with improved HRV
- High visceral fat linked with diminished autonomic function

Such correlations provide precise starting points for interventions. For example, a diabetic retinopathy patient with low HRV, poor flexibility, and excess abdominal fat would receive a targeted plan including breath training, spinal yoga, and metabolic rebalancing. Cluster analysis further helps categorize patients into high-risk phenotypes who need intensive lifestyle interventions. These include individuals with low parasympathetic tone, poor sleep quality, and sedentary behavior – the very profile yoga-based programs are known to reverse.

Mind-body mechanisms and neuro-visceral integration

Mindfulness embedded in yoga nurtures interoceptive awareness and neurovisceral integration. This improves vagal tone, modulates cortical-limbic interactions, and enhances glycemic control. Techniques like Bhramari, Yoga Nidra, and alternate nostril breathing have demonstrated neuromodulatory effects, beneficial in stress-linked conditions like fibromyalgia and Type 2 diabetes.

Yoga Nidra, in particular, influences thalamocortical circuits, stabilizing emotional reactivity and supporting restorative sleep. These effects extend to endocrine normalization, including reduced cortisol and better insulin sensitivity. The practice of Anulom Vilom has shown increased left-sided vagal activity, offering a pathway to reduce sympathetic overload.

Public health potential and scalability

Beyond the clinic, yoga-based interventions offer scalable, low-cost tools for community health. Integrating yoga modules into employee wellness programs, school-based health education, and chronic disease clinics can reduce the burden on tertiary healthcare. Mobile health technologies and wearable HRV trackers can facilitate remote monitoring and tele-guidance by clinical physiologists.

Further research must continue to validate protocolized yoga therapy against gold-standard biomarkers such as HRV spectral indices, PhA, inflammatory cytokines, and glycemic variability. The integration of this evidence into public policy could catalyze a paradigm shift from pharmaceutical dependency to self-regulatory health models.
Moving forwards…

Precision lifestyle medicine – powered by autonomic diagnostics, body composition insights, and simple home tests – is redefining chronic disease management. Yoga, as both a physical and neuroregulatory tool, sits at the heart of this movement. A clinical physiologist's guidance ensures that every protocol is rooted in data and adapted to individual profiles.

The journey toward healing chronic disorders is not just about treating the disease but nurturing the person. Yoga, in its integrative wisdom, empowers both body and mind to regain harmony with nature and self. ■

References:

1. Jaryal, A. K., et al. (2018). Autonomic Neuroscience, 212, 1-6.
2. Deepak, K. K., et al. (2014). Journal of Clinical Physiology, 36(3), 117-123.
3. Yadav, R. K., et al. (2013). Indian Journal of Physiology and Pharmacology, 57(3), 265-271.
4. Innes, K. E., & Selfe, T. K. (2014). Journal of Diabetes Research, 2016, 6979370.
5. Sengupta, P. (2012). Int J Prev Med, 3(7), 444-458.

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Changing Landscape in Indian Healthcare

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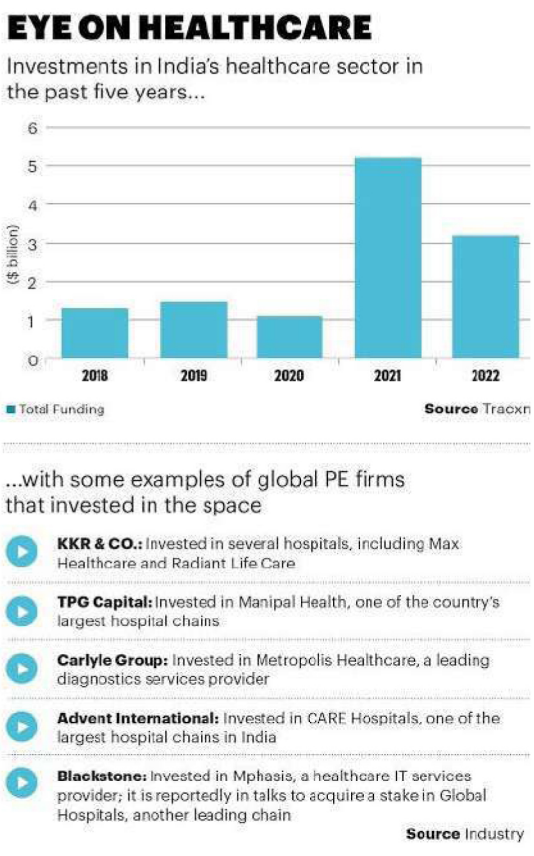
I hear this statement often – and as a surgical oncologist working in a tertiary care superspeciality private hospital, I can tell you it's not the full picture.

Over the last decade, India's private healthcare sector has scaled at a pace I could not have imagined when I started my career. Most major cities in India, well beyond the six largest metros, now have the same advanced surgical systems, precision oncology tools, robotic platforms, and diagnostic technologies you would find in New York or London. This is not just about shiny machines – it's about faster diagnoses, minimally invasive procedures, improved survival rates, and reduced recovery times for our patients.

Much of this progress has been made possible through significant capital infusion, including from global investors. This funding has accelerated technology adoption, enabled advanced surgeon training programs, and built world-class infrastructure at a speed that would have been far slower without such support. And crucially, these services are delivered at a fraction

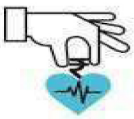


Hospital Chain	Private Equity	Stake
Manipal Hospitals	Temasek	Majority, 59%
CARE Hospitals	Blackstone	Majority, 73%
KIMS Hospitals	Blackstone	Majority, ~80%
Healthcare Global (HCG)	CVC Capital	Majority, 60.4%
Ujala Cygnus	General Atlantic	Majority, 70%
Sahyadri Hospitals	Ontario Teacher's Pension Plan	100% Stake
Motherhood Hospitals	TPG Growth	Majority, 55%
Indira IVF	BPEA EQT	Majority, 60%
Baby Memorial Hospitals	KKR	Majority, 70%
Sterling Hospitals	Arpwood Partners	100% Stake
Max Hospitals	Radiant, KKR (exited)	Controlling stake, 49.7%
Maxivision Hospital	Quadria	Minority
Rainbow Hospitals	CDC Group, Abraaj Group	Minority
Cloudline	IVFA, Matrix Partners, Sequoia	Minority
Apollo Hospitals	Advent	Minority,
Medanta Medicity	Temasek, Carlyle (exited)	Minority
Pristyn Care	Tiger Global, Sequoia, Epiq, etc	Minority

Source- News and Media Reports

WHY GLOBAL PE FIRMS ARE INVESTING IN INDIAN HOSPITALS

Growing demand: The demand for quality healthcare services in India is increasing rapidly due to a rise in chronic diseases, a growing middle class population, and an increase in healthcare spending. This makes the hospital sector an attractive investment opportunity



Favourable regulatory environment: The Indian government has introduced several measures to encourage private sector investments in the healthcare sector, including tax benefits, subsidies and the establishment of SEZs

Improved infrastructure: India's healthcare infrastructure has significantly improved in recent years, with more hospitals being built and equipped with modern facilities and tech

Potential for high returns: The Indian hospital sector offers high growth potential and attractive returns on investment, which make it an attractive destination for global PE firms

of the cost compared to the West, making them far more accessible to Indian patients.

We are also beginning to see Indian private equity firms and venture capitalists stepping into healthcare. This is a welcome sign – and I believe they should invest even more aggressively so that cutting-edge care is not limited to large urban centres. If we can channel both domestic and global capital toward expanding into Tier II cities, we can ensure equitable access to advanced healthcare for millions more people.

The real question is not whether foreign investment should be allowed – it's how we regulate and channel it. With strong oversight, clear ethical safeguards, and a patient-first approach, both global and Indian investment can strengthen our healthcare system without compromising its integrity.

This is not a story of loss – it's a story of opportunity. And if we handle it wisely, it can be a story of India leading the world in delivering advanced, affordable healthcare at scale. ■

The Paradox of Technological Advancements: Convenience vs Health Consequences

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The technological revolution, marked by smartphones, artificial intelligence, and digital systems, has transformed the modern lifestyle, providing convenience and connectivity unimaginable a few decades ago. While these advancements have made life easier, they have also inadvertently contributed to increased sedentary behaviour. Prolonged sitting, a hallmark of modern sedentary lifestyles, poses significant health risks to both the brain and body, affecting posture, mental acuity, and overall quality of life. This article explores the dual-edged sword of technology, emphasizing the need for balancing its benefits with proactive measures to mitigate its health impacts.

Introduction

Technology has infiltrated nearly every aspect of our lives, revolutionizing communication, work, and leisure. Smartphones and artificial intelligence (AI) have become indispensable tools, enabling efficiency and connectivity. We rely on technology not just for professional tasks but also for daily conveniences such as navigation, shopping, entertainment, and even maintaining social relationships. However, while these innovations have undeniably transformed our lives for the better, they have also paved the way for a sedentary lifestyle.

The paradox of technological advancements lies in the balance between convenience and health: while technology simplifies tasks, it encourages prolonged periods of inactivity. This article delves into how sedentary behaviour, exacerbated by technological dependence, impacts human health and suggests solutions to counteract these adverse effects.

Technological Advancements: A Double-Edged Sword

Ease of Life Through Technology

Smartphones and AI have redefined the con-

cept of convenience. From automated home systems to virtual assistants like Siri and Alexa, individuals can accomplish tasks with minimal physical effort. The integration of AI in industries such as healthcare, finance, and transportation has increased efficiency and reduced the need for manual intervention.

For instance, telemedicine has made healthcare accessible from the comfort of our homes, and mobile banking has eliminated the need for physical visits to banks. These advancements, although beneficial, have contributed to a significant reduction in physical activity.

Sedentary Behaviour: An Unintended Consequence

The ease provided by technology often leads to excessive reliance on devices, fostering sedentary habits. Smartphones, video streaming platforms, and social media apps encourage prolonged screen time. Remote work setups enabled by technology further exacerbate this issue, as many professionals spend hours seated at desks without adequate breaks.

While technology promotes productivity, it also fosters inactivity. The convenience of modern devices has inadvertently reduced the incentive for physical movement, contributing to a sedentary lifestyle that poses serious health risks.

Health Impacts of Prolonged Sitting

Physical Consequences

Prolonged sitting has detrimental effects on the body. extended periods of inactivity can disrupt circulation, weaken muscles, and strain connective tissues. Key physical health impacts include:

1. Poor Posture:
Sitting for long hours often leads to slouched or hunched posture, which can result in chronic back pain, neck stiffness, and spinal issues.

2. Obesity and Metabolic Disorders:
Sedentary behaviour contributes to weight gain and increases the risk of conditions like diabetes and cardiovascular diseases. Reduced physical activity slows the body's metabolism, making it harder to burn calories effectively.

3. Muscular Degeneration:
Sitting reduces the activation of core and lower-body muscles, leading to weakened musculature and impaired mobility over time.

Cognitive and Mental Health Consequences

The brain is not immune to the effects of prolonged sitting. sedentary behaviour can impair cognitive functions and mental health, including:

1. Reduced Brain Function:
Prolonged inactivity reduces blood flow to the brain, potentially impairing cognitive functions such as memory, focus, and problem-solving abilities.

- Shrinking of brain regions linked to memory and Alzheimer's.
- Lower levels of Brain-Derived Neurotrophic Factor (BDNF), a protein responsible for brain cell growth

2. Mental Health Challenges:
Excessive screen time and lack of movement can contribute to feelings of isolation, anxiety, and depression. Moreover, the constant influx

of notifications and information from technological devices can lead to mental fatigue, reducing overall well-being.

Lifestyle Implications: A Vicious Cycle

Impact on Daily Routines

Prolonged sitting influences daily routines by creating a vicious cycle of inactivity. Many individuals find themselves glued to their desks during work hours, only to transition to couch-bound leisure activities such as watching TV or scrolling social media. This sedentary lifestyle perpetuates unhealthy habits, leading to long-term consequences.

Reduced Engagement in Physical Activities

The convenience provided by technology often reduces the motivation to engage in physical activities. Historically, tasks such as grocery shopping or commuting required some level of physical exertion. Today, these tasks can be accomplished via apps or online platforms, further minimizing movement.

Counteracting Sedentary Behaviour

Incorporating Movement into Daily Life

To counteract the health risks associated with prolonged sitting, Doctor recommends incorporating movement into daily routines. Strategies include:

1. Taking Regular Breaks:
Stand, stretch, or walk every hour to combat the adverse effects of prolonged sitting.

2. Using Ergonomic Furniture:
Invest in standing desks or ergonomic chairs that promote better posture and encourage movement.

3. Scheduling Physical Activities:
Allocate specific times for exercise, such as morning walks, yoga sessions, or gym workouts.

Leveraging Technology for Health

Ironically, technology itself can be used to mitigate its negative effects. Wearable devices like fitness trackers can monitor activity levels and remind users to move. Smartphone apps can provide guided exercises, mindfulness sessions, and health tips to promote an active lifestyle.

Conclusion

Technological advancements have undoubtedly made life more convenient, but their unintended consequences, particularly increased sedentary behaviour, cannot be ignored. Prolonged sitting negatively impacts the body and brain, affecting posture, metabolic health, and cognitive functions. i advocates for a balanced approach to technology usage, emphasizing the importance of integrating physical movement into daily routines.

As society continues to embrace technological innovations, it is crucial to remain vigilant about their long-term implications on health. By leveraging technology responsibly and prioritizing physical activity, individuals can enjoy the benefits of modern conveniences while safeguarding their well-being. ■

References:

1. Kumar, K. (2023). Technological Advancements and Health Impacts. Journal of Lifestyle Studies.
2. World Health Organization (WHO). (2022). Sedentary Behavior and Health Risks.
3. Smith, J., & Turner, L. (2020). The Role of Ergonomics in Modern Workspaces. Health and Productivity Review.

AI in Radiology: Transforming Diagnostics, Shaping the Future

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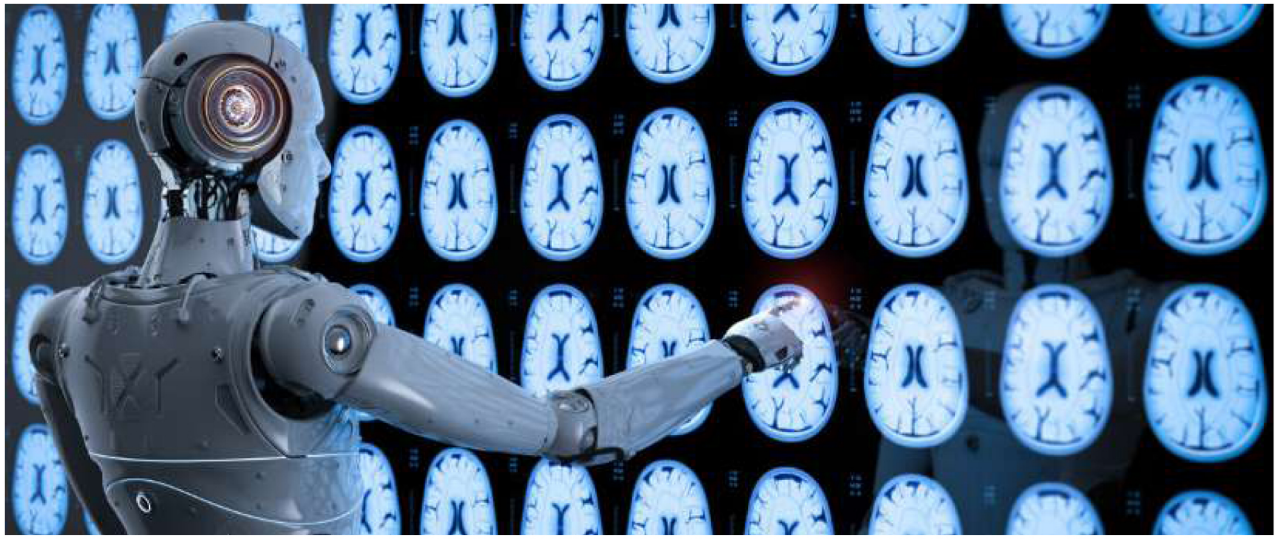

AI will interpret radiology images faster and more accurately than humans.

As a radiologist with over 18 years of experience in the field, I have witnessed how technological advancements have revolutionized our ability to diagnose and treat diseases.

From analog X-rays to cutting-edge digital imaging, we have always strived to enhance precision and efficiency. Yet, we stand today on the precipice of a transformation that promises to redefine our field entirely: Artificial Intelligence (AI).

AI is not merely an upgrade; it's a paradigm shift. But like all revolutionary changes, it comes with its challenges.

Today, I want to explore this profound prediction and discuss its implications on patient care, job displacement, and the reliability of AI systems.

AI's Potential to Outperform Human Radiologists

AI algorithms are increasingly capable of interpreting medical images at astonishing speed and accuracy. Powered by machine learning (ML) and deep learning (DL), these systems are trained on vast datasets of annotated images. They excel at identifying patterns, highlighting anomalies, and even predicting diseases at stages far earlier than the human eye can detect.

Let me paint you a picture:

Speed: AI can process thousands of images in seconds. Consider the criticality of speed in diagnosing acute conditions like strokes or pulmonary embolisms. Time saved in interpretation translates directly to lives saved.

Accuracy: AI models, such as convolutional neural networks (CNNs), boast accuracy rates

that rival, and sometimes surpass, human experts. For example, an AI system developed by Stanford researchers demonstrated the ability to detect pneumonia on chest X-rays better than board-certified radiologists.

Consistency: Unlike human radiologists who may experience fatigue or cognitive bias, AI delivers consistent results 24/7.

So, does this mean AI will replace radiologists? Not entirely. What AI offers is a symbiotic relationship: we bring clinical context and decision-making to the table, while AI augments our capabilities. Together, the goal is not just to be faster but also to be better.

Job Displacement: Fear vs. Reality

The rise of AI in radiology has understandably sparked concerns about job security. Will AI render radiologists obsolete? I don't believe so, and here's why:

Radiology is More Than Image Interpretation: A radiologist's role extends beyond reading scans. We consult with clinicians, discuss treatment plans, and guide interventions. AI, for all its brilliance, cannot synthesize complex patient narratives and collaborate effectively with multidisciplinary teams.

New Roles Will Emerge: History shows us that technological advancements often create new opportunities. Radiologists may evolve into "AI supervisors," validating algorithms, ensuring data integrity, and incorporating AI insights into clinical decision-making. Moreover, expertise in AI tools will become a valuable skill set in itself.

The Human Touch: Patients value empathy and communication. No AI can deliver the reassurance of a human radiologist explaining a complex diagnosis with compassion and clarity.

Instead of fearing displacement, we must focus on adaptation. Radiologists who embrace AI will be indispensable in the new era of medicine. The key is to lead the change rather than resist it.

Reliability of AI Systems: Hype vs. Reality

While the promise of AI is undeniable, it's essential to approach its adoption with caution. After all, lives are at stake.

Algorithm Bias: AI systems are only as good as the data they are trained on. If the training dataset lacks diversity (e.g., images from a homogenous population), the algorithm's performance may falter in real-world settings. This could exacerbate health disparities rather than reduce them.

Overfitting and Errors: AI may excel in controlled environments but struggle with atypical cases or images that fall outside its training parameters. For example, detecting rare diseases or handling poor-quality images can pose challenges.

Accountability: If an AI system makes a diagnostic error, who is responsible – the software developer, the hospital, or the supervising radiologist? Establishing clear accountability is critical.

To ensure reliability, we must:

Advocate for rigorous validation of AI algorithms using diverse datasets.

Push for regulatory frameworks that prioritize patient safety.

Develop robust protocols for human-AI collaboration.

In short, AI should enhance clinical practice, not undermine it.

The Road Ahead: Embracing AI in Radiology

To harness the full potential of AI, radiologists must play an active role in its development and implementation. Here's how:

1) Education and Training: Incorporate AI literacy into medical training programs. Radiologists must understand how these systems work, their limitations, and their applications.

2) Collaboration with Tech Experts: Work closely with data scientists and engineers to ensure AI systems address real clinical needs.

3) Focus on Ethics: Advocate for ethical AI use, ensuring transparency, fairness, and patient-centered care.

4) Lead the Dialogue: Radiologists must shape the narrative around AI. By being proactive, we can ensure that AI serves as a tool to amplify, not replace, our expertise.

A Vision for the Future

Imagine this: a world where AI-enabled radiology systems detect cancers at their earliest stages, where advanced imaging algorithms monitor chronic conditions in real time, and where radiologists work smarter, not harder, thanks to AI-powered tools. This is not a distant dream; it is within reach.

But let's not lose sight of what matters most: the patients. Our ultimate goal is to deliver better outcomes and improve lives. AI is a means to that end, not an end in itself.

As we move forward, let us remain grounded in our purpose as healthcare providers. Let us embrace AI as a partner in innovation and a catalyst for excellence.

The future of radiology is bright, and it's one where AI and humans work hand-in-hand to push the boundaries of what's possible.

Are you ready to embrace the AI revolution in radiology?

Share your thoughts, insights, or experiences below.

Let's shape the future together! ■

Plastics and Health

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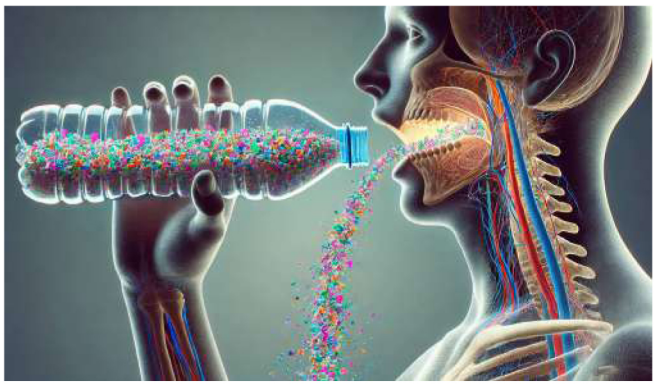

Microplastics are POISONING us – slowly, silently, and PERMANENTLY.

There are TRILLIONS of microplastics everywhere and they're

- the highest they've ever been in our bodies – brain, liver, lungs, everywhere.
- Experts have studied microplastics since the 1960s.
- But just in the last 5 years, they've been found in the blood, brain, semen & placenta.

They're in the air we breathe, the food we eat, and the clothes we wear.

Microplastics range in size from microscope nanoparticles to a few millmeters.

There are 2 types:

Primary: Manufactured particles used in cosmetics, clothing, etc.
Secondary: Particles broken down from larger plastics.
They penetrate us through food, air, water.

How do microplastics invade us?

- **Ingestion:** Up to 5g of plastic WEEKLY from food and water (exact amount still being studied).
- **Inhalation:** we breathe up to 22 million particles/year.
- **Skin contact:** Direct contact with microplastics leads to exposure.

These are the damage they cause:

1. Brain: Neuroinflammation and cognitive decline as they breach of blood-brain barrier.
2. Heart: up to 4.5X increased risk of heart attacks & stroke.
3. Lungs: Chronic inflammation, impaired lung function, scarring from synthetic fibers.
4. Gut: Increase of harmful bacteria & disrupting digestion.
5. Metabolic health: Interference with cellular metabolism – linked to insulin resistance, obesity, and diabetes.

And the scariest part?

-We can't just REMOVE microplastics once they're inside us.
If we can't remove them, directly, how can we avoid microplastics?

1. Reduce plastic use – Avoid plastics in cosmetics, plastic cookware, bottles & single-use plastic.
2. Choose natural fibers – Cotton, linen, wool over synthetics like polyester.

PREVENTION is key. ■

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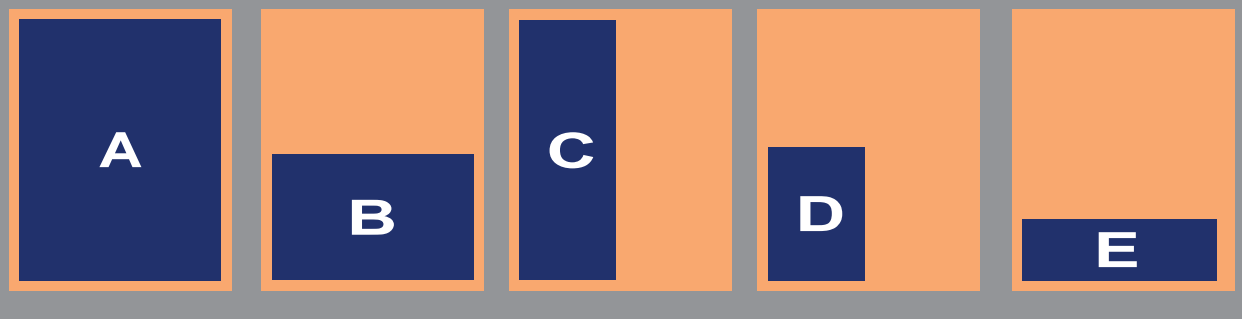

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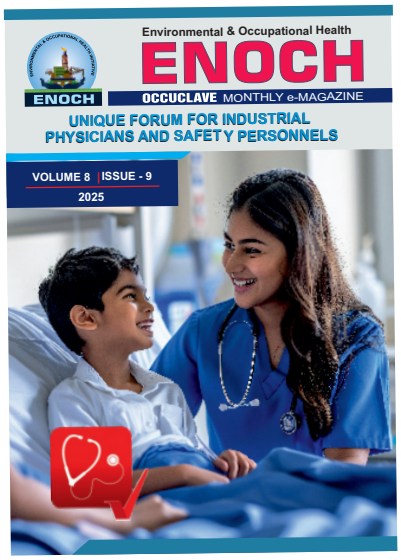

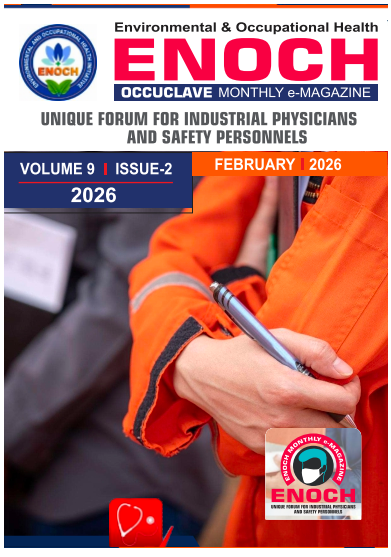

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