

科技部人文社會科學研究中心
跨領域整合型研究計畫之前置規劃案成果報告

青少年靜態行為之跨領域研究

規劃案編號：MOST 107-2420-H-002-007-MY3-PA10703

規劃案執行期間：107年8月1日至108年1月31日

執行機構及系所：國立彰化師範大學運動健康研究所

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中 華 民 國 108 年 1 月 22 日

中英文摘要及關鍵詞

(一) 中文摘要

本整合型計畫聚焦在青少年靜態行為，並包含以下 3 項子計畫。

子計畫 1：綜整過去文獻發現，靜態行為佔據了青少年生活的多數時間，其每日靜態時間約介於 5.8 至 9.3 小時之間，據此，各國國家之公部門皆建議青少年應減少其從事靜態行為的時間，以減少靜態行為對於青少年健康的負面影響。但在測量工具部分，至今國、內外皆尚未能發展出同時具備良好信、效度的青少年靜態行為測量問卷，故尚缺乏對於其行為現況及趨勢的有效掌握。因此，本研究之第一年旨在發展一份「適合臺灣本土」的青少年靜態行為測量問卷，第二年再進行臺灣青少年「整體」及「不同面向 (如休閒、交通、學校、及居家)」靜態時間 (domain-specific sedentary behavior) 的大型流行病學調查，相關數據將有助於瞭解臺灣青少年靜態行為的現況。再者，有鑑於「環境因素」為影響青少年靜態行為與健康之重要決定因子，本研究將於第二、第三年運用量性與質性的混合研究，藉由探討青少年靜態行為的主、客觀環境因素，以發展長時間且大範圍的有效介入方案。依據上述研究背景，本研究之主要目的如下：(1) 第一年之目的為發展測量青少年靜態行為之問卷，並驗證其信度與效度。(2) 第二年將運用第一年所發展之問卷，進行全國電話訪問調查，以瞭解青少年靜態行為之現況，找出高風險的族群，並同時探討客觀環境因素與青少年靜態行為之關聯性。(3) 第三年主要運用焦點團體法及質性訪談，深入瞭解家長、老師及青少年本身對於靜態行為的環境有利及阻礙因子之主觀看法，最後將根據質性與量性的研究結果，提出我國青少年靜態行為之改變方案。綜整本研究三年期之研究結果，期能提出有效解決方案，作為未來主管機關與學校研擬相關政策或因應策略之重要參考。

子計畫 2：靜態行為與青少年身體健康 (如；肥胖、近視、代謝與心血管指標) 和社會心理健康 (如；自尊心、自我概念) 指標有顯著負相關，並可能增加社會行為問題。而睡眠不足的人容易感冒，且對學生的學習及學業表現有負面的影響，並會顯著增加死亡率的風險。

另外，靜態行為與睡眠困擾兩者皆為青少年健康之不利條件，而且兩者可能相互作用，增加青少年過重與肥胖的機率與憂鬱症狀。因此，本研究擬深入了解青少年之靜態行為與睡眠情形，並進行長期追蹤調查研究，進一步分析青少年靜態行為與睡眠品質變化之軌跡，並探討兩者之關係。

本計畫之研究對象為青少年，主要自變項為靜態行為，依變項為睡眠品質，控制變項包括人口統計學變項、身體適能及心理因素。本計畫擬分三年完成，主要研究方法為三年流行病學調查研究與穿戴式科技錶實驗介入研究，透過每年問卷調查，身高、體重、體適能等身體檢測，再加上客觀檢測靜態行為與睡眠品質。其次，於第二年進行穿戴式科技錶實驗介入，分析 3 個月穿戴式科技錶介入對青少年靜態行為之影響。

子計畫 3：青少年的生活型態多為久坐的長時間靜態行為，例如白天上課長期久坐，課後也持續參加課輔、寫作業、看電視、用電腦等等。但近期研究調查顯示，每天久坐超過 9 小時，身體各種危險指數就顯著上升。為早日預防此現象，本計畫擬探討青少年的

靜態行為與疲勞、認知功能之間的關係，藉由操弄不同強度的靜態時間中斷介入方法，包括輕度的站著上課（實驗組一）與中度的踩踏運動（實驗組二），比較兩種實驗組與傳統上課模式的控制組，在疲勞與認知功能表現上的長短期影響。研究第一年採短期介入實驗、第二年採長期介入實驗，第三年則改以質化研究方式，召集焦點團體訪談，探討實際應用層面的政策可行性。研究結果預計可整合質化與量化研究的數據，提供教育現場政策修正的依據，期望對於改善青少年長期靜態活動的現況能提出具體且實質的建議。

關鍵字：久坐、學生、地理資訊系統、失眠、認知、長期追蹤、介入研究

(二) 英文摘要

This integrated research project focuses on sedentary behaviors in adolescents and comprises the three sub-studies as follows.

Substudy 1: Previous studies have shown that sedentary behavior occupies the majority of time among adolescents' life. The adolescents on average spend 5.8-9.3 hours in a day on sedentary behavior. Although a number of countries have recommended the adolescents to reduce their sedentary time, there is still no sedentary behavior questionnaire with both good reliability and validity for adolescents in the world. Therefore, it is important to develop a valid and reliable questionnaire of sedentary behavior in adolescents, for the purpose of population-based survey. To better understand the prevalence of sedentary behavior in Taiwanese adolescents, this study aimed to develop a sedentary behavior questionnaire for local Taiwanese adolescents in first year, and then further investigate their domain-specific sedentary behavior, such as leisure, transport, school and household in next year. These data would be critical to inform policy maker. Moreover, given that "environment" is a key determinant of adolescents' health, to further identify the built and perceived environmental factors associated with adolescents' sedentary behavior is also beneficial for designing long-term impact on larger population. Existing literature on this issue is mostly reported from Western countries, however, there is still limited evidence from Taiwan. Based on above-mentioned research gap, this study aimed to (1) develop a sedentary behavior questionnaire for Taiwanese adolescent and test its validity and reliability in the first year. (2) to investigate the prevalence of adolescent sedentary behavior via telephone-based survey using our developed questionnaire in first year and also identify the at-risk population and related environmental factors. (3) to better understand the school teacher, parents and students' perception of environmental facilitators and barriers using focus group and in-depth interview. Based on these qualitative and quantitative results, we will propose potential strategy for adolescents' sedentary behavior. To sum up, the results of this proposal are expected to provide potential solutions for the basis of informing policy maker and school.

Substudy 2: Sedentary behavior was associated with negative health outcomes including physical (e.g. obesity, myopia, metabolic and cardiovascular indicators) and mental health (e.g. self-esteem, self-concept) and may increase social behavioral problems among adolescents. People who are not getting enough sleep are prone to catch a cold and have negative impacts on their learning and academic performance. Lack of sleep also significantly increase the risk of mortality. Additionally, both sedentary behavior and sleep disturbance are risk factors for adolescent health, which may interact and increase the risks of obesity and depression among adolescents. Therefore, this study will explore the associations between sedentary behaviors and sleep quality among adolescents. It will conduct a long-term follow-up investigation to further analyze the changes of sedentary behavior and sleep quality among adolescents. The participants of this study will be adolescents. The independent variable will be sedentary behavior and the dependent variable will be sleep quality. The control variables will include demographic variables, physical fitness and psychological factors. This study will be a three-year project, including a three-year epidemiologic survey and an experimental intervention by wearing wearable devices. The epidemiologic study will consist of annual questionnaire survey, physical

tests (e.g. body height, weight, physical fitness), and device-measured sedentary behavior and sleep quality. In the second year, a three-month experimental intervention by wearing wearable devices will be conducted to examine the effects of wearable devices on sedentary behaviors among adolescents.

Substudy 3: The lifestyles of adolescents are mostly sedentary. For example, adolescents spend long time sitting in the classroom to study when they are in the school. After school, they attend tutoring classes or cram schools, do homework, watch television, use computers, etc. These activities again involve long-time sitting. However, according to recent research, various risk indicators rise significantly when adults sit over a long period of more than 9 hours per day. In order to prevent this phenomenon at an early age, this project intends to explore the relationship among factors of sedentary behavior, fatigue, and cognitive functions in adolescents. By means of intervention methods that break the sedentary time with different levels of activity intensities, including mild intensity of standing during class (Experimental Group 1) and moderate intensity of pedaling in class (Experimental Group 2), this study attempts to compare the short-term and long-term effects of different types of intervention upon fatigue and cognitive function performance with a control group. The present study plans to conduct a short-term intervention experiment in the first year and a long-term intervention experiment in the second year. In the third year, a qualitative research method will be adopted by hosting focus group interviews to discuss the feasibility of the practical application of the intervention in terms of policy making. The results of the study are expected to integrate data from qualitative and quantitative research methods and to provide a basis for policy revisions on educational sites. It is expected that specific and substantive recommendations can be made to improve the current situation of adolescents' sedentary behavior.

Keywords: prolonged sitting, student, Geographical Information System (GIS), insomnia, cognition, longitudinal, intervention study