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The finite element analysis of risk of lumbar fatigue for 55-65 years old Chinese female who act as stay-home grandchildren sitter

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Up to 22% Chinese adults (50 years and older) have suffered from low back pain caused by chronic lumbar fatigue under the long-term effect of physiological and external loading. The epidemiological data shows that the bone fracture risk of female out of bone fatigue is 1.1-21%, higher than that of male. Up to 66.47% of the 55-65 years old Chinese female stayed home and acted as grandchildren sitter (e.g., holding kid in daily life) because the mothers returned to work in 6 months after giving birth. In consequence of these frequently external loading, the chronic lumbar fatigue probably caused higher risk of lumbar degeneration and fatigue. In this study, the Chinese 55-65 years old female and normal (serve as control) lumbar finite element model (FEM) were developed and validated. The material properties of old female lumbar vertebra was modified according to degenerated bone mineral density and geometry was adjusted based on old female's intervertebral disc height. The motion of holding kid was simulated by old female FEM and the stress distribution was calculated. The results indicated that the pressure of posterior lateral edge of lumbar intervertebral disc was significantly higher (20.9%) than that of the normal, the pressure of the L4 bottom vertebra and L5 upper vertebra was also higher (16.68%) than that of normal. These results imply that the holding kid motion could increase the lumbar fatigue risk of old female and the old female should decrease the frequency of the motion of holding kids in the daily life. This study could contribute to give 55-65 years old female suggestion how to avoid lumbar vertebral fatigue by predicting high risk.

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Challenges of molecular diagnostics innovation system development in India

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Molecular diagnostics is emerging technological innovation system in India. It has lot of potential which can improve diagnostic practices and healthcare outcome but practice of innovation-making for system development in respect of molecular diagnostics is facing substantial obstacles and misaligned incentives in India. This study through empirical analysis finds India being a latecomer country in the field of molecular biology research and has not been able to keep up with the worldwide pace of development of technological innovation system. Investigations also indicate dependence on imports in the supply of molecular diagnostics has meant high prices due to which these tests are unaffordable and also therefore unavailable to majority of population. Recently few domestic start-up firms have begun taking interest for developing molecular biomarkers for tropical disease but their overall market share as compared to foreign firms is quite insignificant. Study also suggests that lack in capability for macular diagnostic development in India results from failures occurring at discovery research as well as technology development. Therefore, it is suggested that India should undertake a responsible innovation framework for the development and diffusion of this emerging diagnostic technologies to look after the country specific social, legal and ethical diagnostic challenges of innovation making. Responsible innovation approach would provide long term sustainability for technological developments which can contribute to morally desirable and socially acceptable diagnostic practices.

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