



INCREASING PHYSICAL LITERACY IN PENCAK SILAT ATHLETES: TWO-MONTHS PEER TEACHING MODEL PROGRAM IN COVID-19

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Abstract

Study purpose. This study aims to investigate the effect of the peer teaching model on improving the physical literacy of pencak silat athletes.

Materials and methods. This study applied a mixed method. Participants were pencak silat male athletes (n=30) who studied at elementary schools in Cianjur district (Indonesia). Participants were divided into an experimental group (n=15) that carried out the peer teaching model and a control group (n=15) that carried out daily teaching routines without participating in any activities. After implementing the peer teaching model, 15 participants were interviewed about the implementation of peer teaching in school model and the benefits of peer teaching. The quantitative research instrument involved physical literacy-movement competence, cognitive and affective domains. Meanwhile, the qualitative research instrument involved in-depth interviews for 30 minutes. Analysis of quantitative data used IBM SPSS. Analysis of qualitative data used thematic analysis.

Results. The quantitative study results showed that there was a significant increase in physical literacy in the experimental group ($p < 0.05$) but there was no increase in the control group ($p > 0.05$). The qualitative study results showed that most of participants gave diverse perceptions and all agreed that the peer teaching model could improve the physical literacy of athletes with poor condition.

Conclusions. This study concluded that peer teaching is an alternative teaching that can be used during COVID-19 to improve the physical literacy of pencak silat athletes.

Keywords: Peer Teaching, Physical Literacy, Pencak Silat athletes, Mixed Method.

Introduction

Nowadays, most of the world are facing a high risk pandemic that has a huge negative impact on all areas including physical education in elementary schools to universities (López-Valenciano, Suárez-Iglesias, Sanchez-

Lastra & Ayán, 2021; Roe, Blikstad-Balas & Dalland, 2021; Fang, Teng & Wang, 2021). Data reported that the COVID-19 pandemic caused athletes and teachers to carry out offline teaching while some people claimed that online teaching had various obstacles and did not provide optimal results (Jumareng et al., 2021; Sortwell & Ramirez-Campillo, 2022), which could led to a significant decrease in their talent related to physical literacy (Duclos-Bastías, Vallejo-Reyes, Giakoni-Ramírez & Parra-Camacho 2021; Young, O'Connor, Alfrey & Penney, 2021). According to Liu

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& Chen (2021) (2021), physical literacy in the context of physical education and sports has a concept as knowledge, motivation, self-efficacy and physical competence for active and sustainable involvement in lifelong physical activity (see Fig. 1).



Fig. 1. Physical Literacy Conceptual Model

The benefits of physical literacy that have been well-documented, for example the potential to help children (Pambudi, Sugiyanto, Hidayatullah & Purnama, 2021) and adolescents to improve healthy lifestyles throughout life (Lundvall, 2015; Irmansyah et al., 2021; Rihatno & Nuraini, 2021), promote levels of physical activity and higher physical fitness during the current COVID-19 pandemic crisis (Kwan, Graham, Healey, Paolucci & Brown, 2020). However, until now research on physical literacy is scarce (Edwards et al., 2018) particularly in physical education and sports settings (Warner et al., 2021), so that it becomes an urgency in this research. According to Silverman & Mercier, (2015) the best way to improve physical literacy is teaching that involves the psychomotor, cognitive and affective domains. The teaching method that has the potential to develop the three domains simultaneously is the peer teaching method.

Peer teaching is an athlete-centered instructional which help each other to achieve common goals in teaching activities (Farias, Mesquita, Hastie & Toni O'Donovan, 2018). According to Whipp, Jackson, Dimmock & Soh (2015) peer teaching is a peer or paired teaching model (Thurston, Cockerill & Chiang, 2021), in which athlete who become tutor must teach other athletes to complete a learning task. The tutor is chosen from one athlete who has better abilities than other athletes (Klavina & Rodionova, 2015). While teacher has a task to oversee the teaching process between tutor and athletes. It is expected that by using this model, tutor and athletes could interact with each other, actively involved and work together to develop their potential in teaching activities (Gunduz & Uner, 2019). According to previous studies, peer teaching was claimed to have benefits in improving performance (Lowton-Smith et al., 2019; Kastrena, Setiawan, Patah & Nur, 2020 2020). However, other studies reported that there was still a gap, which showed that peer teaching was less effective because it had several problems such as the feedback provided by tutors might be partially correct, completely wrong or misleading for other athletes (Trabelsi, Gharbi, Masmoudi & Mrayeh, 2020). Therefore, it is highly needed to follow up research on peer teaching models.

Research on peer teaching models has been well documented internationally (Moliner & Alegre, 2020; Tan & Gevera, 2020; Bores-García, Hortigüela-Alcalá, González-Calvo & Raúl Barba-Martín, 2020). However, there is still limited research on peer teaching models that related to physical education. In addition, this study presents a novelty from previous studies, namely applying the peer teaching model to improve the physical literacy of pencak silat athletes through mixed method analysis. Therefore, this study aims to investigate the effect of peer teaching model to improve the physical literacy of pencak silat athletes in physical education at schools.

Materials and methods

Study participants

This research adopted a mixed method, which combined quantitative and qualitative research to solve the problems in this research (Gani et al., 2022). Thirty participants of pencak silat athletes from elementary schools in Cianjur district (Indonesia) had agreed to participate in this study. Ethics clearance was granted by the elementary school committee (approval number: E 277/C-3/2022) prior to any data collection.

The participants were recruited by sending invitation letters via email to schools. From several number of schools that had been received invitation letters, only 30 male athletes responded and showed interest to be further involved in this study and 10 female athletes withdrew. The recruitment activity was carried out in March 2022. The characteristics of participants were: male gender, age: 11-12 years, height: 110-130 cm, weight: 30-40 kg. Participants were divided in 2 groups, half of participants (n=15) allocated to the experimental group who received treatment in the form of a peer teaching model and the rest allocated to the control group (n=15) who did their daily teaching or did not participate in any program.

Instrument

Quantitative Instruments

The physical literacy literature has a multi-dimensional concept, therefore the researcher adopted instruments from previous studies (Bremer, Graham & Cairney, 2020) along with the program leaders (n = 7), including:

Physical Literacy-Movement Competence Domain. Children's movement competence was assessed using locomotor, object-control and balance tests. The criteria for this assessment was the ability of athletes to run, leap or other movements correctly according to the assessment norms then they would get score between 1 to 4 and if it was not according to the assessment norms, then the score would be 0 (Behan, Belton, Peers, O'Connor & Issartel, 2020). As for object control, there were three performance criteria namely: a) the preparatory phase : hands were put in front of the body and the elbows are bent, b) the arms were outstretched when reaching for the ball which enters the field, and, c) the ball was caught by hand only. Each child was evaluated against these criteria. If they met the performance criteria, then they would get score 1 to 4. If they could not met performance criterion, then the score would be 0 (Juliantine, Setiawan, Jumareng, Gani & Asnaldi 2022). The assessment

Table 1. Peer Teaching Model Program

Role	Activities	Duration
Teacher	The teacher conveys the physical activities that will be carried out on that day. Warm-up The teacher selects a tutor from one of the athletes. Teachers provide motivation and self-efficacy to tutors.	10 min
Tutor	Tutors take on the role of teachers to teach athletes to perform physical activities, such as: Team plays with hula hoop Jumping games Push-up games Training punches and kicks in pencak silat	45 min
Teacher and Tutor	Evaluation Cooling-down	5 min

for stability component balance was conducted by assessing how long the child can walking straight line, and standing on one leg. Each child tried two trials for each movement skill and was assessed on the performance criteria (Vernadakis, Papastergiou, Zetou & Antoniou, 2015). The total score of the children (the sum of their individual scores) was calculated.

Physical Literacy-Cognitive Domain. Physical Literacy-Cognitive Domain. The knowledge level of children can be measured using a questionnaire with 10 question items (Bremer, Graham & Cairney, 2020). Examples: “how to do an effective physical activity or exercise during the COVID-19 pandemic (knowledge and understanding). This instrument was assessed using a Likert scale from 1 = has a very low knowledge to 7 = has a very high knowledge. Scores were calculated by averaging the ratings for each item to produce scores on a scale from 1 until seven.

Physical Literacy-Affective Domains. (1) Motivation. The measurement of children’s motivation to involve in physical activity and sports during the COVID-19 pandemic could be carried out by using the effort subscale from an intrinsic motivation inventory which consists of 5 question (Bremer, Graham & Cairney, 2020). Likert scale from 1 = Definitely false 7 = Definitely true were applied to assess the questions. An example of an item is: “I try my best to do physical activity and sports during the COVID-19 pandemic”. The motivation score was calculated by averaging the ratings for each item to obtain a score on a scale of one up to seven. (2) Self-Efficacy. The measurement of children’s self-efficacy could be carried out by using a questionnaire with 16 questions (Bremer, Graham & Cairney, 2020). For example: “I believe I can run 2 kilometers”. To assess this question, you can use a Likert scale from 0 = not sure to 10 = considerably sure. Self-efficacy scores were calculated by averaging the ratings for each item to obtain a score on a scale of one up to 10.

Qualitative Instruments

The instrument used in qualitative research was in-depth interviews with participants with a duration of 30 minutes per individual. Interviews were conducted directly via Whatsapps in Bahasa language (Gani et al., 2022).

Study organization

This research was conducted from April to May 2022 in Cianjur district (Indonesia). The research follows the guidelines of the World Medical Association Code of Ethics

(Helsinki Declaration for humans) which is intended for research with human subjects. In quantitative research, there were several meetings held, namely the first meeting on April 1, 2022, all participants carried out a pre-test (physical literacy test). The second meeting on April 4, 2022, the experimental group carried out the peer teaching model program while the control group only carried out their usual daily activities (traditional learning) until the 17th meeting (May 9, 2022). At the 18th meeting (11 May 2022), all participants carried out a final test activity, namely a physical literacy test. The peer teaching method program was conducted on Monday, Wednesday and Friday at 08.00-09.00 am. This research was carried out strictly by implementing the COVID-19 health protocol, including: all participants and the research team must be checked for body temperature, used hand sanitizers and were required to have a vaccine card to participate in this intervention program. While the qualitative research was conducted on May 20, 2022, the peer teaching model group was interviewed for 30 minutes in Bahasa language. The peer teaching model program is presented in Table 1.

Statistical analysis

Quantitative analysis

Data from quantitative research were analyzed using IBM SPSS version 25.0 (Armonk, NY: IBM Corp). First, analyzed the descriptive statistics (mean±standard deviation) and the normality of the data (Kolmogorov-Smirnov). Paired sample t-test was used to test differences in physical literacy scores pre-test and post-test in the experimental and control groups (Gani et al., 2022). This study used level of significance $p < 0.05$

Qualitative analysis

Qualitative research data were analyzed using qualitative thematics, namely the results of in-depth interviews with participation were analyzed and discussed among researchers, then it would be coded and categorized into three main themes (Gani et al., 2022; Essiet et al., 2022), namely: theme 1 relates to implementing the peer teaching model in school and theme 2 relates to the benefits of peer teaching.

Results

The quantitative results in this study showed that the normality test was normal ($p = 0.181 > 0.05$). While the results

of the statistical descriptive test are presented in Table 2. Table 3 shows that the experimental group (peer teaching model) has a significant effect on increasing physical literacy-movement competence domain ($p < 0.05$), physical literacy-cognitive domain ($p < 0.05$) and physical literacy-affective domain ($p < 0.05$). While the control group showed no increase in physical literacy ($p > 0.05$).

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

Theme 1: Implementing metode peer teaching in school

The application of a teaching method in elementary schools is very important (Jumareng et al., 2022), because it cause the teaching process much more fun and not boring for athletes. Therefore, this theme 1 resulting two sub-themes, namely: (i) Implementation of peer teaching methods and (ii) obstacles.

Table 2. Descriptive Statistics between EG and CG

Dependent Variable	EG (n = 15)		CG (n = 15)	
	Pretest	Posttest	Pretest	Posttest
	M(SD)	M(SD)	M(SD)	M(SD)
PLMCD				
Locomotor	2.33(0.617)	3.87(0.352)	2.33(0.617)	2.27(0.799)
Object-control	2.00(0.535)	3.60(0.507)	2.00(0.535)	2.20(0.862)
Balance	2.33(0.488)	3.47(0.516)	1.60(0.07)	1.73(0.704)
PLCD	22.00(2.07)	39.67(2.66)	21.60(2.74)	21.73(2.73)
PLAD				
Motivation	13.27(1.38)	23.00(2.07)	13.27(1.38)	13.607(2.02)
Self-efficacy	44.80(3.36)	73.40(9.18)	37.80(6.36)	38.007(6.31)

M: Mean, SD: Standard Deviation, EG: Experimental Group, CG: Control Group, PLMCD: Physical Literacy-Movement Competence Domain, PLCD: Physical Literacy-Cognitive Domain, PLAD: Physical Literacy-Affective Domain

Subtheme 1: Implementation

Participants shared their experiences on how to succeed in implementing the peer teaching model in elementary schools. In this regard, participants expressed their opinion that:

This is a valuable experience for us as tutors, because we are required to be responsible for providing subject matter to other athletes or friends. Based on our opinion, this peer teaching model is a positive teaching for the development of the potential of tutors and athletes simultaneously, so that peer teaching must be taken into account to be implemented in the education curriculum in Indonesia (Participant 1).

Indonesia applied a teacher-centered curriculum, in which athletes are less active in teaching activities. Therefore, integrating the peer teaching model in physical education and sports learning is appropriate method as an innovation in physical education learning in elementary schools (Participant 2). Participant 7 further explained that:

However, in our opinion, to optimally apply the peer teaching model in grade 6 elementary school, a tutor must have learning motivation, self-confidence and broad insight, thus the application of peer teaching will be more effective (Participant 7).

Of course, although the peer teaching model is claimed to have good effectiveness, the knowledge, skills and psychological factors of the tutor will greatly determine the final outcome of learning achievement (Participant 3).

Regarding this, another participant explained that:

At the beginning of the implementation of the peer teaching model, we felt anxious and did not have the confidence to become a tutor, but the teacher continued to motivate me so that I succeeded in carrying out my duties as a tutor (Participant 10).

In addition, teacher has an important role in implementing the peer teaching model, because the teacher acts as a facilitator to explain the subject matter to the tutor, and the teacher must be able to motivate and increase the self-confidence of the tutors and athletes so they willing to learn (Participant 8). Participant 11 gave his perception that:

I agree that the teacher has a role in guiding tutors as the main tool to achieve success in implementing the peer teaching model in elementary schools (Participant 11).

Subtheme 2: Barriers

Barriers are the main problems that often arise in physical education and sports learning activities in elementary schools,

Table 3. Differences values in pre-test and post in the EG and CG groups

Dependent Variable	EG (n = 15)			CG (n = 15)		
	Pretest-Posttest	t	p	Pretest-Posttest	t	p
	M(SD)			M(SD)		
PLMCD						
Locomotor	1.53(0.743)	7.990	0.000	0.067(.799)	0.323	0.751
Object-control	1.60(0.632)	9.798	0.000	0.200(.775)	1.000	0.334
Balance	1.13(0.640)	6.859	0.000	0.133(.834)	0.619	0.546
PLCD	17.66(3.71)	18.412	0.000	0.133(1.846)	0.280	0.784
PLAD						
Motivation	9.73(2.43)	15.488	0.000	0.333(1.234)	1.046	0.313
Self-efficacy	33.60(8.74)	14.888	0.000	0.200(1.26)	0.612	0.550

M: Mean, SD: Standard Deviation, EG: Experimental Group, CG: Control Group, $p < 0.05$, PLMCD: Physical Literacy-Movement Competence Domain, PLCD: Physical Literacy-Cognitive Domain, PLAD: Physical Literacy-Affective Domain

and these should be evaluated so that the learning process can run effectively (Participant 4).

Participants gave their perceptions regarding the obstacles in peer teaching, namely:

According to me, the obstacle that often occurred was a dispute between tutors who have arrogant personalities and the athletes which causes uncondusive learning activities (Participant 5).

Dispute between tutors and athletes often occur in the teaching process of physical education in elementary schools, therefore the teacher as a facilitator and mentor must be able to provide an understanding to the tutor to preven overacting in teaching (Participant 6).

Participant 9 argued that:

I agree, many tutors behave fiercely or often joke around. But after the teacher giving them understanding, they started to behave much better and we started to feel comfortable and excited to learn (Participant 9).

Theme 2: Benefits of peer teaching

Although there were obstacles in the process of peer teaching models, the benefits for tutors and athletes were greater, so that theme 2 resulting three sub-themes, including: (i) benefits of peer teaching for physical literacy-movement competence, (ii) benefits of peer teaching for physical literacy-cognitive and benefits of peer teaching for physical literacy-affective (iii).

Subtheme 1: Benefits of peer teaching for Physical Literacy-Movement Competence

The first benefit that can be obtained from the application of peer teaching is related to the domain of movement competence of tutors and athletes. In this case, participant 13 gave the perception that:

After participating in this peer teaching method program, my movement skills experienced a positive increase, it was because the teachers and tutors provided fun physical activity programs. (Participant 13)

Even when the tutor was demonstrating a movement or physical activity to athletes, the physical literacy-movement competence could develop indirectly (Participant 14).

Subtema 2: Benefits of peer teaching for Physical Literacy-Cognitive

It has been proven that peer teaching model has provided some beneficial for the development of physical literacy-cognitive athletes. Participant 7 further explained that:

Our cognitive domain is gradually increasing, because at the beginning of learning the teacher always explains the subject matter to the tutor first, and then the tutor teaches the material to the athletes. This means that in these activities there is a knowledge transfer process from teacher to tutor and from tutor to athlete (Participant 7).

Peer teaching activities started with the teacher providing an understanding to the tutor about the material or motion task that would be studied that day and continues with the tutor's activities explaining and demonstrating the subject matter to athletes. Thus, this cycle indirectly increase our knowledge (Participant 15).

Subtheme 3: Benefits of peer teaching for Physical Literacy-Affective

The third benefit from the application of peer teaching is the increase in the physical literacy-affective domain. Participant 1 expressed his opinion that:

I think our effective domain also increases, it proves that we are more motivated to study physical education (Participant 1).

The peer teaching model is a learning that has the potential to trigger motivation and self-confidence to learn, because the teacher at the beginning of learning always motivates and instills confidence in tutors and athletes (Participant 15). Furthermore, Participant 10 argued that:

When I became a tutor, I was required to be motivated in learning and had to believe in my own abilities to teach our other friends. I believe it promotes our motivation and our self-confidence continues to increase gradually (Participant 5).

The characteristics of peer teaching model are the role of tutors who contribute to help other athletes who have learning difficulties. Peer teaching has a student centered learning system and active learning, in this learning process athletes have more active opportunities to obtain information and provide information (Participant 10).

Discussion

Our study aims to investigate the effect of applying the peer teaching method to improve the physical literacy of pencak silat athletes.

The first quantitative finding in our study showed that the application of the peer teaching method was proven to improve the physical literacy of athletes gradually. This is because the peer teaching method has characteristics, learning stages and learning objectives that lead to the development of the three domains between movement competence, cognitive (Thurston, Cockerill & Chiang, 2021) and affective simultaneously (Metzler, 2011; Iserbyt, 2015). This is in accordance with the opinion of (Silverman & Mercier, 2015) that the effective strategy to improve physical literacy is through learning that presents and transfers cognitive, affective and psychomotor domains. The results of previous studies also reported that student-centered learning has the potential to positively improve physical literacy (Choi, Sum, Leung & Ng, 2018). The results of this study support previous studies which explain that peer teaching is conducive to promote a positive and attractive learning environment for both tutors and learners (athletes). The clear impact of implementing peer teaching is the development of cognitive, psychosocial, affective and motor skills (Jenkinson, Naughton & Benson, 2014; Mirzeoglu, 2014). Meanwhile, different findings occurred in the control group, and there was no significant change in the physical literacy aspect of the athletes.

The second qualitative finding in this study shows that most of the athletes who received the intervention program gave diverse and positive perceptions towards the implementation of peer teaching models to improve physical literacy aspect. Finally, our research has implications for being a solution for teachers to improve physical literacy during the COVID-19 pandemic crisis and our research can provide information for lecturers, coaches, teachers and athletes about the importance of using the peer teaching method.

Conclusions

Based on the results and findings in this study, we can conclude that the peer teaching method program has an effect

on improving the physical literacy of pencak silat athletes. However, the scope of this study was limited in term of the small number of participants who came from one area in Indonesia, so further studies are needed by involving a large number of pencak silat athletes from other regions. Future studies are interesting to follow up, for example comparing the peer teaching method with the sport education model.

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Conflict of interest

The researcher declares that there is no conflict of interest in this research.

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ПІДВИЩЕННЯ РІВНЯ ФІЗИЧНОЇ ГРАМОТНОСТІ У СПОРТСМЕНІВ, ЯКІ ЗАЙМАЮТЬСЯ ПЕНЧАК-СИЛАТОМ: ДВОМІСЯЧНА ПРОГРАМА ПІДГОТОВКИ ЗА МОДЕЛЛЮ ВЗАЄМОНАВЧАННЯ В ПЕРІОД ПАНДЕМІЇ COVID-19

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

Реферат. Стаття: 8 с., 3 табл., 1 рис., 40 джерел.

Мета дослідження. Метою цього дослідження є вивчення впливу моделі взаємонавчання на підвищення рівня фізичної грамотності спортсменів, які займаються бойовим мистецтвом пенчак-силат.

Матеріали та методи. У цьому дослідженні застосовували змішаний метод. Учасниками дослідження були спортсмени чоловічої статі ($n=30$), які займалися пенчак-силатом і навчалися в початкових школах в окрузі Чианджур (Індонезія). Учасників розділили на експериментальну групу ($n=15$), яка займалася за моделлю взаємонавчання, і контрольну групу ($n=15$), яка виконувала повсякденну навчальну програму без участі в жодних заходах. Після реалізації моделі взаємонавчання було проведено опитування 15 учасників із питань реалізації взаємонавчання в шкільній моделі та переваг взаємонавчання. Інструмент кількісного аналізу включав фізичну грамотність, рухову компетентність, когнітивну та емоційну сфери. Тоді як інструмент якісного аналізу передбачав проведення поглиблених інтерв'ю протягом 30 хвилин. Для аналізу кількісних даних використовували програмне забезпечення IBM SPSS. Для аналізу якісних даних використовували тематичний аналіз.

Результати. Результати кількісного дослідження показали статистично значуще підвищення рівня фізичної грамотності в експериментальній групі ($p<0,05$), але в контрольній групі підвищення не було ($p>0,05$). Результати якісного дослідження показали, що більшість учасників висловила різні думки й усі погодилися, що модель взаємонавчання може покращити фізичну грамотність недостатньо підготовлених спортсменів.

Висновки. За результатами цього дослідження було зроблено висновок, що взаємонавчання є альтернативною формою навчання, яку можна використовувати під час пандемії COVID-19 із метою підвищення рівня фізичної грамотності спортсменів, які займаються пенчак-силатом.

Ключові слова: взаємонавчання, фізична грамотність, спортсмени, які займаються пенчак-силатом, змішаний метод.

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