



Physical activity and well-being during a Covid-19 lockdown period.

Yannis Theodorakis

Reference:

Morres, I.D.; Galanis, E.; Hatzigeorgiadis, A.; Androutsos, O.; Theodorakis, Y. Physical Activity, Eating Behaviour and Well-Being During a COVID-19 Period Among Greek Adolescents. *Nutrients*, **2021**, 2021030495 (doi: 10.20944/preprints202103.0495.v1).



Study 1. 8.000 steps per day

- **In this observational study that included 4840** participants, a greater number of steps per day was significantly associated with lower all-cause mortality (adjusted hazard ratio for 8000 steps/d vs 4000 steps/d, 0.49). There was no significant
- association between step intensity and all-cause mortality after adjusting for the total number of steps per day.
- **Greater numbers of steps per day were associated with lower risk of all-cause mortality.**
- **Saint-Maurice** PF et al. Association of daily step count and step intensity with mortality among US adults. *JAMA* 2020 Mar 24/31; 323:1151. (<https://doi.org/10.1001/jama.2020.1382>)

Study 2. Daily steps count all-cause mortality

- Key Points
- The optimum step count per day for health promotion has not been yet determined.
- The present meta-analysis suggested evidence of high certainty for a strong inverse association between step count per day and risk of mortality.
- There was an inverse linear association within step counts of 2700 to 17,000 steps per day.



2.700 to 17.000 steps per day.

Jayed, A., Gohari, A. & Shab-Bidar, S. Daily Step Count and All-Cause Mortality: A Dose–Response Meta-analysis of Prospective Cohort Studies. Sports Med 52, 89–99 (2022). <https://doi.org/10.1007/s40279-021-01536-4>

Association between device-based step count per day and all-cause mortality risk in the general population

Fig. 2 Hazard ratio of all-cause mortality for each 1000 steps per day. *HR*

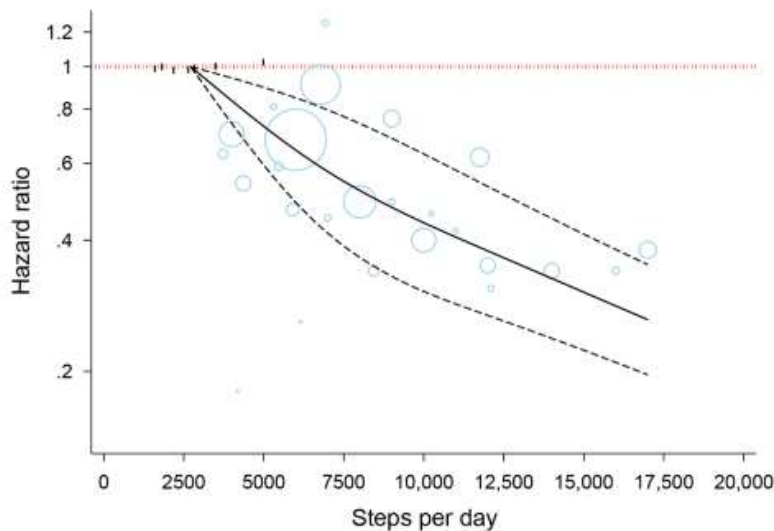


Fig. 3 Dose–response association between step count per day and risk of all-cause mortality. Solid line represents non-linear dose response and broken lines represent 95% confidence interval. Circles represent hazard ratio point estimates for steps per day categories from each study with circle size proportional to inverse of standard error. Small vertical black lines are baseline steps per category in each study

Key Points

The optimum step count per day for health promotion has not been yet determined.

The present meta-analysis suggested evidence of high certainty for a strong inverse association between step count per day and risk of mortality.

There was an inverse linear association within step counts of 2700 to 17,000 steps per day.

EXERCISE AND COVID

The association between physical activity and risk of SARS-CoV-2 infection, COVID-19-associated hospitalisation, severe illness and death due to COVID-19 in adults. Meta-analysis

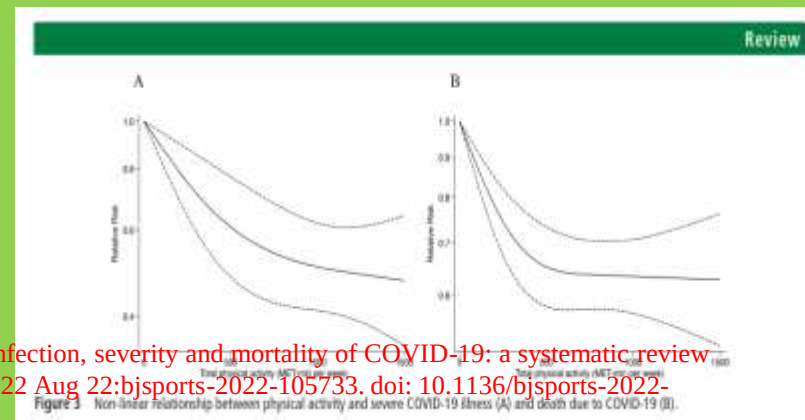
1.800.000 participants (Mean age=53).

Regular physical activity seems to be related to a lower likelihood of adverse COVID-19 outcomes. Our findings highlight the protective effects of engaging in sufficient physical activity as a public health strategy, with potential benefits to reduce the risk of severe COVID-19.

Overall, those who engaged in regular physical activity had a lower risk of infection, hospitalisation, severe COVID-19 illness and COVID-19-related death compared with their inactive peers.

Suggestions for more than 150 min per week.

Ezzatvar Y, Ramírez-Vélez R, Izquierdo M, García-Hermoso A. Physical activity and risk of infection, severity and mortality of COVID-19: a systematic review and non-linear dose-response meta-analysis of data from 1 853 610 adults. Br J Sports Med. 2022 Aug 22;bjsports-2022-105733. doi: 10.1136/bjsports-2022-



World Health Organization

Sedentary behaviour and low levels of physical activity can have negative effects on the health, well-being and quality of life of individuals.

Self-quarantine can also cause ***additional stress and challenge the mental health of citizens.***

Physical activity and relaxation techniques can be valuable tools to help you remain calm and continue to protect your health during this time.

Changes in physical activity and sedentary behaviour due to the COVID-19 outbreak
and associations with mental health in 3,052 US adults

(Meyer, et al., 2020)

- **The COVID-19 pandemic and associated global response have significantly altered people's behaviour, likely decreasing physical activity, increasing sitting and screen time, while simultaneously worsening mental health.**
- **Weekly physical activity was reduced after COVID-19-related restrictions among previously active participants (mean change: -32.3%) . Large increases in sitting time, were reported higher depressive symptoms, loneliness, stress, lower positive mental health:**
- **The COVID-19 outbreak has resulted in rapid, substantial changes to physical activity and sedentary behaviour. Decreased physical activity and increased screen time were consistently associated with poorer mental health. Concerted efforts to maintain and enhance**
- **physical activity participation and limit screen time during pandemic-related public health restrictions are needed to mitigate short- and likely long-term mental health consequences.**

Physical inactivity is associated with a higher risk for
severe COVID-19 outcomes: a study in 48 440
adult patients

- Patients with COVID-19 who were consistently inactive during the 2 years preceding the pandemic were more likely to be hospitalised, admitted to the intensive care unit and die than patients who were consistently meeting physical activity guidelines.
- Other than advanced age and a history of organ transplant, physical inactivity was the strongest risk factor for severe COVID-19 outcomes.
- Meeting US Physical Activity Guidelines was associated with substantial benefit, but even those doing some physical activity had lower risks for severe COVID-19 outcomes including death than those who were consistently inactive.
- *The potential for habitual physical activity to lower COVID-19 illness severity should be promoted by the medical community and public health agencies.*
- *Pandemic control recommendations should include regular physical activity across all population groups.*
- **Sallis R, Young DR, Tartof SY, et al. Br J Sports Med Epub ahead of print: doi:10.1136/bjsports-2021-104080**

Physical activity and vaccination

- Engaging regularly in moderate to vigorous physical activity is associated with a 31% risk reduction of community-acquired infectious disease and 37% risk reduction in infectious disease mortality Engaging regularly in moderate to vigorous physical activity is associated with the increased strength of the mucosal immune barrier (salivary IgA immunoglobulin) and higher concentration of immune cells that prepare, orchestrate, regulate and effect immunity (CD4 T-cells) **Engaging regularly in moderate to vigorous physical activity could strengthen the effect of vaccination campaigns**

Sports Medicine
<https://doi.org/10.1007/s40279-021-01466-1>

SYSTEMATIC REVIEW

Effects of Regular Physical Activity on the Immune System, Vaccination and Risk of Community-Acquired Infectious Disease in the General Population: Systematic Review and Meta-Analysis

Sebastien F. M. Chastin^{1,2} · Ukachukwu Abaraogu¹ · Jan G. Bourgois² · Philippa M. Dall¹ · Jennifer Darnborough³ · Elaine Duncan¹ · Jasmien Dumortier² · David Jiménez Pavón^{4,5} · Joanna McParland¹ · Nicola J. Roberts¹ · Mark Hamer⁶



The COVID-19 home confinement had a negative effect on all PA intensity levels (vigorous, moderate, walking and overall).

Additionally, daily sitting time increased from 5 to 8 h per day. Food consumption and meal patterns (the type of food, eating out of control, snacks between meals, number of main meals) were more unhealthy during confinement, with only alcohol binge drinking decreasing significantly.



Article

Effects of COVID-19 Home Confinement on Eating Behaviour and Physical Activity: Results of the ECLB-COVID19 International Online Survey

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.



- › **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

It is recommended that:

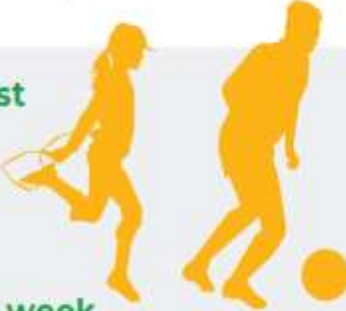
- › **Children and adolescents should do at least an average of 60 minutes per day of moderate- to vigorous-intensity, mostly aerobic, physical activity, across the week.**

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.

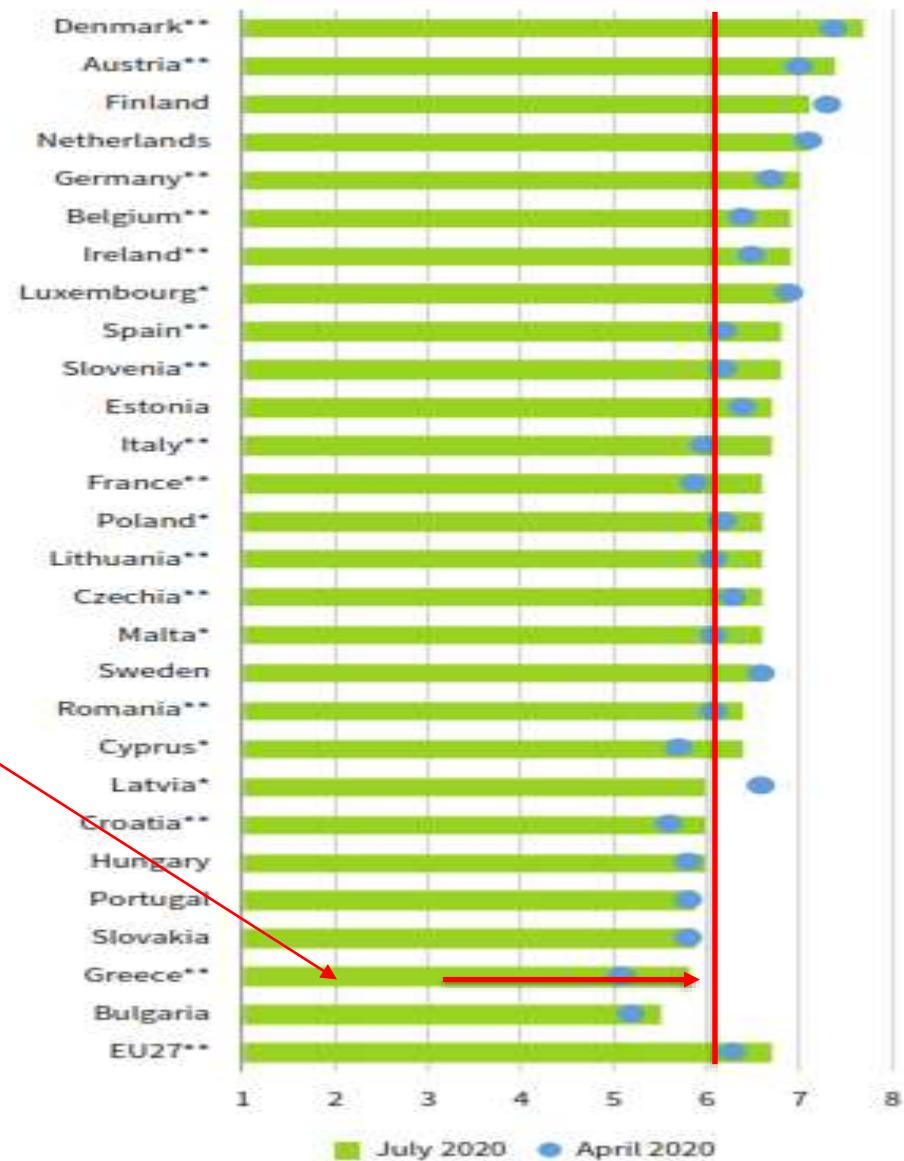




Life satisfaction

(European Foundation for the Improvement of Living
Working Conditions, April 2020)
https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef20059en.pdf

Figure 16: Life satisfaction in April and July 2020
(mean scores by country)



Notes: * Low reliability in July for Cyprus, Latvia, Luxembourg, Malta and Poland, **Statistically significant change ($p=0.05$).



- 1) Morres, I.D., Galanis, E., Hatzigeorgiadis, A., Androutsos, O., & Theodorakis, Y. (2021). Physical Activity, Sedentariness, Eating Behaviour and Well-Being during a COVID-19 Lockdown Period in Greek Adolescents. *Nutrients*, 13, 1449. <https://doi.org/10.3390/nu13051449>.

This study examined well-being and the level and predictive effects of physical (in)-activity and eating behaviours on well-being in adolescents during a lockdown period in Greece.

A total of 950 adolescents participated in a web-based survey on psychological well-being, physical (in)-activity and eating behaviour during the latest Covid-19 lockdown period (January 2021).

Among them, 698 (73%) were members of sport clubs with mean sport experience 7.17 (SD = 2.89) years, mean competitive experience 4.70 (SD = 2.26) years; they were training between 3 and 6 days per week (M = 4.57, SD = 1.43 days) for an average of 6.94 (SD = 4.28) hours..



Measurements

The International Physical Activity Questionnaire Short Form (IPAQ-SF)

Greek version of the 4-Dimensional Mood Scale

The World Health Organization Well-Being Index-5

Short Diet Behaviour Questionnaire for Lock- downs (SDBQ-L)

Results

Table 1. Descriptive statistics, Cronbach's alpha, and correlations.

	Descriptives		Alpha	Correlations									
	M	SD		1	2	3	4	5	6	7	8	9	10
1. Well-being	12.63	5.92	.84	-									
2. Positive energy	3.00	.98	.87	.67**	-								
3. Relaxation	2.75	.81	.80	.53**	.46**	-							
4. Negative activation	2.07	.89	.87	-.45**	-.25**	-.35**	-						
5. Tiredness	2.03	.80	.85	-.33**	-.17**	-.19**	.51**	-					
6. Eating behaviour	4.45	1.21	.75	.24**	.29**	.13**	-.09**	-.09**	-				
7. Light PA	247.78	209.30	-	.28**	.30**	.11**	-.07*	.00	.11**	-			
8. Moderate PA	97.28	119.55	-	.24**	.22**	.08**	-.07*	-.04	.13**	.39**	-		
9. Vigorous PA	70.23	104.06	-	.27**	.29**	.06	-.07*	.01	.14**	.35**	.31**	-	
10. Total PA	415.28	334.29	-	.35**	.36**	.12**	-.10**	-.01	.16**	.87**	.70**	.64**	-
11. Sedentary time	439.11	216.57	-	-.24**	-.27**	-.10**	.19**	.14**	-.10**	-.15**	-.03	-.11**	-.14**

*p<0.5, **p<0.01; M: Mean; SD: Standard Deviation.

Table 2. Mean scores for all subgroups.

		Boys		Girls		Athletes		Non-athletes	
		M	SD	M	SD	M	SD	M	SD
1.	Well-being	14.41	5.55	10.47	5.63	13.22	5.90	10.96	5.65
2.	Positive energy	3.22	0.95	2.73	0.96	3.07	1.00	2.86	0.91
3.	Relaxation	2.95	0.76	2.50	0.79	2.77	0.83	2.70	0.75
4.	Negative activation	1.83	0.72	2.36	0.97	2.03	0.84	2.18	0.99
5.	Tiredness	1.93	0.71	2.16	0.89	2.01	0.77	2.11	0.89
6.	Eating behaviour	4.38	1.18	4.53	1.24	4.49	1.23	4.34	1.14
7.	Light PA	281,96	221,42	205,71	184,62	267,57	209,79	190,99	196,03
8.	Moderate PA	106,74	123,19	85,80	114,24	112,57	128,05	54,58	77,79
9.	Vigorous PA	85,42	118,82	51,74	79,26	80,40	108,28	41,51	85,16
10.	Total PA	474.12	359.28	343.25	288.00	460.55	339.34	287.09	281.84
11.	Sedentary time	413.73	210.68	469.55	219.82	429.29	211.53	466.37	228.19

M: Mean; SD: Standard Deviation; PA: Physical Activity.



Περιγραφικά Στατιστικά, Εσωτερική Συνέπεια (Cronbach's alpha) & Συσχετίσεις

	Περιγραφικά Στατιστικά		Alpha	Συσχετίσεις									
	Μέσος	Τυπική		1	2	3	4	5	6	7	8	9	10
	Όρος	Απόκλιση											
1. Ψυχολογική Ευεξία	12.63	5.92	.84	-									
2. Θετική Ενέργεια	3.00	.98	.87	.67**	-								
3. Χαλάρωση	2.75	.81	.80	.53**	.46**	-							
4. Αρνητική Ενέργεια	2.07	.89	.87	-.45**	-.25**	-.35**	-						
5. Κούραση	2.03	.80	.85	-.33**	-.17**	-.19**	.51**	-					
6. Διατροφική Συμπεριφορά	4.45	1.21	.75	.24**	.29**	.13**	-.09**	-.09**	-				
Φυσική Δραστηριότητα (λεπτά/εβδομάδα)													
7. Ήπια Ένταση	247.78	209.30	-	.28**	.30**	.11**	-.07*	.00	.11**	-			
8. Μέτρια Ένταση	97.28	119.55	-	.24**	.22**	.08**	-.07*	-.04	.13**	.39**	-		
9. Έντονη Ένταση	70.23	104.06	-	.27**	.29**	.06	-.07*	.01	.14**	.35**	.31**	-	
10. Συνολική	415.28	334.29	-	.35**	.36**	.12**	-.10**	-.01	.16**	.87**	.70**	.64**	-
11. Καθιστική Ζωή	439.11	216.57	-	-.24**	-.27**	-.10**	.19**	.14**	-.10**	-.15**	-.03	-.11**	-.14**

< 13 = κακή ευεξία, χρήζει ελέγχου για πιθανή καταθλιπτική διαταραχή

μέτριο επίπεδο υγιεινής διατροφής

168 λεπτά / εβδομάδα

*p<0.5, **p<0.01

Ανεπαρκή επίπεδα φυσικής δραστηριότητας σε σχέση με τις οδηγίες του ΠΟΥ
ΠΟΥ = 420 λεπτά / εβδομάδα μέτριας - έντονης έντασης φυσική δραστηριότητα



Πίνακας 1. Περιγραφικά Στατιστικά Υπο-ομάδων.

	Αγόρια		Κορίτσια		Αθλητές		Μη-Αθλητές	
	ΜΟ	ΤΑ	ΜΟ	ΤΑ	ΜΟ	ΤΑ	ΜΟ	ΤΑ
Ψυχική ευεξία	14.41	5.55	10.47	5.63	13.22	5.90	10.96	5.65
Θετική ενέργεια	3.22	.95	2.73	.96	3.07	1.00	2.86	.91
Χαλάρωση	2.95	.76	2.50	.79	2.77	.83	2.70	.75
Αρνητική ενέργεια	1.83	.72	2.36	.97	2.03	.84	2.18	.99
Κούραση	1.93	.71	2.16	.89	2.01	.77	2.11	.89
Διατροφική συμπεριφορά	4.38	1.18	4.53	1.24	4.49	1.23	4.34	1.14
Φυσική Δραστηριότητα (λεπτά/εβδομάδα)								
Σύνολο Φυσικής Δραστηριότητας	474.12	359.28	343.25	288.00	460.55	339.34	287.09	281.84
Καθιστική ζωή	413.73	210.68	469.55	219.82	429.29	211.53	466.37	228.19

ΜΟ: Μέσος Όρος, ΤΑ: Τυπική Απόκλιση

1

Τα αγόρια κατέγραψαν καλύτερη ψυχολογική ευεξία από τα κορίτσια

Τα αγόρια κατέγραψαν περισσότερη φυσική δραστηριότητα και λιγότερη καθιστική ζωή από τα κορίτσια

Οι αθλητές κατέγραψαν καλύτερη ψυχολογική ευεξία, υγιεινή διατροφή και φυσική δραστηριότητα από τους μη αθλητές



results

- Results showed that our participants demonstrated poor well-being, insufficient physical activity levels and moderate scores of healthy eating.
- Hierarchical regression analysis showed that, after controlling for age and gender, increased physical activity and healthier eating predicted better well-being, whereas sedentariness predicted worse well-being.

Analysis of variance showed that athletes vs. non-athletes demonstrated significantly better well-being.

The most striking result was the worryingly low levels of well-being reported by participants. The average score on well-being, and accordingly the score of 49.5% of the participants, was below the threshold (total score <13) identified by the WHO as requiring inspection for depressive symptoms

Physical activity of participants in the present study was below the recommended by the WHO levels, nevertheless, was the stronger predictor of well-being, even after controlling for the effects of sex and BMI that were also found to influence well-being.



Discussion

We also found that increased physical activity, decreased sedentariness and healthier eating could lead to well-being enhancement. This finding is supported by the fact that athletes compared to non-athletes experienced significantly better well-being, which was, however, marginally within the range of the general population norms of the World Health Organisation.

Policies promoting increased physical activity, decreased sedentariness and healthier eating behaviours are thus essential, and relevant action needs to be urgently prioritized.



Συζήτηση

Οι Έλληνες έφηβοι στην παρούσα μελέτη εμφάνισαν **πολύ χαμηλή Ψυχολογική Ευεξία** (< 13).

Ο Παγκόσμιος Οργανισμός Υγείας προτείνει ψυχομετρική εξέταση για πιθανή μείζονα κατάθλιψη όταν ο δείκτης ψυχολογικής ευεξίας είναι < 13 .

Χαμηλή Ψυχολογική Ευεξία ισοδυναμεί:

1. Απώλεια ενεργητικότητας και ικμάδας
2. Έλλειψη ενδιαφέροντος και χαράς
3. Γενικότερη διαταραχή της διάθεσης
4. Λιγότερη ηρεμία και γαλήνη



Συζήτηση

Οι Έλληνες έφηβοι στην παρούσα μελέτη εμφάνισαν **ανεπαρκή** Φυσική Δραστηριότητα (μέτρια-έντονη ένταση = 168λεπτά/εβδομάδα).

Ωστόσο, βρήκαμε ότι η αύξηση της Φυσικής Δραστηριότητας αναδύθηκε ως σημαντικός παράγοντας πρόβλεψης καλύτερης ψυχολογικής ευεξίας.

Ο Οδηγίες του Παγκόσμιου Οργανισμού Υγείας αναφέρουν:
Για καλύτερη ψυχική υγεία, οι έφηβοι πρέπει να συμμετέχουν σε Φυσική Δραστηριότητα με μέτρια-έντονη ένταση για τουλάχιστον 420 λεπτά/εβδομάδα.



Συζήτηση

Η Εκπαιδευτική Κοινότητα, οι Γονείς, και, πρωτίστως, η Πολιτεία καλούνται να λάβουν επειγόντως υπόψιν ότι:

Η παρούσα Ελληνική μελέτη, κατέγραψε παρόμοια αποτελέσματα σε σύγκριση με άλλες μελέτες:

- κακή ψυχολογική ευεξία, υψηλή συναισθηματική τρωτότητα και ανεπαρκή φυσική δραστηριότητα σε έφηβους σε συνθήκες μέτρων κοινωνικής αποστασιοποίησης λόγω της πανδημίας COVID-19.
- η αύξηση των ανεπαρκών επιπέδων φυσικής δραστηριότητας σε μέτρια-έντονη άσκηση και η περαιτέρω βελτίωση της υγιεινής διατροφής προβλέπουν βελτίωση της κακής ψυχολογικής ευεξίας των εφήβων κατά την πανδημία COVID-19.

Diabetes and covid 19.

Elina Touloudi, master thesis

The study included 51 patients (22 male and 29 female) diagnosed with type 2 diabetes, aged from 34 to 93 years old, who answered questions about well-being, symptoms of depression and anxiety, diet and physical activity in a period of Covid-19 nationwide lockdown.

The results showed that patients who exercise have better levels of well-being and reduced symptoms of depression and anxiety, compared to those who do not exercise. However, the results have shown that few patients could achieve the exercise goals suggested by WHO guidelines for diabetics, which may be due to their age. Nevertheless, the findings of this study support the belief that physical activity can be beneficial in well-being, anxiety, depression and therefore in quality of life in people with type 2 diabetes. Finally, based on the results, exercise instructions for this population are developed.

Small steps, strong shield against Covid 19

Directly measured physical activity data , from 65 361 adult patients with a COVID- 19 diagnosis from 19 March 2020 to 30 June 2021, were grouped by activity level: low (<60 min/week), moderate (60–149 min/week) and high activity (≥ 150 min/week).

- High physical activity was associated with lower rates of hospitalisation, ventilation and death due to COVID-19 than those who engaged in low physical activity.
- Moderate physical activity also was associated with lower rates of hospitalisation admission, ventilation and death.
- Adults with high and moderate physical activity levels had significantly better outcomes than those with low activity when contracting COVID-19. The apparent protective effects of regular physical activity extended to those with concomitant chronic medical conditions.

Review questions

- Relationships between walking and health
- Those who were in the high activity group were much less likely than those in the low activity group to be hospitalised or die from COVID 9.
- Regular physical activity, even below recommended weekly guidelines for health, could have substantial benefits.
- Recommended types and forms of exercise for healthy and clinical populations during pandemic.



Γιάννης Θεοδωράκης
Πανεπιστήμιο Θεσσαλίας