



ORIGINAL SCIENTIFIC ARTICLE

THE EFFECT OF MOVEMENT GAMES ON THE LEVEL OF PHYSICAL FITNESS AND MENTAL HEALTH OF STUDENTS WITH DISABILITIES: MIXED METHOD

Akhmad Dimiyati^{1ABCDE}, Edi Setiawan^{2ABCDE}, Retna Kinanti Dewi^{1ABCDE},
Yopi Meirizal^{3ABCDE}, Ruslan Abdul Gani^{1ABCDE}, Yulianto Dwi Saputro^{4ABCDE},
Baiq Satrianingsih^{5ABCDE}, Mashuri Eko Winarno^{6ABCDE} and Zsolt Németh^{7ABCDE}

¹Universitas Singaperbangsa Karawang

²Universitas Suryakencana

³STKIP Pasundan Cimahi

⁴IKIP Budi Utomo Malang

⁵Universitas Pendidikan Mandalika

⁶Universitas Negeri Malang

⁷University of Pécs

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

Corresponding Author: Akhmad Dimiyati, E-mail: akhmad.dimiyati@fkip.unsika.ac.id

Accepted for Publication: August 15, 2022

Published: December 23, 2022

DOI: 10.17309/tmf.v.2022.4.02

Abstract

Study purpose. This study aims to investigate the effects of movement games as an effort to increase the level of physical fitness and mental health of students with disabilities during COVID-19.

Materials and methods. This study adopted a mixed method. The participants involved in this study were students with disabilities who came from two special schools students with disabilities in Karawang Regency, Indonesia (n=40). Participants were divided into an experimental group who carried out a movement game program (n=20) and a control group (n=20) who followed routine learning without participating in any activities. After implementing the movement game program, 20 participants were interviewed about the experiences, advantages and disadvantages of the movement game program. Quantitative research instruments used muscular strength, muscular endurance and cardiorespiratory fitness tests. Meanwhile, the qualitative research instrument used in-depth interviews for 30 minutes. Analysis of quantitative data used IBM SPSS, and analysis of qualitative data used thematic analysis.

Results. The quantitative study results showed that there was a significant increase in the level of physical fitness and mental health in the experimental group ($p < 0.05$), and no increase was found in the control group ($p > 0.05$). In addition, the qualitative study results showed that the majority of participants acknowledged that the movement game program was a fun method of education and had a positive effectiveness.

Conclusions. After carrying out this research, we confirm that the movement game activity is an education method that has a great effect on the increase in the physical fitness level and mental health of students with disabilities during COVID-19.

Keywords: movement games, physical fitness, mental health, mixed method.

Introduction

The current COVID-19 pandemic crisis has attacked several aspects including physical fitness among the community

(Rasheed, Abduljawad, Mabrouk, Jdaitawi, Abdulmonem, 2021; Gultom, Baharuddin, Ampera, Fibriasari & Sembiring, 2022), including students with disabilities. A survey study reported that 80% of Indonesian people have low physical fitness (Kusuma et al., 2021). Data reported several factors induce the lowering physical fitness levels such as isolation/lock down (Kamyuka, Carlin, McPherson & Misener, 2020), work and school from home (Kaur, Singh, Arya & Mittal, 2020; Liskustyawati, Riyadi, Sabarini, Waluyo & Shidiq, 2020),

© Dimiyati, A., Setiawan, E., Dewi, R.K., Meirizal, Y., Gani, R.A., Saputro, Y.D., Satrianingsih, B., Winarno, M.E., Németh, Z., 2022.

physical activity was limited and significantly reduced (Hill-yard, Sinclair, Murphy, Casson, Mulligan, 2021). Physical fitness is an important aspect for students to learn at school during the COVID-19 crisis (Dao, 2021), because a high level of physical fitness could support students to perform various activities without experiencing excessive fatigue and obtain an optimize learning outcomes. On the other hand, low levels of physical fitness will hinder the students in the learning process and consequently decreasing their achievement (Gultom, Baharuddin, Ampora, Fibriasari & Sembiring, 2022).

Recently, COVID-19 has attacked the mental health of all people in the world (Suarez-Balcazar et al., 2021; Yang, Li & Yu, 2021; Essadek et al., 2022), including students with disabilities who has high risk to being affected by COVID-19 so that it often affects their level of mental health (Sharpe et al., 2021; Walton, Medhurst, Madhavan & Shankar, 2022). Mental health is a condition of someone who does not experience a mental disorder, such as depression, high anxiety and stress, a mood disorder or refers to a state of well-being of a person who can overcome pressure in life (Buckley et al., 2020; Sokić et al., 2021). According to Huang, (2021) mental health refers to the emotional, psychological and social well-being of a person. Students with high mental health will have motivation and independence in learning, on the other hand students with low mental health are less motivated to learn, so academic achievement will decrease drastically and they are likely to drop out from school (Grubic, Badovinac & Johri, 2020). A recent study reported that the impact of COVID-19 has affected all fields, especially education, in which the learning system has shifted from offline to online (Jumareng et al., 2022). Several obstacles in online learning, such as platforms that incompatible with technology that used to teach visually impaired students and poor internet connection (Jumareng et al., 2021), coupled with the lack of recreational activities that can be conducted at home have been proved as factors that cause students with disabilities felt frustration or mental health impairment (Patel, 2020). According to Grubic, Badovinac and Johri, (2020), cessation of teaching and learning activities in schools, loss of routine and social connections among students are factors that worsen mental health conditions. Given the importance of physical fitness and mental health for students with disabilities, an appropriate and effective teaching is needed for them, namely through movement games.

Movement games are activities that involve various kinds of movement activities (e.g., Walking Paper Color, Trampoline, Hoolahoop), in fun games for students with disabilities (Kamyuka, Carlin, McPherson & Misener, 2020). According to Dao, (2021) movement games involved motor skills such as jumping, crawling, running, walking. This game presents a lot of movement in a game as a powerful tool to increase the overall potential of students. Previous research has reported that game-based sports have a positive effect on improving athlete performance (Gabbett, Jenkins & Abernethy, 2009). This movement game provides various benefits that have been reported by previous studies (Chou, Chen, Huang & Tu 2020). Unfortunately there is still limited literature on this movement game and there was no previous studies have reported on the effect of movement games to change physical fitness levels, and mental health of children with disabilities during COVID-19. This research offers something different from previous research, namely investigate the effects of movement games through mixed research, in order to

reveal the effects of movement games with quantitatively and qualitatively. It is expected that this research could contribute to the development of movement games in the physical education, to improve the level of physical fitness and mental health of students with disabilities in the current pandemic crisis era. Therefore, the purpose of this study was to examine the effect of movement games to increase the level of physical fitness and mental health of students with disabilities.

Materials and Methods

Study participants

This research adopted mixed methods, namely research that combined quantitative and qualitative method. Research with mixed method aims to reveal the problem through two analyzes between quantitative and qualitative (Gani et al., 2022).

The participants in this study were students with disabilities who came from several special schools with disabilities in Karawang Regency (Indonesia). The recruitment method is as following: (1) researchers conducted a survey to two schools for children with disabilities in Karawang Regency, (2) researchers sent invitations to participate in research via Whatsapps to parents and students, (3) researchers recorded how many students were willing to participate in the research, (4) students were provided with information about the research and required to make a statement about their willingness to participate in all activities in the intervention program, (5) students who participated in the study were given a \$15 gift as a thank you for participating. Participants were allocated to the experimental group (n=20), which received treatment in the form of movement games and partly to the control group (n=20), where participants carried out their usual daily learning activities. The characteristics of the participants are presented in Table 1.

Instruments

Quantitative Instruments

Instruments to assess the physical fitness level of disabled students were adopted from the American College of Sports Medicine (ACSM), including: muscular strength,

Table 1. Characteristics of Participants

Variables	n(%)
Gender	
Boys	20(50.0%)
Girls	20(50.0%)
Age (y)	
9	20(50.0%)
10	20(50.0%)
Weight (kg)	
30	12(30.0%)
35	15(37.5%)
40	13(32.5%)
High (cm)	
130	16(40.0%)
135	19(47.5%)
140	5(12.5%)

muscular endurance and cardiorespiratory fitness (Wouters, Evenhuis & Hilgenkamp, 2020).

Muscular strength. This test aims to assess the muscle strength of students aged 4-10 years using throwing bags. In this test, the participant stood behind the line and then lifted a 4 kg bag over his head and threw the bag as far as possible. The throwing distance of the bag was measured in cm. Participants had three chances and the final score was the best score of three repetitions. This test has an Intraclass Correlation Coefficients (ICC) = 0.76.

Muscular endurance. This test aims to assess students' muscular endurance by using the stair climbing test. Participants walked as fast as they can to go up and down as many steps as possible in 30 seconds. The score was determined based on the number of steps in 30 seconds. The participants had three chances and the final score was the best score of the three repetitions. This test has an ICC = 0.92.

Cardiorespiratory fitness. Participants walked as far as possible by crossing a 20 m track for 6 minutes. After that, their heart rate was checked using Polar.

Instruments to assess the mental health level of students with disabilities adopted from previous studies (Gilmore, Campbell & Shochet, 2022), including:

Revised Children's Manifest Anxiety Scale (RCMAS). This instrument aims to assess anxiety in children with disabilities aged 6 to 19 years. This instrument has 37 items with subscales of Physiological Anxiety, Excessive Anxiety, Sensitivity, and Social Anxiety/Concentration. This instrument is assessed using a scale of 1 = "yes" and 0 = "no".

Strengths and Difficulties Questionnaire (SDQ). This instrument has 25 items with subscales: hyperactivity, emotional symptoms, peer problems, behavioral problems and pro-social behavior. This instrument was rated using a scale of 1 = "not true", 2 = "somewhat true", 3 = "of course".

Intellectual Disability Mood Scale (IDMS). This instrument was developed for children with disabilities aged 10 to 18 years and has been used frequently by previous studies and has been validated with Cronbach ranging from 0.63 to 0.77. This instrument has 12 question items with subscales: Anger, Confusion, Depression, Fatigue, Tension. This instrument was assessed using a Likert scale from a value of 1 to 5.

Qualitative Instruments

The instrument for qualitative research used in-depth interviews with participants with a duration of 30 minutes per individual. Interviews were conducted directly via Whatsapps and Bahasa language.

Research Program. This research was conducted in January-February at Singaperbangsa University Karawang (Indonesia) with approval number: 261.174/SP2H/UN64.10/LL/2022 and the 2 schools involved also approved this research. In addition, the research follows the guidelines of the World Medical Association Code of Ethics (Helsinki Declaration for humans). In this quantitative study there were several meetings, namely the first meeting on January 1, 2022, all participants carried out a pre-test (physical fitness and mental health test). The second meeting on January 5, 2022, the experimental group carried out the movement game program and the control group only carried out their usual daily activities until the 15th meeting (February 11, 2022). At the

16th meeting (12 February 2022), all participants carried out final exam activities, namely physical fitness and mental health tests. The movement game program was carried out on Wednesday, Friday and Saturday in the morning from 08.00-09.00 in the field located at Singaperbangsa University Karawang (Indonesia). This study strictly applied the COVID-19 health protocol, for example all participants and the research team were checked for body temperature and used hand sanitizers and are vaccinated before the intervention program. While the qualitative research was conducted on 16 and 17 February 2022, the movement game intervention group was interviewed for 30 minutes and the interviews were conducted using Bahasa language. The movement game program is presented in Table 2.

Table 2. Program movement games

Training Unit Components	Activities	Duration
Warm-up	Prestretch and warm-up	5 min
Program movement games	1. Boucce	50 min
	2. Walking paper colour	
	3. Frog jump	
	4. Trampoline	
	5. Hoolahoop	
	One movement game is done with a duration of 10 minutes.	
Cool-down	Cardiorespiratory cool down and the poststretch.	5 min

Statistical analysis

Quantitative analysis. Quantitative data were analyzed using IBM SPSS version 25.0 statistical software version 25.0 (Armonk, NY: IBM Corp) to find descriptive statistics (mean±standard deviation) and data normality. Paired-samples t-tests were used to test the scores of physical fitness and mental health before and after in the experimental and control groups (Xu, Yao, Kang & Duan, 2020). The level of significance used is 0.05.

Qualitative analysis. The qualitative analysis in this study was qualitative thematic, namely the results of in-depth interviews were coded and categorized into three themes, namely: theme 1: Experience of movement games, theme 2: Benefits of movement game and theme 3: Disadvantages of movement games.

Results

In this study, the normality test of data was declared normal ($p > 0.05$). Statistical descriptive tests are presented in Table 3. While the results of the paired-samples t-tests showed that the experimental group that movement games was proven to have a significant positive effect on increase the level of physical fitness and health of students with disabilities ($p < 0.05$), but there was no significant effect in the control group ($p > 0.05$) (Table 4).

While the results of qualitative research through in-depth interviews with the experimental group obtained the following answers:

Table 3. Descriptive Statistics of PF and MH in the EG and CG groups

Dependent Variable		EG				CG			
		Boys (n =10)		Girls (n =10)		Boys (n =10)		Girls (n =10)	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
		M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)
PF	MS	63.50(8.32)	71.50(8.77)	62.20(7.06)	67.50(7.73)	63.20(8.32)	61.40(7.91)	62.70(7.11)	62.30(6.46)
	ME	14.10(1.79)	16.20(1.22)	10.50(1.08)	14.00(1.56)	14.60(2.59)	13.80(2.57))	12.40(1.71)	11.80(1.47)
	CF	62.50(3.80)	66.90(3.21)	68.20(3.76)	76.00(4.34)	70.30(3.82)	69.20(3.99)	71.00(3.46)	70.30(2.83)
MH	RCMAS	27.80(3.76)	26.50(3.47)	30.60(3.97)	27.20(4.07)	27.80(3.76)	29.70(4.11)	28.90(4.08)	28.10(3.24)
	SDQ	22.10(2.05)	20.60(2.11)	21.10(3.95)	19.50(3.71)	22.10(2.02)	21.80(2.57)	23.30(3.09)	22.80(3.36)
	IDMS	30.00(3.26)	26.70(2.005)	29.70(2.35)	21.80(2.82)	27.40(3.74)	28.10(4.30)	26.90(3.95)	27.40(4.03)

Note. PF: Physical Fitness, MH: Mental Health, MS: Muscular Strength, ME: Muscular Endurance, CF: Cardiorespiratory fitness, RCMAS: Revised Children's Manifest Anxiety Scale, SDQ: Strengths and Difficulties Questionnaire, IDMS: Intellectual Disability Mood Scale, M: Mean, SD: Standard Deviation, EG: Experimental Group, CG: Control Group, n: participant.

Table 4. Differences values in pre-test and post PF and MH in the EG and CG groups

Dependent Variable		EG (n = 20)						CG (n = 20)					
		Pre-Post Boys			Pre-Post Girls			Pre-Post Boys			Pre-Post Girls		
		M(SD)	t	p	M(SD)	t	p	M(SD)	t	p	M(SD)	t	p
PF	MS	8.30 (4.32)	6.073	0.000	5.30 (3.26)	5.129	0.001	1.80 (4.21)	1.352	0.209	0.40 (3.95)	0.320	0.756
	ME	2.10 (1.19)	5.547	0.000	3.50 (2.01)	5.496	0.001	0.80 (1.47)	1.714	0.121	0.60 (1.71)	1.108	0.297
	CF	4.40 (1.71)	8.124	0.000	7.80 (2.70)	9.136	0.000	1.10 (2.13)	1.632	0.137	0.70 (2.00)	1.105	0.298
MH	RCMAS	1.30 (1.05)	3.881	0.004	3.40 (1.35)	7.965	0.000	1.90 (5.74)	1.046	0.323	0.80 (2.25)	1.124	0.290
	SDQ	1.50 (1.43)	3.308	0.009	1.60 (.516)	9.798	0.000	0.30 (1.49)	0.635	0.541	0.50 (1.17)	1.342	0.213
	IDMS	3.30 (2.16)	4.825	0.001	7.90 (2.33)	10.718	0.000	0.70 (2.79)	0.793	0.448	0.50 (.972)	1.627	0.138

Note. PF: Physical Fitness, MH: Mental Health, MS: Muscular Strength, ME: Muscular Endurance, CF: Cardiorespiratory fitness, RCMAS: Revised Children's Manifest Anxiety Scale, SDQ: Strengths and Difficulties Questionnaire, IDMS: Intellectual Disability Mood Scale, M: Mean, SD: Standard Deviation, EG: Experimental Group, CG: Control Group, n: participant.

Theme 1: Gesture game experience

Experience is an important point that must be clearly disclosed, obtaining information related to the experiences of students with disabilities in participating the movement game program proved that this game provides many benefits for the development of physical fitness and mental health. Some participants argued that:

Honestly, we feel happy and lucky to be able to join this movement game program. We will continue to use this program even after the research activities have been completed (opinions of 10 female participants).

Some of them mentioned that:

We will never forget this interesting movement game program. We hope that our physical education teachers in schools can use this program to change our level of physical fitness and mental health to gain improvement (opinions of 10 male participants).

Theme 2: The advantages of movement games

To observe the effectiveness of a program, it is necessary to conduct interviews with participants to obtain informa-

tion about the advantages of the program. Several participants gave their perception about the movement game program, namely:

In our opinion, the advantage of this movement game program is fun and provides us with lots of physical activities or movement experiences. Thus our physical fitness began to improve and our mental health became better than before (the opinion of 5 male participants).

In our opinion, this movement games provide several advantages, such as it is easy to play, it can be played anywhere and anytime. For example, this game can be played in the yard and can be done individually (the opinion of 5 female participants).

Furthermore, the participants explained that:

According to our perception, this program has benefit in promoting physical activity that is fun and can encourage us to be active. We like this program (the opinion of 5 female participants).

We are lucky to be able to participate in this movement game program, because this program provides advantages that it can be done at home safely and protected from the Corona virus. In addition, this program has proven to

be effective in increasing the level of our physical fitness and mental health to be positive (the opinion of 5 male participants).

Theme 3: Lack of movement games

To optimize the education program, it is necessary to know the shortcomings of the program. Thus, these deficiencies can be evaluated and minimized. Participants gave perceptions related to the shortcomings of the movement game program, including:

We all agree that the main drawback in this program is students with disabilities need a close supervision from a teacher when they are performing the physical activity. Because there were 2 students who were injured while doing this program. In our opinion, the implementation of this program is limited or cannot be carried out by all students with disabilities (the opinions of 10 participants are male and 10 are female).

Discussion

The quantitative findings in our study show that the movement game program has positive power to increase the physical fitness level of students with disabilities in the experimental group to a higher level. This is because movement games have game-focused characters and provide movement experiences. For example, crocodile crawling, frog jumping, trampoline and hoolahoop games are effective tools to improve physical fitness components, such as muscular strength, muscular endurance and cardiorespiratory (Polevoy, 2021). According to Dao, (2021) games or activities that provide entertainment and satisfaction elements and require students to walk, jump or crawl can facilitate the gradual development of students' physical fitness (Chou, Chen, Huang, Tu & Huang, 2020). Thus, the study results support previous studies reported the similar results, where a movement game program was proven to be implemented in physical education classes to improve aspects of physical fitness in elementary school students (Cocca, Verdugo, Cuenca & Cocca, 2020). As for the control group, no significant effect was found in this study. Qualitative research findings show that all disabled students in the experimental group provided diverse and positive perceptions about the application of an effective movement game program in increasing physical fitness levels.

The second finding of this study shows that the movement game program also has a positive effect on the mental health development of students with disabilities. This is because movement games promote an element of entertainment to students with disabilities and it causes them to enjoy doing all the activities in the program (Dao, 2021; Sokic, Popov, Dinic' & Rastovic, 2021). In this method, the mental health of students with disabilities will change to a better result. For example, students with high levels of anxiety, anger, depression, tension and anger begin to decrease because they enjoy the activities. In addition, issues regarding negative behavior among students with disabilities have turned towards positive behavior (Cocca, Verdugo, Cuenca & Cocca 2020). Different results were shown by the control group, where the students did not experience significant changes in their mental health. The qualitative research also shows the similar results, all students with disabilities provide an over-

view that the movement game program is an effective way to change negative mental health into positive.

Conclusions

The conclusion in the study confirms that the movement game program based on quantitative and qualitative analysis has been proven to be effective in increase the level of physical fitness and mental health of students with disabilities to be better than before during the COVID-19 period. In addition, this research is able to contribute and provide information for teachers or lecturers about the importance of using movement games for students with disabilities. Further studies with larger sample sizes need to be carried out in order to compare movement game programs with traditional sports, or improve other aspects such as the fundamental movement skills of students with disabilities.

Acknowledgement

We would like to express our gratitude to the Research and Development from Singaperbangsa Karawang University for providing support especially the research facilities. We also thank all parties who have contributed to the implementation of this research.

Conflict of Interest

All authors declare that there is no conflict of interest whatsoever in this study.

References

- Rasheed, A., Abduljawad, R., Mabrouk, S., Jdaitawi, M., & Abdulmonem, M. (2021). Physical fitness training program using electronic simulation games to foster psychological health among university students during COVID-19 pandemic. *International Journal of Human Movement and Sports Sciences*, 9(3), 421-427. <https://doi.org/10.13189/saj.2021.090305>
- Gultom, S., Baharuddin, Ampera, D., Fibriasari, H., & Sembiring, N. (2022). Profile of Student Physical Fitness Level of Sports Science Study Program: Relationship between Nutrition Status and Learning Achievement during COVID-19 Pandemic. *International Journal of Education in Mathematics, Science and Technology*, 10(1), 100-112. <https://doi.org/10.46328/ijemst.2115>
- Kusuma, I. K. H. W., Asmawi, M., Hernawan, H., Dlis, F., Widiastuti, W., & Kanca, I. N. (2021). A Study of Learning Physical Fitness Activities Based on Traditional Balinese Sports Games for Students' Physical Fitness. *International Journal of Human Movement and Sports Sciences*, 9(5), 1029-1039. <https://doi.org/10.13189/saj.2021.090525>
- Kamyuka, D., Carlin, L., McPherson, G., & Misener, L. (2020). Access to Physical Activity and Sport and the Effects of Isolation and Cordon Sanitaire During COVID-19 for People With Disabilities in Scotland and Canada. *Frontiers in Sports and Active Living*, 2(December), 1-9. <https://doi.org/10.3389/fspor.2020.594501>
- Kaur, H., Singh, T., Arya, Y. K., & Mittal, S. (2020). Physical Fitness and Exercise During the COVID-19 Pandemic: A Qualitative Enquiry. *Frontiers in Psychology*, 11(October), 1-10. <https://doi.org/10.3389/fpsyg.2020.590172>

- Liskustyawati, H., Riyadi, S., Sabarini, S. S., Waluyo, W., & Purnomo Shidiq, A. A. (2020). Level of physical fitness of elderly people from 60 to 80 years old during a pandemic COVID-19. *Health, Sport, Rehabilitation*, 6(4), 27-38. <https://doi.org/10.34142/hsr.2020.06.04.03>
- Hillyard, M., Sinclair, M., Murphy, M., Casson, K., & Mulligan, C. (2021). The impact of COVID-19 on the physical activity and sedentary behaviour levels of pregnant women with gestational diabetes. *PLoS ONE*, 16(8 August). <https://doi.org/10.1371/journal.pone.0254364>
- Dao, C. T. (2021). Using Movement Games in Physical Education Class to Improve Physical Fitness and Stabilize Vestibule for Children Aged 6 to 7 years. *International Journal of Human Movement and Sports Sciences*, 9(6), 1396-1402. <https://doi.org/10.13189/saj.2021.090636>
- Suarez-Balcasar, Y., Mirza, M., Errisuriz, V. L., Zeng, W., Brown, J. P., Vanegas, S., Heydarian, N., Parra-Medina, D., Morales, P., Torres, H., & Magaña, S. (2021). Impact of covid-19 on the mental health and well-being of latinx caregivers of children with intellectual and developmental disabilities. *International Journal of Environmental Research and Public Health*, 18(15). <https://doi.org/10.3390/ijerph18157971>
- Yang, Y., Li, Y., & Yu, J. (2022). The influence of personal factors on adolescents' physical and mental health: from the perspective of sports commitment. *Revista De Psicología Del Deporte (Journal of Sport Psychology)*, 30(4), 96-104. Retrieved from <https://www.rpd-online.com/index.php/rpd/article/view/591>
- Essadek, A., Gressier, F., Robin, M., Shadili, G., Bastien, L., Peronnet, J.-C., Falissard, B., & Rabeyron, T. (2022). Mental health of medical students during the COVID19: Impact of studies years. *Journal of Affective Disorders Reports*, 8, 100318. <https://doi.org/10.1016/j.jadr.2022.100318>
- Sharpe, D., Rajabi, M., Chileshe, C., Joseph, S. M., Sesay, I., Williams, J., & Sait, S. (2021). Mental health and wellbeing implications of the COVID-19 quarantine for disabled and disadvantaged children and young people: evidence from a cross-cultural study in Zambia and Sierra Leone. *BMC Psychology*, 9(1), 1-15. <https://doi.org/10.1186/s40359-021-00583-w>
- Walton, C., Medhurst, D., Madhavan, G., & Shankar, R. (2022). The Current Provision of Mental Health Services for Individuals with Mild Intellectual Disability: A Scoping Review. *Journal of Mental Health Research in Intellectual Disabilities*, 15(1), 49-75. <https://doi.org/10.1080/19315864.2021.1992549>
- Buckley, N., Glasson, E. J., Chen, W., Epstein, A., Leonard, H., Skoss, R., Jacoby, P., Blackmore, A. M., Srinivasjois, R., Bourke, J., Sanders, R. J., & Downs, J. (2020). Prevalence estimates of mental health problems in children and adolescents with intellectual disability: A systematic review and meta-analysis. *Australian and New Zealand Journal of Psychiatry*, 54(10), 970-984. <https://doi.org/10.1177/0004867420924101>
- Huang, G. (2022). The effect of aerobic exercise on the mental health of college students. *Revista De Psicología Del Deporte (Journal of Sport Psychology)*, 30(4), 132-139. Retrieved from <https://www.rpd-online.com/index.php/rpd/article/view/596>
- Sokić, J., Popov, S., Dinić, B. M., & Rastović, J. (2021). Effects of Physical Activity and Training Routine on Mental Health During the COVID-19 Pandemic and Curfew. *Frontiers in Psychology*, 12(June), 1-14. <https://doi.org/10.3389/fpsyg.2021.624035>
- Grubic, N., Badovinac, S., & Johri, A. M. (2020). Student mental health in the midst of the COVID-19 pandemic: A call for further research and immediate solutions. *International Journal of Social Psychiatry*, 66(5), 517-518. <https://doi.org/10.1177/0020764020925108>
- Jumareng, H., Setiawan, E., Asmuddin, A., Rahadian, A., Gazali, N., & Badaruddin, B. (2022). Online Learning for Children with Disabilities During the COVID-19: Investigating Parents' Perceptions. *The Qualitative Report*, 27(2), 591-604. <https://doi.org/10.46743/2160-3715/2022.4926>
- Jumareng, H., Setiawan, E., Patah, I. A., Aryani, M., Asmuddin, & Gani, R. A. (2021). Online learning and platforms favored in physical education class during COVID-19 era: Exploring student' perceptions. *International Journal of Human Movement and Sports Sciences*, 9(1), 11-18. <https://doi.org/10.13189/saj.2021.090102>
- Patel, K. (2020). Mental health implications of COVID-19 on children with disabilities. *Asian Journal of Psychiatry Journal*, January. <https://doi.org/10.1016/j.ajp.2020.102273>
- Gabbett, T., Jenkins, D., & Abernethy, B. (2009). Game-Based Training for Improving Skill and Physical Fitness in Team Sport Athletes. *International Journal of Sports Science & Coaching*, 4(2), 273-283. <https://doi.org/10.1260/174795409788549553>
- Chou, C. C., Chen, K. C., Huang, M. Y., Tu, H. Y., & Huang, C. J. (2020). Can movement games enhance executive function in overweight children? A randomized controlled trial. *Journal of Teaching in Physical Education*, 39(4), 527-535. <https://doi.org/10.1123/JTPE.2019-0165>
- Gani, R. A., Achmad, I. Z., Julianti, R. R., Setiawan, E., Németh, Z., Muzakki, A., Yanti, N., & Habibie, H. (2022). Does the Athletes' Leg Muscle Power Increase After the Tabata Aquatic Program? *Physical Education Theory and Methodology*, 22(1), 56-61. <https://doi.org/10.17309/tmfv.2022.1.08>
- Wouters, M., Evenhuis, H. M., & Hilgenkamp, T. I. M. (2020). Physical fitness of children and adolescents with moderate to severe intellectual disabilities. *Disability and Rehabilitation*, 42(18), 2542-2552. <https://doi.org/10.1080/09638288.2019.1573932>
- Gilmore, L., Campbell, M., & Shochet, I. (2022). Adapting Self-Report Measures of Mental Health for Children with Intellectual Disability. *Journal of Mental Health Research in Intellectual Disabilities*, 15(1), 1-19. <https://doi.org/10.1080/19315864.2021.1959687>
- Xu, C., Yao, M., Kang, M., Duan, G., & Bocalini, D. S. (2020). Improving Physical Fitness of Children with Intellectual and Developmental Disabilities through an Adapted Rhythmic Gymnastics Program in China. *BioMed Research International*, 2020. <https://doi.org/10.1155/2020/2345607>
- Polevoy, G. G. (2021). Use of exercise classics in physical education classes for the development of vestibular stability of schoolchildren. *International Journal of Human Movement and Sports Sciences*, 9(2), 180-184. <https://doi.org/10.13189/saj.2021.090203>
- Cocca, A., Verdugo, F. E., Cuenca, L. T. R., & Cocca, M. (2020). Effect of a game-based physical education program on physical fitness and mental health in elementary school children. *International Journal of Environmental Research and Public Health*, 17(13), 1-13. <https://doi.org/10.3390/ijerph17134883>

ВПЛИВ РУХЛИВИХ ІГОР НА РІВЕНЬ ФІЗИЧНОЇ ПІДГОТОВКИ ТА ПСИХІЧНОГО ЗДОРОВ'Я УЧНІВ З ІНВАЛІДНІСТЮ: ЗМІШАНИЙ МЕТОД

Ахмад Дім'яті^{1ABCDE}, Еді Сетіаван^{2ABCDE}, Ретна Кінанті Деві^{1ABCDE},
Йопі Мейризал^{3ABCDE}, Руслан Абдул Гані^{1ABCDE}, Юліанто Дві Сепутро^{4ABCDE},
Байк Сатріанінсіх^{5ABCDE}, Машурі Еко Вінарно^{6ABCDE}, Жольт Немет^{7ABCDE}

¹Каравангський університет імені Сінгапербангса

²Університет Сур'яканчана

³Педагогічний коледж Пасундан в Чімахі

⁴Малангський педагогічний інститут Буді Утомо

⁵Університет освіти Мандаліка

⁶Малангський державний університет

⁷Печський університет

Авторський вклад: А – дизайн дослідження; В – збір даних; С – статаналіз; D – підготовка рукопису; Е – збір коштів

Реферат. Стаття: 7 с., 4 табл., 1 рис., 28 джерел.

Мета дослідження. Це дослідження має на меті вивчення впливу рухливих ігор як спроби підвищити рівень фізичної підготовки та психічного здоров'я учнів з інвалідністю під час пандемії COVID-19.

Матеріали та методи. У цьому дослідженні використовували змішаний метод. Учасниками цього дослідження були учні з інвалідністю з двох спеціальних шкіл для учнів з інвалідністю, розташованих у регіоні Караванг, Індонезія (n=40). Учасників розподілили на експериментальну групу, яка виконувала програму рухливих ігор (n=20), і контрольну групу (n=20), яка дотримувалася усталеного режиму навчання без участі в заходах. Після реалізації програми рухливих ігор 20 учасників були опитані про досвід і враження, переваги та недоліки програми рухливих ігор. Вимірні засоби кількісного аналізу дослідження використовували тести на м'язову силу, м'язову витривалість і кардіореспіраторну витривалість. Тоді як вимірні засоби якісного аналізу використовували глибинні інтерв'ю протягом 30 хвилин. Для аналізу кількісних даних використовували програмне забезпечення IBM SPSS, а для аналізу якісних даних використовували тематичний аналіз.

Результати. Результати кількісного дослідження показали достовірне підвищення рівня фізичної підготовленості та психічного здоров'я в експериментальній групі (p<0,05), а в контрольній групі підвищення не виявлено (p>0,05). Крім того, результати якісного дослідження показали, що переважна більшість учасників визнала, що програма рухливих ігор була цікавим методом навчання та мала безсумнівну ефективність.

Висновки. Провівши це дослідження, ми підтверджуємо, що рухлива ігрова діяльність є методом навчання, який має значний вплив на підвищення рівня фізичної підготовки та психічного здоров'я учнів з інвалідністю під час пандемії COVID-19.

Ключові слова: рухливі ігри, фізична підготовленість, психічне здоров'я, змішаний метод.

Information about the authors:

Dimiyati, Akhmad: akhmad.dimiyati@fkip.unsika.ac.id; <https://orcid.org/0000-0003-1018-9006>; Universitas Singaperbangsa Karawang, Jl. HS.Ronggo Waluyo, Puseurjaya, Telukjambe Timur, Karawang, Jawa Barat 41361, Indonesia.

Setiawan, Edi: edisetiawanmpd@gmail.com; <https://orcid.org/0000-0001-7711-002X>; Faculty of Teacher Training and Education, Universitas Suryakencana, Jl. Pasirgede Raya, Bojongherang, Kec. Cianjur, Kabupaten Cianjur, Jawa Barat 43216, Indonesia.

Dewi, Retna Kinanti: retna.kinanti@fkesunsika.ac.id; <https://orcid.org/0000-0001-5854-501X>; Universitas Singaperbangsa Karawang, Jl. HS.Ronggo Waluyo, Puseurjaya, Telukjambe Timur, Karawang, Jawa Barat 41361, Indonesia.

Meirizal, Yopi: yopimeirizal@stkipasundan.ac.id; <https://orcid.org/0000-0002-3237-124X>; STKIP Pasundan Cimahi, Jl. Permana No.32B, Citeureup, Kec. Cimahi Utara, Kota Cimahi, Jawa Barat 40512, Indonesia.

Gani, Ruslan Abdul: ruslan.abdulgani@staff.unsika.ac.id; <https://orcid.org/0000-0002-7608-1658>; Faculty of Teacher Training and Education, Universitas Singaperbangsa Karawang, Jl. HS.Ronggo Waluyo, Puseurjaya, Telukjambe Timur, Karawang, Jawa Barat 41361, Indonesia.

Saputro, Yulianto Dwi: yulianto@budiutomomalang.ac.id; <https://orcid.org/0000-0002-8539-543X>; IKIP Budi Utomo Malang, Jl. Simpang Arjuno No.14B, Kauman, Kec. Klojen, Kota Malang, Jawa Timur 65119, Indonesia.

Satrianingsih, Baiq: baiqsatrianingsih@ikipmataram.ac.id; Universitas Pendidikan Mandalika, Jl. Pemuda No.59A, Dasan Agung Baru, Kec. Mataram, Kota Mataram, Nusa Tenggara Barat 83125, Indonesia.

Winarno, Mashuri Eko: m.e.winarno.fk@um.ac.id; <https://orcid.org/0000-0002-2064-5418>; Department of Physical Education, Faculty of Sport Science, Universitas Negeri Malang, Jl. Semarang No.5, Sumberasri, Kec. Lowokwaru, Kota Malang, Jawa Timur 65145, Indonesia.

Németh, Zsolt: zsolt.nemeth@gamma.ttk.pte.hu; <https://orcid.org/0000-0003-4656-2618>; Faculty of Sciences, Institute of Sport Science and Physical Education, University of Pécs, Pécs, Vasvári Pál u. 4, 7622, Hungary.

Cite this article as: Dimiyati, A., Setiawan, E., Dewi, R.K., Meirizal, Y., Gani, R.A., Saputro, Y.D., Satrianingsih, B., Winarno, M.E., Németh, Z. (2022). The Effect of Movement Games on the Level of Physical Fitness and Mental Health of Students with Disabilities: Mixed Method. *Physical Education Theory and Methodology*, 22(4), 466-472. <https://doi.org/10.17309/tmf.2022.4.02>

Received: 15.05.2022. Accepted: 15.08.2022. Published: 23.12.2022

This work is licensed under a Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0>).