

Sedentary Behaviour and Mental Health in Children and Adolescents: A Meta-analysis

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Abstract

Background: A growing body of research is emerging examining the associations between sedentary behaviour and mental health in young people. The magnitude of the impact sedentary behaviour has on the mental health of young people has not been examined, though this has been investigated for physical health conditions. The aim of this article is to examine the associations between sedentary behaviour and mental health in young people aged 5-18 years of age using meta-analysis.

Methods: Published studies in the English language were located via manual and computerised searches of PubMed, Science Direct, SPORTDiscus, PsychINFO, Medline, Web of Science, Cochrane Library, and Google Scholar databases. Included were observational studies assessing an association between at least one sedentary behaviour and at least one aspect of mental health in young people aged 5-18 years. Effect sizes (ESs) were calculated for each study and an overall effect size was computed. Average effect sizes were also calculated for moderator variables.

Results: Thirty-five studies were included (n=373,512); most studies examined screen-time as sedentary behaviour and five mental health outcomes were identified (depression, anxiety, self-esteem, psychological distress, and quality of life). The summary effect was small and significant (ES = -0.30, 95% confidence intervals = -0.20, -0.45, p<0.001), suggesting that sedentary behaviour is negatively associated with mental health in young people. Moderator analysis showed that television viewing had the largest effect size (ES = -0.47, 95% confidence intervals = -0.35, -0.62, p<0.001). Moreover, depression seems to be the main mental health outcome affected by sedentary behaviour (ES = 0.55, 95% confidence intervals = 0.42, 0.68, p<0.001).

Conclusions: There was a small but a significant negative association between sedentary behaviour and mental health. High levels of sedentary behaviour are associated with increased depressive symptoms. This finding is consistent with a systematic review on adults which indicated that sedentary behaviour is significantly associated with mental health problems.

Keywords: Sedentary behavior; Sitting time; Screen; TV; Video game; Computers games; Mental health; Depression; Anxiety; Stress; Psychological distress

Background

Mental health is a complex part of cognitive neuroscience by factors such as biopsychosocial –i.e. biological, psychological, social and environmental systems [1]. Individual lifestyles have become a central focus in healthcare since population patterns of ill health have changed from contagious to lifestyle diseases [1,2]. It is well established that physical activity is associated with positive health in all populations health of physical

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did not provide data, the entire article was retrieved and screened to determine whether it met the inclusion criteria. A customised 'in-out' form was used to appraise the studies for inclusion or exclusion.

Total sedentary	3.05	1	p>0.05	0.05	-0.02, 0.10	2	n.s
Mental well-being outcome							
Anxiety	6.99	4	p>0.05	0.31	0.14, 0.45	5	*
Depression	2206.49	9	p<0.001	0.55	0.42, 0.68	10	*
Self-esteem	10.95	7	p>0.05	0.01	-0.01, 0.02	8	n.s
Psychological distress	1812.87	3	p<0.001	0.41	0.30, 0.56	4	*
Quality of life	73.50	2	p<0.001	-0.15	-0.12, -0.23	3	*
Study quality							
High	18757.05	19	p<0.001	0.31	0.20, 0.45	20	*
Low							

Schmitz et al. [26]	N = 3798 students from sixteen schools in the U.S. Boys and girls of 11 to 15 years.	Cross-sectional	Television viewing and video game playing	Depression	non-use of computer games. Sedentary behaviour was positively associated with depression.	7
Murdey et al. [23]	N = 119 children and adolescents from two schools in the U.K. Boys and girls aged 10 to 15 years.	Cross-sectional	Sedentary behaviour	Self-esteem	A significant but small negative association between sedentary behaviour and body image in girls.	8
Singer et al. [49]	N = 2245 students from eleven schools in U.S. Boys and girls from 7 to 15 years.	Cross-sectional	Television viewing	Anxiety	A significant but small positive association between sedentary behaviour and anxiety.	5
Chen et al. [50]	N = 7887 junior high school students from Japan. Boys and girls of 12 to 13 years.	Cross-sectional	Television viewing	Quality of life	Longer duration of television viewing was significantly associated with poor quality of life.	7
Lohaus et al. [51]	N = 357 German students. Boys and girls aged 10 to 14 years	Cross-sectional	Television viewing and computer use	Anxiety	A significant but small positive association between media use and anxiety.	7
Ybarra et al. [52]	N = 1501 children and adolescents from the U.K. Boys and girls from 11 to 16 years.	Cross-sectional	Internet use	Depression	Internet use for 3 hours a day was significantly associated with higher depression.	5
Goldfield et al. [53].	N = 30 Canadian children. Boys and girls of 8 to 12 years.	Cross-sectional	Television viewing	Self-esteem	A significant negative relationship between sedentary behaviour and physical self-worth and global self-esteem. A moderate association determined.	6
Ha et al. [54]	N = 452 Korean adolescents. Boys and girls.	Cross-sectional	Internet use	Depression	A significant and strong positive relationship between excessive internet	

Holder et al. [59]	N = 375 Canadian school children of 8 to 12 years. Boys and girls.	Cross-sectional	Screen use (Television, computer and video games)	Happiness and self-esteem	A small negative association between screen use and happiness. A small negative association between screen use and body image.	4
Iannotti et al. [60]	N = 204534 students from ten countries in Europe and America. Boys and girls of 11 to 15 years.	Cross-sectional	Screen use (Television, computer and video games)	Self-esteem and quality of life	A small but significant negative association between screen use and self-esteem and quality of life.	7
Iannotti et al. [61]	2 samples. N = 22084 school children from 40 countries in the U.S. and Canada. Boys and girls.	Cross-sectional	Screen use (Television, computer and video games)	Self-esteem and quality of life	A small but significant association between screen use and self-esteem and quality of life.	6
Mathers et al. [62]	N = 925 adolescents. Boys and girls of 13 to 20 years.	Cross-sectional	Screen use (Television, computer, video games)	Psychological distress	Longer use of screen was significantly associated with higher psychological difficulties.	9
Primack et al. [25]	N = 4142 adolescents from multi-ethnic cultures including Europe, America and Asia. Boys and girls.	Longitudinal	Screen use (Television, computer and video games)	Depression	Longer television viewing was significantly associated with the likelihood of higher depression at follow-up.	7
Russ et al. [63]	N = 54863 (TOM video)					

screen use constitutes the main aspect of sedentary behaviour in young people than other aspects of sedentary behaviour associated with reading, sitting to chat without screen and travelling. Strasburger [10]

12. Haines L, Wan KC, Lynn R, Barrett TG, Shield JP (2007) Rising incidence of type 2 diabetes in children in the U.K. *Diabetes Care* 30: 1097-1101.
13. Mark AE, Janssen I (2008) Relationship between screen time and metabolic syndrome in adolescents. *J Public Health (Oxf)* 30: 153-160
14. Tremblay MS, Willms JD (2003) Is the Canadian childhood obesity epidemic related to physical inactivity? *Int J Obes Relat Metab Disord* 27: 1100-1105
15. National Health Service (2009) Healthy bodies, healthy minds: Physical activity and mental health in children and young people. Edinburgh: National Health Service.
16. World Health Organization (2011) Adolescent health. Geneva: World Health Organization.
17. Emerson CS, Mollet GA, Harrison DW (2005) Anxious-depression in boys: an evaluation of executive functioning. *Arch Clin Neuropsychol* 20: 539-546
18. Biddle SJ, Asare M (2011) Physical activity and mental health in children and adolescents: a review of reviews. *Br J Sports Med* 45: 886-895
19. Chinapaw MI, Proper KI, Brug J, van Mechelen W, Singh AS (2011) Relationship between young people's sedentary behaviour and biomedical health indicators: a systematic review of prospective studies. *Obes Rev* 12: 621-632
20. Craggs C, Corder K, van Sluijs EM, SJ (2011) Determinants of change in physical activity in children and adolescents: a systematic review. *Am J Prev Med* 40: 645-658
21. Cohen J (1998) *Statistical power analysis for the behavioural sciences* (2nd Edn.). Hillsdale: Erlbaum
22. Moher D, Liberati A, J Altman DG, (2009) PRISMA Group: Preferred reporting items for systematic reviews and meta-analyses: PRISMA Statement. *Br Med J* 339: b2535
23. Murley ID, Cameron N, Biddle SJ, Marshall SJ, Gorely T (2004) Pubertal development and sedentary behaviour during adolescence. *Ann Hum Biol* 31: 75-86
24. Lemola S, Brand S, Vogler N, Perkinson-Gloor N, Allemann M, et al. (2011) Habitual computer game playing at night is related to depressive symptoms. *Personality and Individual Differences* 51: 117-122
25. Primack BA, Swanier B, Georgiopoulos AM, Land SR, Fine MJ (2009) Association between media use in adolescence and depression in young adulthood: a longitudinal study. *Arch Gen Psychiatry* 66: 181-188
26. Schmitz KH, Lytle LA, Phillips GA, Murray DM, Bimbaum AS, et al. (2002) Psychosocial correlates of physical activity and sedentary leisure habits in young adolescents: the Teens Eating for Energy and Nutrition at School study. *Prev Med* 34: 266-278
27. Li Dowda M, Dezauteux C, Pate R (2010) Associations between sport and screen-entertainment with mental health problems in 5-year-old children. *Int J Behav Nutr Phys Act* 7: 30
28. Ussher MH, Owen CG, Cook DG, Whincup PH (2007) relationship between physical activity, sedentary behaviour and psychological wellbeing among adolescents. *Soc Psychiatry Psychiatr Epidemiol* 42: 851-856
29. Teychenne M, Ball K, Salmon J (2010) Sedentary behavior and depression among adults: a review. *Int J Behav Med* 17: 246-254
30. Hamilton MT, Hamilton DG, Zderic TW (2004) Exercise physiology versus inactivity physiology: an essential concept for understanding lipoprotein lipase regulation. *Exerc and Sport Sci Rev* 32: 161-166
31. Owen N, Healy GN, Matthews CE, Dunstan DW (2010) Too much sitting: the population health science of sedentary behavior. *Exerc Sport Sci Rev* 38: 105-113
32. Shann MH (2001) Students' use of time outside of school: A case for school programs for urban middle school youth. *Urban Rev* 33: 339-356
33. Rideout V, Roberts DF, Foehr MA (2010) *Generation M: Media in the lives of 8-18 year olds*. Menlo Park CA: Henry J Kaiser Family Foundation.
34. Biddell SJ, Blyth BJ, Buntin J, Riscoe BL, Chermak SD (2011) TVs in the bedrooms of children: does it impact health and behavior? *Prev Med* 52: 104-108
35. Battle J (1980) Relationship between self-esteem and depression among high school students. *Percept Mot Skills* 51: 157-158
36. Durkin K, Barber B (2002) Not so doomed: computer game play and positive adolescent development. *Applied Dev Psychol* 23: 373-392
37. Valkenburg PM, Peter J, Schouten AP (2006) Friend networking sites and their relationship to adolescents' well-being and social self-esteem. *Cyberpsychol Behav* 9: 584-590
38. Comer RJ (2007) *Abnormal psychology* (6th Edn.). New York: Worth Publishers.
39. Brodersen NH, Steptoe A, Boniface DR, Wardle J (2007) Trends in physical activity and sedentary behaviour in adolescence: ethnic and socioeconomic. *Br J Sports Med* 41: 140-144
40. Lack CW, Green AL (2009) Mood disorders in children and adolescents. *J Pediatr Nurs* 24: 13-25
41. Choo H, Gentile DA, Sim T, Li D, Khoo A, et al. (2010) Pathological video-gaming among Singaporean youth. *Ann Acad Med Singapore* 39: 822-829
42. Deyreh E (2011) Psychological pathology of computer and video games among elementary students. *Procedia Soc Behav Sci* 15: 3095-3097.
43. Aronen ET, Simola P, Soininen M (2011) Motor activity in depressed children. *J Disord* 133: 188-196
44. Biddle SJ, Gorely T, Marshall SJ (2009) Is television viewing a suitable marker of sedentary behavior in young people? *Ann Behav Med* 38: 147-153
45. Richardson CR, Faulkner e

- well-being among adolescents: a longitudinal study. *Dev Psychol* 44: 655-665.
58. Hamer M, Stamatakis E, Mishra G (2009) Psychological distress, television viewing, and physical activity in children aged 4 to 12 years. *Pediatrics* 123: 1263-1268.
59. Holder MD, Coleman B, Sehn ZL (2009) Contribution of active and passive leisure to children's well-being. *J Health Psychol* 14: 378-386.
60. Iannotti RJ, Janssen I, Haug E, Kololo H, Annaheim B, et al. (2009) Interrelationships of adolescent physical activity, screen-based sedentary behaviour, and social and psychological health. *Int J Public Health* 54 Suppl 2: 191-198.
61. Iannotti RJ, Kogan MD, Janssen I, Boyce WF (2009) Patterns of adolescent physical activity, screen-based media use, and positive and negative health indicators in the U.S. and Canada. *J Adolesc Health* 44: 493-499.
62. Mathers M, Canterford L, Olds T, Hesketh K, Ridley K, et al. (2009) Electronic media use and adolescent health and well-being: cross-sectional community study. *Acad Pediatr* 9: 307-314.
63. Russ SA, Larson K, Franke TM, Halfon N (2009) Associations between media use and health in US children. *Acad Pediatr* 9: 300-306.
64. Dumith SC, Hallal PC, Menezes AM, Araujo CL (2010) Sedentary behavior in adolescents: the 11-year follow-up of the 1993 Pelotas (Brazil) birth cohort study. *Cad Saude Publica* 26: 1928-1936.
65. Katon W, Richardson L, Russo J, McCarty CA, Rockhill C, et al. (2010) Depressive symptoms in adolescence: the association with multiple health risk behaviors. *Gen Hosp Psychiatry* 32: 233-239.
66. Page AS, Cooper AR, Griew P, Jago R (2010) Children's screen viewing is related to psychological health irrespective of physical activity. *Pediatrics* 126: e1011-1017.
67. Cao H, Qian Q, Weng T, Yuan C, Sun Y, et al. (2011) Screen time, physical activity and mental health among urban adolescents in China. *Prev Med* 53: 316-320.
68. Holtz P, Appel M (2011) Internet use and video gaming predict problem behavior in early adolescence. *J Adolesc* 34: 49-58.
69. Jackson LA, von Eye A, Fitzgerald HE, Witt EA, Zhao Y (2011) Internet use, videogame playing and cell phone use as predictors of children's body mass index (BMI), body weight, academic performance, and social and overall self-esteem. *Computers in Human Behav*, 27: 599-604.
70. Messias E, Castro J, Saini A, Usman M, Peoples D (2011) Sadness, suicide, and their association with video game and internet overuse among teens: results from the youth risk behavior survey 2007 and 2009. *Suicide Life Behav* 41: 307-315.
71. Sund AM, Larsson B, Wichström L (2011) Role of physical and sedentary activities in the development of depressive symptoms in early adolescence. *Soc Psychiatry Psychiatr Epidemiol* 46: 431-441.