

Physical Activity and Psychological Wellbeing: The Mediating Role of Sleep Quality

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Purpose: Sleep disturbances are a significant public health concern due to their negative impact on psychological wellbeing. At the same time, physical activity can improve sleep quality and promote mental health. Since both sleep quality and physical activity are independently related to psychological wellbeing and physical activity may influence sleep, it is plausible that sleep quality mediates the relationship between physical activity and mental health. However, this hypothesis has not yet been examined. This study investigated whether sleep quality mediates the relationship between physical activity levels and psychological wellbeing.

Methods: An anonymous online survey was completed by 160 volunteers from the general population aged 18–65. Sleep quality was assessed using the Sleep Quality Scale (SQS), with higher scores indicating poorer sleep. Psychological wellbeing was measured with the Mental Health Continuum–Short Form (MHC-SF). Physical activity levels were classified as insufficient (1), moderate (2), or high (3), based on the International Physical Activity Questionnaire (IPAQ). Mediation analysis, based on linear regression with bootstrapped confidence interval (CI), was conducted to estimate direct and indirect effects. Repeated contrasts were applied to IPAQ categories to compare adjacent levels (2 vs 1, 3 vs 2).

Results: A significant indirect effect was observed for moderate versus insufficient physical activity (estimate = 1.78; 95% CI = 0.24, 4.24; $\beta = 0.055$), indicating that moderate activity was associated with greater psychological wellbeing through improved sleep quality. Higher physical activity was generally linked to better sleep, which in turn predicted enhanced wellbeing. In contrast, no significant indirect or direct effects were found for the comparison between high and moderate activity levels (estimate = -0.06 ; 95% CI = -1.87 , 1.50; $\beta = -0.002$). Thus, moderate activity appeared more beneficial than insufficient levels, while increasing activity beyond moderate levels did not confer additional psychological benefits via sleep quality.

Conclusion: These findings highlight sleep quality as a key mediator linking physical activity and psychological wellbeing. Interventions that promote even moderate levels of physical activity may enhance sleep and, consequently, mental health. Future studies should explore these associations longitudinally to determine causality and consider demographic or individual differences. Personalised lifestyle interventions, particularly for individuals with limited access to physical activity, warrant further investigation.

