PERCHE' L'ATTIVITA' FISICA E' UN INTERVENTO FONDAMENTALE IN MEDICINA ED IN PSICHIATRIA E NON VIENE PRESCRITTA?

ALCUNE RISPOSTE

Giovanni de Girolamo
IRCCS Fatebenefratelli, Brescia

Zip! è un progetto realizzato grazie al sostegno di Fondazione della Comunità Bresciana, in collaborazione con Fondazione Cariplo

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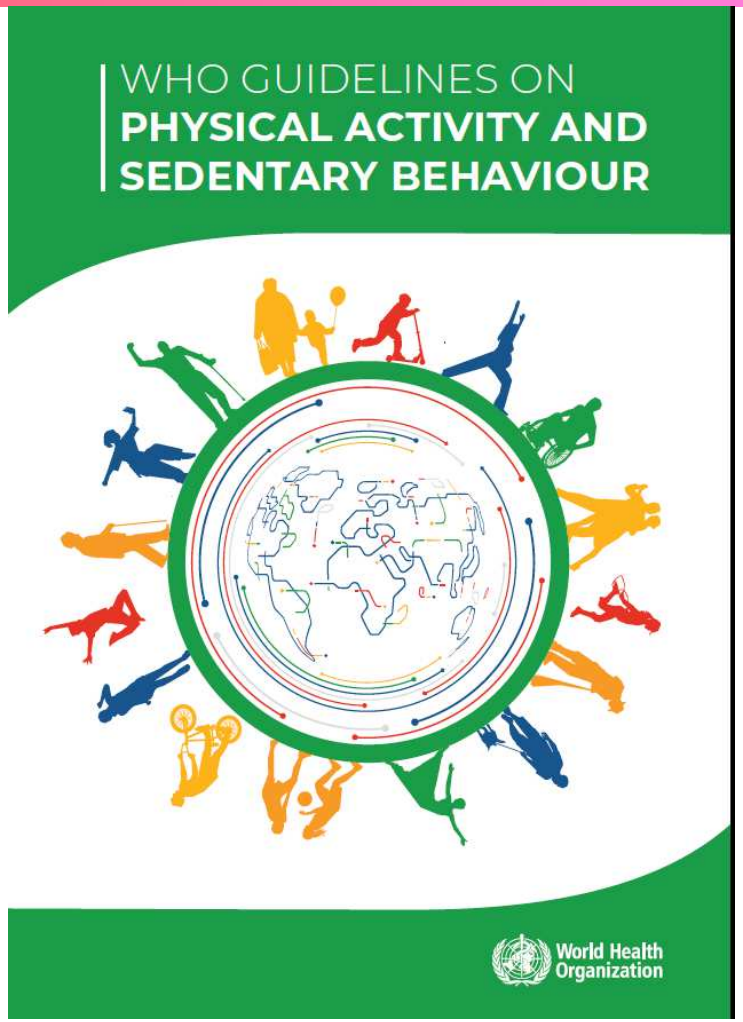
2020



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ADULTS
(aged 18–64 years)

In adults, physical activity confers benefits for the following health outcomes: improved all-cause mortality, cardiovascular disease mortality, incident hypertension, incident site-specific cancers,[1] incident type-2 diabetes, mental health (reduced symptoms of anxiety and depression); cognitive health, and sleep; measures of adiposity may also improve.

It is recommended that:

› **All adults should undertake regular physical activity.**

Strong recommendation, moderate certainty evidence

› **Adults should do at least 150–300 minutes of moderate-intensity aerobic physical activity; or at least 75–150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week, for substantial health benefits.**

Strong recommendation, moderate certainty evidence

For additional health benefits:

On at least **2** days a week

muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups.

› **Adults should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits.**

Strong recommendation, moderate certainty evidence

[1] *Site-specific cancers of: bladder, breast, colon, endometrial, oesophageal adenocarcinoma, gastric, and renal.*

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PHYSICAL ACTIVITY CLASSIFICATION

Sedentary behaviour: time spent sitting or lying down (except when sleeping), with very little energy expenditure, as sitting at work, watching TV, reading.

Light intensity activities: those that require standing up and moving around, either in the home, workplace or community, as housework like hanging out the washing, ironing and dusting, working at a standing workstation.

Moderate intensity: the activities require some effort but you can still talk while doing them, as brisk walking, recreational swimming, social tennis, cleaning the windows at home.

Vigorous intensity: the activities lead to harder breathing, or puffing and panting (depending on your fitness), as aerobics, jogging, many competitive sports, lifting, carrying and digging.

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Physical Activity: Benefits

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- Early death
- Coronary artery disease
- Stroke
- High blood pressure
- Adverse lipid profile
- Type II Diabetes
- Metabolic syndrome
- Colon Cancer
- Breast Cancer
- Prevention of Weight Gain and to achieve weight loss
- Bone health in kids
- Function in older adults

- Hip fracture, falls, bone density
- Lung cancer
- Endometrial cancer
- Maintaining wt loss
- Improved sleep quality

- Within weeks
- Increased cardiorespiratory fitness
- Increased muscular strength
- Decreased blood pressure
- Decreased depressive

Deaths potentially averted by small changes in physical activity and sedentary time: an individual participant data meta-analysis of prospective cohort studies

Ulf Ekelund, Jakob Tarp, Ding Ding, Miguel Adriano Sanchez-Lastra, Knut Eirik Dalene, Sigmund A Anderssen, Jostein Steene-Johannessen, Bjørge H Hansen, Bente Morseth, Laila A Hopstock, Edvard Sagelv, Peter Nordström, Anna Nordström, Maria Hagströmer, Ing-Mari Dohrn, Keith M Diaz, Steven Hooker, Virginia J Howard, I-Min Lee, Morten W Fagerland

Summary

Background The effects of small, realistic changes in physical activity and sedentary behaviour on population-level mortality are unclear. We aimed to estimate the proportion of deaths preventable by 5-min and 10-min incremental increases in moderate-to-vigorous intensity physical activity (MVPA) and 30-min and 60-min reductions in daily sedentary time.

Methods We did an individual participant data meta-analysis of prospective cohort studies. We included studies with device-measured physical activity and sedentary time. We estimated the proportion of deaths prevented (potential impact fractions; PIFs) by changes in (1) the approximately 20% least active participants (high-risk approach) and (2) all participants except the approximately 20% most active (population-based approach). We calculated PIFs from adjusted hazard ratios estimated for 5-min and 10-min increases in MVPA and 30-min and 60-min reductions in sedentary time from observed levels across the activity distribution.

Findings We included seven cohorts from Norway, Sweden, and the USA (n=40 327; 4895 deaths). Data from the UK Biobank (n=94 719; 3487 deaths) were analysed separately. A 5-min/day increase in MVPA in the least active participants might prevent 6·0% (95% CI 4·3–7·4) of all deaths. A similar increase in MVPA in all participants except the most active might prevent 10·0% (6·3–13·4) of all deaths. Reducing sedentary time by 30 min/day might prevent 3·0% (2·0–4·1) of all deaths in the high-risk approach and 7·3% (4·8–9·6) in the population-based approach. Results from the UK Biobank were of a smaller magnitude but still substantial—eg, reducing sedentary time by 30 min/day in all except the most active participants was associated with preventing 4·5% (2·8–6·1) of total deaths.

Interpretation Small and realistic increases in MVPA of 5 min/day might prevent up to 6% of all deaths in a high-risk approach and 10% of all deaths in population-based approach. Reducing sedentary time by 30 min/day might prevent a smaller, but still meaningful, proportion of deaths in the two risk scenarios.

Funding None.

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Oslo Research Centre for Physical Activity and Population Health (ORC-PAPH), Department of Sports Medicine, Norwegian School of Sport Sciences, Oslo, Norway (Prof U Ekelund PhD, J Tarp PhD, M A Sanchez-Lastra PhD, Prof S A Anderssen PhD, Prof J Steene-Johannessen PhD, Prof B H Hansen PhD, M W Fagerland PhD); Department of Chronic Diseases, Norwegian Institute of Public Health, Oslo, Norway (Prof U Ekelund, K E Dalene PhD); Prevention Research Collaboration, Sydney School of Public Health (Prof D Ding PhD), Charles Perkins Centre (Prof D Ding), The University of Sydney, Camperdown, NSW, Australia; Department of Special Didactics, Faculty of Education and Sports Sciences, University of Vigo, Pontevedra, Spain (M A Sanchez-Lastra); Well-

N in Norvegia, Svezia e USA: 40.327

N in Inghilterra: 94.719

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Background e Obiettivo

Problema

- **L'inattività fisica causa il 7–9% della mortalità globale**
- **Le stime esistenti si basano su dati self-report e sulla dicotomizzazione attivo/inattivo**
- **Effetti di piccoli aumenti realistici di PA sulla mortalità di popolazione: sconosciuti**

Obiettivo

Stimare la proporzione di morti prevenibili (PIF) con:

- **+5 e +10 min/die di MVPA**
- **−30 e −60 min/die di tempo sedentario**
- **+30 e +60 min/die di LPA e PA totale**

Due scenari: high-risk (20% meno attivi) e population-based (tutti tranne il 20% più attivi)

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Metodi

Campione

- 7 coorti (Norvegia, Svezia, USA)
- N = 40.327; 4.895 decessi
- UK Biobank separata (N = 94.719; 3.487 decessi)
- Età media 63,9 anni; 61% donne
- Follow-up medio 8,2 anni

Esposizioni

- PA misurata con accelerometro (anca o polso)
- MVPA, LPA, PA totale, tempo sedentario (min/die)
- Dati armonizzati tra coorti
- Analisi basata su distribuzioni continue

Analisi

- IPD meta-analisi a due stadi
- Spline cubiche (nodi a P5, P35, P65, P95)
- Modelli di Cox (fully adjusted)
- Potential Impact Fractions (PIF) cumulative
- Approccio di Rose: high-risk vs popolazione

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Risultati Principali: MVPA e Mortalità

6,0%

IC 95%: 4,3–7,4

Morti evitate con +5 min/die MVPA

Approccio high-risk (20% meno attivi)

10,0%

IC 95%: 6,3–13,4

Morti evitate con +5 min/die MVPA

Approccio population-based (80% meno attivi)

8,8%

IC 95%: 7,0–10,4

Morti evitate con +10 min/die MVPA

Approccio high-risk

14,9%

IC 95%: 9,7–19,3

Morti evitate con +10 min/die MVPA

Approccio population-based

Nota: +5 min/die di MVPA da 1 a 6 min → riduzione del rischio ~30%. Rendimenti decrescenti oltre ~24 min/die.

Conclusioni e Implicazioni

Anche piccoli aumenti di 5 min/die di MVPA possono prevenire fino al 6–10% di tutte le morti, a seconda dell'approccio preventivo adottato

Ridurre il tempo sedentario di 30 min/die potrebbe prevenire il 3–7% delle morti — un obiettivo raggiungibile con interventi evidence-based

I maggiori benefici si osservano ai livelli più bassi di attività: ogni minuto in più conta di più per i soggetti più inattivi.

Ekelund U et al. The Lancet 2026. DOI: 10.1016/S0140-6736(25)02219-6

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Physical Activity 2

Correlates of physical activity: why are some people physically active and others not?

*Adrian E Bauman, Rodrigo S Reis, James F Sallis, Jonathan C Wells, Ruth J F Loos, Brian W Martin, for the Lancet Physical Activity Series Working Group**

Lancet 2012; 380: 258–71

Published Online
July 18, 2012
tp://dx.doi.org/10.1016/
)140-6736(12)60735-1

he second in a Series of
rs about physical activity

bers listed at end of paper

Prevention Research
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ydney, NSW, Australia
Bauman PhD); School
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Pontifícia Universidade
ólica do Paraná, Curitiba,

Physical inactivity is an important contributor to non-communicable diseases in countries of high income, and increasingly so in those of low and middle income. Understanding why people are physically active or inactive contributes to evidence-based planning of public health interventions, because effective programmes will target factors known to cause inactivity. Research into correlates (factors associated with activity) or determinants (those with a causal relationship) has burgeoned in the past two decades, but has mostly focused on individual-level factors in high-income countries. It has shown that age, sex, health status, self-efficacy, and motivation are associated with physical activity. Ecological models take a broad view of health behaviour causation, with the social and physical environment included as contributors to physical inactivity, particularly those outside the health sector, such as urban planning, transportation systems, and parks and trails. New areas of determinants research have identified genetic factors contributing to the propensity to be physically active, and evolutionary factors and obesity that might predispose to inactivity, and have explored the longitudinal tracking of physical activity throughout life. An understanding of correlates and determinants, especially in countries of low and middle income, could reduce the effect of future epidemics of inactivity and contribute to effective global prevention of non-communicable diseases.

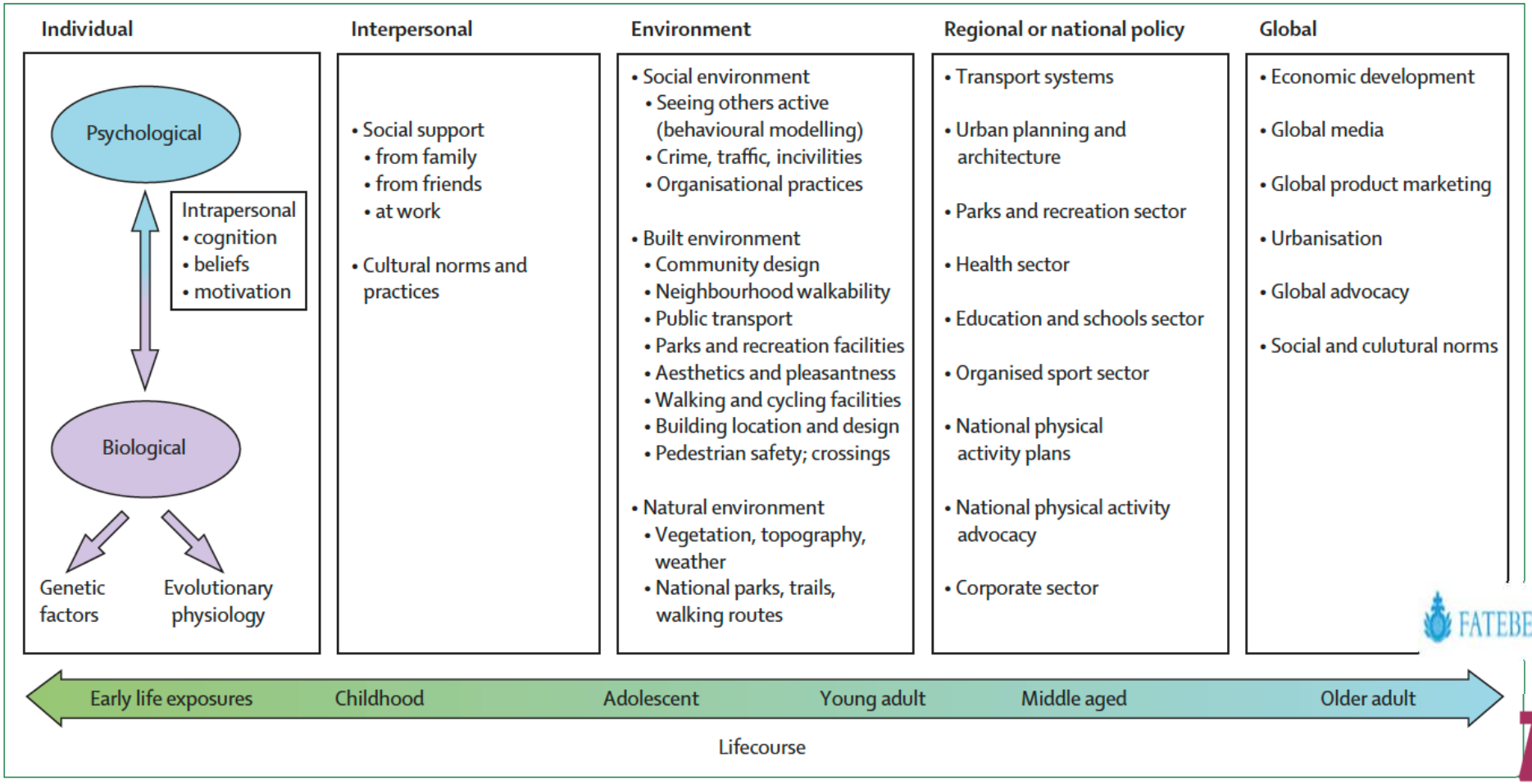
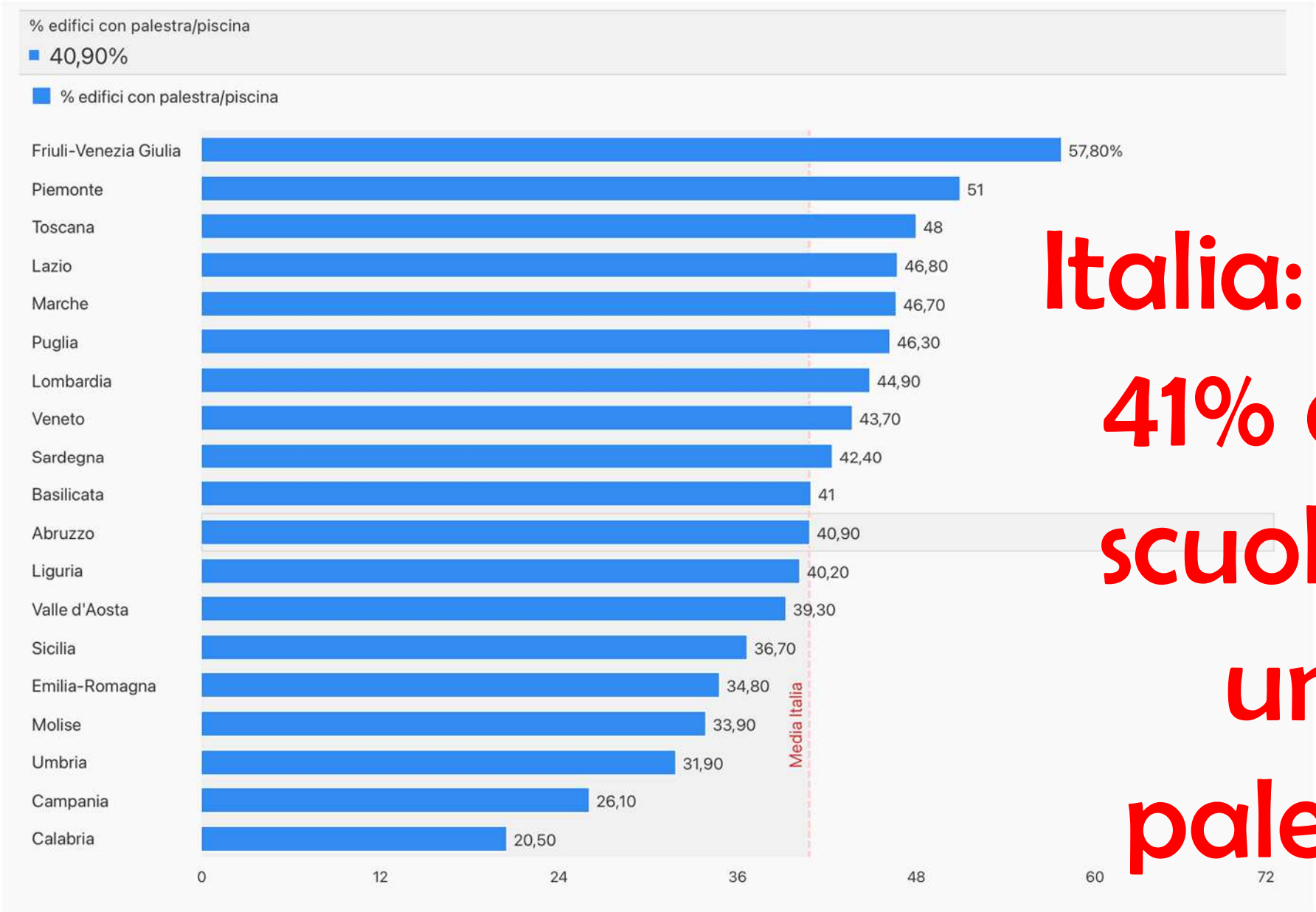


Figure 1: **Adapted ecological model of the determinants of physical activity**



Italia: solo il 41% delle scuole ha una palestra

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MODELLO COM (Michie et al, 2011)

CHILDREN AND ADOLESCENTS
(aged 5–17 years)

In children and adolescents, physical activity confers benefits for the following health outcomes: improved physical fitness (cardiorespiratory and muscular fitness), cardiometabolic health (blood pressure, dyslipidaemia, glucose, and insulin resistance), bone health, cognitive outcomes (academic performance, executive function), mental health (reduced symptoms of depression); and reduced adiposity.

At least **60** minutes a day

moderate- to vigorous-intensity physical activity across the week; most of this physical activity should be aerobic.

It is recommended that:

› **Children and adolescents should do at least an average of 60 minutes per day of moderate- to vigorous-intensity, mostly aerobic, physical activity, across the week.**

Strong recommendation, moderate certainty evidence

On at least **3** days a week

vigorous-intensity aerobic activities, as well as those that **strengthen muscle and bone** should be incorporated.

› **Vigorous-intensity aerobic activities, as well as those that strengthen muscle and bone, should be incorporated at least 3 days a week.**

Strong recommendation, moderate certainty evidence

GOOD PRACTICE STATEMENTS

- Doing some physical activity is better than doing none.
- If children and adolescents are not meeting the recommendations, doing some physical activity will benefit their health.
- Children and adolescents should start by doing small amounts of physical activity, and gradually increase the frequency, intensity and duration over time.
- It is important to provide all children and adolescents with safe and equitable opportunities, and encouragement, to participate in physical activities that are enjoyable, offer variety, and are appropriate for their age and ability.

In children and adolescents, higher amounts of sedentary behaviour are associated with the following poor health outcomes: increased adiposity; poorer cardiometabolic health, fitness, behavioural conduct/pro-social behaviour; and reduced sleep duration.

It is recommended that:

› **Children and adolescents should limit the amount of time spent being sedentary, particularly the amount of recreational screen time.**

Strong recommendation, low certainty evidence

LIMIT the amount of time spent being sedentary, particularly recreational screen time.

At least **60** minutes a day

moderate- to vigorous-intensity physical activity across the week; most of this physical activity should be aerobic.

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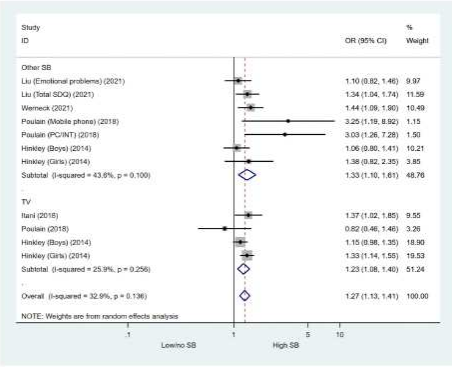

Fig. 5. Forest plot for the association between sedentary behaviour and other mental health problems using logistic regressions
Legend: SB: sedentary behaviour, SDQ: Strength and Difficulties Questionnaire, ST: screen time, PC: computers, TV: television.

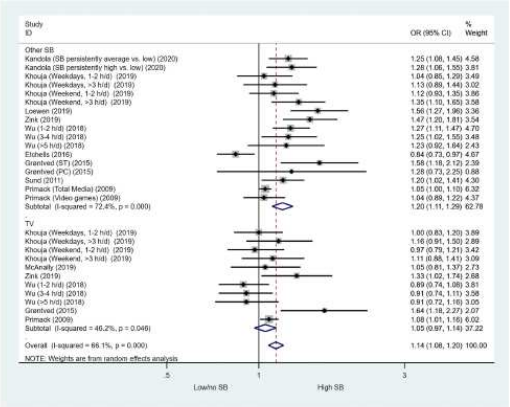

Fig. 2. Forest plot for the association between sedentary behaviour and depression using logistic regressions
Legend: SB: sedentary behaviour, ST: screen time, PC: computers.

Journal of Affective Disorders 306 (2022) 90–114

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

The influence of sedentary behaviour on mental health among children and adolescents: A systematic review and meta-analysis of longitudinal studies

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ARTICLE INFO

Keywords:
Sedentary behaviour
Mental health
Children
Adolescents
Systematic review
Longitudinal study

ABSTRACT

Background: Systematic reviews that have examined associations between sedentary behaviour (SB) and mental health among children and adolescents are mainly based on cross-sectional investigations. There is a lack of evidence for a prospective relationship between SB and mental health in children and adolescents. This systematic review synthesized longitudinal studies that examined prospective associations between SB and mental health among children and adolescents.

Methods: We conducted computer searches for English language literature from electronic databases of PubMed, Embase, PsycInfo and Google scholar, and manually screened the references of existing relevant studies to select studies for the synthesis. We included observational longitudinal studies that assessed the association between SB and mental health among children and adolescents. This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Results: In total, 50 longitudinal studies met the inclusion criteria and were synthesized in the review. We found that higher SB among children and adolescents was associated with increased depression, anxiety and other mental health problems later in life. A dose-response association between SB and mental health was observed, suggesting that children and adolescents who spend more time on SB may have a higher risk of developing poorer mental health later.

Conclusions: The findings in the present study suggest that intervention programs targeting reducing SB may benefit to the prevention of poor mental health among children and adolescents. Future intervention studies especially randomized controlled trials are needed to elucidate a causal relationship between SB and mental health among children and adolescents.

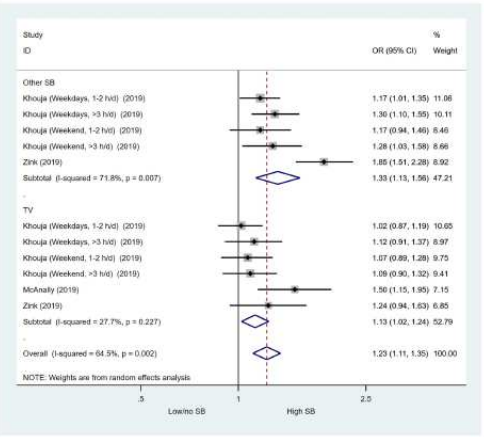

Fig. 4. Forest plot for the association between sedentary behaviour and anxiety using logistic regressions
Legend: SB: sedentary behaviour, TV: television.

Preventive Medicine 76 (2015) 48–57

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Preventive Medicine

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Review

Sedentary behavior and indicators of mental health in school-aged children and adolescents: A systematic review

Vivien Suchert *, Reiner Hanewinkel, Barbara Isensee

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ARTICLE INFO

Available online 18 April 2015

Keywords:
Sedentary lifestyle
Mental health
Child
Adolescent
Systematic review

ABSTRACT

Objective. The presented systematic review aims at giving a comprehensive overview of studies assessing the relationship between sedentary behavior and indicators of mental health in school-aged children and adolescents.

Methods. Six online databases (MEDLINE, EMBASE, PsycINFO, PsycARTICLES, CINAHL and SPORTDiscus) as well as personal libraries and reference lists of existing literature were searched for eligible studies.

Results. Ninety-one studies met all inclusion criteria. There was strong evidence that high levels of screen time were associated with more hyperactivity/inattention problems and internalizing problems as well as with less psychological well-being and perceived quality of life. Concerning depressive symptoms, self-esteem, eating disorder symptoms, and anxiety symptoms, no clear conclusion could be drawn. But, taking quality assessment into account, self-esteem was negatively associated with sedentary behavior, i.e. high levels of time engaging in screen-based sedentary behavior were linked to lower scores in self-esteem.

Conclusions. Overall, the association between sedentary behavior and mental health indicators was rather indeterminate. Future studies of high quality and with an objective measure of sedentary behavior will be necessary to further examine this association as well as to investigate longitudinal relationships and the direction of causality. Furthermore, more studies are needed to identify moderating and mediating variables.

Neuroscience and Biobehavioral Reviews 130 (2021) 431–441

Contents lists available at ScienceDirect

Neuroscience and Biobehavioral Reviews

journal homepage: www.elsevier.com/locate/neubiorev

Neurobiological evidence of longer-term physical activity interventions on mental health outcomes and cognition in young people: A systematic review of randomised controlled trials

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ARTICLE INFO

Keywords:
Exercise
MRI
DTI
fMRI
EEG
BDNF
Cortisol

ABSTRACT

Objective: To investigate putative neurobiological mechanisms that link longer-term physical activity interventions to mental health and cognitive outcomes using randomised controlled trials in children, adolescents and young adults.

Data sources: A range of medical and psychological science electronic databases were searched (MEDLINE, EMBASE, Scopus, Web of Science, PsycINFO).

Review methods: Original research studies were selected, data were extracted and quality was appraised.

Results: Sixteen primary papers were included, ranging from healthy and community samples to subclinical and clinical populations across a variety of age ranges and using different neurobiological measures (e.g. magnetic resonance imaging, electroencephalography, cortisol, brain-derived neurotropic factor).

Discussion: The majority of studies report improvement in mental health and cognition outcomes following longer-term physical activity interventions which coincide with neurobiological alterations, especially neuroimaging alterations in activation and electrophysiological parameters in frontal areas. Future research should include measures of pre-existing fitness and target those who would benefit the most from this type of intervention (e.g. those with a lower level of fitness and at risk for or with mental health problems).

Are Physical Activity Interventions Effective in Improving Health-Related Quality of Life in Children and Adolescents? A Systematic Review and Meta-Analysis

Alberto Bermejo-Cantarero, PhD,[†‡] Mairena Sánchez-López, PhD,[†§] Celia Álvarez-Bueno, PhD,*[†‖] Andres Redondo-Tébar, PhD,[†] Antonio García-Hermoso, PhD,[¶#] and Vicente Martínez-Vizcaíno, PhD[†**]

Context: Physical activity (PA) interventions improve well-being and positive mental health in children and adolescents, but the results of previous systematic reviews included participants with chronic medical conditions and did not accurately assess the multidimensional nature of health-related quality of life (HRQoL).

Objective: The aims of this meta-analysis were to (1) evaluate the effects of PA interventions on several domains of HRQoL in healthy <18-year-olds and (2) examine the effectiveness of interventions on HRQoL according to whether they were successful in increasing PA, the type of intervention delivered, and the duration of the intervention.

Data Sources: PubMed (Medline), EMBASE, the Cochrane Library, SCIELO, SPORTDiscus, and PEDro databases were systematically searched from inception to September 30, 2022.

Study Selection: Experimental studies that examined the effectiveness of PA interventions on HRQoL participants aged <18 years.

Study Design: Systematic review with meta-analysis and meta-regression.

Level of Evidence: Level 1.

Methods: Random-effects models were used to calculate pooled effect size (ES) for total HRQoL score and its dimensions. Subgroup analyses were conducted to examine the effect of PA program characteristics.

Results: A total of 17 studies were included. Pooled ES (95% CI) estimations were as follows: 0.179 (0.045, 0.002) for total HRQoL score, 0.192 (0.077, 0.306) for physical well-being, 0.158 (0.080, 0.237) for psychological well-being, 0.118 (0.044, 0.192) for autonomy and parent relation, 0.135 (0.043, 0.227) for social support and peers, and 0.129 (-0.013, 0.270) for school environment. Subgroup analyses suggested there were no differences in the effectiveness of the interventions by category of PA increase or by type and duration of intervention.

Conclusion: Exercise interventions are an effective strategy for improving overall HRQoL and its most significant domains in children and adolescents.

Keywords: adolescents; children; health-related quality of life; HRQoL; meta-analysis; physical activity; well-being

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DOI: 10.1111/cch.13048

REVIEW ARTICLE

WILEY

Physical activity interventions for the mental health of children: A systematic review

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Abstract

Objective: This systematic review explored the effectiveness of using physical activity (PA) interventions to enhance psychological well-being and reduce psychological ill-being (e.g., anxiety and depression) in children aged six to 11 years old from the general population.

Methods: Electronic databases were searched for studies published between January 2005 and June 2020: Web of Science, ProQuest Psychology Journals, PsycINFO, Pub Med, ASSIA, CINHAL PLUS, SPORTDiscus, EMBASE and Wiley Online Library. Search terms included 'physical activity intervention', 'psychological well-being' and 'child*'. After removing duplicates, 11 390 studies were independently screened by two authors based on inclusion/exclusion criteria and assessed for risk of bias.

Results: A total of 23 studies were narratively synthesized and categorized into four domains: Quality of Life (QOL), body image, self-esteem and psychological ill-being. Evidence was provided for the impact of PA interventions in improving QOL, body image and self-esteem. Despite the positive effect on psychological well-being, evidence for a reduction in the frequency and severity of symptoms associated with psychological ill-being in children is less clear.

Conclusions: Reviewed studies support the use of PA interventions in enhancing the psychological well-being of children in school and community settings. More research is warranted to understand the impact of PA interventions on reducing psychological ill-being in children from the general population.

PLOS ONE

RESEARCH ARTICLE

Associations between organized sport participation and mental health difficulties: Data from over 11,000 US children and adolescents

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OPEN ACCESS

Citation: Hoffmann MD, Barnes JD, Tremblay MS, Guerrero MD (2022) Associations between organized sport participation and mental health difficulties: Data from over 11,000 US children and adolescents. PLoS ONE 17(6): e0268583. https://doi.org/10.1371/journal.pone.0268583

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Data Availability Statement: Data used in the preparation of this article were obtained from the Adolescent Brain Cognitive Development (ABCD) Study (https://abcdstudy.org), held in the NIMH Data Archive (NDA). The ABCD data repository grows and changes over time. The ABCD data used in this report came from NIMH Data Archive Digital Object Identifier (DOI) 10.15154/1523360.

Funding: The authors received no specific funding for this work.

Abstract

The purpose of this study was to explore the association between participation in organized sport and a broad array of mental health difficulties among US children and adolescents. The data (cross-sectional) were from Data Release 3.0 (one-year follow-up visits on the full cohort) of the Adolescent Brain Cognitive Development (ABCD) study—a broadly representative sample of 11,235 US children and adolescents aged 9 to 13 years. Parents/guardians provided self-reports of their child's mental health difficulties using the Child Behavior Checklist. To assess participation in organized sport, children and adolescents were categorized into one of four groups: 1) participation in team sport, 2) participation in individual sport, 3) participation in team and individual sport, and 4) non-sport participation. Participation in team sport compared to non-sport participation was associated with 10% lower anxious/depressed scores, 19% lower withdrawn/depressed scores, 17% lower social problems scores, 17% lower thought problems scores, and 12% lower attention problems scores. Participation in team sport compared to non-sport participation was also associated with 20% lower rule-breaking behavior scores for females (compared to males). Conversely, participation in individual sport compared to non-sport participation was associated with 16% higher anxious/depressed scores, 14% higher withdrawn/depressed scores, 12% higher social problems scores, and 14% higher attention problems scores. Participation in both team and individual sport compared to non-sport participation was associated with 17% lower rule-breaking behavior scores for females (compared to males). Results indicate that team sport participation was associated with fewer mental health difficulties, whereas individual sport participation was associated with greater mental health difficulties. The findings complement previous research suggesting that team sport participation may be a vehicle to support child and adolescent mental health. Additional research is needed to determine to what extent, and under what circumstances, participation in individual sport may be problematic for younger cohorts.

Depressive symptoms and objectively measured physical activity and sedentary behaviour throughout adolescence: a prospective cohort study

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See **Comment** page 221

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Summary

Background Identifying modifiable risk factors is essential to reduce the prevalence adolescent depression. Self-report data suggest that physical activity and sedentary behaviour might be associated with depressive symptoms in adolescents. We examined associations between depressive symptoms and objectively measured physical activity and sedentary behaviour in adolescents.

Methods From a population-based cohort of adolescents whose mothers were invited to participate in the Avon Longitudinal Study of Parents and Children (ALSPAC) study, we included participants with at least one accelerometer recording and a Clinical Interview Schedule-Revised (CIS-R) depression score at age 17·8 years (reported as age 18 years hereafter). Amounts of time spent in sedentary behaviour and physical activity (light or moderate-to-vigorous) were measured with accelerometers at around 12 years, 14 years, and 16 years of age. Total physical activity was also recorded as count per minute (CPM), with raw accelerometer counts averaged over 60 s epochs. Associations between the physical activity and sedentary behaviour variables and depression (CIS-R) scores at age 18 years were analysed with regression and group-based trajectory modelling.

Findings 4257 adolescents from the 14 901 enrolled in the ALSPAC study had a CIS-R depression score at age 18 years. Longitudinal analyses included 2486 participants at age 12 years, 1938 at age 14 years, and 1220 at age 16 years. Total follow-up time was 6 years. Total physical activity decreased between 12 years and 16 years of age, driven by decreasing durations of light activity (mean 325·66 min/day [SD 58·09] at 12 years; 244·94 min/day [55·08] at 16 years) and increasing sedentary behaviour (430·99 min/day [65·80]; 523·02 min/day [65·25]). Higher depression scores at 18 years were associated with a 60 min/day increase in sedentary behaviour at 12 years (incidence rate ratio [IRR] 1·111 [95% CI 1·051–1·176]), 14 years (1·080 [1·012–1·152]), and 16 years of age (1·107 [1·015–1·208]). Depression scores at 18 years were lower for every additional 60 min/day of light activity at 12 years (0·904 [0·850–0·961]), 14 years (0·922 [0·857–0·992]), and 16 years of age (0·889 [0·809–0·974]). Group-based trajectory modelling across 12–16 years of age identified three latent subgroups of sedentary behaviour and activity levels. Depression scores were higher in those with persistently high (IRR 1·282 [95% CI 1·061–1·548]) and persistently average (1·249 [1·078–1·446]) sedentary behaviour compared with those with persistently low sedentary behaviour, and were lower in those with persistently high levels of light activity (0·804 [0·652–0·990]) compared with those with persistently low levels of light activity. Moderate-to-vigorous physical activity (per 15 min/day increase) at age 12 years (0·910 [0·857–0·966]) and total physical activity (per 100 CPM increase) at ages 12 years (0·941 [0·910–0·972]) and 14 years (0·965 [0·932–0·999]), were negatively associated with depressive symptoms.

Interpretation Sedentary behaviour displaces light activity throughout adolescence, and is associated with a greater risk of depressive symptoms at 18 years of age. Increasing light activity and decreasing sedentary behaviour during adolescence could be an important target for public health interventions aimed at reducing the prevalence of depression.

American Journal of
Preventive Medicine

REVIEW ARTICLE

Mechanisms Linking Physical Activity With Mental Health in Children and Adolescents With Neurodevelopmental Disorders: A Systematic Review

Chang Liu, MPE,[1] Xiao Liang, PhD,[2] Yijian Yang, PhD,[1] Ran Liu, MD,[3] Kelly Arbour-Nicitopoulos, PhD,[4] Cindy Hui-ping Sit, PhD[1]

Introduction: Physical activity (PA) is a promising way to improve mental health in children and adolescents with neurodevelopmental disorders (NDDs). However, the underlying mechanisms remain unclear. The current review aimed to explore the potential neurobiological, psychosocial, and behavioral mechanisms between PA interventions and mental health in children and adolescents with NDDs.

Methods: Web of Science, PsycINFO, SPORTDiscus, MEDLINE, CINAHL, and ERIC were searched from inception to June 2023. Randomized controlled trials/quasi-experimental designs applying PA interventions and reporting at least one mental health outcome and at least one potential mechanism in children and adolescents with NDDs were included. The best evidence synthesis rating system was adopted to determine the strength and consistency of potential mechanisms and was performed in 2024.

Results: In total, 45 studies were included, 29 of which were randomized controlled trials and 16 were quasi-experimental, with a total of 1,751 participants. According to the best evidence synthesis rating system, neurobiological (theta activity and P3 amplitude), psychosocial (social skills and social participation), and behavioral (motor skills and sleep) mechanisms were the frequently examined and consistent mechanisms through which PA affected mental health in children and adolescents with NDDs. However, evidence regarding P3 latency, beta activity, and physical self-concept was insufficient.

Discussion: Future PA interventions could consider neurobiological (theta activity and P3 amplitude), psychosocial (social skills and social participation), and behavioral (motor skills and sleep) mechanisms. Alternatively, PA can be developed as an adjunctive approach with interventions that specifically focus on these mechanisms to enhance mental health in children and adolescents with NDDs.

Am J Prev Med 2024;67(4):592–605.

Table 1. Categorical Moderator Analyses for the Effect Size of Physical Activity for Overall Mental Health

Categorical moderator	Value	No. of studies	No. of effect sizes	Hedges *g* (95% CI)	*F* statistic	*P* value
Type of NDD	ADHD	28	81	0.65 (0.39 to 0.91)	$F_{4,135} = 0.99$	.42
	ASD	14	32	0.52 (0.14 to 0.89)		
	DCD	5	8	0.47 (−0.18 to 1.13)		
	ID	8	12	0.97 (0.46 to 1.48)		
	LD	4	7	1.13 (0.41 to 1.84)		
Type of study	Nonrandomized	13	35	0.50 (0.11 to 0.89)	$F_{1,138} = 0.98$	.32
	RCT	46	105	0.72 (0.52 to 0.92)		
Type of physical activity	Aerobic exercise	11	25	0.65 (0.22 to 1.08)	$F_{2,137} = 0.01$	.99
	Aerobic exercise and cognitively engaging exercise	4	8	0.66 (−0.05 to 1.37)		
	Cognitively engaging exercise	44	107	0.68 (0.47 to 0.89)		
Setting	Clinical	2	4	0.51 (−0.57 to 1.59)	$F_{1,78} = 0.03$	.87
	Field	27	76	0.60 (0.32 to 0.88)		
Intervention sessions	Short term	4	7	0.71 (0.01 to 1.40)	$F_{1,138} = 0.01$	.93
	Long term	55	133	0.67 (0.49 to 0.86)		
Intervention intensity	Light to moderate physical activity	3	5	0.97 (−0.04 to 1.97)	$F_{3,31} = 0.32$	.81
	Moderate physical activity	5	9	0.38 (−0.42 to 1.18)		
	Moderate to vigorous physical activity	7	19	0.63 (−0.03 to 1.30)		
	Vigorous physical activity	2	2	0.44 (−0.83 to 1.71)		

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; ASD, autism spectrum disorders; DCD, developmental coordination disorder; ID, intellectual disability; LD, learning disorder; NDD, neurodevelopmental disorder; RCT, randomized clinical trial.

JAMA Pediatrics | Original Investigation | ADOLESCENT MENTAL HEALTH

Physical Activity and Mental Health in Children and Adolescents With Neurodevelopmental Disorders
A Systematic Review and Meta-Analysis

Chang Liu, MPE; Xiao Liang, PhD; Cindy H. P. Sit, PhD

IMPORTANCE Children and adolescents with neurodevelopmental disorders experience mental health issues and are encouraged to be brought together in real-life treatment. However, physical activity, which is a promising method for boosting mental health, has only been examined in children and adolescents with certain types of neurodevelopmental disorders.

OBJECTIVE To examine the association of physical activity interventions with mental health (ie, cognitive function, psychological well-being, internalizing, and externalizing problems) in children and adolescents with neurodevelopmental disorders and to identify possible moderators.

DATA SOURCES Studies were searched from inception to May 2023 through Web of Science, PsycINFO, SPORTDiscus, MEDLINE, CINAHL, and ERIC.

STUDY SELECTION Randomized clinical trials or nonrandomized designs applying physical activity interventions and reporting at least 1 mental health outcome in children and adolescents aged 5 to 17 years with neurodevelopmental disorders were included. Two independent reviewers selected and assessed the studies.

DATA EXTRACTION AND SYNTHESIS Random multilevel meta-analysis using Hedges *g* was performed. Data extraction and risk-of-bias assessment were conducted by multiple reviewers. Heterogeneity, publication bias, sensitivity analysis, and moderator analysis were examined to substantiate the results.

MAIN OUTCOMES AND MEASURES The main outcomes were mental health related to cognitive function, psychological well-being, internalizing, or externalizing problems measured by neurocognitive tasks or subjective questionnaires.

RESULTS A total of 76 studies involving 3007 participants were included in systematic review, 59 of which were used for meta-analysis. The findings indicated that physical activity interventions were associated with significant benefits for overall mental health (*g*, 0.67; 95% CI, 0.50-0.85), cognitive function (*g*, 0.74; 95% CI, 0.53-0.95), psychological well-being (*g*, 0.56; 95% CI, 0.16-0.96), internalizing (*g*, 0.72; 95% CI, 0.34-1.10), and externalizing problems (*g*, 0.58; 95% CI, 0.28-0.89). Moderators were also identified: frequency, total sessions, and total duration for overall mental health; total sessions, and total duration for cognitive function; session duration and frequency for psychological well-being; physical activity type for internalizing problems; and session duration for externalizing problems. Moderator analyses showed that type of neurodevelopmental disorder did not modify the associations between physical activity and overall mental health or its subgroups.

CONCLUSIONS AND RELEVANCE The findings in this study suggest that children and adolescents with different types of neurodevelopmental disorders may be grouped together when performing physical activity interventions, which were confirmed to be beneficial to overall mental health and its subgroups in this new diagnostic population, but that physical activity interventions should be tailored when targeting different mental health domains.

Supplemental content

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From: **Childhood Lifestyle Behaviors and Mental Health Symptoms in Adolescence**

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JAMA Network Open.
Childhood Lifestyle Behaviors and Mental Health Symptoms in Adolescence

Table 2. Associations of Cumulative Lifestyle Behaviors From Childhood to Adolescence With Mental Health Symptoms in Adolescence

	Perceived stress score		Depressive symptoms score	
Self-reported lifestyle behaviors	β (95% CI)[a]	*P* value	β (95% CI)[a]	*P* value
Total physical activity, min/d	−0.15 (−0.30 to −0.01)	.04	−0.17 (−0.31 to −0.02)	.03
Unsupervised physical activity, min/d	−0.09 (−0.24 to 0.05)	.21	−0.14 (−0.29 to 0.01)	.06
Sports, min/d	−0.12 (−0.26 to 0.02)	.10	−0.11 (−0.26 to 0.03)	.13
Supervised exercise, min/d	−0.15 (−0.29 to −0.01)	.04	−0.14 (−0.29 to −0.00)	.05
Total screen time, min/d	0.27 (0.13 to 0.41)	<.001	0.30 (0.15 to 0.44)	<.001
TV watching, min/d	0.10 (−0.04 to 0.24)	.16	0.10 (−0.04 to 0.24)	.16
Computer use, min/d	0.16 (0.01 to 0.30)	.03	0.15 (0.00 to 0.30)	.05
Mobile device use, min/d	0.28 (0.16 to 0.41)	<.001	0.33 (0.19 to 0.46)	<.001
Baltic Sea Diet Score	−0.11 (−0.25 to 0.03)	.11	−0.08 (−0.23 to 0.06)	.25
Device-assessed lifestyle behaviors				
Sedentary time, min/d	−0.04 (−0.18 to 0.11)	.61	0.01 (−0.14 to 0.16)	.89
Light physical activity, min/d	0.02 (−0.14 to 0.18)	.76	0.03 (−0.13 to 0.20)	.68
Moderate to vigorous physical activity, min/d	0.09 (−0.11 to 0.29)	.40	−0.04 (−0.24 to 0.16)	.69
Vigorous physical activity, min/d	0.11 (−0.11 to 0.32)	.34	−0.04 (−0.26 to 0.18)	.74
Physical activity energy expenditure, min/d	0.11 (−0.07 to 0.28)	.23	−0.01 (−0.19 to 0.17)	.90
Sleep duration, min/d	−0.09 (−0.25 to 0.06)	.24	−0.08 (−0.24 to 0.07)	.29

[a] Data are standardized regression coefficients (β) and their 95% CIs adjusted for age, sex, and parental education. Data on all variables were available for 187 participants except that data on device-assessed movement behaviors were available for 170 participants.

Associations of Cumulative Lifestyle Behaviors From Childhood to Adolescence With Mental Health Symptoms in Adolescence[a]
Data are standardized regression coefficients (β) and their 95% CIs adjusted for age, sex, and parental education. Data on all variables were available for 187 participants except that data on device-assessed movement behaviors were available for 170 participants.

Systematic Review

Mediterranean Diet and Mental Health in Children and Adolescents: A Systematic Review

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Context: *Childhood and adolescence are periods of critical importance in the development of mental health disorders. The Mediterranean diet (MD) has been linked to multiple positive health outcomes, including reduced incidence of mental health disorders and fewer psychiatric symptoms.* ***Objective:*** *This study aimed to investigate the association between adherence to an MD and mental health outcomes in children and adolescents.* ***Methods:*** *A systematic literature review was conducted of original research that explored the relationship between psychiatric symptoms or disorders and adherence to an MD. The literature search was conducted on PubMed, Scopus, Web of Science, MEDES, Dialnet, and Latindex from inception to November 2022, and the Newcastle-Ottawa Scale was used to evaluate the quality of studies.* ***Results:*** *A total of 13 studies (6 cross-sectional, 4 case-control, 2 randomized clinical trials, and 1 longitudinal cohort) out of 450 met the inclusion criteria. A total of 3058 children or adolescents with a mean age range from 8.6 to 16.2 years were included. Among the reviewed studies, 5 (71.42%) of those looking at attention-deficit/hyperactivity disorder, 4 (80%) examining depression, and 2 (50%) assessing anxiety found a significant protective association. Seven articles (53.84%) were found to be of high quality and 6 (46.15%) of moderate quality.* ***Conclusion:*** *Adherence to an MD could be a protective factor for mental health in child and adolescent populations. This suggests that promoting an MD could help prevent the onset of clinical psychiatric symptoms, reduce symptom severity, and improve prognosis in young patients.*

Systematic Review Registration: *PROSPERO registration no. CRD42021276316.*

PREVENTING CHRONIC DISEASE

PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

Volume 21, E82 OCTOBER 2024

ORIGINAL RESEARCH

Association Between Diet and Mental Health Outcomes in a Sample of 13,887 Adolescents in Canada

Julia Dabravolskaj, PhD[1,2]; Karen A. Patte, PhD[3]; Shelby Yamamoto, PhD[4]; Scott T. Leatherdale, PhD[5]; Paul J. Veugelers, PhD[4]; Katerina Maximova, PhD[1,2]

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PEER REVIEWED

Summary

What is already known on this topic?

Healthy eating might be linked to mental health among adolescents, but the evidence is mostly limited to cross-sectional studies; prospective studies are needed.

What is added by this report?

Using longitudinal data, we found that sugar-sweetened beverage (SSB) consumption is prospectively associated with greater severity of depressive and anxiety symptoms and poorer psychological well-being among adolescents, while vegetables and fruit consumption was prospectively associated with better psychological well-being.

What are the implications for public health practice?

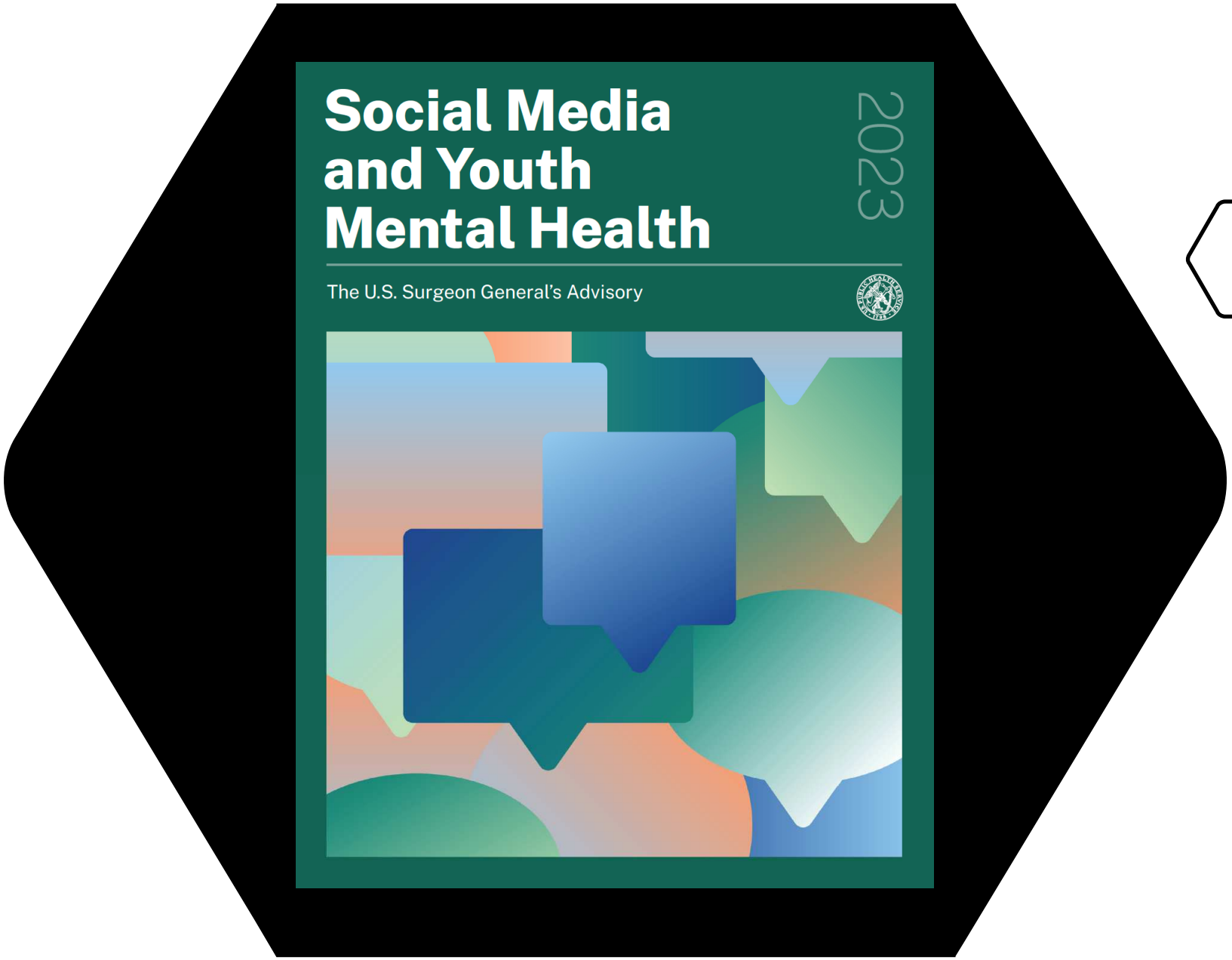
Community-based and population-level strategies should target SSB and vegetables and fruit consumption to prevent further widening of socioeconomic inequalities in diet, which can translate into widening inequalities in mental health.

Methods

We estimated the effect of diet (ie, consumption of vegetables and fruit and sugar-sweetened beverages [SSBs]) at baseline on depressive symptoms, anxiety symptoms, and psychological well-being (measured by the Center for Epidemiologic Studies Depression Scale–Revised, Generalized Anxiety Disorder 7 scale, and Flourishing Scale, respectively) and at 1-year follow-up in a sample of 13,887 Canadian secondary school students who participated in the 2017–2018 and 2018–2019 cycles of the Cannabis, Obesity, Mental health, Physical activity, Alcohol, Smoking, and Sedentary (COMPASS) behavior study. We applied linear mixed-effects methods informed by a directed acyclic graph. Sensitivity analyses assessed the robustness of the effect estimates to unmeasured confounding variables.

Results

Baseline SSB consumption was associated with greater severity of depressive ($\beta = 0.04$; 95% CI, 0.01–0.06) and anxiety ($\beta = 0.02$; 95% CI, 0–0.05) symptoms, particularly among male students, and poorer psychological well-being ($\beta = -0.03$; 95% CI, −0.05 to −0.01) at follow-up. Baseline vegetables and fruit consumption was positively associated with psychological well-being ($\beta = 0.06$; 95% CI, 0.03–0.10) but not other mental health outcomes at follow-up.



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Nomophobia: Dependency on virtual environments or social phobia?

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ABSTRACT

Background: The increasing use of new technologies and virtual communication involving personal computers (PCs), tablets and mobile phones are causing changes in individuals' daily habits and behavior. We report the case of an individual with social phobia who developed a dependency on communication through virtual environments (i.e., nomophobia), and used a PC as a form of relating to the outside world to reduce stress and to avoid direct social relations. Nomophobia refers to the discomfort or anxiety caused by the non-availability of a mobile phone, PC or any another virtual communication device. Social phobia is described as an anxiety disorder of chronic evolution.
Objective: To study nomophobia as a manifest behavior that might serve as an indication of a possible anxiety disorder.
Methodology: The treatment consisted of the use of medication, cognitive-behavioral therapy (CBT) and the application of evaluation tools (interviews, scales, inventories and questionnaires).
Results: The individual responded satisfactorily to medication and CBT treatment, which reduced his time using the PC and increased his exposure to real-life situations.
Conclusion: Nomophobic behavior produces changes in daily habits and can reveal other aspects to be investigated, such as the presence of comorbid mental disorders.

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Research Paper

Social Media Use and Adolescent Mental Health: Findings From the UK Millennium Cohort Study

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Social media
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ABSTRACT

Background: Evidence suggests social media use is associated with mental health in young people but underlying processes are not well understood. This paper i) assesses whether social media use is associated with adolescents' depressive symptoms, and ii) investigates multiple potential explanatory pathways via online harassment, sleep, self-esteem and body image.

Methods: We used population based data from the UK Millennium Cohort Study on 10,904 14 year olds. Multivariate regression and path models were used to examine associations between social media use and depressive symptoms.

Findings: The magnitude of association between social media use and depressive symptoms was larger for girls than for boys. Compared with 1–3 h of daily use: 3 to <5 h 26% increase in scores vs 21%; ≥5 h 50% vs 35% for girls and boys respectively. Greater social media use related to online harassment, poor sleep, low self-esteem and poor body image; in turn these related to higher depressive symptom scores. Multiple potential intervening pathways were apparent, for example: greater hours social media use related to body weight dissatisfaction (≥5 h 31% more likely to be dissatisfied), which in turn linked to depressive symptom scores directly (body dissatisfaction 15% higher depressive symptom scores) and indirectly via self-esteem.

Interpretation: Our findings highlight the potential pitfalls of lengthy social media use for young people's mental health. Findings are highly relevant for the development of guidelines for the safe use of social media and calls on industry to more tightly regulate hours of social media use.

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The drawbacks of Information and Communication Technologies: Interplay and psychopathological risk of nomophobia and cyber-bullying, results from the bullying and youth mental health Naples study (BYMHNS)

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ABSTRACT

Nomophobia and cyber-bullying are of particular interest for their intrinsic interplay. This study aims to describe the association between the two phenomena. The data presented in this study derived from a large school-based population survey that included 2959 students in 12 middle schools in the (*place omissed for double blind peer review metropolitan city of Naples, Italy*). The survey included several questions for nomophobia phenomena (smartphone addiction (SA), Check the smartphone (CS), Phantom phone signal (PPS), and for cyber-bullying (victimization and perpetration).

SA was associated with cyber-perpetration; CS was associated with both cyber-victimization and cyber-perpetration. PPS was associated with both cyber-victimization and cyber-perpetration. Correlation analyses confirmed the association of nomophobia and cyber-bullying with emotional and behavioural difficulties.

Nomophobia and Cyber-bullying were widespread phenomena among adolescent population. Data on their interplay showed that nomophobia was associated with an increase in cyber-perpetration behaviours. Both phenomena are associated with emotional problems, hyperactivity, conduct problems and total problems. Therefore these situations should be assessed and targeted carefully in their intrinsic relationship and potential impact on psychopathological risk. Information interventions are needed and psychotherapeutic treatments should consider these findings. Due to the cross-sectional nature of the study, the direction of the relationships remains uncertain and will require longitudinal and intervention studies to

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Current Opinion in Psychology

Review

Social media use and its impact on adolescent mental health: An umbrella review of the evidence

Patti M. Valkenburg*, Adrian Meier* and Ine Beyens†

Abstract

Literature reviews on how social media use affects adolescent mental health have accumulated at an unprecedented rate of late. Yet, a higher-level integration of the evidence is still lacking. We fill this gap with an *umbrella review*, a review of reviews published between 2019 and mid-2021. Our search yielded 25 reviews: seven meta-analyses, nine systematic, and nine narrative reviews. Results showed that most reviews interpreted the associations between social media use and mental health as 'weak' or 'inconsistent,' whereas a few qualified the same associations as 'substantial' and 'detrimental.' We summarize the gaps identified in the reviews, provide an explanation for their diverging interpretations, and suggest several avenues for future research.

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Keywords

Meta-review, Social networking sites, SNS, Facebook, Instagram, Well-being, Depression, Digitalize symptoms.

Introduction

The past years have witnessed a staggering increase in the number of studies into the effects of social media use (SMU) on adolescents' mental health (e.g. [1–3]), defined as the absence of mental illness and the presence of well-being [4]. This rapid increase may be due to at least two reasons. First, SMU occupies an ever-growing part of adolescents' daily lives, whereas, at the same time, adolescents do not easily accept parental regulation of this use [5]. Second, adolescence is the stage in life in which well-being shows the most fluctuations [6], in which risk-taking is at its peak [7], and in which mental disorders, such as depression, typically emerge [8]. As social media (SM) offer adolescents ample opportunities to engage in risky behaviors, join dubious communities, and interact with strangers outside of parental oversight, it is imaginable that parents, policymakers, and researchers alike want to understand the effects of adolescents' and SMU on their mental health.

The rapid increase in empirical studies into the effects of SMU on mental health has been paralleled with a comparable increase in literature reviews. Therefore, instead of adding another review of empirical studies, we decided to conduct an *umbrella review*, also called a meta-review, which is a synthesis of existing literature reviews [9]. Three earlier umbrella reviews have summarized the effects of SMU on mental health [10–12], but two of them did not focus on adolescents, and none included the 19 reviews published in 2020 and 2021. The aims of our umbrella review were to identify and discuss (1) general characteristics of existing reviews, such as the type of review (meta-analytic, systematic, narrative); (2) the conceptualization of SMU and mental health or its constituent outcomes; (3) the interpretation of the effects of SMU on these outcomes (e.g. weak, inconsistent, strong); and (4) the gaps in the evidence base and directions for future research.

Methods

The first two authors independently conducted literature searches via Google Scholar to find reviews that appeared from 2019 up to July 2021, combining four sets of search terms that correspond with our inclusion criteria (1) 'review,' 'meta-analysis,' or 'synthesis,' (2) 'social media,' 'social networking site,' 'Facebook,' or 'Instagram,' (3) 'well-being,' 'mental health,' or 'psychopathology,' and (4) 'adolescents,' 'youth,' or 'children.' Included studies had to be (1) published reviews that focused on (2) SMU, (3) mental health, and (4) adolescents.

Our operational definition of mental health included indicators of well-being (i.e., happiness, positive affect,

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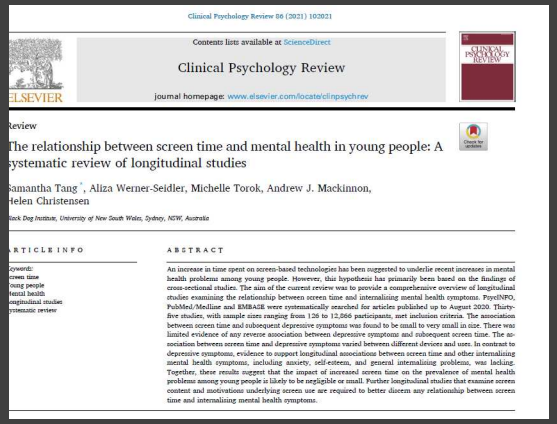

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Review

The relationship between screen time and mental health in young people: A systematic review of longitudinal studies

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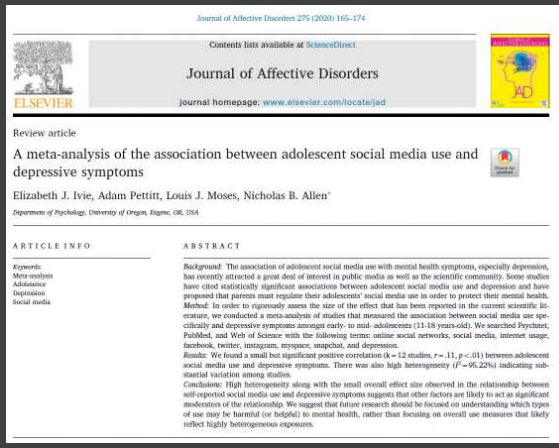
ARTICLE INFO

Keywords:
Screen time
Young people
Mental health
Longitudinal studies
Systematic review

ABSTRACT

An increase in time spent on screen-based technologies has been suggested to underlie recent increases in mental health problems among young people. However, this hypothesis has primarily been based on the findings of cross-sectional studies. The aim of the current review was to provide a comprehensive overview of longitudinal studies examining the relationship between screen time and internalizing mental health symptoms. PsycINFO, PubMed/Medline and EMBASE were systematically searched for articles published up to August 2020. Thirty-five studies, with sample sizes ranging from 126 to 12,866 participants, met inclusion criteria. The association between screen time and subsequent depressive symptoms was found to be small to very small in size. There was limited evidence of any reverse association between depressive symptoms and subsequent screen time. The association between screen time and depressive symptoms varied between different devices and uses. In contrast to depressive symptoms, evidence to support longitudinal associations between screen time and other internalizing mental health symptoms, including anxiety, self-esteem, and general internalizing problems, was lacking. Together, these results suggest that the impact of increased screen time on the prevalence of mental health problems among young people is likely to be negligible or small. Further longitudinal studies that examine screen content and motivations underlying screen use are required to better discern any relationship between screen time and internalizing mental health symptoms.



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Review article

A meta-analysis of the association between adolescent social media use and depressive symptoms

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ARTICLE INFO

Keywords:
Meta-analysis
Adolescence
Depression
Social media

ABSTRACT

Background: The association of adolescent social media use with mental health symptoms, especially depression, has recently attracted a great deal of interest in public media as well as the scientific community. Some studies have cited statistically significant associations between adolescent social media use and depression and have proposed that parents must regulate their adolescents' social media use in order to protect their mental health. *Method:* In order to rigorously assess the size of the effect that has been reported in the current scientific literature, we conducted a meta-analysis of studies that measured the association between social media use specifically and depressive symptoms amongst early- to mid- adolescents (11-18 years-old). We searched Psychnet, PubMed, and Web of Science with the following terms: online social networks, social media, internet usage, facebook, twitter, instagram, myspace, snapchat, and depression.

Results: We found a small but significant positive correlation ($k = 12$ studies, $r = .11$, $p < .01$) between adolescent social media use and depressive symptoms. There was also high heterogeneity ($I^2 = 95.22\%$) indicating substantial variation among studies.

Conclusions: High heterogeneity along with the small overall effect size observed in the relationship between self-reported social media use and depressive symptoms suggests that other factors are likely to act as significant moderators of the relationship. We suggest that future research should be focused on understanding which types of use may be harmful (or helpful) to mental health, rather than focusing on overall use measures that likely reflect highly heterogeneous exposures.

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DOI: 10.1111/jcpp.13809

REVIEW ARTICLE

Adolescents' interactive electronic device use, sleep and mental health: a systematic review of prospective studies

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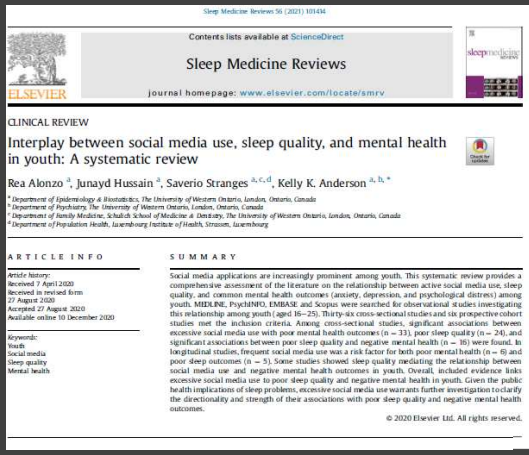
Summary

Optimal sleep, both in terms of duration and quality, is important for adolescent health. However, young people's sleeping habits have worsened over recent years. Access to and use of interactive electronic devices (e.g., smartphones, tablets, portable gaming devices) and social media have become deep-rooted elements of adolescents' lives and are associated with poor sleep. Additionally, there is evidence of increases in poor mental health and well-being disorders in adolescents; further linked to poor sleep. This review aimed to summarise the longitudinal and experimental evidence of the impact of device use on adolescents' sleep and subsequent mental health. Nine electronic bibliographical databases were searched for this narrative systematic review in October 2022. Of 5779 identified unique records, 28 studies were selected for inclusion. A total of 26 studies examined the direct link between device use and sleep outcomes, and four examined the indirect link between device use and mental health, with sleep as a mediator. The methodological quality of the studies was generally poor. Results demonstrated that adverse implications of device use (i.e., overuse, problematic use, telepressure, and cyber-victimisation) impacted sleep quality and duration; however, relationships with other types of device use were unclear. A small but consistent body of evidence showed sleep mediates the relationship between device use and mental health and well-being in adolescents. Increasing our understanding of the complexities of device use, sleep, and mental health in adolescents are important contributions to the development of future interventions and guidelines to prevent or increase resilience to cyber-bullying and ensure adequate sleep.

KEYWORDS

intervention, longitudinal studies, mobile devices, social media, teenagers, young people



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CLINICAL REVIEW

Interplay between social media use, sleep quality, and mental health in youth: A systematic review

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Social media
Sleep quality
Mental health

SUMMARY

Social media applications are increasingly prominent among youth. This systematic review provides a comprehensive assessment of the literature on the relationship between active social media use, sleep quality, and common mental health outcomes (anxiety, depression, and psychological distress) among youth. MEDLINE, PsycINFO, EMBASE and Scopus were searched for observational studies investigating this relationship among youth (aged 16–25). Thirty-six cross-sectional studies and six prospective cohort studies met the inclusion criteria. Among cross-sectional studies, significant associations between excessive social media use with poor mental health outcomes (n = 33), poor sleep quality (n = 24), and significant associations between poor sleep quality and negative mental health (n = 16) were found. In longitudinal studies, frequent social media use was a risk factor for both poor mental health (n = 6) and poor sleep outcomes (n = 5). Some studies showed sleep quality mediating the relationship between social media use and negative mental health outcomes in youth. Overall, included evidence links excessive social media use to poor sleep quality and negative mental health in youth. Given the public health implications of sleep problems, excessive social media use warrants further investigation to clarify the directionality and strength of their associations with poor sleep quality and negative mental health outcomes.

2020

RESEARCH REPORT

A meta-review of "lifestyle psychiatry": the role of exercise, smoking, diet and sleep in the prevention and treatment of mental disorders

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There is increasing academic and clinical interest in how "lifestyle factors" traditionally associated with physical health may also relate to mental health and psychological well-being. In response, international and national health bodies are producing guidelines to address health behaviors in the prevention and treatment of mental illness. However, the current evidence for the causal role of lifestyle factors in the onset and prognosis of mental disorders is unclear. We performed a systematic meta-review of the top-tier evidence examining how physical activity, sleep, dietary patterns and tobacco smoking impact on the risk and treatment outcomes across a range of mental disorders. Results from 29 meta-analyses of prospective/cohort studies, 12 Mendelian randomization studies, two meta-reviews, and two meta-analyses of randomized controlled trials were synthesized to generate overviews of the evidence for targeting each of the specific lifestyle factors in the prevention and treatment of depression, anxiety and stress-related disorders, schizophrenia, bipolar disorder, and attention-deficit/hyperactivity disorder. Standout findings include: a) convergent evidence indicating the use of physical activity in primary prevention and clinical treatment across a spectrum of mental disorders; b) emerging evidence implicating tobacco smoking as a causal factor in onset of both common and severe mental illness; c) the need to clearly establish causal relations between dietary patterns and risk of mental illness, and how diet should be best addressed within mental health care; and d) poor sleep as a risk factor for mental illness, although with further research required to understand the complex, bidirectional relations and the benefits of non-pharmacological sleep-focused interventions. The potentially shared neurobiological pathways between multiple lifestyle factors and mental health are discussed, along with directions for future research, and recommendations for the implementation of these findings at public health and clinical service levels.

Table 1 Physical activity and prospective risk of mental disorders in meta-analyses

	Outcome	n	Exposure	Main results	Summary
Schuch et al[29] (NIH=7)	Clinical depression or depressive symptoms	36	Higher physical activity levels	OR=0.837, 95% CI: 0.794-0.883 I^2=0.00%	Good quality review indicating that high levels of physical activity reduce the risk of depression. Effects persisted across age groups and geographic regions. Although there was evidence of significant publication bias, correcting for this did not alter the indicated protective effects.
Wang et al[30] (NIH=5)	Clinical depression or depressive symptoms	7	Screen time-based sedentary behavior	OR=1.02, 95% CI: 1.01-1.04 I^2=3.0%	Fair quality review which found only a very small association between screen time-based sedentary behavior and prospective risk of depression, with low heterogeneity.
Liu et al[31] (NIH=5)	Depressive symptoms	4	Screen time in children and adolescents	OR=0.88, 95% CI: 0.67-1.14 I^2=90.4%	Fair quality review finding no prospective associations between screen time and depression. However, there was a lack of large-scale longitudinal studies to determine this.
Zhai et al[32] (NIH=6)	Clinical depression or depressive symptoms	11	Sedentary behavior	RR=1.14, 95% CI: 1.06-1.21 I^2=0.00%	Fair quality review showing that higher sedentary behavior (of all types) at baseline was associated with increased risk of depression at follow-up.
Schuch et al[36] (NIH=7)	Incident anxiety	11	Higher physical activity levels	OR=0.748, 95% CI: 0.629-0.889 I^2=23.96%	Good quality review indicating that self-reported physical activity reduces the risk of anxiety. There was evidence of significant publication bias, and correcting for this slightly reduced the protective effects. Subgroup analyses found that physical activity reduces risk of agoraphobia and post-traumatic stress.
McDowell et al[37] (NIH=7)	Anxiety symptoms	9	Higher physical activity levels	OR=0.874, 95% CI: 0.77-0.99 I^2=48.7%	Good quality review showing that physical activity is associated with reduced risk of anxiety symptoms and anxiety disorders. The moderate degree of heterogeneity between studies and the limited number of studies using diagnosis outcomes prevent firm conclusions.
	Any anxiety disorder	3		OR=0.663, 95% CI: 0.53-0.82 I^2=62.3%	
	Diagnosed GAD	3		OR=0.544, 95% CI: 0.32-0.92 I^2=0.00%	
Brokmeier et al[38] (NIH=6)	Psychotic disorders	5	Higher physical activity levels	OR=0.728, 95% CI: 0.532-0.995 I^2=36.9%	Fair quality review showing that higher levels of physical activity are associated with significantly reduced prospective risk of psychosis. However, significant associations were not observed in the two studies that sufficiently adjusted for confounding factors, although this may be due to the limited sample size of this subgroup underpowering the analysis.

n – number of comparisons, OR – odds ratio, RR – risk ratio, NIH – quality of the study evaluated by the National Institutes of Health's Quality Assessment Tool for Systematic Reviews and Meta-Analyses (good: 7 or 8; fair: 4-6; poor: 0-3), GAD – generalized anxiety disorder

N=1.237.194 americani > 18 anni.
Chi faceva AF aveva il 43% in meno di giorni con salute mentale 'negativa' rispetto a chi faceva AF.

Association between physical exercise and mental health in 1·2 million individuals in the USA between 2011 and 2015: a cross-sectional study

Sammi R Chekroud, Ralitza Gueorguieva, Amanda B Zheutlin, Martin Paulus, Harlan M Krumholz, John H Krystal, Adam M Chekroud

Summary

Background Exercise is known to be associated with reduced risk of all-cause mortality, cardiovascular disease, stroke, and diabetes, but its association with mental health remains unclear. We aimed to examine the association between exercise and mental health burden in a large sample, and to better understand the influence of exercise type, frequency, duration, and intensity.

Methods In this cross-sectional study, we analysed data from 1 237 194 people aged 18 years or older in the USA from the 2011, 2013, and 2015 Centers for Disease Control and Prevention Behavioral Risk Factors Surveillance System survey. We compared the number of days of bad self-reported mental health between individuals who exercised and those who did not, using an exact non-parametric matching procedure to balance the two groups in terms of age, race, gender, marital status, income, education level, body-mass index category, self-reported physical health, and previous diagnosis of depression. We examined the effects of exercise type, duration, frequency, and intensity using regression methods adjusted for potential confounders, and did multiple sensitivity analyses.

Findings Individuals who exercised had 1·49 (43·2%) fewer days of poor mental health in the past month than individuals who did not exercise but were otherwise matched for several physical and sociodemographic characteristics (W=7·42×10^{10}, p<2·2×10^{-16}). All exercise types were associated with a lower mental health burden (minimum reduction of 11·8% and maximum reduction of 22·3%) than not exercising (p<2·2×10^{-16} for all exercise types). The largest associations were seen for popular team sports (22·3% lower), cycling (21·6% lower), and aerobic and gym activities (20·1% lower), as well as durations of 45 min and frequencies of three to five times per week.

Interpretation In a large US sample, physical exercise was significantly and meaningfully associated with self-reported mental health burden in the past month. More exercise was not always better. Differences as a function of exercise were large relative to other demographic variables such as education and income. Specific types, durations, and frequencies of exercise might be more effective clinical targets than others for reducing mental health burden, and merit interventional study.

Lancet Psychiatry 2018

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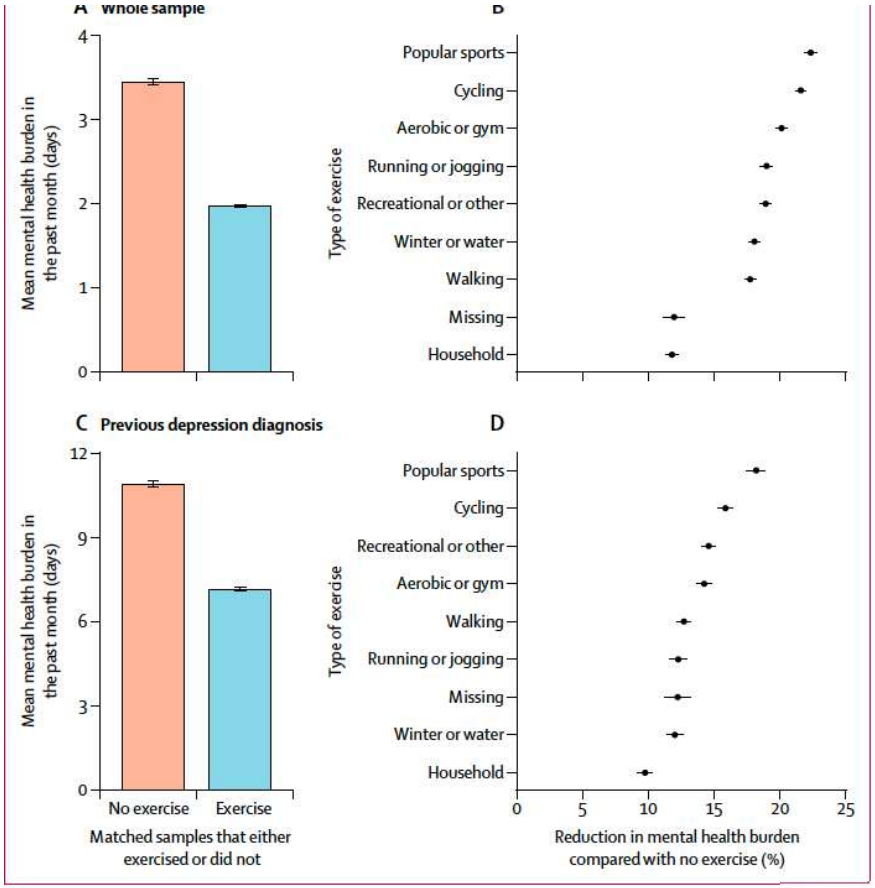

Figure 1: **Cross-sectional data from more than 1·2 million individuals in the USA**
(A) In samples matched for a range of physical and sociodemographic characteristics, individuals who e had a 1·49 day (43·2%) reduction in mental health burden. (B) Relative to no exercise, individuals who e popular sports, cycling, or aerobic and gym exercises had the lowest mental health burden. Even walking was associated with a 17·7% reduction in mental health burden relative to not exercising (C). Among individuals with a

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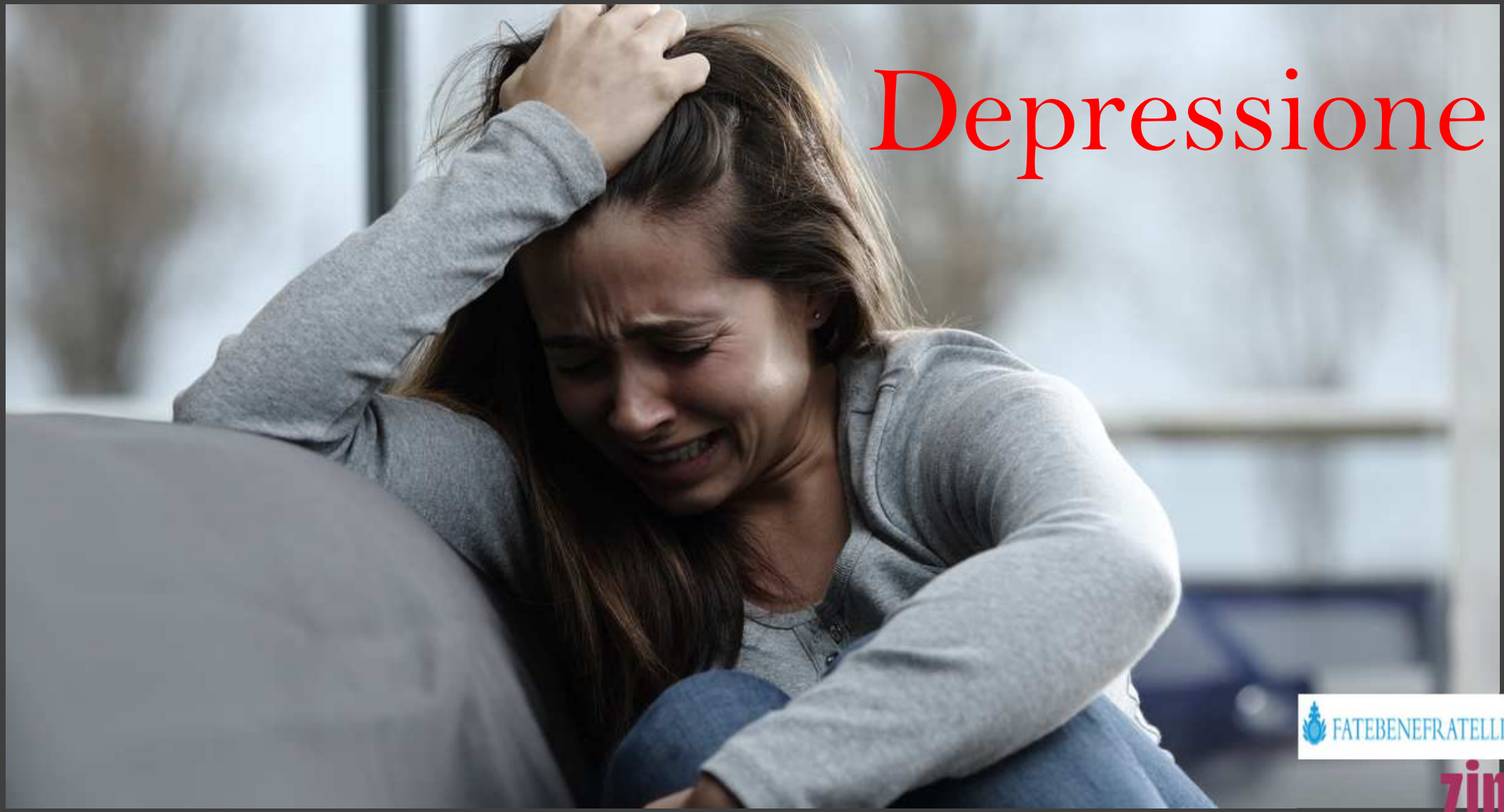
Depressione



Journal of Neurology
https://doi.org/10.1007/s00415-019-09493-9

REVIEW

Physical exercise improves quality of life, depressive symptoms, and cognition across chronic brain disorders: a transdiagnostic systematic review and meta-analysis of randomized controlled trials

Meenakshi Dauwan[1,2,5] · Marieke J. H. Begemann[1] · Margot I. E. Slot[1] · Edwin H. M. Lee[3] · Philip Scheltens[4] · Iris E. C. Sommer[1,5,6]

Received: 19 March 2019 / Revised: 29 July 2019 / Accepted: 30 July 2019

Abstract

We performed a meta-analysis to synthesize evidence on the efficacy and safety of physical exercise as an add-on therapeutic intervention for quality of life (QoL), depressive symptoms and cognition across six chronic brain disorders: Alzheimer's disease, Huntington's disease, multiple sclerosis, Parkinson's disease, schizophrenia and unipolar depression. 122 studies ($=k$) ($n=7231$) were included. Exercise was superior to treatment as usual in improving QoL ($k=64$, $n=4334$, ES $=0.40$, $p<0.0001$), depressive symptoms ($k=60$, $n=2909$, ES $=0.78$, $p<0.0001$), the cognitive domains attention and working memory ($k=21$, $n=1313$, ES $=0.24$, $p<0.009$), executive functioning ($k=14$, $n=977$, ES $=0.15$, $p=0.013$), memory ($k=12$, $n=994$, ES $=0.12$, $p=0.038$) and psychomotor speed ($k=16$, $n=896$, ES $=0.23$, $p=0.003$). Meta-regression showed a dose–response effect for exercise time (min/week) on depressive symptoms ($\beta=0.007$, $p=0.012$). 69% of the studies that reported on safety, found no complications. Exercise is an efficacious and safe add-on therapeutic intervention showing a medium-sized effect on QoL and a large effect on mood in patients with chronic brain disorders, with a positive dose–response correlation. Exercise also improved several cognitive domains with small but significant effects.

122 studi con 7.231 soggetti. 60 studi (N=2.909) su persone con depressione e ES di 0,78.

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JAMA Psychiatry | Original Investigation

Association Between Physical Activity and Risk of Depression
A Systematic Review and Meta-analysis

Matthew Pearce, PhD; Leandro Garcia, PhD; Ali Abbas, PhD; Tessa Strain, PhD; Felipe Barreto Schuch, PhD; Rajna Golubic, PhD; Paul Kelly, PhD; Saad Khan, MB,BChir; Mrudula Utukuri, MB,BChir; Yvonne Laird, PhD; Alexander Mok, PhD; Andrea Smith, PhD; Marko Tainio, PhD; Søren Brage, PhD; James Woodcock, PhD

IMPORTANCE Depression is the leading cause of mental health-related disease burden and may be reduced by physical activity, but the dose-response relationship between activity and depression is uncertain.

OBJECTIVE To systematically review and meta-analyze the dose-response association between physical activity and incident depression from published prospective studies of adults.

DATA SOURCES PubMed, SCOPUS, Web of Science, PsycINFO, and the reference lists of systematic reviews retrieved by a systematic search up to December 11, 2020, with no language limits. The date of the search was November 12, 2020.

STUDY SELECTION We included prospective cohort studies reporting physical activity at 3 or more exposure levels and risk estimates for depression with 3000 or more adults and 3 years or longer of follow-up.

DATA EXTRACTION AND SYNTHESIS Data extraction was completed independently by 2 extractors and cross-checked for errors. A 2-stage random-effects dose-response meta-analysis was used to synthesize data. Study-specific associations were estimated using generalized least-squares regression and the pooled association was estimated by combining the study-specific coefficients using restricted maximum likelihood.

MAIN OUTCOMES AND MEASURES The outcome of interest was depression, including (1) presence of major depressive disorder indicated by self-report of physician diagnosis, registry data, or diagnostic interviews and (2) elevated depressive symptoms established using validated cutoffs for a depressive screening instrument.

RESULTS Fifteen studies comprising 191 130 participants and 2 110 588 person-years were included. An inverse curvilinear dose-response association between physical activity and depression was observed, with steeper association gradients at lower activity volumes; heterogeneity was large and significant (I^2 = 74%; P < .001). Relative to adults not reporting any activity, those accumulating half the recommended volume of physical activity (4.4 marginal metabolic equivalent task hours per week [mMET-h/wk]) had 18% (95% CI, 13%-23%) lower risk of depression. Adults accumulating the recommended volume of 8.8 mMET hours per week had 25% (95% CI, 18%-32%) lower risk with diminishing potential benefits and higher uncertainty observed beyond that exposure level. There were diminishing additional potential benefits and greater uncertainty at higher volumes of physical activity. Based on an estimate of exposure prevalences among included cohorts, if less active adults had achieved the current physical activity recommendations, 11.5% (95% CI, 7.7%-15.4%) of depression cases could have been prevented.

CONCLUSIONS AND RELEVANCE This systematic review and meta-analysis of associations between physical activity and depression suggests significant mental health benefits from being physically active, even at levels below the public health recommendations. Health practitioners should therefore encourage any increase in physical activity to improve mental health.

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Supplemental content

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2022

15 studi di coorte prospettici con 191.130 partecipanti.
Sulla base dei dati raccolti, gli autori stimano che se le persone meno attive fisicamente raggiungessero gli standard raccomandati di AF, si potrebbero prevenire l'11,5% dei casi depressione (circa 1 caso su 9).

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49 studi di coorte prospettici con 266.939 partecipanti.

Physical Activity and Incident Depression: A Meta-Analysis of Prospective Cohort Studies

Felipe B. Schuch, Ph.D., Davy Vancampfort, Ph.D., Joseph Firth, Ph.D., Simon Rosenbaum, Ph.D., Philip B. Ward, Ph.D., Edson S. Silva, B.Sc., Mats Hallgren, Ph.D., Antonio Ponce De Leon, Ph.D., Andrea L. Dunn, Ph.D., Andrea C. Deslandes, Ph.D., Marcelo P. Fleck, Ph.D., Andre F. Carvalho, Ph.D., Brendon Stubbs, Ph.D.

Objective: The authors examined the prospective relationship between physical activity and incident depression and explored potential moderators.

Method: Prospective cohort studies evaluating incident depression were searched from database inception through Oct. 18, 2017, on PubMed, PsycINFO, Embase, and SPORTDiscus. Demographic and clinical data, data on physical activity and depression assessments, and odds ratios, relative risks, and hazard ratios with 95% confidence intervals were extracted. Random-effects meta-analyses were conducted, and the potential sources of heterogeneity were explored. Methodological quality was assessed using the Newcastle-Ottawa Scale.

Results: A total of 49 unique prospective studies (N=266,939; median proportion of males across studies, 47%) were followed up for 1,837,794 person-years. Compared with people with low levels of physical activity, those with high levels had lower odds of developing depression (adjusted odds ratio=0.83, 95% CI=0.79, 0.88; I^2=0.00). Furthermore, physical activity had a protective effect against the emergence of depression in youths (adjusted odds ratio=0.90, 95% CI=0.83, 0.98), in adults (adjusted odds ratio=0.78, 95% CI=0.70, 0.87), and in elderly persons (adjusted odds ratio=0.79, 95% CI=0.72, 0.86). Protective effects against depression were found across geographical regions, with adjusted odds ratios ranging from 0.65 to 0.84 in Asia, Europe, North America, and Oceania, and against increased incidence of positive screen for depressive symptoms (adjusted odds ratio=0.84, 95% CI=0.79, 0.89) or major depression diagnosis (adjusted odds ratio=0.86, 95% CI=0.75, 0.98). No moderators were identified. Results were consistent for unadjusted odds ratios and for adjusted and unadjusted relative risks/hazard ratios. Overall study quality was moderate to high (Newcastle-Ottawa Scale score, 6.3). Although significant publication bias was found, adjusting for this did not change the magnitude of the associations.

Conclusions: Available evidence supports the notion that physical activity can confer protection against the emergence of depression regardless of age and geographical region.

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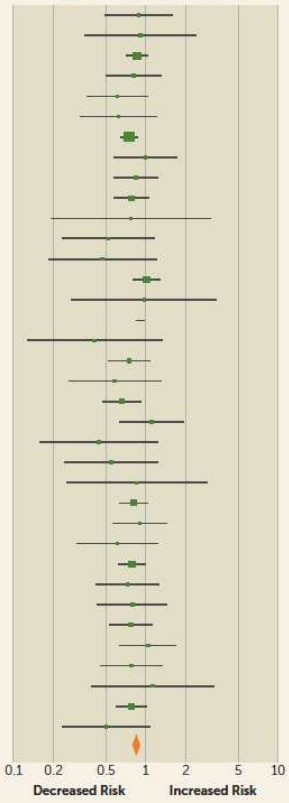
FIGURE 1. Forest Plot of Studies Examining the Association Between Physical Activity and Incident Depression[a]

Study Authors, Year, Reference	Odds Ratio	Lower Limit	Upper Limit	p
Augestad et al., 2008 (30) (men)	0.880	0.484	1.599	0.675
Augestad et al., 2008 (30) (women)	0.910	0.343	2.415	0.850
Baumeister et al., 2017 (31)	0.854	0.699	1.044	0.124
Cabello et al., 2017 (34)	0.810	0.496	1.322	0.399
Chang et al., 2016 (36)	0.610	0.359	1.036	0.068
Chen and Millar, 1999 (37)	0.620	0.315	1.221	0.167
Choi et al., 2015 (38)	0.750	0.639	0.881	0.000
Clark et al., 2007 (39)	0.990	0.570	1.720	0.972
Da Silva et al., 2012 (42)	0.840	0.566	1.247	0.387
España-Romero et al., 2013 (43)	0.780	0.570	1.068	0.121
Farmer et al., 1988 (44) (men)	0.769	0.189	3.123	0.713
Farmer et al., 1988 (44) (women)	0.520	0.230	1.175	0.116
Gallegos-Carrillo et al., 2013 (45)	0.470	0.183	1.209	0.117
Garcia-Pena et al., 2013 (46)	1.010	0.795	1.283	0.935
Hiles et al., 2015 (49)	0.970	0.274	3.440	0.962
Jerstad et al., 2010 (50)	0.910	0.837	0.990	0.028
Joshi et al., 2016 (52)	0.410	0.126	1.335	0.139
Ku et al., 2009 (54)	0.750	0.521	1.080	0.122
Messier et al., 2013 (57) (remained active)	0.584	0.260	1.313	0.193
Mihrshahi et al., 2015 (58)	0.660	0.468	0.930	0.018
Mobily et al., 1996 (60)	1.110	0.631	1.951	0.717
Park et al., 2015 (61)	0.440	0.157	1.237	0.120
Pasco et al., 2011 (62)	0.550	0.241	1.254	0.155
Rius-Ottenheim et al., 2013 (63)	0.850	0.248	2.910	0.796
Roh et al., 2015 (64)	0.810	0.629	1.043	0.102
Sanchez-Villegas et al., 2008 (65)	0.900	0.553	1.466	0.672
Smith et al., 2010 (67)	0.610	0.298	1.249	0.176
Strawbridge et al., 2002 (68)	0.790	0.620	1.007	0.057
Strohle et al. 2007 (69)	0.730	0.417	1.278	0.271
Ten have et al., 2011 (70)	0.790	0.428	1.457	0.450
Tsai et al., 2013 (71)	0.770	0.525	1.129	0.181
Tsutsumimoto et al., 2017 (72)	1.040	0.632	1.713	0.878
Veronese et al., 2017 (73)	0.780	0.453	1.344	0.371
Wereyer, 1992 (75)	1.130	0.388	3.295	0.823
Wise et al., 2006 (76)	0.780	0.593	1.026	0.075
Yoshida et al., 2015 (77) (maintenance)	0.500	0.230	1.089	0.081
Summary effect size estimate	0.837	0.794	0.883	0.000



[a] Random-effects modeling was employed. The square size is proportional to the individual studies' sample size, and the diamond represents the summary effect size estimate.

Adjusted OR=0,83.
Crude OR=0,59

JAMA Psychiatry | Original Investigation

Association of Efficacy of Resistance Exercise Training With Depressive Symptoms

Meta-analysis and Meta-regression Analysis of Randomized Clinical Trials

Brett R. Gordon, MSc; Cillian P. McDowell, BSc; Mats Hallgren, PhD; Jacob D. Meyer, PhD; Mark Lyons, PhD; Matthew P. Herring, PhD

IMPORTANCE The physical benefits of resistance exercise training (RET) are well documented, but less is known regarding the association of RET with mental health outcomes. To date, no quantitative synthesis of the antidepressant effects of RET has been conducted.

OBJECTIVES To estimate the association of efficacy of RET with depressive symptoms and determine the extent to which logical, theoretical, and/or prior empirical variables are associated with depressive symptoms and whether the association of efficacy of RET with depressive symptoms accounts for variability in the overall effect size.

DATA SOURCES Articles published before August 2017, located using Google Scholar, MEDLINE, PsycINFO, PubMed, and Web of Science.

STUDY SELECTION Randomized clinical trials included randomization to RET (n = 947) or a nonactive control condition (n = 930).

DATA EXTRACTION AND SYNTHESIS Hedges *d* effect sizes were computed and random-effects models were used for all analyses. Meta-regression was conducted to quantify the potential moderating influence of participant and trial characteristics.

MAIN OUTCOMES AND MEASURES Randomized clinical trials used validated measures of depressive symptoms assessed at baseline and midintervention and/or postintervention. Four primary moderators were selected a priori to provide focused research hypotheses about variation in effect size: total volume of prescribed RET, whether participants were healthy or physically or mentally ill, whether or not allocation and/or assessment were blinded, and whether or not the RET intervention resulted in a significant improvement in strength.

RESULTS Fifty-four effects were derived from 33 randomized clinical trials involving 1877 participants. Resistance exercise training was associated with a significant reduction in depressive symptoms with a moderate-sized mean effect Δ of 0.66 (95% CI, 0.48-0.83; $z = 7.35$; $P < .001$). Significant heterogeneity was indicated (total $Q = 216.92$, $df = 53$; $P < .001$; $I^2 = 76.0\%$ [95% CI, 72.7%-79.0%]), and sampling error accounted for 32.9% of observed variance. The number needed to treat was 4. Total volume of prescribed RET, participant health status, and strength improvements were not significantly associated with the antidepressant effect of RET. However, smaller reductions in depressive symptoms were derived from randomized clinical trials with blinded allocation and/or assessment.

Supplemental content

CME Quiz at jamanetwork.com/learning and CME Questions page 660

Solo RCT con training ad esercizi di resistenza vs controlli

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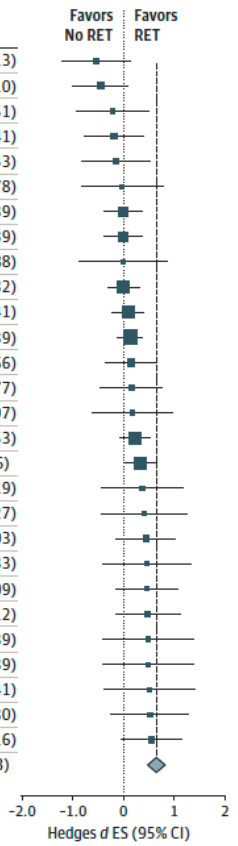
orest Plot of Distribution of Hedges *d* Effect Sizes (ES)

	Hedges *d* ES (95% CI)
16 2004	-0.53 (-1.19 to 0.13)
al,[61] 2011	-0.44 (-0.99 to 0.10)
oi et al,[43] 2007	-0.21 (-0.93 to 0.51)
,[67] 2009	-0.17 (-0.76 to 0.41)
oi et al,[43] 2007	-0.14 (-0.80 to 0.53)
t al,[33] 2011	-0.02 (-0.82 to 0.78)
t al,[34] 2011	0.00 (-0.39 to 0.39)
t al,[34] 2011	0.00 (-0.39 to 0.39)
al,[71] 2012	0.01 (-0.87 to 0.88)
et al,[51] 2007	0.01 (-0.30 to 0.32)
et al,[51] 2007	0.10 (-0.21 to 0.41)
t al,[32] 2002	0.14 (-0.11 to 0.39)
t al,[53] 1999	0.16 (-0.34 to 0.66)
et al,[55] 1997	0.17 (-0.44 to 0.77)
,[42] 2013	0.19 (-0.60 to 0.97)
t al,[63] 1999	0.23 (-0.07 to 0.53)
et al,[56] 2015	0.34 (0.02 to 0.66)
,[49] 2014	0.38 (-0.43 to 1.19)
,[42] 2013	0.42 (-0.43 to 1.27)
,[50] 2015	0.45 (-0.14 to 1.03)
al,[35] 2014	0.46 (-0.41 to 1.33)
t al,[59] 2017	0.47 (-0.15 to 1.09)
al,[66] 2006	0.49 (-0.14 to 1.12)
al,[58] 2011	0.50 (-0.39 to 1.39)
al,[58] 2011	0.50 (-0.39 to 1.39)
al,[58] 2011	0.52 (-0.37 to 1.41)
,[68] 2001	0.53 (-0.24 to 1.30)
al,[62] 2015	0.56 (-0.05 to 1.16)
	0.66 (0.48 to 0.83)



Source	Hedges *d* ES (95% CI)
Abrahão et al,[48] 2016	0.57 (-0.04 to 1.19)
Dalgas et al,[52] 2010	0.64 (-0.09 to 1.36)
Singh et al,[68] 2001	0.68 (-0.09 to 1.46)
Häkkinen et al,[57] 2001	0.72 (-0.17 to 1.60)
Singh et al,[68] 2001	0.73 (-0.05 to 1.51)
Vizza et al,[70] 2016	0.84 (-0.30 to 1.98)
Doyne et al,[54] 1987	0.84 (0.04 to 1.65)
Putiri et al,[65] 2012	0.86 (-0.31 to 2.02)
Alves et al,[42] 2013	0.93 (0.11 to 1.76)
Singh et al,[29] 1997	0.95 (0.22 to 1.69)
Levinger et al,[33] 2011	0.99 (0.20 to 1.77)
Singh et al,[29] 1997	1.03 (0.29 to 1.77)
Doyne et al,[54] 1987	1.07 (0.25 to 1.89)
Singh et al,[29] 1997	1.16 (0.41 to 1.91)
Singh et al,[29] 1997	1.16 (0.41 to 1.91)
Norvell et al,[72] 1993	1.18 (0.39 to 1.97)
Alves et al,[42] 2013	1.24 (0.32 to 2.15)
Lincoln et al,[60] 2011	1.28 (0.72 to 1.85)
Doyne et al,[54] 1987	1.48 (0.61 to 2.35)
Pilu et al,[64] 2007	1.54 (0.69 to 2.40)
Doyne et al,[54] 1987	1.66 (0.77 to 2.55)
Doyne et al,[54] 1987	2.15 (1.18 to 3.11)
Tapps et al,[69] 2013	2.16 (1.25 to 3.07)
Doyne et al,[54] 1987	2.22 (1.24 to 3.20)
Tapps et al,[69] 2013	3.52 (2.33 to 4.66)
Tapps et al,[69] 2013	4.19 (2.91 to 5.47)
Mean Δ	0.66 (0.48 to 0.83)

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Hed

effects and overall effect of resistance exercise training on depressive
s. The different sizes of the data markers indicate the respective
the individual effects in the overall analysis. Studies are cited multiple

times because multiple efl
represents a unique effect
between the overall effect

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Clinical Review & Education

JAMA Clinical Evidence Synopsis

39 RCT con 2.326 pazienti

Exercise for Depression

Gary Cooney, AB, MBChB; Kerry Dwan, PhD; Gillian Mead, FRCP

CLINICAL QUESTION Is exercise an effective treatment for depression?

BOTTOM LINE Exercise is associated with a greater reduction in depression symptoms compared with no treatment, placebo, or active control interventions, such as relaxation or meditation. However, analysis of high-quality studies alone suggests only small benefits.

Depression affects more than 121 million people worldwide.[1] Although depression is commonly treated with medications or psychological therapies, some consider exercise as an adjunct or substitute treatment. This JAMA Clinical Evidence Synopsis summarizes an updated Cochrane review[2] that assesses whether exercise is associated with improvements in depression.

Summary of Findings

Of the 39 trials that fulfilled inclusion criteria, 37 trials provided data for meta-analysis; 35 trials (1356 participants) compared exercise with no treatment or a "control intervention." Because different depression scales were used, standardized mean difference (SMD) was used to combine data. An SMD of 0.20 represents a small effect, 0.50 a moderate effect, and 0.80 a large effect.[3]

We converted SMD to the Beck Depression Inventory (BDI) score, using data from a study by Chalder and colleagues[4] and methods described in the Cochrane handbook.[3] The BDI, a self-rated depression scale, includes 21 items, each scored 0 to 3, giving a maximum score of 63. Scores below 10 are considered minimal depression, whereas scores above 30 indicate severe depression.[5]

Exercise was associated with a greater reduction in depression scores compared with control (35 trials; pooled SMD, −0.62 [95% CI, −0.81 to −0.42]). This represented a moderate effect, equivalent to a difference of approximately 5 BDI points. For the 16 studies reporting BDI, the mean difference was 4.76 BDI points (**Figure**). However, analyzing only the 6 trials with adequate allocation concealment, intention-to-treat analysis, and blinded outcome assessment (n = 464) showed no association of exercise with improved depression (SMD, −0.18 [95% CI, −0.47 to 0.11]; BDI, −1.71 [95% CI, −4.47 to 1.05]). Seven trials (n = 189) found no difference between exercise and psychological therapy (SMD, −0.03 [95% CI, −0.32 to 0.26]; BDI, −0.29 [95% CI, −3.04 to 2.47]). Four trials (n = 298) found no difference between exercise and antidepressant therapy (SMD, −0.11 [95% CI, −0.34 to 0.12]; BDI, −1.05 [95% CI, −3.23 to 1.14]). Subgroup analyses were conducted to examine the association between type of exercise and whether depression was diagnosed by a clinical interview or a depression scale threshold score. The SMD for aerobic exercise indicated a moderate clinical association (SMD, −0.55 [95% CI, −0.77 to −0.34]; BDI, −5.23 [95% CI, −7.32 to −3.23]). The SMD for resistance exercise (SMD, −1.03 [95% CI, −1.52 to −0.53]; BDI, −9.79 [95% CI, −14.44 to −3.71]) indicated a stronger association. However, aerobic and resistance exercise were not directly compared head-to-head.

There was also a moderate favorable association between exercise and reduction in depression scores in studies that reached a clinical diagnosis of depression by interview (SMD, −0.57 [95% CI, −0.81 to −0.32]; BDI, −5.42 [95% CI, −7.70 to −3.04]), as well as studies that reached a diagnosis by cutoff point on a scale (SMD, −0.67 [95% CI, −0.95 to −0.39]; BDI, −6.37 [95% CI, −9.03 to −3.71]). Studies with long-term follow-up (8 trials; n = 377; duration of follow-up, 4-26 mo) reported only a small favorable association (SMD, −0.33 [95% CI, −0.63 to −0.03]; BDI, −3.14 [95% CI, −5.99 to −0.29]). Only 7 trials reported adverse events. None reported an increase in adverse events associated with exercise.

Discussion

This meta-analysis suggests that exercise may have a moderate-sized favorable association with depression, but because of risk of bias, this association may be small. The optimal type, intensity, frequency, and duration of exercise for depression remain unclear.

Evidence Profile

No. of randomized clinical trials: 39

Study years: Published, 1979-2012; conducted, 1978-2010

No. of patients: 2326

Men: 637 (31%) **Women:** 1382 (68%); only 31 trials (2019 participants) reported sex

Age, mean range: 22-87.9 years

Settings: Community, outpatient, inpatient populations

Countries: Australia, Brazil, Canada, Denmark, Germany, Iran, Italy, New Zealand, Norway, Portugal, Russia, Thailand, United Kingdom, United States

Comparisons: Exercise vs no treatment or a "control intervention" (ie, placebo treatment or an active control treatment, such as meditation or relaxation); exercise vs antidepressants; exercise vs psychological therapies

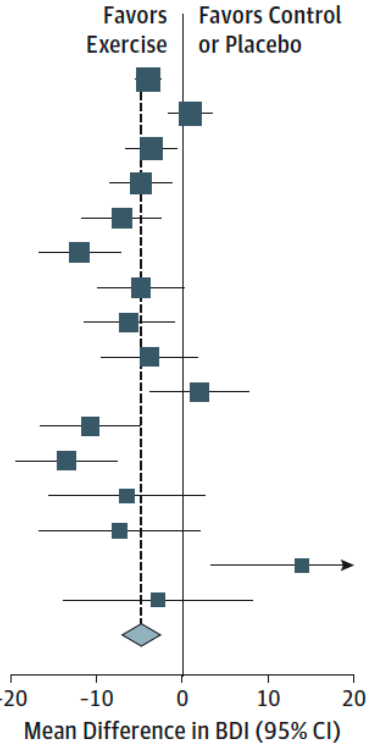
Duration of intervention: 4-16 weeks

Primary outcomes: Clinical diagnosis of depression, Beck Depression Inventory score, Hamilton Rating Scale for Depression score, Geriatric Depression Scale score

Secondary outcomes: Treatment acceptability, quality of life, adverse events

Figure. Mean Difference in Beck Depression Inventory Score for Exercise vs Control or Placebo Intervention

Study	Mean Difference in BDI (95% CI)
Foley, 2008	-4.00 (-5.53 to -2.47)
Bonnet, 2005	0.92 (-1.66 to 3.50)
Epstein, 1986	-3.60 (-6.55 to -0.65)
Hess-Homeier, 1981	-4.78 (-8.41 to -1.15)
Reuter, 1984	-7.07 (-11.70 to -2.44)
Martinsen, 1985	-11.94 (-16.74 to -7.14)
Fremont, 1987	-4.80 (-9.80 to 0.20)
Veale, 1992	-6.20 (-11.45 to -0.95)
Hemat-Far, 2012	-3.85 (-9.43 to 1.73)
Hoffman, 2010	2.00 (-3.71 to 7.71)
Mutrie, 1998	-10.70 (-16.56 to -4.84)
Doyne, 1987	-13.46 (-19.37 to -7.55)
Chu, 2008	-6.40 (-15.47 to 2.67)
McNeil, 1991	-7.30 (-16.62 to 2.02)
Blumenthal, 1999	13.96 (3.34 to 24.58)
Singh, 1997	-2.82 (-13.84 to 8.20)
Overall	-4.76 (-6.99 to -2.53)



BDI indicates Beck Depression Inventory. Only 16 trials used the BD... size of the data markers indicates the weight of the study. Meta-an... the random-effects method.

CORRELATI NEUROBIOLOGICI DELLA AF

Psychological Medicine

www.cambridge.org/psm

Disentangling the biological mechanisms underlying the effects of physical exercise in major depressive disorder: a comprehensive systematic review of randomized controlled trials

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Review Article

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Accepted: 15 May 2025

Keywords:
biological effects; biomarkers; inflammatory system; major depressive disorder; monoaminergic system; neurotrophic system; physical exercise; randomized controlled trials; stress-response system; systematic review

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Abstract

Background. Major depressive disorder (MDD) is a disabling psychiatric condition in which physical activity provides clinical benefits. While exercise effectively alleviates depressive symptoms, its biological mechanisms remain unclear.

Methods. This systematic review investigated the neurobiological effects of physical exercise on biomarkers in adults with MDD through randomized controlled trials, including studies assessing exercise interventions and reporting data on their biological effects.

Results. A total of 30 studies, including 2194 participants, were included, examining the effects of physical exercise on various biological systems in patients with MDD. Exercise interventions had mixed effects on inflammatory markers, including interleukins, C-reactive protein, and tumor necrosis factor-α, suggesting a potential but inconsistent anti-inflammatory role. Neurotrophic factors, such as brain-derived neurotrophic factor showed promise as biomarkers of treatment response, but their role in clinical improvements remained inconclusive. Findings for the stress-response system, including cortisol and monoaminergic systems, primarily involving serotonin and dopamine, were limited and variable. Exercise demonstrated potential benefits in reducing oxidative stress and enhancing β-endorphin levels, although these effects were not consistently observed.

Conclusion. This systematic review adopted a broader perspective than prior studies, exploring less-studied biological systems and identifying several limitations in the included studies, including small sample sizes, varying methodologies, and a predominant focus on biochemical markers. Future research should prioritize larger, standardized trials and particularly employ omics approaches to better understand the biological mechanisms underlying the effects of exercise in MDD. The findings highlight the complexity of exercise's biological effects and emphasize the need for further research to clarify its mechanisms.

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Meccanismi biologici dell'esercizio fisico nella Depressione Maggiore

Carvalho Silva R et al., Psychological Medicine 2025 | Revisione sistematica di 30 RCT (n = 2.194)

Sistema infiammatorio/immunitario

▲ IL-10 ↑ con esercizio + CBT; risultati misti per IL-6 e IL-1β

● CRP: riduzione modesta, limitata a sottogruppi con rischio CV

● TNF-α: predittore di risposta ma effetti inconsistenti post-intervento

Sistema neurotrofico

▲ BDNF ↑ con esercizio aerobico, yoga e ECT+esercizio

● BDNF basale elevato predice remissione; ruolo clinico ancora incerto

▼ VEGF e IGF-1: nessun effetto significativo dell'esercizio

Sistema dello stress (HPA)

▼ Cortisolo: scarsa sensibilità all'esercizio nella maggior parte degli studi

▲ Yoga e meditazione: riduzione significativa del cortisolo

▼ Copeptina e ACTH: nessuna differenza significativa

Sistema monoaminergico

▲ Esercizio + farmaco ↓ attività della COMT solubile

▼ Nessun cambiamento significativo in serotonina, dopamina, noradrenalina plasmatiche

▲ MHPG-solfato urinario ↑ con esercizio, correlato a miglioramento sintomatico

Stress ossidativo e β-endorfine

▲ TBARS ↓ con esercizio in pazienti gravi; yoga ↓ danno al DNA

▲ β-endorfine ↑ con esercizio + antidepressivo → correlazione con miglioramento clinico

Limitazioni e direzioni future

▼ Campioni piccoli, eterogeneità metodologica, focus su marcatori biochimici

● 29/30 studi con rischio di bias intermedio

● Necessari RCT più ampi con approcci omici (genomica, proteomica, metabolomica)

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▲ Effetto positivo/significativo ▼ Nessun effetto/risultato negativo ● Risultato misto/incerto

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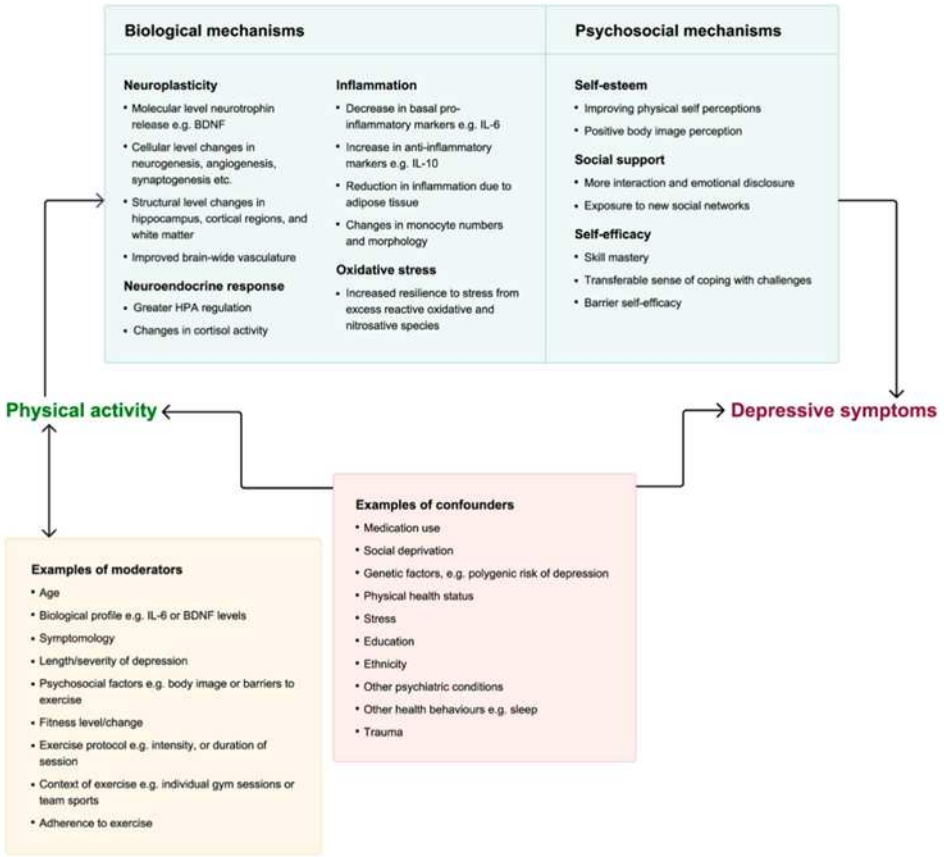

Fig. 1. Mechanisms, moderators, and confounders of the relationship between physical activity and depressive symptoms.

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Increasing activity and reducing sedentary behaviour for people with severe mental illness: what are the active ingredients for behaviour change? A systematic review

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Physical activity
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Behaviour change
Systematic literature review

ABSTRACT

Increasing physical activity (PA) and reducing sedentary behaviour (SB) can improve health outcomes and reduce rates of premature mortality for people with severe mental illness (SMI). In this systematic review we aimed to explore the active ingredients of existing PA interventions for people with SMI. We reviewed intervention functions, behaviour change techniques (BCTs), contextual features and underpinning theories. We included 15 PA interventions, of which 4 were classed as effective (effect size >0.273). We identified the frequency of intervention functions and BCTs that were used in each study and compared the number of effective studies that featured a particular BCT or intervention function with the total number that featured those components. We used the TIDieR checklist to document contextual features that might be important within effective interventions including the theories that guided the development of interventions. The most frequently used functions were education and environmental restructuring, both of which were identified in effective interventions. The BCTs that were identified as potentially useful were framing and reframing, feedback on behaviour and self-monitoring. No discernible contextual features were unique to the effective interventions, but combinations of some features seemed to be (PA tracking, educational components and support delivered by community health teams). More high quality and better reported studies are required to strengthen this evidence base.

Prospero registration: PROSPERO 2024 CRD42024541859

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Table 2
Intervention functions, comparing effective and non-effective interventions.

Intervention functions	Effective interventions (n = 4)	Not effective interventions (n = 10)	All interventions (n = 14[a])	Effectiveness ratio
Education	4	10	14	29 %
Persuasion	3	6	9	33 %
Incentivisation	1	0	1	100 %
Coercion	0	0	0	0 %
Training	1	7	8	13 %
Enablement	3	10	13	23 %
Modelling	1	3	4	25 %
Environmental restructuring	4	10	14	29 %
Restrictions	0	0	0	0 %

[a] Kaplan et al., 2018 not included in line with the previous review; this intervention showed too much incongruence with the other included interventions due to its primary aim, which was to decrease levels of subjective sleep inertia.

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Schizofrenia
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Advance Access publication November 7, 2015

2016

Exercise Improves Clinical Symptoms, Quality of Life, Global Functioning, and Depression in Schizophrenia: A Systematic Review and Meta-analysis

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Background: **Physical exercise may be valuable for patients with schizophrenia spectrum disorders as it may have beneficial effect on clinical symptoms, quality of life and cognition.** ***Methods:*** **A systematic search was performed using PubMed (Medline), Embase, PsychInfo, and Cochrane Database of Systematic Reviews. Controlled and uncontrolled studies investigating the effect of any type of physical exercise interventions in schizophrenia spectrum disorders were included. Outcome measures were clinical symptoms, quality of life, global functioning, depression or cognition. Meta-analyses were performed using Comprehensive Meta-Analysis software. A random effects model was used to compute overall weighted effect sizes in Hedges' *g*.** ***Results:*** **Twenty-nine studies were included, examining 1109 patients. Exercise was superior to control conditions in improving total symptom severity (*k* = 14, *n* = 719: Hedges' *g* = .39, *P* < .001), positive (*k* = 15, *n* = 715: Hedges' *g* = .32, *P* < .01), negative (*k* = 18, *n* = 854: Hedges' *g* = .49, *P* < .001), and general (*k* = 10, *n* = 475: Hedges' *g* = .27, *P* < .05) symptoms, quality of life (*k* = 11, *n* = 770: Hedges' *g* = .55, *P* < .001), global functioning (*k* = 5, *n* = 342: Hedges' *g* = .32, *P* < .01), and depressive symptoms (*k* = 7, *n* = 337: Hedges' *g* = .71, *P* < .001). Yoga, specifically, improved the cognitive subdomain long-term memory (*k* = 2, *n* = 184: Hedges' *g* = .32, *P* < .05), while exercise in general or in any other form had no effect on cognition.** ***Conclusion:*** **Physical exercise is a robust add-on treatment for improving clinical symptoms, quality of life, global functioning, and depressive symptoms in patients with schizophrenia. The effect on cognition is not demonstrated, but may be present for yoga.**

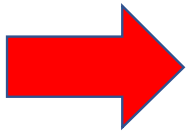
Key words: psychopathology/functioning/cognition/yoga/aerobic exercise

Introduction

Schizophrenia, a severe psychiatric disorder, affects approximately 24 million people worldwide.[1] This disorder is characterized by (1) positive symptoms such as hallucinations and delusions, (2) negative symptoms including affective flattening, alogia and avolition, and (3) neurocognitive deficits including perception, memory, and attention, among others.[2] Negative and cognitive symptoms, emerging in the pre-psychotic stage, appear to be related.[3] Higher negative and cognitive symptoms are significantly associated with poorer functional outcome.[4,5] Treatment with antipsychotic drugs, applied as first line therapy, typically result in reduction in positive symptoms with minimal to no effects on negative and cognitive symptoms.[6] In addition, antipsychotics result in the side effects weight gain and metabolic syndrome.[7,8] Furthermore, reduced physical capacity in patients with schizophrenia is strongly related to negative and cognitive symptoms.[9,10] These risk factors are major contributors of cardiovascular diseases in schizophrenia which in turn is associated with 2- to 3-fold higher mortality rate compared to the general population.[11] Saha et al found an all-cause standardized mortality ratio of 2.58 showing an increase in mortality in these patients over the last decades.[12] Therefore, it is time to implement a therapy for patients with schizophrenia that decreases the negative symptoms and cognitive deficits, and also improves the functional and clinical outcome.

Physical inactivity has been described as the leading risk factor for global mortality.[13] The World Health Organization (WHO) 2009[14] reported that physical inactivity accounts for 27% of diabetes and 30% of ischemic heart diseases, whereas an active lifestyle reduces these risks, largely improving general health and wellness, and life expectancy.[14] Furthermore, physical activity in healthy aging populations is associated with improvement in cognitive functioning and depressive symptoms, delay in age-related cognitive decline and neurodegeneration.[15,16] On the brain level, exercise induces neurogenesis, modulates synaptic plasticity and increases several growth factors

- **29 studi con 1.109 pazienti con diagnosi di schizofrenia.**
- **Sessioni di AF comprese tra 16' sino a 360'-720' alla settimana.**
- **Durata media dell'intervento: 12 settimane.**
- **Tutti gli studi comprendevano AF svolta in gruppo e sotto supervisione.**



- **Programmi raccomandati di gruppo con supervisione <u>con sessioni di almeno 30' 3 volte alla settimana per un minimo di 12 settimane</u>.**

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Psychological Medicine, Page 1 of 19. © Cambridge University Press 2015
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REVIEW ARTICLE

A systematic review and meta-analysis of exercise interventions in schizophrenia patients

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[4] *Institute of Psychology, Health and Society, The University of Liverpool, UK*
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Background. The typically poor outcomes of schizophrenia could be improved through interventions that reduce cardiometabolic risk, negative symptoms and cognitive deficits; aspects of the illness which often go untreated. The present review and meta-analysis aimed to establish the effectiveness of exercise for improving both physical and mental health outcomes in schizophrenia patients.

Method. We conducted a systematic literature search to identify all studies that examined the physical or mental effects of exercise interventions in non-affective psychotic disorders. Of 1581 references, 20 eligible studies were identified. Data on study design, sample characteristics, outcomes and feasibility were extracted from all studies and systematically reviewed. Meta-analyses were also conducted on the physical and mental health outcomes of randomized controlled trials.

Results. Exercise interventions had no significant effect on body mass index, but can improve physical fitness and other cardiometabolic risk factors. Psychiatric symptoms were significantly reduced by interventions using around 90 min of moderate-to-vigorous exercise per week (standardized mean difference: 0.72, 95% confidence interval −1.14 to −0.29). This amount of exercise was also reported to significantly improve functioning, co-morbid disorders and neurocognition.

Conclusions. Interventions that implement a sufficient dose of exercise, in supervised or group settings, can be feasible and effective interventions for schizophrenia.

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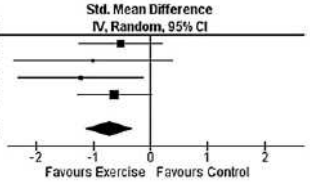
(*b*) Sensitivity Analysis: Total Symptoms

Study	Exercise Mean	SD	Total	Comparators Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Acil 2008	-8.7	14.43	15	0.93	20.74	15	33.3%	-0.52 [-1.25, 0.21]
Beebe 2005	-8.25	11.46	4	4.66	11.73	6	9.2%	-1.00 [-2.39, 0.38]
Pajonk 2010	-6.1	9.6	8	8.4	12.6	8	14.8%	-1.22 [-2.32, -0.13]
Scheewe 2013a	-6.7	13.32	20	1.1	10.86	19	42.7%	-0.63 [-1.27, 0.02]
Total (95% CI)			47			48	100.0%	**-0.72 [-1.14, -0.29]**

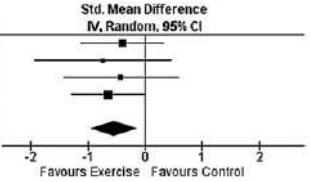
Heterogeneity: Tau² = 0.00; Chi² = 1.33, df = 3 (P = 0.72); I² = 0%
Test for overall effect: Z = 3.33 (P = 0.0009)



(*c*) Sensitivity Analysis: Positive Symptoms

Study	Exercise Mean	SD	Total	Control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Acil 2008	-7	11.3	15	-1	17.44	15	31.7%	-0.40 [-1.12, 0.33]
Beebe 2005	-2.75	3.53	6	0.66	4.88	6	11.8%	-0.74 [-1.93, 0.45]
Pajonk 2010	-1	2.6	8	0.8	5.1	8	16.8%	-0.42 [-1.41, 0.57]
Scheewe 2013a	-2.1	4.46	20	0.9	4.65	19	39.8%	-0.65 [-1.29, 0.00]
Total (95% CI)			49			48	100.0%	**-0.54 [-0.95, -0.13]**

Heterogeneity: Tau² = 0.00; Chi² = 0.42, df = 3 (P = 0.94); I² = 0%
Test for overall effect: Z = 2.60 (P = 0.009)



(*d*) Sensitivity Analysis: Negative Symptoms

Study	Exercise Mean	SD	Total	Control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Acil 2008	-10.4	16.7	15	2.86	20.09	15	21.6%	-0.70 [-1.44, 0.04]
Beebe 2005	-1.75	5.41	4	1.5	5.88	6	7.0%	-0.51 [-1.81, 0.78]
Gholipour 2012	-21	14.8	15	-17.5	23.5	30	30.7%	-0.16 [-0.78, 0.46]
Pajonk 2010	-2.8	4.7	8	0.9	5.7	8	11.5%	-0.67 [-1.69, 0.35]
Scheewe 2013a	-1.5	6.11	20	1.1	6.06	19	29.3%	-0.42 [-1.05, 0.22]
Total (95% CI)			62			78	100.0%	**-0.44 [-0.78, -0.09]**

Heterogeneity: Tau² = 0.00; Chi² = 1.44, df = 4 (P = 0.84); I² = 0%
Test for overall effect: Z = 2.49 (P = 0.01)

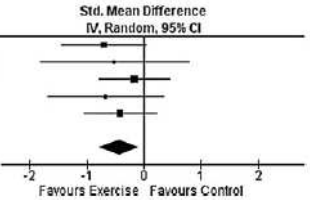


Fig. 3. Forest plots showing change in psychiatric symptoms in exercise and control conditions. 'Std. Mean Difference' indicates the effect size, with 95% confidence intervals (CIs). The *Z* value and associated *p* value indicate whether the effect size differs significantly from zero. The squares in the figure indicate the weight of the particular study in the meta-analysis. SD, Standard deviation; IV, inverse variance; df, degrees of freedom.

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https://doi.org/10.1186/s12888-020-02588-y

BMC Psychiatry

STUDY PROTOCOL Open Access

DAily time use, Physical Activity, quality of care and interpersonal relationships in patients with Schizophrenia spectrum disorders (DiAPASon): an Italian multicentre study

Giovanni de Girolamo[1*], Matteo Rocchetti[2,3], Ilaria Maria Antonietta Benzi[1], Sara Agosta[4], Letizia Casiraghi[2,3],

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DOI: 10.1111/bjc.12450

RESEARCH ARTICLE

Working alliance in treating staff and patients with Schizophrenia Spectrum Disorder living in Residential Facilities

Laura Fusar-Poli[1] | Fabio Panariello[2] | Katherine Berry[3,4] | Matteo Rocchetti[1,5] | Letizia Casiraghi[1] | Matteo Malvezzi[6] | Fabrizio Starace[7] | Manuel Zamparini[8] | Cristina Zarbo[8] | Giovanni de Girolamo[8] | on behalf of DiAPAson Consortium[‡]

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Italian Ministry of Health (Bando per la RicercaFinalizzata 2018: RF-2018-12365514)

Abstract

Objectives: Working Alliance (WA) is important in the care of patients with Schizophrenia Spectrum Disorders (SSD). This study aims to determine which sociodemographic and clinical factors are associated with WA, as assessed by patients and staff members in Residential Facilities (RFs), and may predict WA dyads' discrepancies.

Methods: Three hundred and three SSD patients and 165 healthcare workers were recruited from 98 RFs and characterized for sociodemographic features. WA was rated by the Working Alliance Inventory (WAI) for patients (WAI-P) and staff members (WAI-T). SSD patients were assessed for the severity of psychopathology and psychosocial functioning.

Results: Pearson's correlation revealed a positive correlation ($\rho = .314$; $p < .001$) between WAI-P and WAI-T ratings. Linear regression showed that patients with higher education reported lower WAI-P ratings ($\beta = -.50$, $p = .044$), while not being engaged in work or study was associated with lower WAI-T scores ($\beta = -4.17$, $p = .015$). A shorter lifetime hospitalization was associated with higher WAI-P ratings ($\beta = 5.90$, $p = .008$), while higher psychopathology severity negatively predicted WAI-T ($\beta = -.10$, $p = .002$) and WAI-P ratings ($\beta = -.19$, $p < .001$). Better functioning level

Patterns of antipsychotic prescription and accelerometer-based physical activity levels in people with schizophrenia spectrum disorders: a multicenter, prospective study

Vincenzo Oliva[a], Giuseppe Fanelli[a,b], Manuel Zamparini[c], Cristina Zarbo[c], Matteo Rocchetti[d,e], Letizia Casiraghi[d,e], Fabrizio Starace[f], Alessandra Martinelli[g,h], Alessandro Serretti[a], Giovanni de Girolamo[c] and the DiAPASon Consortium

Antipsychotic polypharmacy (APP) in patients with schizophrenia spectrum disorders (SSDs) is usually not recommended, though it is very common in clinical practice. Both APP and SSDs have been linked to worse health outcomes and decreased levels of physical activity, which in turn is an important risk factor for cardiovascular diseases and premature mortality. This real-world, observational study aimed to investigate antipsychotic prescribing patterns and physical activity in residential patients and outpatients with SSDs. A total of 620 patients and 114 healthy controls were recruited in 37 centers across Italy. Each participant underwent a comprehensive sociodemographic and clinical evaluation. Physical activity was monitored for seven consecutive days through accelerometer-based biosensors. High rates of APP were found in all patients, with residential patients receiving more APP than outpatients, probably because of greater psychopathological severity. Physical activity was lower in patients compared to controls. However, patients on APP showed trends of reduced sedentariness and higher levels of light physical activity than those in monopharmacy. Rehabilitation efforts in psychiatric residential treatment facilities were likely to result in improved physical activity performances in residential patients. Our findings may have important public health implications, as they indicate the importance of reducing APP and encouraging physical activity. ***Int Clin Psychopharmacol* XXX: 000–000 Copyright**

International Clinical Psychopharmacology XXX, XXX:000–000

Keywords: actigraph, antipsychotics, monopharmacy, physical fitness, polypharmacy, psychiatric residential treatment facilities, psychosis, psychotropic drugs, rehabilitation, wearable accelerometer-based biosensor

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Molecular Psychiatry www.nature.com/mp

ARTICLE

Shared and distinct abnormalities in sleep-wake patterns and their relationship with the negative symptoms of Schizophrenia Spectrum Disorder patients

Ahmad Mayeli[1,12], Alice D. LaGoy[1,12], Stephen F. Smagula[1], James D. Wilson[1], Cristina Zarbo[2], Matteo Rocchetti[3], Fabrizio Starace[4], Manuel Zamparini[2], Letizia Casiraghi[3], Stefano Calza[5], Matteo Rota[5], Armando D'Agostino[6], Giovanni de Girolamo[7], DiAPAson Consortium* and Fabio Ferrarelli[1,8]

Sleep and rest-activity-rhythm (RAR) abnormalities are commonly reported in schizophrenia spectrum disorder (SSD) patients. However, an in-depth characterization of sleep/RAR alterations in SSD, including patients in different treatment settings, and the relationship between these alterations and SSD clinical features (e.g., negative symptoms) is lacking. SSD ($N = 137$ altogether, $N = 79$ residential and $N = 58$ outpatients) and healthy control (HC) subjects ($N = 113$) were recruited for the DiAPAson project. Participants wore an ActiGraph for seven consecutive days to monitor habitual sleep-RAR patterns. Sleep/rest duration, activity (i.e., M10, calculated on the 10 most active hours), rhythm fragmentation within days (i.e., intra-daily variability, IV; beta, steepness of rest-active changes), and rhythm regularity across days (i.e., inter-daily stability, IS) were computed in each study participant. Negative symptoms were assessed in SSD patients with the Brief Negative Symptom Scale (BNSS). Both SSD groups showed lower M10 and longer sleep/rest duration vs. HC, while only residential patients had more fragmented and irregular rhythms than HC. Compared to outpatients, residential patients had lower M10 and higher beta, IV and IS. Furthermore, residential patients had worse BNSS scores relative to outpatients, and higher IS contributed to between-group differences in BNSS score severity. Altogether, residentials and outpatients SSD had both shared and unique abnormalities in Sleep/RAR measures vs. HC and relative to one another, which also contributed to the patients' negative symptom severity. Future work will help establish whether improving some of these measures may ameliorate the quality of life and clinical symptoms of SSD patients.

Molecular Psychiatry; https://doi.org/10.1038/s41380-023-02050-x

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CAMPIONE STUDIATO

	RESIDENTIAL PATIENTS N = 313 (50.5%)	OUTPATIENTS N = 307 (49.5%)	p value*
Età (media, SD)	41.0 (±9.7)	41.7 (±9.2)	.423
Sesso maschile, N (%)	220 (70.3)	202 (65.8)	.231
Occupato, N (%)	38 (12.2)	90 (29.3)	<.001
Non coniugato, N (%)	271 (86.9)	263 (85.7)	.003
Durata di malattia (media, SD)	18.3 (±9.6)	18.1 (±9.4)	.859
% con antipsicotici	97.8	98.1	.998
BPRS (media, SD)	51.0 (±16.2)	42.6 (±11.9)	<.001
BNSS (media, SD)	26.3 (±16.6)	19.3 (±13.9)	<.001
SLOF (media, SD)	174.3 (±22.6)	183.2 (±18.6)	<.001
WHODAS (media, SD)	12.5 (±8.7)	13.4 (±9.7)	.386

OBIETTIVO

- **Comparare le differenze nell'attività fisica (sedentaria, lieve, moderata ed intensa) tra pazienti residenziali, pazienti ambulatoriali e controlli sani.**

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METODI

56 pazienti residenziali + 49 pazienti ambulatoriali + 111 controlli sani.

<u>Valutazione clinica</u>: circonferenza addominale, comorbidità fisiche, indice di massa corporea (BMI).

<u>Monitoraggio dell'attività fisica (PA)</u>: Actigraph GT9X Link.

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GT9X Link

Motion Tracking Designed for Multiple Wear Locations

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- Gyroscope and magnetometer
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- 14-day battery life
- USB, Bluetooth LE 5.0
- Versatile wearing location
- Programmable display
- IP57 Water R

ActiGraph

BMJ Mental Health

ADULT MENTAL HEALTH

Ecological monitoring of physical activity, emotions and daily life activities in schizophrenia: the DiAPAson study

Cristina Zarbo ,[1] Matteo Rota,[2] Stefano Calza,[2] Scott E Crouter,[3] Ulf Ekelund,[4,5] Stefano Barlati,[6] Riccardo Bussi,[7] Massimo Clerici,[8] Roberto Placenti,[9] Giuseppina Paulillo,[10] Silvia Pogliaghi,[11] Matteo Rocchetti,[12] Mirella Ruggeri,[13] Fabrizio Starace,[14] Stefano Zanolini,[15] Manuel Zamparini,[16] Giovanni de Girolamo ,[16] DiAPAson Collaborators

► Additional supplemental material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/bmjment-2023-300836).

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ABSTRACT

Background Schizophrenia spectrum disorders (SSD) compromise psychosocial functioning, including daily time use, emotional expression and physical activity (PA).

Objective We performed a cohort study aimed at investigating: (1) the differences in PA, daily activities and emotions between patients with SSD and healthy controls (HC); (2) the strength of the association between these variables and clinical features among patients with SSD.

Methods Ninety-nine patients with SSD (53 residential patients, 46 outpatients) and 111 matched HC were assessed for several clinical variables, and levels of functioning by means of standardised clinical measures. Self-reported daily activities and emotions were assessed with a smartphone application for ecological momentary assessment (EMA), and PA levels were assessed with a wearable accelerometer for 7 consecutive days.

Findings

Patients with SSD, especially those living in residential facilities, spent more time being sedentary, and self-reported more sedentary and self-care activities, experiencing higher levels of negative emotions compared with HC. Moreover, higher functioning levels among patients were associated with more time spent in moderate-to-vigorous activity.

Conclusions Sedentary behaviour and negative emotions are particularly critical among patients with SSD and are associated with more impaired clinical outcomes.

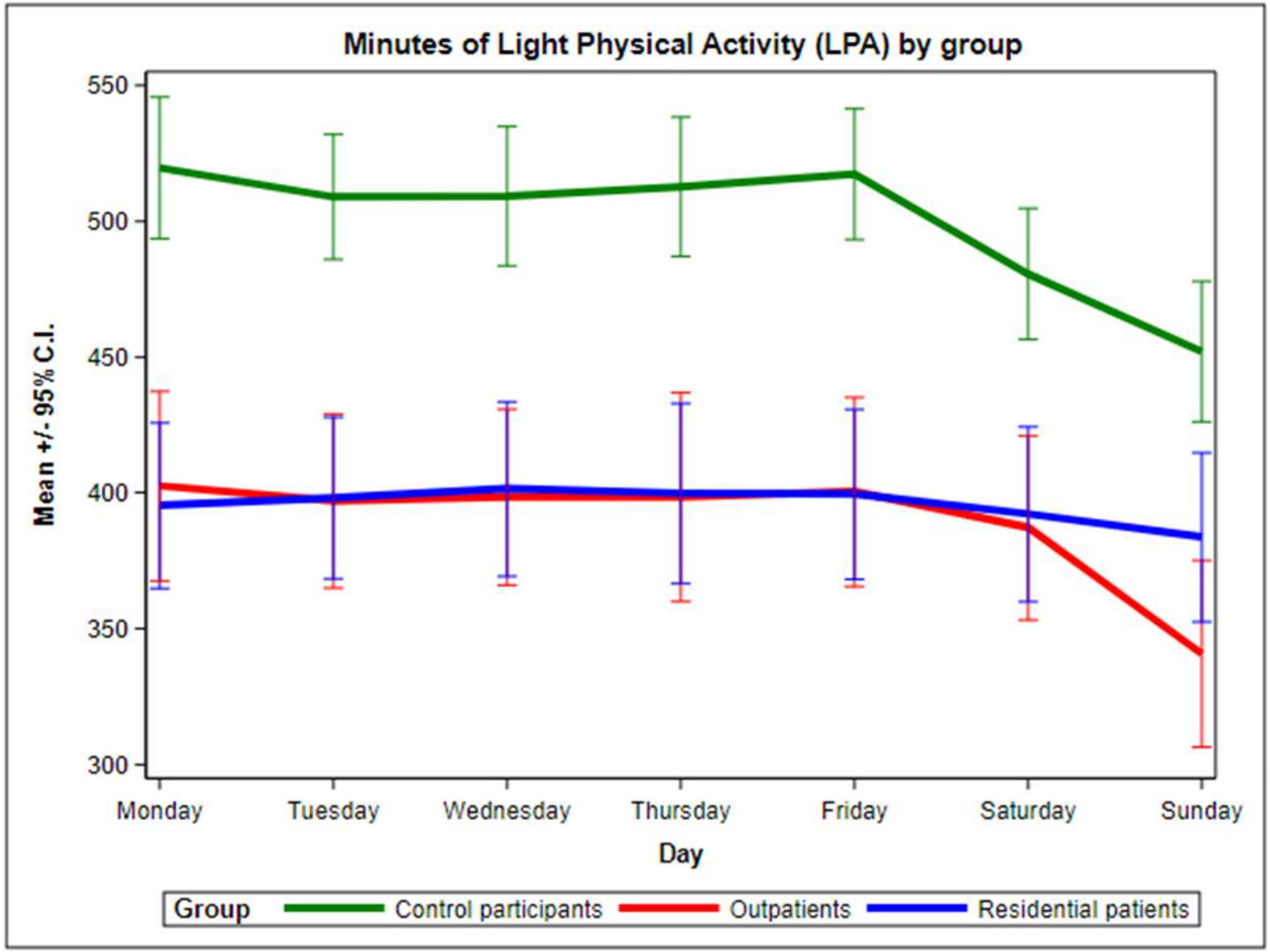
Clinical implications Mobile-EMA and wearable sensors are useful for monitoring the daily life of patients with SSD and the level of PA. This population needs to be targeted with specific rehabilitative programmes aimed at improving their commitment to structured daily activities.

BACKGROUND

Patients with schizophrenia spectrum disorders (SSD) often show marked impairments in daily time functioning,[1] with adverse consequences for prognosis, number of medical comorbidities and mortality rates.[2] However, despite the importance assigned to the daily time use of patients with SSD, most studies have mainly collected self-reported retrospective data. The use of retrospective self-reports in patients with severe mental disorders is prone to errors related to recall bias and to potentially impaired cognitive capacities.[3]

The integration of innovative methodologies (eg, ecological momentary assessment (EMA)) and wearable devices like accelerometer-based biosensors in research and clinical practice with individuals with SSD is promising. These tools reduce biases, provide longitudinal, objective and time-resolved ecologically valid data (ie, a fine-grained picture of patients' experiences in their natural contexts), and capture the variability over time and the dynamic patterns of reactivity to the environment.[4] In the last few decades, EMA has been used with patients with SSD for the evaluation of daily emotions or symptomatology, but only a few have used this methodology to assess daily life activities.[5–8] These studies have generally found that patients with SSD spend more than half (ie, 52%) of the day being inactive/doing nothing,[9] and most activities are performed sitting or lying down.[8] Furthermore, inactivity time is usually higher in patients with SSD when compared with healthy controls.[5 6]

Some studies have used accelerometer-based biosensors for the monitoring of physical activity (PA) in this population.[10–13] PA refers to any bodily movement that requires energy expenditure and engages the muscles. It encompasses a wide range of activities, such as walking, running, cycling, swimming, dancing, playing sports and engaging in structured exercise routines.[14] On the contrary, sedentary behaviour refers to activities involving low energy expenditure characterised by sitting, reclining or lying down while engaging in activities such as watching television, working on a computer, using electronic devices or reading.[15] A recent meta-analysis found that individuals with SSD spend a mean of 80.4 min in light PA, 47.1 min in moderate-to-vigorous PA (MVPA) and 1.05 min in vigorous PA per day[1] and usually show lower MVPA levels compared with healthy controls.[1 12] Moreover, lower PA and sedentary behaviour are



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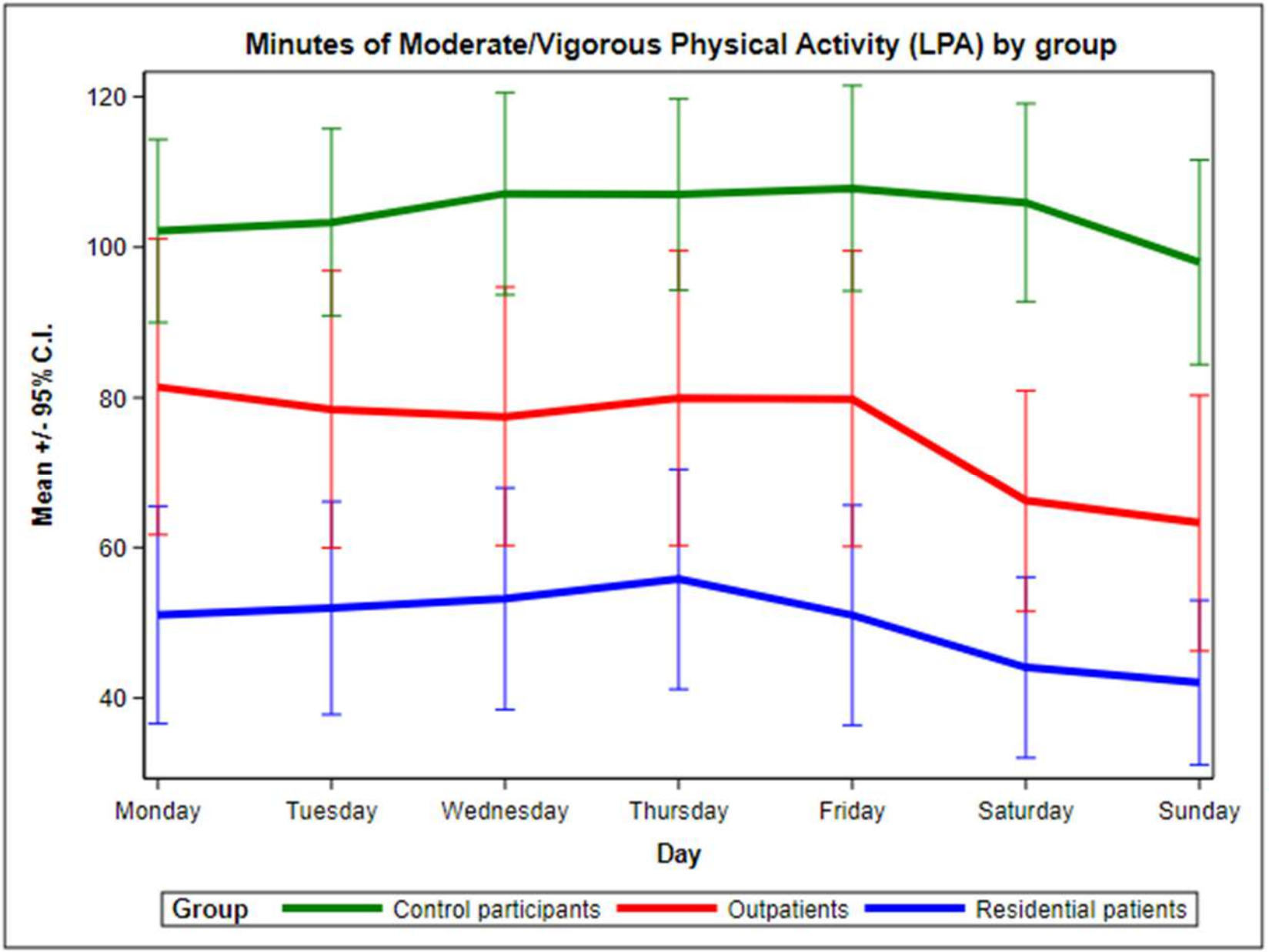

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Full-length Article

Association of Weight Status and Waist Circumference with Physical Activity in people with Schizophrenia Spectrum Disorders and healthy controls

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ARTICLE INFO

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Weight
Waist Circumference
Body Mass Index
Accelerometer
Physical Activity
Quality of Life

ABSTRACT

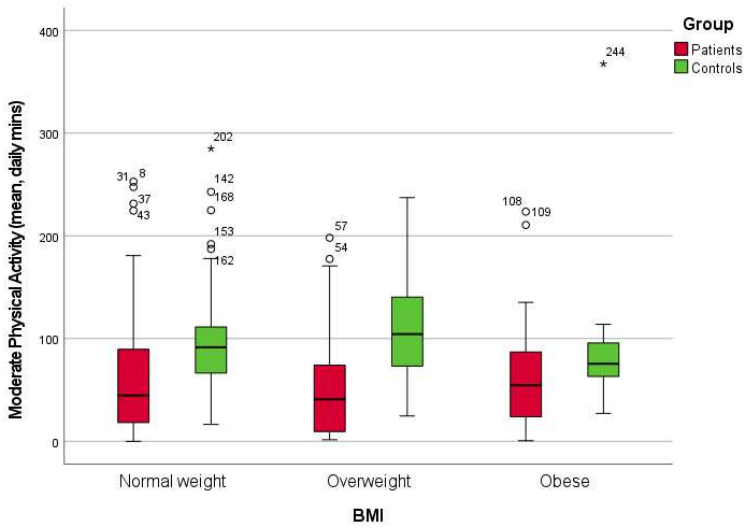
Background: Individuals with Schizophrenia Spectrum Disorders (SSD) often suffer from obesity and do limited Physical Activity (PA). PA has many beneficial effects on a variety of somatic and mental variables and it should be strengthened among people with mental disorders. The relationship between Body Mass Index (BMI), Waist Circumference (WC), and PA in this population is poorly understood, with a lack of precise PA assessment. This study investigates the association between BMI, WC, weight, and PA in individuals with SSD and controls using accelerometers.

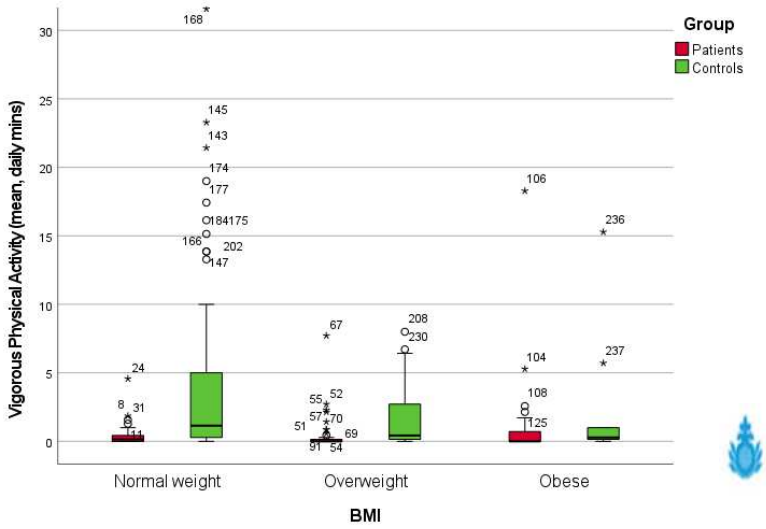
Methods: One hundred twenty-six patients with SSD (residents and outpatients) and 110 sex- and age-matched controls were enrolled. Clinical, sociodemographic, and quality-of-life data were collected. PA was measured with a tri-axial ActiGraph GT9X and quantified by Vector Magnitude (VM). Relationships between PA and BMI, WC, and weight changes were analysed using linear regression models.

Results: Patients were more likely to be unmarried, unemployed, and less educated compared to controls ($p < 0.001$). Residents had more medical comorbidities ($p = 0.001$), while outpatients had higher BMI, weight, and WC ($p < 0.001$). Residents reported more severe psychopathology, lower functioning, and greater use of psychopharmacological medications ($p < 0.001$). Higher PA levels were not significantly associated with lower BMI, WC, or weight. Although not statistically significant, increased PA showed a trend towards lower obesity risk.

Conclusions: Sociodemographic, medical, and clinical characteristics of individuals with SSD define vulnerability factors that can inform tailored interventions to improve PA.

LIVELLI DI ATTIVITA' FISICA MODERATA ED INTENSA IN TRE GRUPPI CON DIFFERENTE BMI





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CONCLUSIONI

1. **I pazienti trascorrono più tempo in attività non-produttive rispetto ai controlli sani, mentre i controlli trascorrono più tempo in attività produttive.**
2. **I pazienti ambulatoriali sono più sedentari dei controlli sani.**
3. **I pazienti dormono più dei controlli.**
4. **Nel complesso, i pazienti fanno poca attività fisica.**
5. **Il setting di trattamento (o di "vita") è una variabile importante.**

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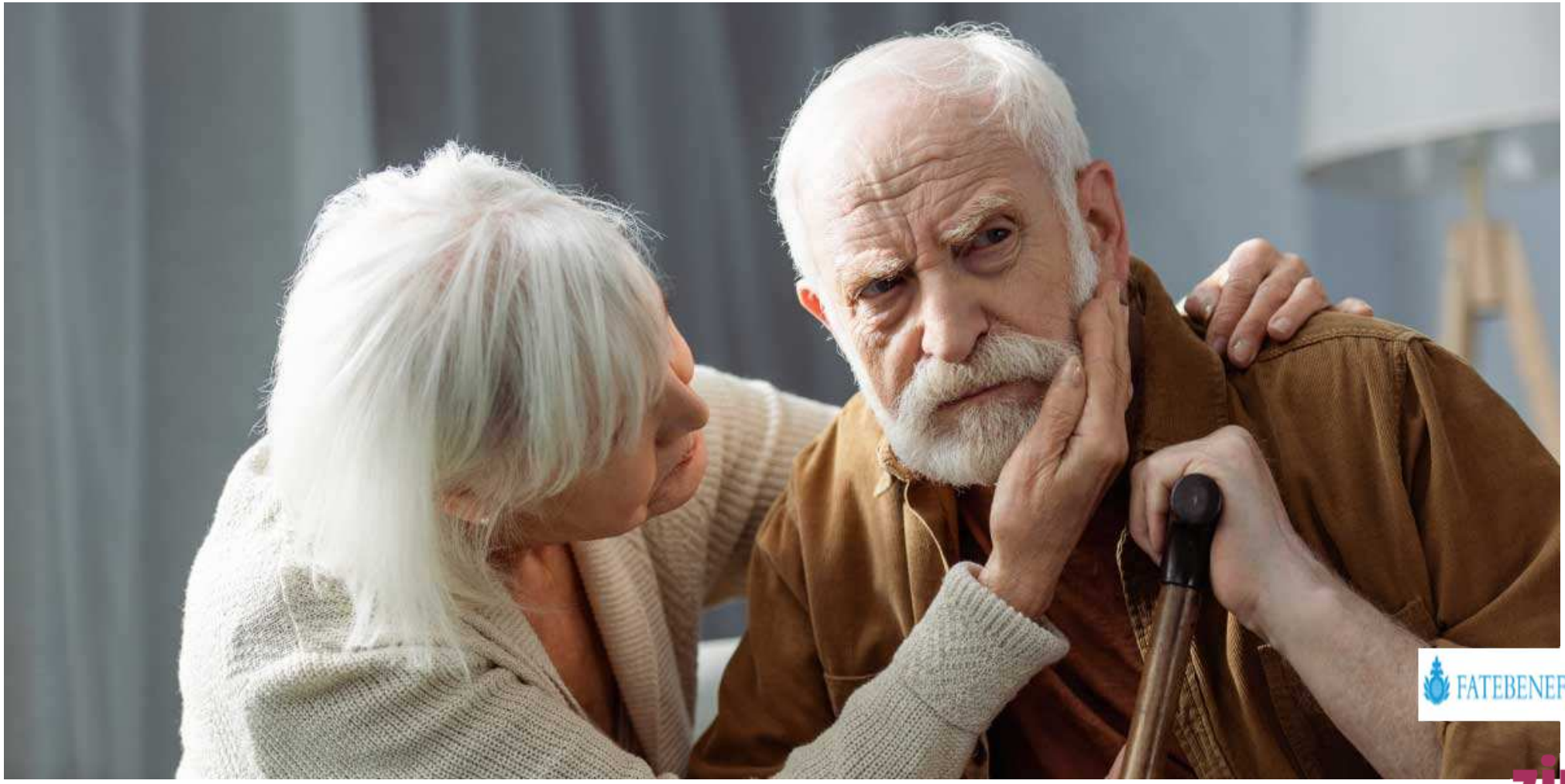
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The Lancet Series on Alzheimer's Disease 1

New landscape of the diagnosis of Alzheimer's disease

Giovanni B Frisoni, Oskar Hansson, Emma Nichols, Valentina Garibotto, Suzanne E Schindler, Wiesje M van der Flier, Frank Jessen, Nicolas Villain, Eider M Arenaza-Urquijo, Lucia Crivelli, Juan Fortea, Lea T Grinberg, Zahinoor Ismail, Satoshi Minoshima, Rik Ossenkoppele, Henrik Zetterberg, Ronald C Petersen, Bruno Dubois

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This is the first in a Series of three papers about the new clinical landscape in Alzheimer's disease. All papers in the Series are available at https://www.thelancet.com/series-dia/alzheimers-disease

Alzheimer's disease involves a drastic departure from the cognitive, functional, and behavioural trajectory of normal ageing, and is both a dreaded and highly prevalent cause of disability to individuals, and a leading source of health and social care expenditure for society. Before the advent of biomarkers, post-mortem examination was the only method available to establish a definitive diagnosis. In this first paper of the Series, we review state-of-the-art diagnostic practices and the typical patient journey in specialist settings, where clinicians engage in a differential diagnosis to establish whether Alzheimer's pathology (cerebral deposition of β-amyloid and hyperphosphorylated tau) is a contributor to cognitive impairment. Biomarkers indicating dysregulation of β-amyloid and tau homeostasis, measured with PET and cerebrospinal fluid analysis, allow a molecular-level diagnosis—a mandatory step in defining eligibility for the recently approved anti-amyloid treatments. We anticipate that easily accessible blood biomarkers, already available in some countries, will lead to a new diagnostic revolution and bring about major changes in health-care systems worldwide.

Introduction

What is Alzheimer's disease? Depending on who is asked, the answers vary, even among doctors and specialists. The definition of Alzheimer's disease is in dynamic evolution in the expert community, and unanimity has not yet been reached. For all practical purposes, Alzheimer's disease in clinical practice consists of cognitive impairment associated with biomarker evidence of its neuropathological hallmarks: β-amyloid plaques composed of aggregated β-amyloid, and neurofibrillary tangles composed of aggregated tau.[1] Different views on the definition of Alzheimer's disease are addressed in the last paper of this Series.[2] The diagnostic approach and patient journey that we describe in this paper are typical of many memory clinics in Europe and elsewhere[3] and are anchored to the clinical phenotype of a middle-aged or older patient with a history of progressive cognitive decline, sometimes accompanied by behavioural changes, neurological signs, and decreased function in everyday activities. Impairment on cognitive tests, particularly tests of episodic memory, and medial temporal atrophy patterns identified via structural brain imaging might support a clinical–radiological syndromic diagnosis of Alzheimer's disease, but are non-specific as they are shared by other neuropathologies. By contrast, molecular biomarkers, including PET, cerebrospinal fluid (CSF), and blood tests, can specifically mark the presence of β-amyloid-containing plaques and tau-containing neurofibrillary tangles, which are characteristic of Alzheimer's disease, allowing for a clinical–biological diagnosis. These biomarkers enable assessment of neuropathological evidence in vivo, and when used in clinical practice, allow for increased accuracy (90–95%, compared with 60–70% of the traditional purely clinical approach)[4,5] and earlier diagnosis.[6]

It should be acknowledged that frequently, Alzheimer's disease is diagnosed based on clinical investigations and structural imaging only—ie, without biomarker confirmation. However, this is already changing as Alzheimer's disease-specific biological drugs require confirmation of β-amyloid pathology before treatment initiation.[7] At the time of the publishing of this review, the anti-amyloid monoclonal antibodies donanemab and lecanemab[8,9] are approved in an increasing number of countries, including the EU, the USA, the UK, China, Japan, South Korea, Hong Kong, United Arab Emirates, and Israel.

This Series paper on the diagnosis of Alzheimer's disease only considers biomarkers that are currently

Search strategy and selection criteria

We conducted a review of published articles with special focus given towards the past 5 years, since Jan 1, 2020, and up to including March 1, 2025, on the PubMed, Embase, Scopus, and Cochrane databases. The search was restricted to studies published in English with different combinations of the following keywords and medical subject heading terms in PubMed (MeSH) and Embase (Emtree): "Alzheimer's disease", "cognitive impairment", "dementia", "epidemiology", "incidence", "prevalence", "risk factor", "protective factor", "cognitive ageing", "biomarker", "APOE", "patient journey", "workflow", "algorithm", "taxonomy", "mild cognitive impairment", "subjective cognitive decline", "MRI", "PET", "CSF", "amyloid", "tau", "neurodegeneration". We prioritised the most robust evidence from clinical trials, systematic reviews, meta-analyses, and pooled studies. We also reviewed guidelines and position statements from the same period on the diagnosis of Alzheimer's disease, cognitive impairment, and dementia.

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The Lancet Series on Alzheimer's Disease 3

Alzheimer's disease outlook: controversies and future directions

Giovanni B Frisoni, Emil Aho, Carol Brayne, Olga Ciccarelli, Bruno Dubois, Nick C Fox, Kristian S Frederiksen, Cem Gabay, Valentina Garibotto, Thomas Hofmarcher, Clifford R Jack Jr, Miia Kivipelto, Ronald C Petersen, Federica Ribaldi, Christopher C Rowe, Sebastian Walsh, Henrik Zetterberg, Oskar Hansson

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This is the third in a Series of three papers about the new clinical landscape in Alzheimer's disease. All papers in the Series are available at https://www.thelancet.com/series-dia/alzheimers-disease

For the first time, reductions in cerebral β-amyloid pathology load and rate of cognitive and functional decline have been achieved in Alzheimer's disease, through pharmacological intervention in randomised controlled trials. However, the results from phase 3 randomised controlled trials of anti-β amyloid monoclonal antibodies are interpreted in different ways, with some experts supporting a clinically meaningful disease-modifying effect, and others judging insufficient benefit-to-risk ratio and opposing market authorisation. In the final paper of this Series, we discuss these contrasting views, all of which wish to contribute to improvements in the quality of life of people with, or at risk of, Alzheimer's disease. We contrast the efficacy, societal costs, and generalisability of monoclonal antibodies for Alzheimer's disease to biologics for other conditions (eg, cancer, multiple sclerosis, and rheumatoid arthritis) and set this debate in the larger context of modern personalised medicine. We discuss current practice implications, future developments directed to β-amyloid and non-amyloid targets that might have more clinical efficacy and less adverse effects for those with the disease, and large-scale prevention interventions for those at risk.

Introduction

Biologics for medical conditions ranging from multiple sclerosis, to some cancers, to rheumatoid arthritis have significantly improved patient care and outcomes.

Search strategy and selection criteria

We searched PubMed, Embase, Scopus, and Cochrane for articles published from Jan 1, 2020, to March 1, 2025. The search was restricted to studies published in English with different combinations of the following keywords and medical subject heading terms in PubMed (MeSH) and Embase (Emtree): "Alzheimer's disease", "cognitive impairment", "dementia", "anti-amyloid", "monoclonal antibodies", "lecanemab", "donanemab", "symptomatic", "disease-modif*", "amyloid-related imaging abnormalities", "ARIA", "clinical* meaningful*", "discontinu*", "APOE", "oncology", "cancer", "biologics", "rheumatoid arthritis", "disability", "morbidity", "quality of life", "disease-free survival", "progression-free survival", "cost-effectiveness", "health care", "burden of disease", "multiple sclerosis", "DALY", "disability-adjusted", "costs", "biomarkers", "secondary prevention", and "primary prevention". We prioritised the most robust evidence from clinical trials, systematic reviews, meta-analyses, and pooled studies. We also reviewed guidelines and position statements from the same period on the diagnosis of Alzheimer's disease, cognitive impairment, and dementia. Biologics for early stage breast cancer (trastuzumab), lung cancer (pembrolizumab), multiple sclerosis (ocrelizumab), and rheumatoid arthritis (tocilizumab) were chosen based on the availability of randomised clinical trials using endpoints homologous to the prevention of disability in Alzheimer's Disease. No filter was set based on cost, efficacy, and safety.

Lecanemab and donanemab are the first monoclonal antibodies with unequivocal evidence of efficacy to reduce cognitive and functional decline in Alzheimer's disease. When applications for a marketing licence were submitted to regulatory agencies, the community of Alzheimer's disease experts showed a wide range of reactions, ranging from lively enthusiasm to strong opposition. Why did this divergence of reactions happen? What is special about dementia, and specifically the Alzheimer's disease field and community, which explains this divergence of reactions? How is it that treatment innovations for other diseases (eg, multiple sclerosis or rheumatoid arthritis), with a similar effect on disability, have been welcomed in such different ways? This Series paper draws on historical, clinical, and scientific considerations to explore why a treatment that has been heralded as a breakthrough by some and received with concern by others.

Anti-β amyloid monoclonal antibodies are not the only major innovation to impact Alzheimer's disease, or expected to do so soon. Drugs active on non-amyloid pathways are being actively explored. Digital biomarkers, which cover measurements of physiology or pathology, for example, through digital health technologies, promise more sensitive and scalable screening compared with current neuropsychological assessments for cognitive impairment. New imaging and fluid biomarkers, including blood biomarkers, have emerged that accurately discriminate the biological changes associated with Alzheimer's disease, paving the way to redrawing the clinical taxonomy of neurodegenerative diseases. Improved knowledge of risk factors has led to the development of pilot secondary prevention programmes for people without cognitive impairment who are at high risk of Alzheimer's disease.

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The Lancet Series on Alzheimer's Disease 2

Treatment for Alzheimer's disease

Nick C Fox, Christopher Belder, Clive Ballard, Helen C Kales, Catherine Mummery, Paulo Caramelli, Olga Ciccarelli, Kristian S Frederiksen, Teresa Gomez-Isla, Zahinoor Ismail, Claire Paquet, Ronald C Petersen, Robert Perneczky, Louise Robinson, Ozge Sayin, Giovanni B Frisoni

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This is the second in a Series of three papers about the new clinical landscape in Alzheimer's disease. All papers in the Series are available at https://www.thelancet.com/series-dia/alzheimers-disease

Over the last three decades, the evidence on how to best treat the cognitive and non-cognitive symptoms of patients with Alzheimer's disease has increased. Although these pharmacological and non-pharmacological strategies have significantly improved health outcomes for patients with Alzheimer's disease, many lack stringent evidence of efficacy. In this second paper of the Series, we provide practical and realistic advice on how to prioritise pharmacological and non-pharmacological strategies to ameliorate cognitive impairment and behavioural and psychological symptoms of dementia. In this clinical environment, dementia specialists are faced with the challenge of holistically integrating the much anticipated and, in some respects, controversial anti-β amyloid monoclonal antibodies. Here, we present the current approval scenario of monoclonal antibodies, our view on how they might further contribute to improve patients' quality of life, and how they could be seamlessly integrated with existing best care options.

Introduction

The pharmacological treatment of patients with Alzheimer's disease is driven by clinical and scientific, but also social, cultural, and contextual, factors. In many European countries, cholinesterase inhibitors, memantine, and their combination, are used and reimbursed to ameliorate cognitive impairment.[1,2] In Switzerland, either cholinesterase inhibitors or memantine is reimbursed, whereas in France both have been de-reimbursed, leading to an 86% drop in doctors prescribing them from 2009 to 2019.[3] In Germany, even some drugs with weak scientific evidence (eg, gingko) are widely used and reimbursed.[4] In Brazil, cholinesterase inhibitors and memantine are offered by the public health system, but in other low-income and middle-income countries, access is limited, particularly for memantine.[3] Expert guidelines recommend non-pharmacological strategies as first-line interventions in patients with behavioural and psychological symptoms of dementia (BPSD) such as agitation, but psychotropic drugs prone to cause significant side-effects are often used.[1,2] Very few of these drugs are approved by regulatory agencies for the treatment of agitation and other BPSD, and most patients are treated with off-label psychotropic drugs.[5]

In this fragmented scenario, anti-β amyloid monoclonal antibodies are now in clinical use or available in the USA, EU, China, Japan, the UK, South Korea, and Israel, among a growing number of countries. The use of these drugs marks the first time in the history of Alzheimer's disease that its inexorable decline has been slowed. The extent to which monoclonal antibodies will contribute to fight the Alzheimer's epidemic is unclear at this time, adding uncertainty to fragmentation. However, it is possible to identify some evidence-based, common-sense rules for the treatment of Alzheimer's disease that are unlikely to change significantly in the foreseeable future, regardless of the uptake of anti-β amyloid monoclonal antibodies.

Alzheimer's disease varies widely, with early memory loss affecting most individuals with the disease.[3] BPSD (apathy, agitation, aggression, delusions, and insomnia, among others) and physical decline develop over time, often alongside other health issues and social challenges, impacting both patients and caregivers. Treatment prioritises addressing social, somatic, and behavioural problems before targeting cognitive symptoms. The second paper of this Series will address the treatment of behavioural and cognitive symptoms of Alzheimer's disease and the use of anti-β amyloid monoclonal antibodies. Acute confusional state, a frequent cause of BPSD in patients with Alzheimer's disease, is addressed in previous reviews.[10,11]

Finally, the lexicon in Alzheimer's disease can be confusing; therefore, this Series adopts the nomenclature

Search strategy and selection criteria

We conducted a review of published articles from Jan 1, 2020, to March 1, 2025, on the PubMed, Embase, Scopus, and Cochrane databases. The search was restricted to studies published in English with different combinations of the following keywords and medical subject heading terms in PubMed (MeSH) and Embase (Emtree): "Alzheimer's disease", "cognitive impairment", "dementia", "behavio(u)ral disturbances", "BPSD", "agitation", "psychosis", "depression", "anxiety", "hallucinations", "delusions", "sleep", "pharmacologic", "non-pharmacologic", "psychological", "interventions", "neuroleptics", "psychotropics", "SSRI", "benzodiazepines", "hypnotics", "cholinesterase inhibitors", "donepezil", "rivastigmine", "galantamine", "memantine", "anti-amyloid", "monoclonal antibodies", "lecanemab", "donanemab", "symptomatic", "disease-modif*", "amyloid-related imaging abnormalities", "ARIA", "clinical* meaningful*", "discontinu*", and "APOE". We prioritised the most robust evidence from clinical trials, systematic reviews, meta-analyses, and pooled studies. We also reviewed guidelines and position statements from the same period on the diagnosis of Alzheimer's disease, cognitive impairment, and dementia.

ORIGINAL ARTICLE

Lecanemab in Early Alzheimer's Disease

C.H. van Dyck, C.J. Swanson, P. Aisen, R.J. Bateman, C. Chen, M. Gee, M. Kanekiyo, D. Li, L. Reyderman, S. Cohen, L. Froelich, S. Katayama, M. Sabbagh, B. Vellas, D. Watson, S. Dhadda, M. Irizarry, L.D. Kramer, and T. Iwatsubo

ABSTRACT

BACKGROUND

The accumulation of soluble and insoluble aggregated amyloid-beta (Aβ) may initiate or potentiate pathologic processes in Alzheimer's disease. Lecanemab, a humanized IgG1 monoclonal antibody that binds with high affinity to Aβ soluble protofibrils, is being tested in persons with early Alzheimer's disease.

METHODS

We conducted an 18-month, multicenter, double-blind, phase 3 trial involving persons 50 to 90 years of age with early Alzheimer's disease (mild cognitive impairment or mild dementia due to Alzheimer's disease) with evidence of amyloid on positron-emission tomography (PET) or by cerebrospinal fluid testing. Participants were randomly assigned in a 1:1 ratio to receive intravenous lecanemab (10 mg per kilogram of body weight every 2 weeks) or placebo. The primary end point was the change from baseline at 18 months in the score on the Clinical Dementia Rating–Sum of Boxes (CDR-SB; range, 0 to 18, with higher scores indicating greater impairment). Key secondary end points were the change in amyloid burden on PET, the score on the 14-item cognitive subscale of the Alzheimer's Disease Assessment Scale (ADAS-cog14; range, 0 to 90; higher scores indicate greater impairment), the Alzheimer's Disease Composite Score (ADCOMS; range, 0 to 1.97; higher scores indicate greater impairment), and the score on the Alzheimer's Disease Cooperative Study–Activities of Daily Living Scale for Mild Cognitive Impairment (ADCS-MCI-ADL; range, 0 to 53; lower scores indicate greater impairment).

RESULTS

A total of 1795 participants were enrolled, with 898 assigned to receive lecanemab and 897 to receive placebo. The mean CDR-SB score at baseline was approximately 3.2 in both groups. The adjusted least-squares mean change from baseline at 18 months was 1.21 with lecanemab and 1.66 with placebo (difference, −0.45; 95% confidence interval [CI], −0.67 to −0.23; P<0.001). In a substudy involving 698 participants, there were greater reductions in brain amyloid burden with lecanemab than with placebo (difference, −59.1 centiloids; 95% CI, −62.6 to −55.6). Other mean differences between the two groups in the change from baseline favoring lecanemab were as follows: for the ADAS-cog14 score, −1.44 (95% CI, −2.27 to −0.61; P<0.001); for the ADCOMS, −0.050 (95% CI, −0.074 to −0.027; P<0.001); and for the ADCS-MCI-ADL score, 2.0 (95% CI, 1.2 to 2.8; P<0.001). Lecanemab resulted in infusion-related reactions in 26.4% of the participants and amyloid-related imaging abnormalities with edema or effusions in 12.6%.

CONCLUSIONS

Lecanemab reduced markers of amyloid in early Alzheimer's disease and resulted in moderately less decline on measures of cognition and function than placebo at 18 months but was associated with adverse events. Longer trials are warranted to determine the efficacy and safety of lecanemab in early Alzheimer's disease. (Funded by Eisai and Biogen; Clarity AD ClinicalTrials.gov number, NCT03887455.)

The authors' full names, academic degrees, and affiliations are listed in the Appendix. Dr. van Dyck can be contacted at christophervandyck@yale.edu or at the Alzheimer's Disease Research Unit, Division of Aging and Geriatric Psychiatry, Yale School of Medicine, 1 Church St., 8th Fl., New Haven, CT 06510.

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ORIGINAL ARTICLE

Trial of Solanezumab in Preclinical Alzheimer's Disease

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ABSTRACT

BACKGROUND

Trials of monoclonal antibodies that target various forms of amyloid at different stages of Alzheimer's disease have had mixed results.

METHODS

We tested solanezumab, which targets monomeric amyloid, in a phase 3 trial involving persons with preclinical Alzheimer's disease. Persons 65 to 85 years of age with a global Clinical Dementia Rating score of 0 (range, 0 to 3, with 0 indicating no cognitive impairment and 3 severe dementia), a score on the Mini–Mental State Examination of 25 or more (range, 0 to 30, with lower scores indicating poorer cognition), and elevated brain amyloid levels on ^{18}F-florbetapir positron-emission tomography (PET) were enrolled. Participants were randomly assigned in a 1:1 ratio to receive solanezumab at a dose of up to 1600 mg intravenously every 4 weeks or placebo. The primary end point was the change in the Preclinical Alzheimer Cognitive Composite (PACC) score (calculated as the sum of four z scores, with higher scores indicating better cognitive performance) over a period of 240 weeks.

RESULTS

A total of 1169 persons underwent randomization: 578 were assigned to the solanezumab group and 591 to the placebo group. The mean age of the participants was 72 years, approximately 60% were women, and 75% had a family history of dementia. At 240 weeks, the mean change in PACC score was −1.43 in the solanezumab group and −1.13 in the placebo group (difference, −0.30; 95% confidence interval, −0.82 to 0.22; P=0.26). Amyloid levels on brain PET increased by a mean of 11.6 centiloids in the solanezumab group and 19.3 centiloids in the placebo group. Amyloid-related imaging abnormalities (ARIA) with edema occurred in less than 1% of the participants in each group. ARIA with microhemorrhage or hemosiderosis occurred in 29.2% of the participants in the solanezumab group and 32.8% of those in the placebo group.

CONCLUSIONS

Solanezumab, which targets monomeric amyloid in persons with elevated brain amyloid levels, did not slow cognitive decline as compared with placebo over a period of 240 weeks in persons with preclinical Alzheimer's disease. (Funded by the National Institute on Aging and others; A4 ClinicalTrials.gov number, NCT02008357.)

From the Center for Alzheimer Research and Treatment, Brigham and Women's Hospital, Massachusetts General Hospital, Harvard Medical School (R.A.S., G.A.M.), and the Departments of Neurology and Radiology, Massachusetts General Hospital, Harvard Medical School (K.J.) — both in Boston; Alzheimer's Therapeutic Research Institute, Keck School of Medicine, University of Southern California, San Diego (M.C.D., R.R., M.S.R., P.S.A.); the Florey Institute, University of Melbourne, Melbourne, VIC, Australia (C.L.M.); the Departments of Psychiatry, Neurology, and Neuroscience, Yale School of Medicine, New Haven, CT (C.H.D.); the Department of Neuropathology, Graduate School of Medicine, University of Tokyo, Tokyo (T.I.); and Eli Lilly, Indianapolis (R.Y., M.M., K.C.H., M.C., J.R.S.). Dr. Aisen can be contacted at paisen@usc.edu or at the USC Alzheimer's Therapeutic Research Institute, 9860 Mesa Rim Rd., San Diego, CA 92121.

*The members of the A4 Study Team are listed in the Supplementary Appendix, available at NEJM.org.

This article was published on July 17, 2023, at NEJM.org.

DOI: 10.1056/NEJMoa2305032

ORIGINAL ARTICLE

Two Phase 3 Trials of Gantenerumab in Early Alzheimer's Disease

R.J. Bateman, J. Smith, M.C. Donohue, P. Delmar, R. Abbas, S. Salloway, J. Wojtowicz, K. Blennow, T. Bittner, S.E. Black, G. Klein, M. Boada, T. Grimmer, A. Tamaoka, R.J. Perry, R.S. Turner, D. Watson, M. Woodward, A. Thanasopoulou, C. Lane, M. Baudler, N.C. Fox, J.L. Cummings, P. Fontoura, and R.S. Doody, for the GRADUATE I and II Investigators and the Gantenerumab Study Group*

ABSTRACT

BACKGROUND

Monoclonal antibodies that target amyloid-beta (Aβ) have the potential to slow cognitive and functional decline in persons with early Alzheimer's disease. Gantenerumab is a subcutaneously administered, fully human, anti-Aβ IgG1 monoclonal antibody with highest affinity for aggregated Aβ that has been tested for the treatment of Alzheimer's disease.

METHODS

We conducted two phase 3 trials (GRADUATE I and II) involving participants 50 to 90 years of age with mild cognitive impairment or mild dementia due to Alzheimer's disease and evidence of amyloid plaques on positron-emission tomography (PET) or cerebrospinal fluid (CSF) testing. Participants were randomly assigned to receive gantenerumab or placebo every 2 weeks. The primary outcome was the change from baseline in the score on the Clinical Dementia Rating scale–Sum of Boxes (CDR-SB; range, 0 to 18, with higher scores indicating greater cognitive impairment) at week 116.

RESULTS

A total of 985 and 980 participants were enrolled in the GRADUATE I and II trials, respectively. The baseline CDR-SB score was 3.7 in the GRADUATE I trial and 3.6 in the GRADUATE II trial. The change from baseline in the CDR-SB score at week 116 was 3.35 with gantenerumab and 3.65 with placebo in the GRADUATE I trial (difference, −0.31; 95% confidence interval [CI], −0.66 to 0.05; P=0.10) and was 2.82 with gantenerumab and 3.01 with placebo in the GRADUATE II trial (difference, −0.19; 95% CI, −0.55 to 0.17; P=0.30). At week 116, the difference in the amyloid level on PET between the gantenerumab group and the placebo group was −66.44 and −56.46 centiloids in the GRADUATE I and II trials, respectively, and amyloid-negative status was attained in 28.0% and 26.8% of the participants receiving gantenerumab in the two trials. Across both trials, participants receiving gantenerumab had lower CSF levels of phosphorylated tau 181 and higher levels of Aβ42 than those receiving placebo; the accumulation of aggregated tau on PET was similar in the two groups. Amyloid-related imaging abnormalities with edema (ARIA-E) occurred in 24.9% of the participants receiving gantenerumab, and symptomatic ARIA-E occurred in 5.0%.

CONCLUSIONS

Among persons with early Alzheimer's disease, the use of gantenerumab led to a lower amyloid plaque burden than placebo at 116 weeks but was not associated with slower clinical decline. (Funded by F. Hoffmann–La Roche; GRADUATE I and II ClinicalTrials.gov numbers, NCT03444870 and NCT03443973, respectively.)

The authors' full names, academic degrees, and affiliations are listed in the Appendix. Dr. Bateman can be contacted at batemanr@wustl.edu or at 660 S. Euclid Ave., Campus Box 8111, St. Louis, MO 63110. Dr. Smith can be contacted at janice.smith.js1@roche.com or at Roche Products, Hexagon Pl., Shire Park, Falcon Way, Welwyn Garden City, AL7 1TW, United Kingdom.

*A complete list of the GRADUATE I and II Investigators and members of the Gantenerumab Study Group is provided in the Supplementary Appendix, available at NEJM.org.

N Engl J Med 2023;389:1862-76.
DOI: 10.1056/NEJMoa2304430

CME at NEJM.org

Cochrane Library

Cochrane Database of Systematic Reviews

Amyloid-beta-targeting monoclonal antibodies for people with mild cognitive impairment or mild dementia due to Alzheimer's disease (Review)

Nonino F, Minozzi S, Sambati L, Del Giovane C, Baldin E, Bassi MC, De Santis C, Gonzalez-Lorenzo M, Vignatelli L, Filippini G, Richard E

2026

Nonino F, Minozzi S, Sambati L, Del Giovane C, Baldin E, Bassi MC, De Santis C, Gonzalez-Lorenzo M, Vignatelli L, Filippini G, Richard E.
Amyloid-beta-targeting monoclonal antibodies for people with mild cognitive impairment or mild dementia due to Alzheimer's disease.
Cochrane Database of Systematic Reviews 2026, Issue 4. Art. No.: CD016297.
DOI: 10.1002/14651858.CD016297.

JAMA | Original Investigation

Sedentary Behavior and Incident Dementia Among Older Adults

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IMPORTANCE Sedentary behavior is associated with cardiometabolic disease and mortality, but its association with dementia is unclear.

OBJECTIVE To investigate whether accelerometer-assessed sedentary behavior is associated with incident dementia.

DESIGN, SETTING, AND PARTICIPANTS A retrospective study of prospectively collected data from the UK Biobank including 49 841 adults aged 60 years or older without a diagnosis of dementia at the time of wearing the wrist accelerometer and living in England, Scotland, or Wales. Follow-up began at the time of wearing the accelerometer (February 2013 to December 2015) and continued until September 2021 in England, July 2021 in Scotland, and February 2018 in Wales.

EXPOSURES Mean daily sedentary behavior time (included in the primary analysis) and mean daily sedentary bout length, maximum daily sedentary bout length, and mean number of daily sedentary bouts (included in the secondary analyses) were derived from a machine learning–based analysis of 1 week of wrist-worn accelerometer data.

MAIN OUTCOME AND MEASURES Incident all-cause dementia diagnosis from inpatient hospital records and death registry data. Cox proportional hazard models with linear and cubic spline terms were used to assess associations.

RESULTS A total of 49 841 older adults (mean age, 67.19 [SD, 4.29] years; 54.7% were female) were followed up for a mean of 6.72 years (SD, 0.95 years). During this time, 414 individuals were diagnosed with incident all-cause dementia. In the fully adjusted models, there was a significant nonlinear association between time spent in sedentary behavior and incident dementia. Relative to a median of 9.27 hours/d for sedentary behavior, the hazard ratios (HRs) for dementia were 1.08 (95% CI, 1.04-1.12, $P < .001$) for 10 hours/d, 1.63 (95% CI, 1.35-1.97, $P < .001$) for 12 hours/d, and 3.21 (95% CI, 2.05-5.04, $P < .001$) for 15 hours/d. The adjusted incidence rate of dementia per 1000 person-years was 7.49 (95% CI, 7.48-7.49) for 9.27 hours/d of sedentary behavior, 8.06 (95% CI, 7.76-8.36) for 10 hours/d, 12.00 (95% CI, 10.00-14.36) for 12 hours/d, and 22.74 (95% CI, 14.92-34.11) for 15 hours/d. Mean daily sedentary bout length (HR, 1.53 [95% CI, 1.03-2.27], $P = .04$ and 0.65 [95% CI, 0.04-1.57] more dementia cases per 1000 person-years for a 1-hour increase from the mean of 0.48 hours) and maximum daily sedentary bout length (HR, 1.15 [95% CI, 1.02-1.31], $P = .02$ and 0.19 [95% CI, 0.02-0.38] more dementia cases per 1000 person-years for a 1-hour increase from the mean of 1.95 hours) were significantly associated with higher risk of incident dementia. The number of sedentary bouts per day was not associated with higher risk of incident dementia (HR, 1.00 [95% CI, 0.99-1.01], $P = .89$). In the sensitivity analyses, after adjustment for time spent in sedentary behavior, the mean daily sedentary bout length and the maximum daily sedentary bout length were no longer significantly associated with incident dementia.

CONCLUSIONS AND RELEVANCE Among older adults, more time spent in sedentary behaviors was significantly associated with higher incidence of all-cause dementia. Future research is needed to determine whether the association between sedentary behavior and risk of dementia is causal.

Multimedia
Supplemental content
CME Quiz at jamacmelookup.com

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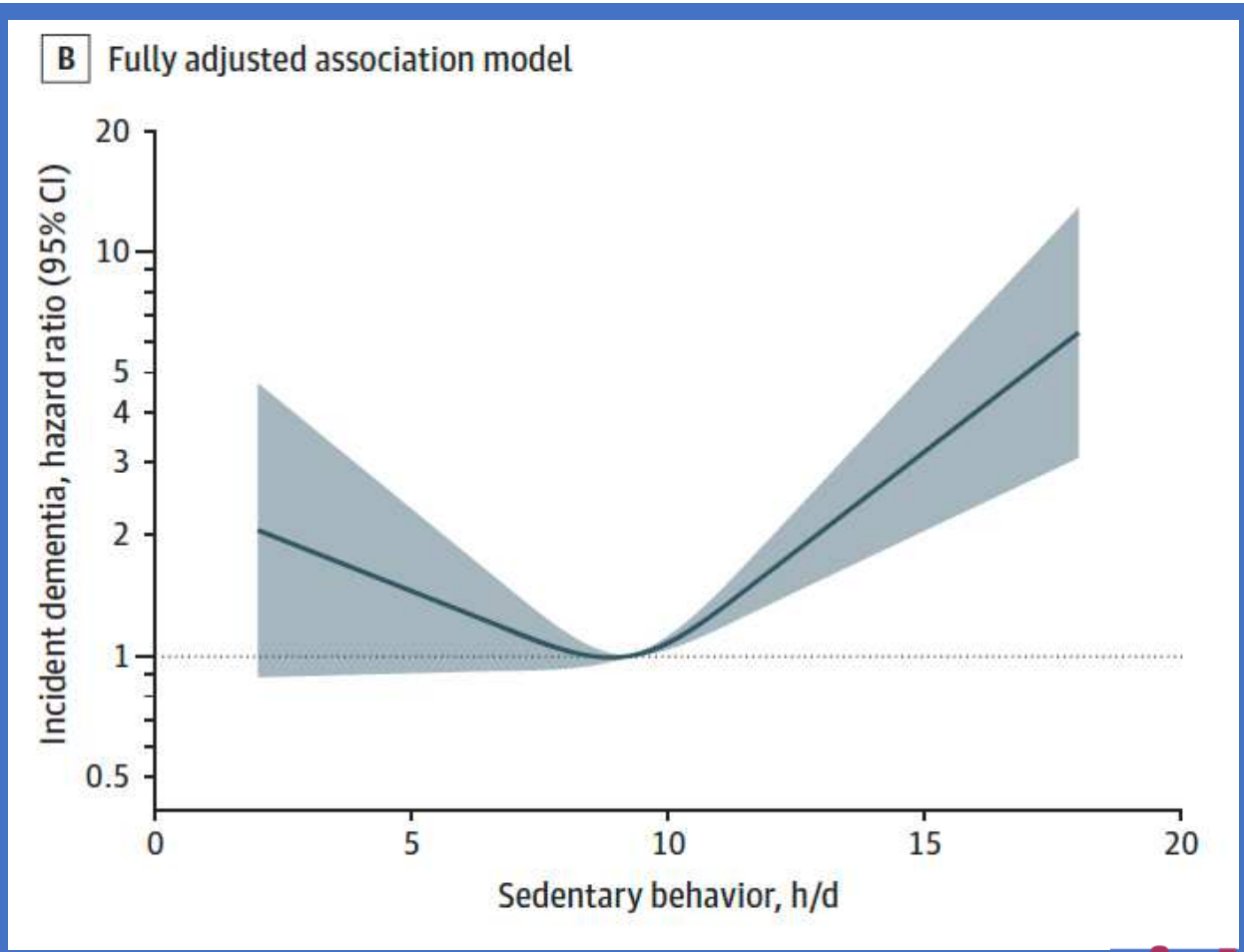

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nature medicine

Article

https://doi.org/10.1038/s41591-025-03955-6

Physical activity as a modifiable risk factor in preclinical Alzheimer's disease

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Check for updates

Wai-Ying Wendy Yau[1,2], Dylan R. Kirn[1], Jennifer S. Rabin[3,4,5], Michael J. Properzi[1], Aaron P. Schultz[1,2], Zahra Shirzadi[1,2], Kailee Palmgren[1], Paola Matos[1], Courtney Maa[1], Jeremy J. Pruzin[6], Stephanie A. Schultz[1,2], Rachel F. Buckley[1,2,7], Dorene M. Rentz[1,2], Keith A. Johnson[1,2,8], Reisa A. Sperling[1,2] & Jasmeer P. Chhatwal[1,2]

Physical inactivity is a recognized modifiable risk factor for Alzheimer's disease (AD), yet its relationship with progression of AD pathology in humans remains unclear, limiting the effective translation into prevention trials. Using pedometer-measured step counts in cognitively unimpaired older adults, we demonstrated an association between higher physical activity and slower cognitive and functional decline in individuals with elevated baseline amyloid. Importantly, this beneficial association was not related to lower amyloid burden at baseline or longitudinally. Instead, higher physical activity was associated with slower amyloid-related inferior temporal tau accumulation, which significantly mediated the association with slower cognitive decline. Dose–response analyses further revealed a curvilinear relationship, where the associations with slower tau accumulation and cognitive decline reached a plateau at a moderate level of physical activity (5,001–7,500 steps per day), potentially offering a more approachable goal for older sedentary individuals. Collectively, our findings support targeting physical inactivity as an intervention to modify the trajectory of preclinical AD in future prevention trials, and further suggest that preferentially enrolling sedentary individuals with elevated amyloid may maximize the likelihood of demonstrating a protective effect of physical activity on tau accumulation and cognitive and functional decline in early AD.

Background e razionale

Gap nella letteratura

La maggior parte degli studi si basa su attività fisica auto-riferita, soggetta a recall bias. Pochi hanno esaminato i biomarcatori AD in modo longitudinale.

Obiettivo dello studio

Chiarire come l'attività fisica misurata oggettivamente (contapassi) sia associata alla progressione della neuropatologia AD nel periodo preclinico.

Novità

Analisi longitudinale con PET amiloide e tau, follow-up cognitivo fino a 14 anni, analisi dose-risposta per livelli di attività fisica.

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Metodi

Campione e disegno

- 296 adulti anziani cognitivamente normali (CU) dalla coorte HABS
- Età media: 72.3 ± 7.2 anni; 59% donne
- Attività fisica: contapassi (pedometro Omron, 7 giorni)
- Follow-up cognitivo mediano: 9.2 anni (fino a 14 anni)
- Aβ PET (PiB): n = 241 longitudinale
- Tau PET (^{18}F-Flortaucipir, ITC): n = 172 longitudinale

Outcome e analisi

- Cognizione: PACC5 (composite z-score)
- Funzione: CDR-SOB
- Modelli lineari ad effetti misti (LME)
- Interazione Attività fisica × Aβ × Tempo
- Mediazione moderata (tau come mediatore)
- Analisi dose-risposta per livelli di PA

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Risultato: Nessun effetto sull'amiloide

P = 0.92

PA × Tempo su Aβ longitudinale

L'attività fisica non è associata a differenze nel carico amiloide, né trasversalmente né longitudinalmente.

L'effetto protettivo non è mediato da una riduzione dell'accumulo di Aβ.

Implicazione

Coerentemente con altri studi longitudinali su coorti CU, l'attività fisica misurata con contapassi non modifica la velocità di accumulo dell'amiloide. Il meccanismo protettivo agisce "a valle" nella cascata patologica.

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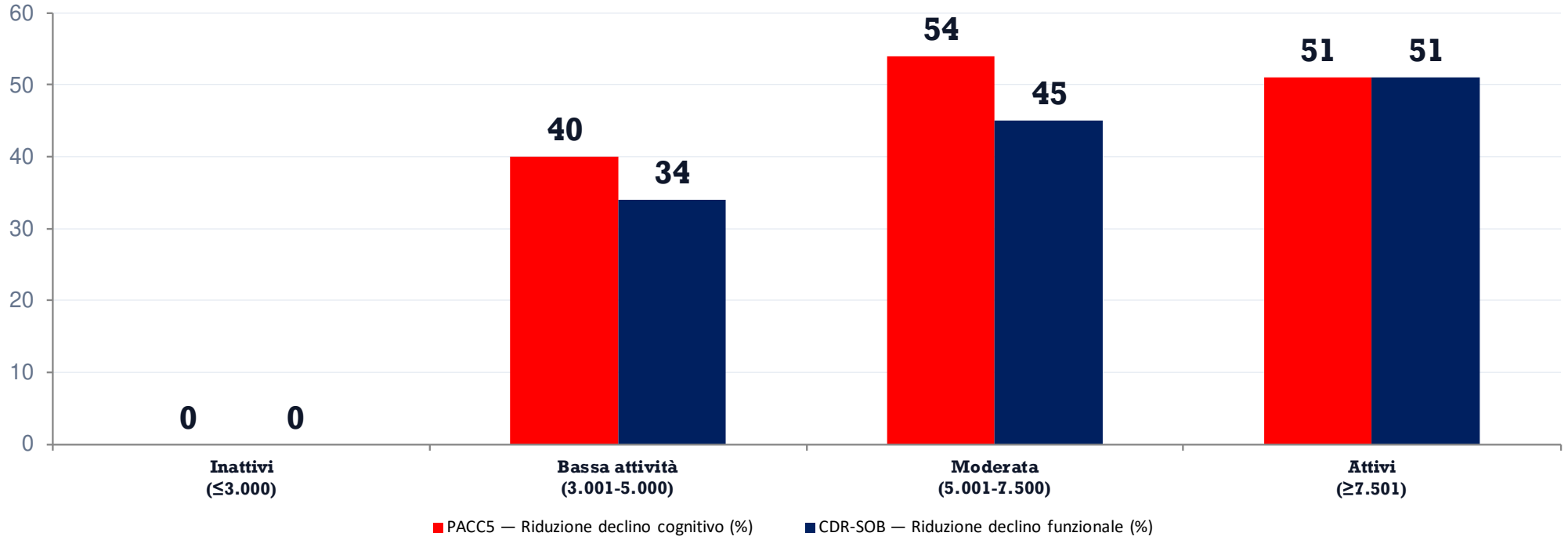
Risultato: Relazione dose-risposta (% di riduzione del declino)



Plateau a 5.001-7.500 passi/giorno: un obiettivo più raggiungibile rispetto ai 10.000 passi comunemente citati, con benefici già evidenti anche a bassi livelli di attività (3.001-5.000 passi/giorno).

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de Girolamo et al.
International Journal of Bipolar Disorders (2024) 12:15
https://doi.org/10.1186/s40345-024-00337-8

International Journal of Bipolar Disorders

The Project BIPCOM has been funded within the framework of the ERA PerMed Call for Proposals 2022

STUDY PROTOCOL Open Access

Medical comorbidities in bipolar disorder (BIPCOM): clinical validation of risk factors and biomarkers to improve prevention and treatment. Study protocol

Giovanni de Girolamo[1*], Ole A. Andreassen[2], Michael Bauer[3], Paolo Brambilla[4,5], Stefano Calza[6], Nicholas Citera[4], Rosa Corcoy[7,11], Andrea Fagiolini[8], Miguel Garcia-Argibay[9], Ophélia Godin[10,14], Florian Klingler[12], Nene F. Kobayashi[13], Henrik Larsson[9], Marion Leboyer[10,16], Silke Matura[13], Alessandra Martinelli[1], Victor De la Peña-Arteaga[7,11], Roberto Poli[15], Andreas Reif[13], Philipp Ritter[3], Linn N. Rødevand[2], Marta Magno[15], Elisa Caselani[11] and for the BIPCOM consortium

Abstract

Background BIPCOM aims to (1) identify medical comorbidities in people with bipolar disorder (BD); (2) examine risk factors and clinical profiles of Medical Comorbidities (MC) in this clinical group, with a special focus on Metabolic Syndrome (MetS); (3) develop a Clinical Support Tool (CST) for the personalized management of BD and medical comorbidities.

Methods The BIPCOM project aims to investigate MC, specifically MetS, in individuals with BD using various approaches. Initially, prevalence rates, characteristics, genetic and non-genetic risk factors, and the natural progression of MetS among individuals with BD will be assessed by analysing Nordic registers, biobanks, and existing patient datasets from 11 European recruiting centres across 5 countries. Subsequently, a clinical study involving 400 participants from these sites will be conducted to examine the clinical profiles and incidence of specific MetS risk factors over 1 year. Baseline assessments, 1-year follow-ups, biomarker analyses, and physical activity measurements with wearable biosensors, and focus groups will be performed. Using this comprehensive data, a CST will be developed to enhance the prevention, early detection, and personalized treatment of MC in BD, by incorporating clinical, biological, sex and genetic information. This protocol will highlight the study's methodology.

Discussion BIPCOM's data collection will pave the way for tailored treatment and prevention approaches for individuals with BD. This approach has the potential to generate significant healthcare savings by preventing complications, hospitalizations, and emergency visits related to comorbidities and cardiovascular risks in BD. BIPCOM's data collection will enhance BD patient care through personalized strategies, resulting in improved quality of life and reduced costly interventions. The findings of the study will contribute to a better understanding of the relationship between medical comorbidities and BD, enabling accurate prediction and effective management of MetS and cardiovascular diseases.

Trial registration: ISRCTN68010602 at https://www.isrctn.com/ISRCTN68010602. Registration date: 18/04/2023.

Criteri diagnostici per la MetS (JIS):

3 criteri su 5

Circonferenza addominale superiore a 102 cm negli uomini e 88 cm nelle donne

Trigliceridi (o trattamento farmacologico) >150 mg/dL

Colesterolo HDL <40 mg/dL negli uomini e <50 mg/dL nelle donne

Ipertensione (o in trattamento farmacologico anti-ipertensivo) sistolica >130 e/o diastolica >85 mm Hg

Glicemia a digiuno (o trattamento farmacologico) >100 mg/dL

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Scientific Contribution: Stratified Metabolic Phenotypes in BD (N=121)*

Variable	MetS+ (N = 31)	MetS- (N = 90)
Glucose (mg/dL, SD)	99.4 (15.5)	89.0 (12.2)
HDL-cholesterol (mg/dL, SD)	45.1 (9.4)	57.5 (13.9)
Triglycerides (mg/dL, SD)	190.6 (87.4)	104.4 (46.2)
Elevated waist (cm, % of N)	110.3 (96.7%)	90.0 (40.0%)
High blood Pressure (N, %)	22 (70.9%)	19 (21.1%)
BMI (SD)	31.1 (4.6)	26.0 (4.9)

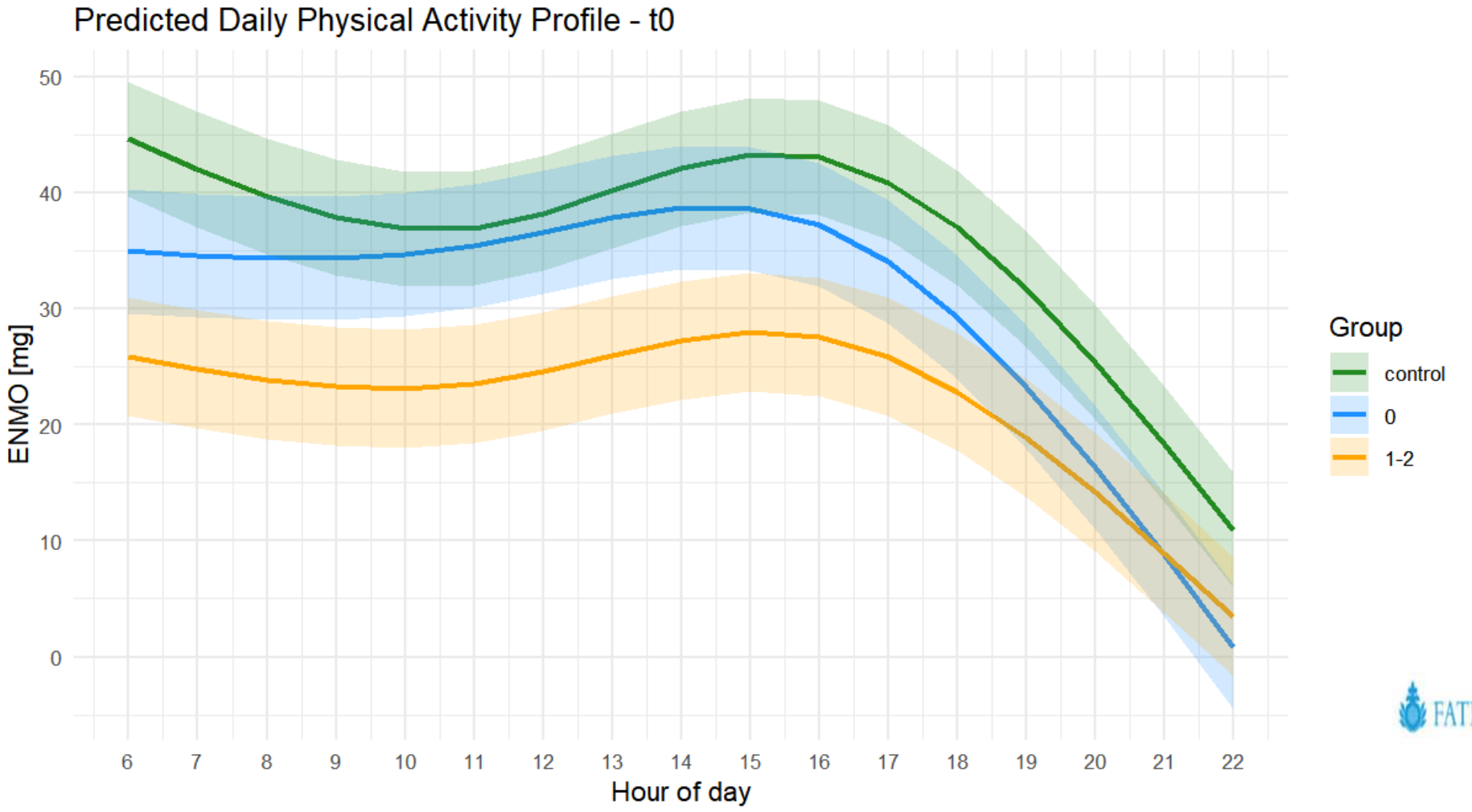
MetS+ BD patients

- ⚠️ Markedly unfavorable cardiometabolic profile
- 🩸 ↑ Glucose
- 🧪 ↑ Triglycerides
- ⚖️ ↑ BMI
- 📏 Abdominal adiposity: **96.7%**
- 💉 Hypertension: **70.9%**

MetS– BD patients

- ❌ Do not meet full diagnostic criteria
- 📉 Still show suboptimal metabolic status:
  - ⚖️ Mean BMI: **26 kg/m²**
  - 📏 Elevated waist circumference: **40%**
  - 💉 Hypertension: **21%**

*Subgroup of 121 patients for whom accelerometer data at T0, biomarkers, and complete sociodemographic variables were available.


Predicted Daily Physical Activity Profile - t0
ENMO [mg]
50
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21
22
Hour of day
Group
control
0
1-2

PLOS ONE

STUDY PROTOCOL

Metabolic Syndrome in people treated with Antipsychotics (RISKMet): A multimethod study protocol investigating genetic, behavioural, and environmental risk factors

Giovanni de Girolamo[1]*, Caterina La Cascia[2], Paolo Emidio Macchia[3,4,5], Maria Nobile[6], Stefano Calza[7], Laura Camillo[6], Maddalena Mauri[6], Marco Pozzi[6], Giada Tripoli[2], Claudia Vetrani[4,8], Elisa Caselani[1‡], Marta Magno[1‡]

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‡ EC and MM are joint last authors on this work.
* gdegirolamo@fatebenefratelli.eu

OPEN ACCESS

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Abstract

Introduction

The RISKMet project aims to: (1) identify risk factors for metabolic syndrome (MetS) by comparing patients with and without MetS; (2) characterise patients treated with second-generation antipsychotics (SGAs) about MetS diagnosis; (3) study behavioural patterns, including physical activity (PA) and dietary habits, in patients and healthy individuals using a prospective cohort design.

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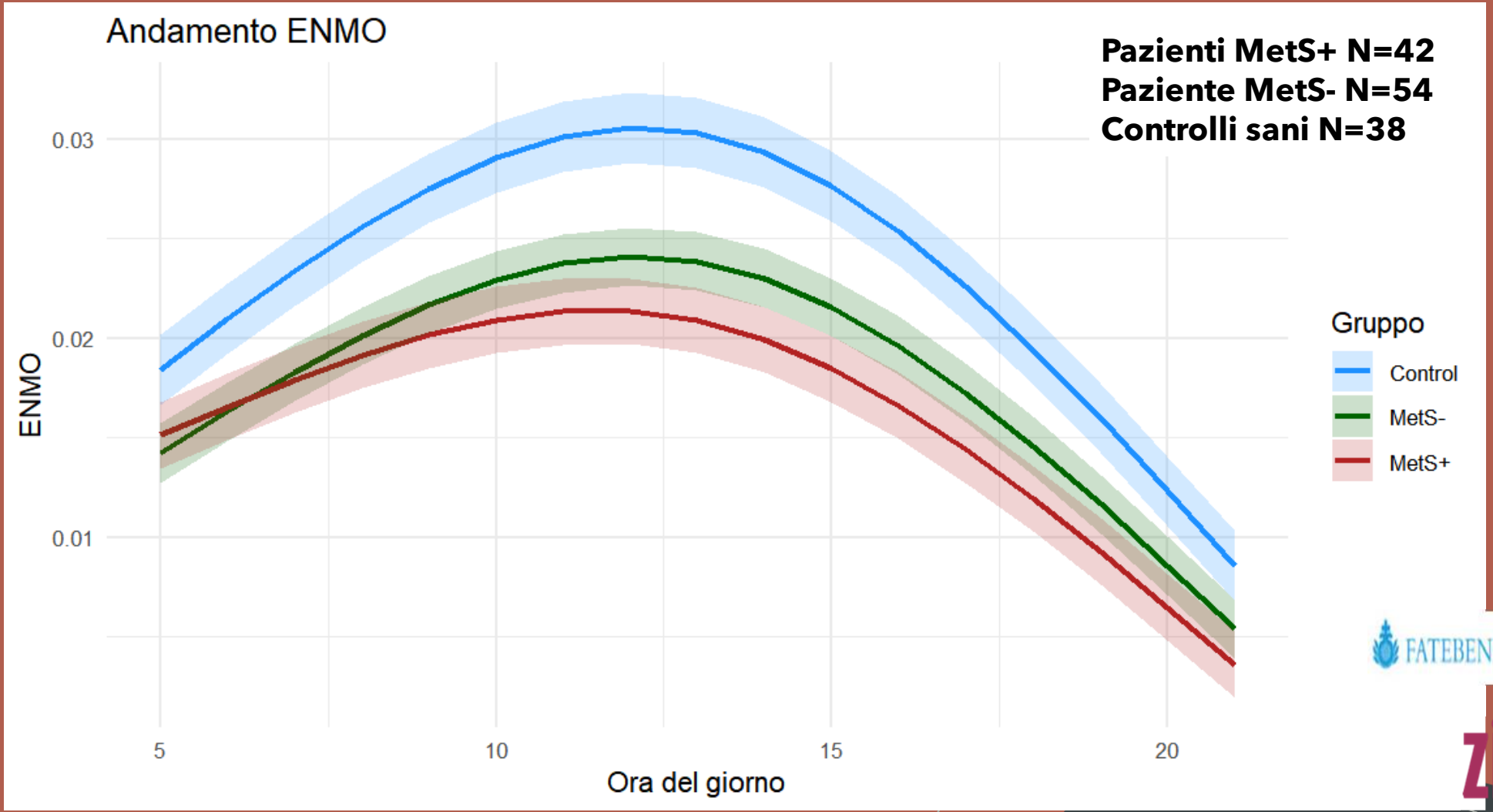
I risultati preliminari dei pazienti adulti



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Farmaci
troppi!

19th IFPE INTERNATIONAL CONGRESS

Patterns of antipsychotic prescription an
based physical activity levels in people w
spectrum disorders: a multicenter, prosp

Vincenzo Oliva[a], Giuseppe Fanelli[a,b], Manuel Zampa
Cristina Zarbo[c], Matteo Rocchetti[d,e], Letizia Casira
Fabrizio Starace[f], Alessandra Martinelli[g,h], Alessand
Giovanni de Girolamo[c] and the DiAPASon Consort

Antipsychotic polypharmacy (APP) in patients with schizophrenia spectrum disorders (SSDs) is usually not recommended, though it is very common in clinical practice. Both APP and SSDs have been linked to worse health outcomes and decreased levels of physical activity, which in turn is an important risk factor for cardiovascular diseases and premature mortality. This real-world, observational study aimed to investigate antipsychotic prescribing patterns and physical activity in residential patients and outpatients with SSDs. A total of 620 patients and 114 healthy controls were recruited in 37 centers across Italy. Each participant underwent a comprehensive sociodemographic and clinical evaluation. Physical activity was monitored for seven consecutive days through accelerometer-based biosensors. High rates of APP were found in all patients, with residential patients receiving more APP than outpatients, probably because of greater psychopathological severity. Physical activity was lower in patients compared to controls. However, patients on APP showed trends of reduced sedentariness and higher levels of light physical activity than those in monopharmacy. Rehabilitation efforts in psychiatric residential treatment facilities were likely to result in improved physical activity

performances in
have important
the importance
activity. *Int Clin P*
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International Clinical

Keywords: actigraph,
polypharmacy, psych
psychotropic drugs,
biosensor

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Istituto Centro San Gi
Mental Health and Die
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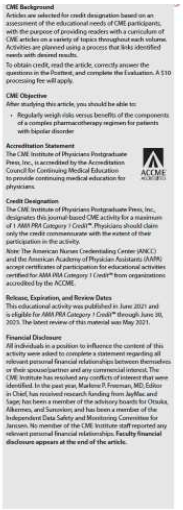
Received 22 June 202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CME Objective
After studying this article, you should be able to:
- Regularly weigh risks versus benefits of the components of a complex pharmacotherapy regimen for patients with bipolar disorder

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Financial Disclosure
All individuals in a position to influence the content of this activity were asked to complete a statement regarding all relevant personal financial relationships between themselves or their spouse/partner and any commercial interest. The CME Institute has resolved any conflicts of interest that were identified. In the past year, Marlene P. Freeman, MD, Editor in Chief, has received research funding from JayMac and Sage; has been a member of the advisory boards for Otsuka, Alkermes, and Sunovion; and has been a member of the Independent Data Safety and Monitoring Committee for Janssen. No member of the CME Institute staff reported any relevant personal financial relationships. Faculty financial disclosure appears at the end of the article.

A Systematic
of Complex Po
in Bipolar Dis
Prevalence, Clin
Adherence, and
Recommendatio

Anna M. Kim, MD*; Lisa S
and Joseph F. Goldberg,

ABSTRACT
Objective: Extensive combi
for bipolar disorder have gai
practice in ways that outpace
trials. The present review exa
pharmacotherapy regimens i
sought to characterize factor
prescribing patterns.
Data Sources: The authors re
the MEDLINE, PsycINFO, and
observational/naturalistic or
trials, using the keywords bip
combination treatment and p
Study Selection: From amon
study inclusion criteria.
Data Extraction: Informatio
rates of extensive polypharm
and metabolic outcomes. Fo
(≥ 2) regimens of psychotrop
Results: A weighted mean (s
outpatients (4,535/13,863) to
was identified. Factors assoc
include female sex, White ra
greater burden of depressive
treatment adherence, more e
greater history of suicidal att
Conclusions: Extensive use
regimens are common in ma
often reflect greater overall il
not point to better outcomes
drug regimens, suggesting li
severity, or comorbid condit
identify optimal drug combi
psychotropic medications in
J Clin Psychiatry 2021;82(3):20

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and preliminary recommendati
2021;82(3):20r13263.
To share: https://doi.org/10.458

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Prevalence, correlates, tolerability-related outcomes, and efficacy-related outcomes of antipsychotic polypharmacy: a systematic review and meta-analysis

Mikkel Højlund, Ole Köhler-Forsberg*, Anton T Gregersen, Christopher Rohde, Angelina I Mellentin, Simon J Anhøj, Adam F Kemp, Nina B Fuglsang, Anne Christine Wiuff, Louise Nissen, Marc A Sørensen, Nanna M Madsen, Christina B Wagner, Armaghan Agharazi, Cecilie Søndergaard, Marie Sandmark, Jana Reinhart, Christoph U Correll*

Summary

Background Antipsychotic polypharmacy remains a clinical reality, despite an increased risk of adverse events and little evidence of additional efficacy compared with antipsychotic monotherapy. In this systematic review and meta-analysis, we aimed to provide a comprehensive assessment of antipsychotic polypharmacy prevalence, trends, and correlates across mental disorders.

Methods We searched MEDLINE and Embase from Jan 1, 2009 to April 30, 2024, for any original study (observational and interventional) reporting antipsychotic polypharmacy prevalence in populations with mental disorders or use of antipsychotics, regardless of age or diagnosis. Relevant studies before May 1, 2009, were identified from two previous systematic reviews of antipsychotic polypharmacy prevalence. Pooled antipsychotic polypharmacy prevalence was estimated using random-effects meta-analysis. Using subgroup and mixed-effects meta-regression analyses, we sought to identify relevant correlates of antipsychotic polypharmacy. People with lived experience were not involved in the project. This review is registered with PROSPERO (CRD42022329953).

Findings We analysed 517 studies with 599 individual timepoints reporting on 4 459 149 individuals (mean age 39·5 years [range 6·4–86·3]; data on sex and ethnicity were infrequently reported). Most studies included patients with schizophrenia spectrum disorders (SSDs; k=270, 52%). Overall, 24·8% (95% CI 22·9–26·7) of the populations received antipsychotic polypharmacy, ranging from 33·2% (30·6–36·0) in people with SSDs to 5·2% (4·0–6·8) in people with dementia. Antipsychotic polypharmacy prevalence varied by region from 15·4% (95% CI 12·9–18·2) in North America to 38·6% (27·7–50·6) in Africa. Overall antipsychotic polypharmacy prevalence increased significantly from 1970 to 2023 (β=0·019, 95% CI 0·009–0·029; p=0·0002) and was higher in adults than in children and adolescents (27·4%, 95% CI 25·2–29·8 *vs* 7·0%, 4·7–10·3; p<0·0001) and among inpatients than among outpatients (31·4%, 27·9–35·2 *vs* 19·9%, 16·8–23·3; p<0·0001). Compared with antipsychotic monotherapy, antipsychotic polypharmacy was associated with an increased risk of relapse (relative risk [RR] 1·42, 95% CI 1·04–1·93; p=0·028), psychiatric hospitalisation (1·24, 1·12–1·38; p<0·0001), worse global functioning (standardised mean difference [SMD] −0·31, 95% CI −0·44 to −0·19; p<0·0001), and more adverse events, including extrapyramidal symptoms (RR 1·63, 95% CI 1·13–2·36; p=0·0098), dystonia (5·91, 1·20–29·17; p=0·029), anticholinergic use (1·91, 1·55–2·35; p<0·0001), higher side-effect scores (SMD 0·33, 95% CI 0·24–0·42; p<0·0001), longer corrected QT interval (0·24, 0·23–0·26; p<0·0001), and greater all-cause mortality risk (RR 1·19, 95% CI 1·00–1·41; p=0·047).

Interpretation The prevalence of antipsychotic polypharmacy has increased globally over the past 50 years and is particularly high in patients with SSDs. Prescription of antipsychotic polypharmacy is associated with greater illness severity and poorer outcomes than is antipsychotic monopharmacy but does not resolve these issues. Furthermore, antipsychotic polypharmacy is associated with higher side-effect burden, including all-cause mortality.

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h polypharmacy and excessive dosing in
chizophrenia treated in four European

ichela Nosé[a], Maria Angela Mazzi[a], Graham Thornicroft[b],
as Becker[a,e], Jonathan Bindman[a], Morven Leese[b],
ten Koeter[c], Stefan Weinmann[a] and Michele Tansella[a]


to calculate the proportion receiving persistent antiecessive dosing in four
hypothesis that excessive olypharmacy is associated thology; and to establish tion antipsychosis is a olypharmacy and excessive ophrenia were recruited psychiatric services serving in Croydon (UK), Verona ld, and Leipzig (Germany). ly receiving high antidosing) as those with a daily dose ratio of >1.5 both t year of follow-up. Similarly, y receiving polypharmacy as more antipsychotic drugs up. A sample of 375 was analyzed. A proportion received high-dose antion of 13% of patients otic polypharmacy. In the thology was not a predictor l excessive dosing; similarly, psychotics was not excessive dosing; antipsychotic doses was
predicted by baseline use of first-generation antipsychotics and second-generation antipsychotics concurrently. Antipsychotic drug use for patients with schizophrenia is only sometimes satisfactory and offers the opportunity of improvement. Clinicians should consider that dose reduction strategies have been shown to be a feasible intervention in patients with schizophrenia. *Int Clin Psychopharmacol* 21:355–362 © 2006 Lippincott Williams & Wilkins.

International Clinical Psychopharmacology 2006, 21:355–362

Keywords: antipsychotic drugs, dose regimens, polypharmacy, schizophrenia

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depot first-generation antipsychotics (FGAs) (Jaffe and Levine, 2003).

A recent survey of clinicians' reasons for antipsychotic polypharmacy found that the most common reasons were reducing positive and negative symptoms, and decreasing the total amount of medication (Sernyak and Rosenheck, 2004). These reasons implied that antipsychotic polypharmacy is reserved for particularly severe cases, and that it is intended to avoid high doses of a single drug. In support of this, longer duration of illness, greater psychotic symptoms, and aggression were found to be associated with polypharmacy and excessive dosing. Other studies, by contrast, suggested that antipsychotic

of studies support its use
2), antipsychotic polypharnitric practice. It is used in patients with schizophrenia *et al.*, 2005a; Biancosino 2005; Tomasi *et al.*, 2005), ing-term treatment option ing to recent evidence, the polypharmacy has been , 2004), particularly since ion antipsychotics (SGAs), l that SGAs were less likely psychotic than were oral or

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n of psychotropic drugs in
dential facilities: a national

G, Picardi A, Micciolo R, S group. The prescription of idential facilities: a national survey

123. © 2005 Blackwell Munksgaard.

R. Tomasi[1], G. de Girolamo[2,3], G. Santone[4], A. Picardi[2], R. Micciolo[5], D. Semisa[6], S. Fava[7] for the PROGRES Group*

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scriptions of psychotropic drugs residential facilities (RFs) in Italy. administered to RF managers and iodemographic and clinical urrent drug prescriptions were

n: on average, each treated patient sociation of one atypical ine represented the most common ost consistently associated with a armacy was a history of admission tric ward in the previous e loosely related to specific

cription patterns for severe ized by substantial rates of ay be helpful for long-stay patients care needs.

Key words: drug utilization; psychotropic drugs; polypharmacy; residential facilities

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*See Appendix.

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The Lancet Psychiatry Commission

Holistic prevention and management of physical health side-effects of psychotropic medication: second report of the *Lancet Psychiatry* Physical Health Commission

Sean Halstead, Chloe X Yap, Nicola Warren, Sri Mahavir Agarwal, Bodyl A Brand, Sherry Kit Wa Chan, Andrea Cipriani, Christoph U Correll, Nicolas Crossley, Enrico D'Ambrosio, Robin Emsley, Joseph Firth, Fiona Gaughran, Siobhan Gee, Margaret Hahn, Joseph F Hayes, Adrian Heald, Oliver D Howes, John M Kane, Maria Kapi, Stefan Leucht, Nicholas Meyer, Brian O'Donoghue, Emmanuel Okeke, Benjamin I Perry, Marco Solmi, Iris E Sommer, Vivek Srivastava, Heidi Taipale, David Taylor, Jari Tiihonen, Allan H Young, the Lancet Psychiatry Physical Health Commission Consortium, Robert A McCutcheon†, Dan Siskind†, Toby Pillinger†*

'Adopting minimum effective dosing and minimising polypharmacy are imperatives to ensure that improvements in mental health are accompanied by a reduction of the risk of adverse drug reactions and empowerment of individuals to manage their own

ATTIVITA' FISICA

Perchè i medici e le/gli psichiatre/i non la prescrivono??

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Sports Medicine and Health Science 6 (2024) 82–88

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Original Article

Physically active primary care physicians consult more on physical activity and exercise for patients: A public teaching-hospital study

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ARTICLE INFO

Keywords:
Physical activity and exercise
Primary care physicians
Cross-Sectional
Exercise prescription
Medicine

ABSTRACT

Physical activity and exercise (PAE) improve quality of life and reduce the effects of chronic diseases. Primary care physicians (PCPs) play an important role to encourage PAE in patients. We aim to assess PCPs' current PAE consultation practices and their enablers/barriers in daily clinical practice. We had 64 PCPs (age [25.3 ± 4.7] y, 47 women) that completed self-administered questionnaires on PAE consultation practices, training, and confidence levels. PCPs (n = 42) also completed the International Physical Activity Questionnaire-Short Form to assess their physical activity (PA) levels. We conducted correlation, one-way analysis of variance and a linear regression to assess the associations between enablers, barriers and PA levels to PAE consultation practices. On average, PCPs counselled on PAE in 69.7% of their daily clinical appointments. Majority of PCPs (70%) strongly agreed that more PAE knowledge were needed to increase consultation practices. Top three barriers related ($p < 0.001$) to practices were lack of PAE education ($r = 0.47$), patients' preference of pharmaceutical interventions ($r = 0.43$) and lack of continuing education in PAE for PCPs ($r = 0.37$). Physically active PCPs (health-enhancing PA levels, n = 6) gave significantly more daily consultations in PAE, 73.3% ± 21.9%, compared to inactive PCPs (n = 13), 37.4% ± 22.8% ($p = 0.013$). In our regression output, PCPs who had higher PA levels consulted more on PAE daily ($F = 6.58$, $p < 0.001$) while controlling for age. Conclusion, PCPs require more knowledge on PAE and need be physically active themselves to increase PAE consultation for patients in their daily practice. Medical education should consider including more PA and exercise topics that may benefit both physicians and their patients.

1. Introduction

Physical activity and exercise (PAE) are essential components of healthy living and have a profound impact on physical and mental health.[1,2] The evidence from the scientific and medical literature regarding insufficient physical activity (PA) or being physically inactive is considered a public health problem with a wide range of harmful effects.[3,4] From managing hypertension[5] to improving our immune system,[6] adequate PA is key to good health and well-being. The World Health Organization (WHO) reported that worldwide, more than a quarter of adult (28%) over aged 18 years are physically inactive.[7] Physically inactive is defined as having less than 150 min of moderate-intensity or 75 min of vigorous-intensity of PA per week. It is estimated that around 5 million deaths per year could be averted if the global population were more physically active.[7]

Primary care physicians (PCPs) are the first-line health care professionals that people meet to diagnose and treat their illnesses and disease. A PCP is defined as a medical doctor who provides screening, diagnosis, preventive services, patient education, and monitoring outcomes such as follow-ups for stable chronic diseases.[8] On the other hand, physicians in hospital settings are prioritized to specialize in specific medical areas, have inadequate time to provide PAE counselling and may present discouraging attitudes towards providing PAE counselling.[9] Nonetheless, the advice given by medical doctors is a powerful motivator for patients and PAE advice may have more weight and influence when delivered by them. As an encouragement for physicians to prescribe exercise, American College of Sports Medicine (ACSM) started the Exercise is Medicine (EIM) initiative to increase exercise in patients and subsequently improve health and wellness.[10] Physical inactivity is considered as a "vital sign" to be assessed in medical primary care alongside other clinical measures such as blood pressure and weight status.[11] Hence, PCPs are encouraged to routinely assess PA levels in their patients and prescribe PAE to reduce and manage chronic conditions.[12] The PA counselling during patient consultation would cover the two Exercise Vital Sign (EVS) questions – (1) How many days per week do you engage

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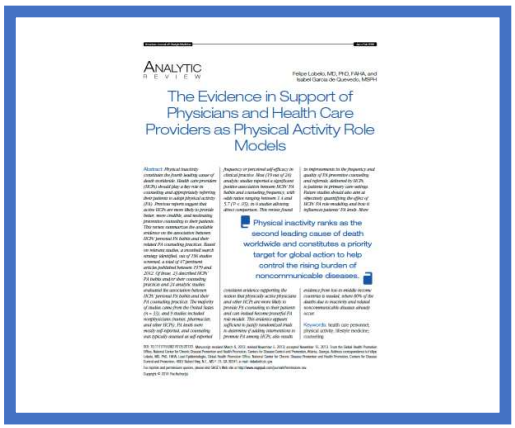

ANALYTIC REVIEW

Felice Lobelo, MD, PhD, FAHA, and Isabel Garcia de Quevedo, MSPH

The Evidence in Support of Physicians and Health Care Providers as Physical Activity Role Models

Physical inactivity ranks as the second leading cause of death worldwide and constitutes a priority target for global action to help control the rising burden of noncommunicable diseases.

Personal Exercise Habits and Counseling Practices of Primary Care Physicians: A National Survey

Scott Abramson, MD, Joel Stein, MD, Michael Schaufele, MD, Elizabeth Frates, MD, and Shannon Rogers, MD

Department of Physical Medicine and Rehabilitation, Harvard Medical School and Spaulding Rehabilitation Hospital, Boston, Massachusetts

Child & Youth Care Forum (2024) 53:981–1001
https://doi.org/10.1007/s10566-023-09782-5

ORIGINAL PAPER

Physical Activity and Mental Health in Children and Youth: Clinician Perspectives and Practices

Madeline Crichton[1] · Hannah Bigelow[1] · Barbara Fenesi[1]

Accepted: 8 November 2023 / Published online: 29 November 2023

Abstract

Background Rates of mental health challenges among children and youth are on the rise. Physical activity has been identified as a promising intervention to improve mental health outcomes for youth.

Objective This study aimed to investigate how mental health clinicians perceive and utilize physical activity as a mental health intervention for children and adolescents.

Methods Seventy-four Ontario mental health clinicians (psychologists, psychotherapists, and social workers) were surveyed about their perspectives and practices related to physical activity as part of mental health care for children and adolescents using a mixed-methods approach. Survey respondents were also asked about barriers to including physical activity in care.

Results Although 100% of clinicians agreed that physical activity was beneficial to their own and to their clients' mental health, only 61% reported prescribing physical activity to their clients. Barriers to prescribing physical activity as a treatment option included lack of training, time, and resources. Clinicians who were more physically active themselves were more likely to view physical activity as beneficial for mental health and were less likely to view time as a barrier to discussing and prescribing physical activity in their practice. Many clinicians expressed a need for more training, knowledge, and resources.

Conclusions The results of this study suggest that with improved access to training and resources, clinicians will be well-positioned to leverage the benefits of physical activity for mental health in their practice.

Keywords Physical activity · Mental health · Psychology · Social work · Psychotherapy

Introduction

One in five Canadians live with mental health challenges (George et al., 2015). Individuals with mental health challenges have a lower life expectancy and are at an increased risk of experiencing chronic health conditions (Fazel, 2014; De Hert et al., 2022). Across clinical disorders, 70% of symptoms are present before the age of 18, indicating that mental

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Cardiorespiratory fitness and self-reported physical activity levels of referring mental healthcare professionals, and their attitudes and referral practices related to exercise and physical health

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ARTICLE INFO

Keywords:
Physical activity
Exercise
Physical fitness
Physical health
Mental illness
Referral

ABSTRACT

Background: Physical activity (PA) interventions can improve mental and physical health of people with mental illness, especially when delivered by qualified exercise professionals. Also, the behaviour, engagement and support of referring mental healthcare professionals (HCP) seem essential, but research is scarce. We aimed to study HCP physical fitness and PA, and associations with their attitudes and referral practices related to physical health and PA interventions.

Methods: HCP at the Dutch Association for Psychiatry congress (2019) were invited to an online questionnaire (demographic/work characteristics, stress, PA levels, knowledge/attitudes regarding PA, referral practices) and cycle ergometer test. Strongest associations were analysed using linear and logistic regression.

Results: Of the 115 HCP who completed the questionnaire (40 also completed the ergometer test), 43% (n = 50) met PA guidelines (i.e., ≥150min moderate-to-vigorous PA and ≥2x bone/muscle-strengthening exercises/week). Women, HCP interns/residents and HCP experiencing more stress were less active and less likely to meet PA guidelines. Conversely, there were positive associations with personal experience with an exercise professional. Knowledge/attitudes on physical health and PA were positive. HCP were more likely to refer patients to PA interventions if they met PA guidelines (OR = 2.56, 95%BI = 0.85–7.13) or had higher beliefs that exercise professionals can increase adherence to PA interventions (OR = 3.72, 95%BI = 1.52–9.14).

Limitations: Mainly psychiatrists, affecting generalisability.

Conclusions: HCP report the importance and relevance of PA in mental healthcare. Despite strong evidence and guidance for PA interventions in prevention and treatment, referral to such interventions partly depends on the PA behaviour and attitude of patient's physician/clinician.

1. Background

It is well known that besides their impaired mental health, people with mental illness often experience impaired physical health which contributes to their substantially reduced life expectancy. This premature mortality is relatively more often caused by cardiometabolic diseases, for which people with mental illness have a 1.4–2.0 times higher risk than the general population, regardless of diagnosis (Firth et al., 2019; Plana-Ripoll et al., 2019, 2020). In addition to disease- and treatment-specific risk factors such as side effects of psychotropic medication, an unhealthy lifestyle including high levels of sedentary behaviour, low physical activity (PA), high smoking rates and poorer dietary patterns is more common in people with mental illness and plays an important role in their poorer health status (Firth et al., 2019; Peckham et al., 2017; Stubbs et al., 2018; Teasdale et al., 2019).

There is robust evidence showing that interventions aiming to

Abbreviations: PA, Physical activity; HCP, Healthcare professional; MVPA, Moderate to vigorous physical activity; BMSE, Bone and muscle strengthening exercises; PSS, Perceived stress scale; AIC, Akaike's information criterion.

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RETE DI PARTENARIATO

Il progetto è realizzato da una rete di partenariato eterogenea composta dalle seguenti realtà, ognuna delle quali, oltre a partecipare alla co-progettazione, ha ruoli specifici nell'implementazione del progetto.

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