

## Physiological Workload, Musculoskeletal Injuries and Dysfunctions Amongst Physical Education Teachers in Singapore Schools—A Prospective Investigation

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### KEY IMPLICATIONS

- Physical education teachers (PETs) in Singapore schools cope with high physical and physiological workload related to teaching PE. They are at a high risk of musculoskeletal (MSK) injuries and dysfunction.
- MSK injuries and dysfunction can lead to movement and functional limitation, adapted teaching, sub-optimal skill demonstration, reduction in dynamic supervision and affects health and wellness amongst PETs.
- Intervention programmes to enhance MSK health and wellness are necessary to minimise risk of injury and dysfunction, and preserve health and well-being of PETs.

### BACKGROUND

PE teachers need to cope with high physical and physiological workloads (Lemoine, Laurencelle, Lirette, & Trudeau, 2007; Sandmark, Wiktorin, Hogstedt, Klenell-Hatschek, & Vingard, 1999). PETs subject themselves to risky activities like running and jumping, asymmetrical body movements while demonstrating movement techniques and skills, and practice activities with students. Such

occupational demands subject the PETs to high physiological workload and increase the risk of MSK injuries and dysfunctions.

### FOCUS OF STUDY

This study determined the physiological workload, and prevalence and incidence of MSK injuries and dysfunction amongst PETs in Singapore schools.

### KEY FINDINGS

PETs in Singapore schools need to cope with high physiological workload. Their heart rates can reach up to 150 beats/min during PE lessons. The cardiovascular load and heart rate strain in PETs was comparable to construction and steel workers.

PETs are at a high risk of MSK injuries and dysfunction. A total of 67% of the participating PETs sustained 238 MSK injuries during the 36 weeks of a schools calendar year; 25% of these injuries were attributable to PE teaching. Majority of injuries were aggravations of pre-existing injuries. Knee and lower back were the most commonly injured body parts

and incomplete muscle-tendon strain followed by incomplete ligament sprain were the most common injuries. Moreover, about 80% of PETs had MSK dysfunction that can cause movement limitations.

A pre-existing MSK injury was a significant predictor of dysfunction and reduced movement. In particular, a recurrent injury significantly worsened the odds of poor MSK function.

## SIGNIFICANCE OF FINDINGS

### Implications for practice

PETs need to be aware of their occupational demands and the associated risks of MSK stress, injuries and dysfunction. They need to adopt best practices to effectively cope with the stresses of PE teaching.

### Implications for policy and research

Most MSK injuries are preventable and their severity can be minimised. This presents the need for developing and implementing MSK wellness programmes for PETs in Singapore schools.

### Learning gains (for studies involving intervention)

Intervention programmes for MSK wellness and injury prevention in PETs is critical sustain quality of lesson delivery, minimise loss of work time and maximising the active career span of PETs.

## Proposed Follow-up Activities

Further studies are needed to determine the effectiveness of intervention programmes and its effect on lesson delivery, man-hours saved and cost-benefit analysis.

## PARTICIPANTS

A total of 152 full-time PETs from 13 primary schools, seven secondary schools and one junior college volunteered to participate in this study.

## RESEARCH DESIGN

The study had three aspects: baseline investigation of MSK injury and dysfunction prevalence (self-reported survey); prospective investigation of physiological workload (objective measurement using accelerometers, done twice for 5 working days of a week); and prospective investigation of MSK injury and dysfunction determined over a 36-week period (self-reported two-weekly online survey).

## REFERENCES

- Lemoyne, J., Laurencelle, L., Lirette, M., & Trudeau, F. (2007). Occupational health problems and injuries among Quebec's physical educators. *Applied Ergonomics*, 38(5), 625–634.
- Sandmark, H., Wiktorin, C., Hogstedt, C., Klenell-Hatschek, E. K., & Vingard, E. (1999). Physical workload in physical education teachers. *Applied Ergonomics*, 30(5), 435–442.

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This brief was based on OER 07/16 SM: Physiological Workload, Musculoskeletal Injuries and Dysfunctions Amongst Physical Education Teachers in Singapore Schools—A Prospective Investigation.

## How to cite this publication

Mukherjee, S, Kee, Y. H., & Bin Johari, M. *Physiological Workload, Musculoskeletal Injuries and Dysfunctions Amongst Physical Education Teachers in Singapore Schools—A Prospective Investigation* (NIE Research Brief Series No. 20-001). Singapore: National Institute of Education.

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