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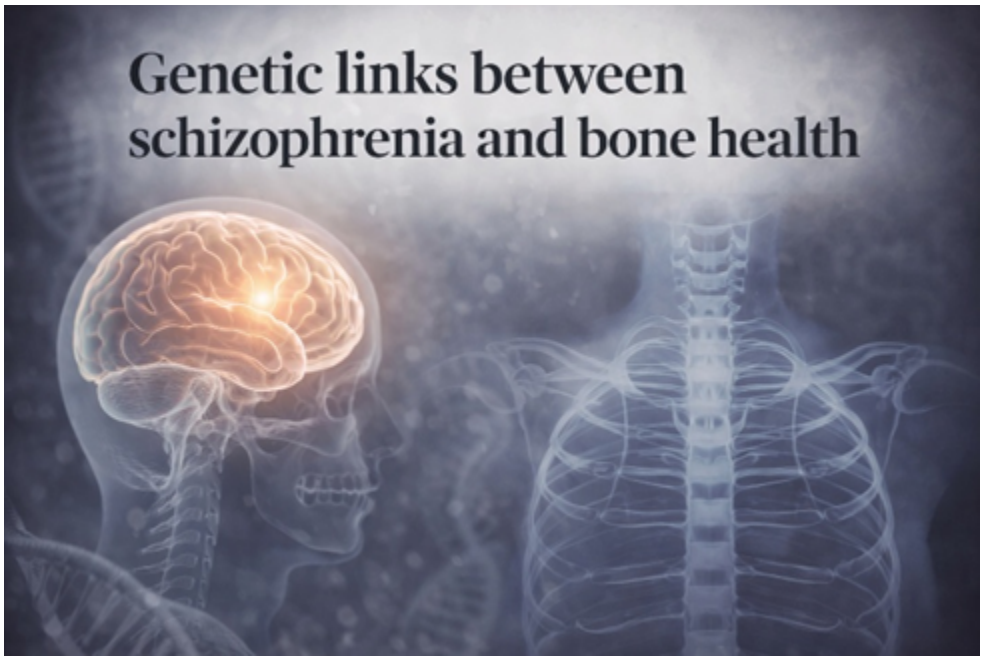
Genetic Links Between Schizophrenia and Bone Health ***~The Hindu***



Schizophrenia is widely regarded as a disorder of the brain, primarily characterised by disturbances in perception, thought and behaviour. Yet for years clinicians have observed a less obvious pattern in the lives of individuals living with the condition: compared with the general population, they appear more prone to weakened bones and fractures. Researchers have often attributed this vulnerability to lifestyle factors or medication side effects. However, a large genetic investigation now suggests that the relationship between schizophrenia and bone health may be rooted, at least partly, in shared biological mechanisms.

Individuals with schizophrenia frequently exhibit behaviours or physiological conditions that increase fracture risk. Long-term use of antipsychotic medications can influence metabolism and hormone balance, which in turn affects bone density. Patients with schizophrenia are also statistically more likely to experience vitamin D deficiency, smoke tobacco, or maintain limited physical activity—all factors associated with compromised skeletal health. While these explanations help account for some of the increased fracture risk, scientists have increasingly wondered whether deeper genetic links might also be involved.

A recent genetic study published in *Genomic Psychiatry* attempted to address this question by examining whether schizophrenia and osteoporosis traits share common DNA patterns. Researchers analysed genetic data drawn from international studies involving more than half a million individuals. Rather than searching for a single gene responsible for both conditions, the scientists investigated whether overlapping genetic signals appeared across different regions of the genome.

Previous studies had reported only modest correlations between schizophrenia and bone density. However, the new investigation used a more detailed analytical method that examined localised DNA segments rather than averaging genetic effects across the entire genome. This approach allowed researchers to detect subtle patterns that might otherwise remain hidden. When they analysed specific genomic regions associated with fracture risk and bone strength, they discovered that several DNA segments were linked to both schizophrenia and skeletal characteristics.

Interestingly, these shared genetic influences were not distributed evenly throughout the skeleton. Among the various bone measurements examined, heel bone strength appeared to account for the majority of overlapping genetic signals. In contrast, other bones—such as those in the forearm—showed weaker associations. This uneven distribution suggests that the biological pathways influencing bone health in schizophrenia may operate differently across distinct parts of the skeleton.

The presence of shared DNA regions does not imply that schizophrenia directly causes bone disease, nor that osteoporosis contributes to psychiatric disorders. Instead, the findings indicate that some genetic factors may influence multiple physiological systems simultaneously. Biological processes involved in metabolism, hormone regulation or cellular growth could plausibly affect both neural functioning and bone development. Such interconnected pathways are increasingly recognised in human genetics, where single genetic variations often contribute to diverse traits.

Another possible explanation relates to body weight and metabolic regulation. Bone density is partly influenced by mechanical load and metabolic processes associated with body mass. Schizophrenia is frequently accompanied by metabolic changes, some related to medication and others linked to the disorder itself. If certain genetic variants influence both metabolic regulation and skeletal structure, they could help explain why individuals with schizophrenia often exhibit altered bone health.

The findings also carry practical implications for medical care. In psychiatric practice, bone health rarely occupies a central role. Clinicians typically focus on managing acute symptoms such as psychosis, mood disturbances or cognitive impairment. While doctors may monitor short-term risks—such as sudden drops in blood pressure or balance issues caused by medication—the possibility of long-term skeletal deterioration often receives less attention.

Researchers involved in the study argue that this oversight deserves reconsideration. Because schizophrenia is often diagnosed in early adulthood, skeletal fragility may remain unnoticed for many years before fractures occur later in life. A more integrated approach to patient care could therefore prove beneficial. Monitoring bone density, encouraging physical activity and addressing nutritional deficiencies might help reduce long-term health complications among patients with severe psychiatric disorders.

The study’s authors emphasise that further research is needed to clarify the biological mechanisms underlying these genetic overlaps. Understanding exactly how shared DNA regions influence both brain function and bone strength will require additional investigations across diverse populations and skeletal measurements. Nevertheless, the discovery of genetic connections between schizophrenia and bone health reinforces an important lesson in modern medicine: diseases traditionally considered separate may, in fact, share deeper biological foundations.

By revealing how mental and physical health can intersect at the genetic level, the research encourages clinicians and scientists alike to adopt a more holistic perspective on complex disorders. Rather than treating psychiatric illness solely as a disorder of the brain, it may be more accurate to view it as part of a broader physiological landscape in which multiple systems of the body interact.

Enterprise AI and the Architecture of Responsible Scaling ***~The Hindu***

Recent discussions among technology leaders increasingly emphasise that the successful deployment of artificial intelligence in large organisations depends less on technological novelty than on institutional discipline. At a gathering of business executives and technology specialists organised by *The Hindu Group* as part of its AI@Work series in Chennai, participants examined the conditions under which artificial intelligence can move beyond experimental projects and become embedded in everyday enterprise operations. The central conclusion that emerged from these discussions was that governance, strategic foresight and organisational discipline are essential if AI initiatives are to scale sustainably.

Many companies initially approach artificial intelligence through small experimental projects. These pilot initiatives often produce promising results in controlled environments. However, translating experimental success into real-world operational systems frequently proves far more difficult. Executives at the conference noted that many AI projects do not fail because the underlying technology is ineffective, but because organisations lack the data infrastructure, operational frameworks and governance structures required to support large-scale implementation.

A recurring theme in these discussions was the importance of evaluating AI projects according to measurable business outcomes rather than technological excitement. Rohit Kumar Agrawala, director of finance at Reliance Corporation Limited, argued that companies must resist the temptation to pursue AI initiatives simply because the technology appears innovative. Instead, decision-makers should determine in advance what value the application is expected to create and establish clear benchmarks for evaluating success. Without such discipline, AI projects risk becoming expensive experiments that fail to deliver tangible benefits.

Healthcare offers a compelling illustration of how carefully designed AI systems can generate meaningful improvements. Dr. Dhanalakshmi Chee, chief executive officer of Apollo Hospitals' Chennai region, described how artificial intelligence has been used to streamline radiology workflows. Previously, radiology reports sometimes required several hours to complete. With the assistance of AI systems that organise and prioritise imaging data, the reporting process has been reduced to minutes. The improvement has not only accelerated clinical decision-making but also enhanced the overall patient experience.

Yet speakers at the conference emphasised that such outcomes require more than technical capability. Sustainable AI deployment depends on an organisational culture capable of integrating new technologies into existing workflows. Santosh T. G., global chief data and analytics officer at Switch Mobility, explained that companies must build capabilities that extend beyond algorithms themselves. Data governance systems, cross-functional collaboration and employee training all play crucial roles in ensuring that AI tools can be adopted effectively.

Another challenge involves determining which organisational units should assume responsibility for AI initiatives. Some companies centralise development within specialised technology teams, while others embed data scientists directly within operational departments. Each model carries advantages and limitations. Centralised teams can maintain consistent standards and technical expertise, whereas decentralised teams may respond more rapidly to operational needs. Organisations must therefore design governance frameworks that balance innovation with accountability.

Financial institutions face particularly stringent requirements in this regard. Banking executives at the event highlighted the importance of maintaining transparent governance structures when deploying AI systems that influence credit decisions, fraud detection or regulatory compliance. Even highly advanced algorithms must operate within frameworks that ensure explainability, auditability and adherence to regulatory standards. Without such safeguards, institutions risk undermining both customer trust and regulatory approval.

The growing capabilities of generative artificial intelligence add another layer of complexity. Large language models can assist employees in drafting documents, analysing data and automating routine administrative tasks. However, their effectiveness depends heavily on the quality of the data and workflows surrounding them. Experts emphasised that generative AI should not be viewed as a standalone solution but as one component within a broader organisational system that includes human expertise, structured data management and well-defined processes.

At Sundaram Finance, for example, executives reported using AI tools to streamline documentation processes and reduce administrative burdens on employees. By automating repetitive tasks, the company has allowed staff to devote greater attention to customer interactions and strategic activities. Yet the organisation remains cautious about adopting AI systems without first ensuring that the underlying data environment and governance frameworks are sufficiently robust.

Participants also cautioned against adopting artificial intelligence solely through off-the-shelf software tools. While such tools may accelerate experimentation, long-term competitiveness often requires deeper integration of AI capabilities within organisational processes. Companies that rely exclusively on external platforms risk losing control over critical technological capabilities and becoming dependent on vendors.

Ultimately, the transition from small-scale experimentation to enterprise-wide deployment represents the most difficult phase of AI adoption. When organisations begin scaling AI initiatives across departments and operational functions, the centre of gravity shifts from experimentation toward governance and coordination. Data quality, compliance requirements and organisational culture become as important as the algorithms themselves.

The broader message emerging from the AI@Work discussions was therefore pragmatic rather than utopian. Artificial intelligence can generate substantial economic value, but only when implemented with clear strategic intent and disciplined governance. Companies that approach AI merely as a technological trend may struggle to translate early enthusiasm into sustainable competitive advantage. Those that treat AI as a long-term organisational capability—supported by strong data infrastructure, thoughtful governance and strategic foresight—are far more likely to realise its transformative potential.

Balancing Safety and Cost in India's Seismic Building Codes ~The Economic Times

The revision of India's seismic building standards has rekindled a long-standing debate about how societies should balance safety with economic practicality. The Bureau of Indian Standards' updated seismic code, IS 1893 (2025), replaces the earlier 2016 version and introduces significant changes in how earthquake risk is assessed and incorporated into building design. While proponents argue that the new code aligns India more closely with international engineering practices, critics caution that stricter requirements for high-risk regions could increase construction costs, delay infrastructure projects and strain public budgets.

At the centre of the debate lies a fundamental question: should policymakers prioritise near-perfect safety, even if doing so substantially raises construction costs, or should they pursue a more calibrated approach that delivers reasonable safety within existing financial constraints? Advocates of the revised code maintain that the changes represent a necessary step toward modernising India's approach to earthquake resilience. They argue that the new provisions incorporate advanced probabilistic hazard assessments, updated soil classification systems and improved design spectra for structures exposed to seismic forces. These changes,

they suggest, bring Indian practices closer to those adopted in countries such as the United States, Japan, New Zealand and parts of Europe.

Supporters also note that the revised framework introduces a more sophisticated understanding of seismic risk. Instead of relying primarily on broad regional zoning categories, the updated code emphasises quantifiable risk metrics and hazard probabilities. Such an approach reflects a shift from traditional zone-based classifications toward risk-based engineering design, a method increasingly used in international structural engineering. Under this framework, engineers evaluate the likelihood of different levels of ground motion over specified time intervals, allowing building designs to account more precisely for potential seismic hazards.

However, the practical implications of these improvements remain contested. Critics warn that the new requirements could significantly increase the cost of construction in high-risk regions, particularly in areas classified under the highest seismic hazard categories. For certain structures—such as hospitals, bridges, dams and high-rise buildings—the revised design parameters may require stronger foundations, increased reinforcement and more detailed structural analysis. These changes, while technically sound, may impose financial burdens on developers and government agencies already managing tight budgets.

Some engineers also express concern about implementation challenges. The revised standards demand more sophisticated analytical methods, including nonlinear structural analysis and detailed soil-structure interaction modelling. While such techniques are widely used in advanced engineering practice, they require specialised training and expertise that may not yet be uniformly available across India's construction sector. Younger engineers entering the profession could find themselves expected to apply complex modelling techniques without adequate training or institutional support.

The new code also modifies the classification of seismic zones across the country. The earlier system divided India into four zones based largely on historical earthquake records. The revised framework introduces updated hazard parameters and significantly increases certain design factors in the highest-risk regions. For example, areas previously classified within Zone V—India's most seismically active category—may experience substantially higher design force requirements under the new code. In some cases, these adjustments could lead to structural design forces rising by 40 percent or more compared with earlier standards.

Proponents argue that such increases are justified by scientific evidence and improved hazard modelling. India's Himalayan belt and parts of the northeastern region remain among the most seismically active areas in the world, with the potential for major earthquakes capable of causing widespread damage. Updated hazard assessments suggest that previous design assumptions may have underestimated the intensity of ground motion possible in certain regions. From this perspective, stricter structural requirements represent a necessary safeguard against catastrophic infrastructure failures.

Yet the debate extends beyond engineering calculations to broader questions of governance and public policy. Even the most technically rigorous building codes are effective only if they are implemented and enforced consistently. In many parts of India, compliance with building regulations remains uneven, particularly in rapidly expanding urban areas and smaller towns where regulatory oversight is limited. As a result, critics argue that strengthening enforcement mechanisms may be more urgent than introducing increasingly complex design standards.

Another dimension of the debate concerns affordability and social equity. Earthquake-resistant construction techniques can increase the cost of housing, particularly for low-income populations living in informal or self-constructed dwellings. If stricter regulations raise construction expenses without providing financial support or incentives, vulnerable communities may continue to build structures that do not meet safety standards. In such cases, improved codes alone may do little to reduce the risk of casualties during earthquakes.

For policymakers, therefore, the challenge lies not in choosing between safety and affordability but in sequencing policies in ways that strengthen both. Effective seismic risk reduction requires a combination of scientifically sound engineering standards, practical enforcement mechanisms and public investment in safer infrastructure. Gradual implementation, supported by training programmes and financial incentives, may offer a more sustainable path toward improving earthquake resilience.

Ultimately, the revised seismic code represents an attempt to reconcile technical precision with economic reality. The objective is not to eliminate risk entirely—an impossible goal—but to reduce vulnerability while maintaining the feasibility of large-scale infrastructure development. Achieving that balance will depend not only on the quality of the code itself but also on the institutions responsible for translating engineering principles into everyday construction practices.