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Physical Literacy Awareness: The Effect on Increasing Students' Abdominal Muscle Endurance in Wetland Environments

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ABSTRACT

Physical Literacy awareness is a key aspect in understanding and improving students' physical health and fitness. This study investigated the impact of Physical Literacy Awareness in improving students' abdominal muscular endurance in a wetland environment. The study explored how a program focusing on physical literacy, when implemented in a wetland environment, impacted students' abdominal muscular endurance. The research method uses an equivalent time series, namely an experimental method applying a time series design. This method is carried out by carrying out three tests, namely an initial test followed by treatment. The second test continues with the treatment and ends with the third test. The research population as well as the research sample was 133 students. The data analysis technique uses the non-parametric Kruskal-Wallis test because the data is not normally distributed. Based on the Kruskal-Wallis Test data analysis technique, it shows a significance value of 0.015 <0.05, so there is a significant difference. The results can be said that there is a significant difference between test-1, test-2 and test-3 in students. Based on the results of the study, it can be concluded that physical literacy awareness can increase physical literacy awareness. increase the abdominal muscle strength of students in wetland areas. This study provides valuable insights into the role of Physical Literacy Awareness in improving college students' abdominal muscle endurance. The findings showed that the implementation of the physical literacy awareness program had a significant positive influence on improving abdominal muscle endurance in a wetland environment.

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1. INTRODUCTION

The strength and endurance of the abdominal muscles in human individuals is very large, enabling them to carry out all kinds of life activities. The stomach is the centre of the body, almost all human movements are connected to the stomach. The stomach is the centre or fulcrum for muscle groups in initiating movements. Like movement; Hitting, throwing, jumping, jumping, lifting objects, and all movements that cause the whole body to move from one place to another. All these movements definitely play a role in the strength and endurance of the abdominal muscles (Maeo et al., 2013).

The involvement of abdominal muscle strength is very visible when human individuals perform fast, strong and long physical movements such as those demonstrated by athletes in competitions or competitions in certain sports. The abdominal muscles are the central muscles for movement, balancing muscles for the body and increasing motor control in the body (Pratama, 2020). So the resulting movement will be stronger, faster, aesthetic and flexible. Seeing how important the role of abdominal muscle strength is in individual humans, especially for athletes, it is very important to always train and maintain their strength. There have been many research results regarding increasing the strength and endurance of the abdominal muscles.

A research conducted by Herly et al., (2022) aimed to enhance the endurance of abdominal muscles in soccer athletes through twisted bicycle crunch training. The outcomes of this study demonstrated a significant improvement in abdominal muscle endurance as a result of the twisted bicycle crunch exercise. Additionally, Pratama, (2020) conducted a study where core stability static exercises, incorporated into circuit training, not only augmented abdominal muscle strength but also contributed to enhancing body balance. The findings from Pratama's research indicated a substantial increase in both abdominal muscle strength and overall body balance through the implementation of core stability static exercises. Another investigation by Herawan et al., (2022) revealed that the combination of bent arm twists and straight arm twists in training sessions resulted in a notable increase in abdominal muscle endurance.

According to the research findings presented by Pramita & Dewi, Putu, Agustina, (2023), engaging in core strengthening exercises has been shown to elevate abdominal muscle strength in multiparous women. This particular study underscores the significance of abdominal muscle strength and endurance, especially in the context of postpartum women. The study showed a clear relationship, indicating that core strengthening exercises significantly contributed to the improvement of abdominal muscle strength in multiparous women.

Based on the results of the research presented above, it is clear how training increases abdominal muscle strength. The strength and endurance of the abdominal muscles increases after individuals receive certain treatment or methods (Sayap Sukarno et al., 2023), and exercise for two months with a training frequency of at least 3-4 times a week with a certain intensity and repetition. Apart from that, the exercises carried out receive strict control from the coach or trainer in the form of a training program. In the long term, this kind of condition is less productive in terms of the strength of human abdominal muscle endurance needed throughout life.

The coach or trainer definitely has a time limit to be able to train and supervise the training. The togetherness of trainers and teachers is limited to an employment contract. The trainer

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will train according to the agreement with the individual being trained. Teachers at schools will train their students as long as the students are still students at the school. This means that the togetherness of trainers and teachers has a time limit (Aziz, Okilanda, Permadi, et al., 2023; Aziz, Okilanda, Rozi, et al., 2023; Mashud et al., 2023). For individuals who are accustomed to living an active life in order to maintain fitness and health throughout their life, this kind of condition becomes a very significant problem. For this reason, training methods are needed to increase the strength of abdominal muscle endurance that enable individuals to independently carry out exercises, prepare programs, implement programs, evaluate and improve training independently (Zulkifli & Danis, 2021). The physical literacy awareness program allows individuals to independently train themselves according to individual characteristics without being influenced by other people.

2. METHODS

Participant

The research population is all students of the Study Program. PE JPOK FKIP ULM even semester of 2022-2023 who are programming physical literacy courses totaling 133 people. The sample used in this study was the entire population (Vaughn, Debbie & Lomax, 2020). The intervention technique to the research sample by following the class division carried out by the PE Program. PE JPOK FKIP ULM, which is divided into three classes: 1) class A-1 totaling 48, 2) class A-2 totaling 45, 3) class A-3 totaling 47.

Procedure

This research uses the experimental times-series method, this is what the researcher chose because the researcher only has access to one group and can provide treatment within a certain period of time (Harrison et al., 2020).

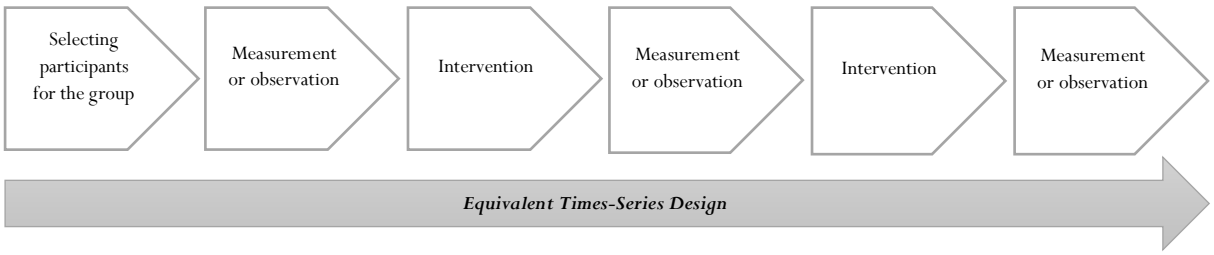

Figure 1. Times Series Experimental Method Design

Based on the experimental times series method research design in Figure 1, the research procedures can be described, namely; 1) the researcher gathers students as research participants according to the class groups determined by the Study Program. Physical Education JPOK FKIP ULM, 2) after being divided into class groups, the researcher then carried out measurements or observations of the abdominal muscle endurance in the first stage of the participants, measurements and observations were carried out in the first week of the research, 3) then carried out learning interventions in the course by implementing active internalization lifestyle through physical literacy awareness, 4) in the fourth week, the second stage of abdominal muscle endurance is measured and observed, 5) then learning

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interventions are carried out in the course, and 6) in the eighth week, the third stage of abdominal muscle endurance is measured and observed. end.

As a control for the physical literacy awareness program, students report daily exercise journals every week. The researchers also used this data to investigate the stages of training carried out by students every week. The data collection instrument in this study used the TKPN test instrument (Isnanta et al., 2022) in the Sit-up test aspect to measure the strength and endurance of the abdominal muscles and a physical literacy portfolio instrument in the form of a daily exercise journal.

Data Analysis

The measurements were carried out three times during the intervention period, so that three sets of data were obtained in a row. For this reason, data analysis was carried out in three stages, namely: descriptive statistics, normality, and repeated measurement Anova Kruskal-Wallis test (Leppink, 2019).

3. RESULTS AND DISCUSSION

Result

The outcomes pertaining to the abdominal muscle endurance category resulting from the incorporation of an active lifestyle through physical literacy awareness are depicted in Table 1 and Figure 2. Among the 133 students surveyed, the breakdown reveals 17.3% falling into the very low category, 45.1% in the low category, 27.1% in the medium category, 9% in the good category, and 1.5% in the excellent category. These findings from test 1 provide substantial evidence indicating that abdominal muscle endurance is predominantly situated in the low category.

Additionally, the data for abdominal muscle endurance in test 2 unveils that out of 133 students, 20.3% are in the very low category, with 45.1% in the low category. Moreover, there are 27.8% in the moderate category, 5.3% in the good category, and 1.5% in the excellent category. These results further support the conclusion that abdominal muscle endurance in test 2 falls within the deficient category. Detailed results are presented in Table 2 and Figure 3.

Further analysis of the abdominal muscle endurance test demonstrates that among the 133 students, 1.5% fall into the very low category. Subsequently, there are 22.6% in the poor category, 52.6% in the moderate category, 21.8% in the good category, and 1.5% in the excellent category. This data provides compelling evidence that abdominal muscle endurance in test 3 is classified within the moderate category. Notably, the results exhibit a positive change, as evidenced by the improved percentage of abdominal muscle endurance. Full details are presented in Table 3 and Figure 4.

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Tabel 1. Sit Up Test 1 Results

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Very Low	23	17,3	17,3	17,3
Low	60	45,1	45,1	62,4
Fair	36	27,1	27,1	89,5
Good	12	9	9	98,5
Excellent	2	1,5	1,5	100
Total	133	100	100	

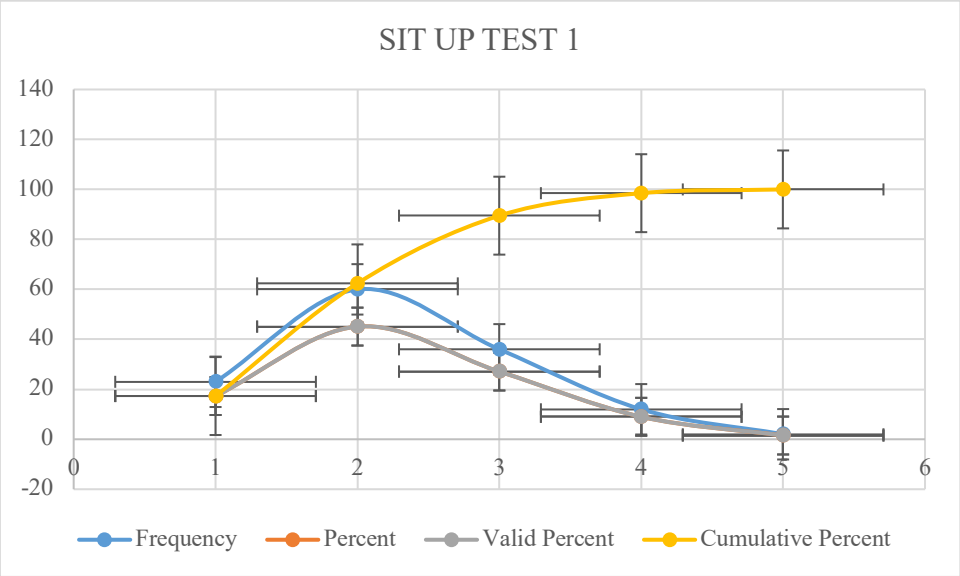

Figure 2. Description of Sit Up Test 1 Results

Tabel 2. Sit Up Test 2 Results

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Very Low	27	20,3	20,3	20,3
Low	60	45,1	45,1	65,4
Fair	37	27,8	27,8	93,2
Good	7	5,3	5,3	98,5
Excellent	2	1,5	1,5	100
Total	133	100	100	

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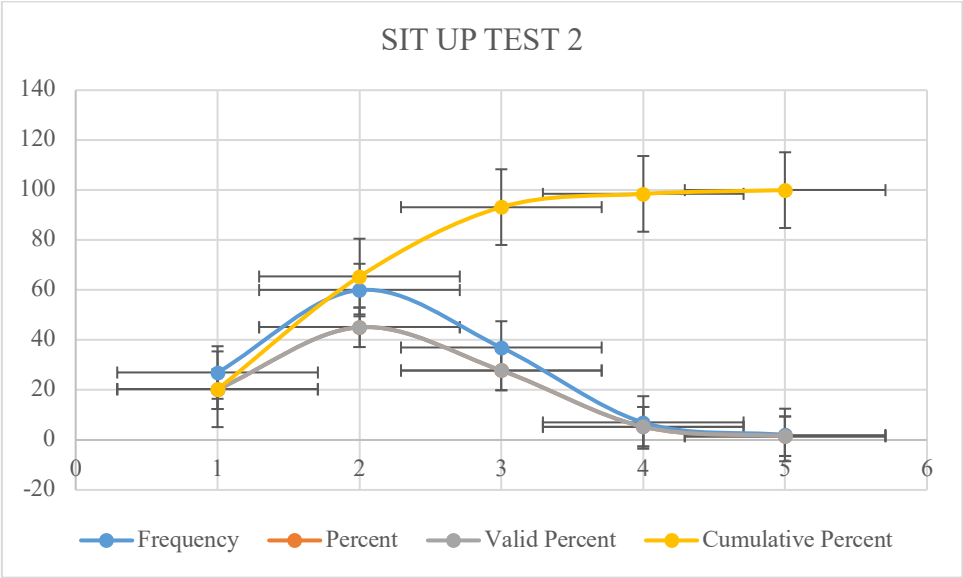

Figure 3. Description of Sit Up Test 2 Results

Tabel 3. Sit Up Test 3 Results

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Very Low	2	1,5	1,5	1,5
Low	30	22,6	22,6	24,1
Fair	70	52,6	52,6	76,7
Good	29	21,8	21,8	98,5
Excellent	2	1,5	1,5	100
Total	133	100	100	

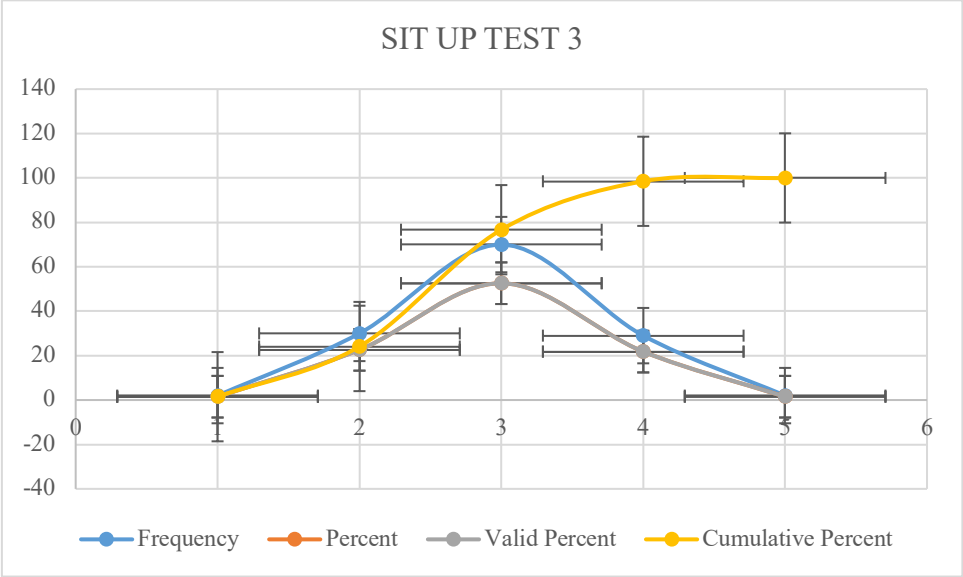

Figure 4. Description of Sit Up Test 3 Results

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Table 4. Normality Test

Tests of Normality							
	Grub	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Results	Test 1	.402	133	.000	.613	133	.000
	Test 2	.403	133	.000	.570	133	.000
	Test 3	.489	133	.000	.449	133	.000

a. Lilliefors Significance Correction

Based on the results of the normality test using Kolmogorov-Smirnov, which shows that the overall significance value of the test (p) is <0.05, it can be concluded that the data is not normally distributed, so a non-parametric test will be tested. The results can be seen in table 4.

Table 5. Kruskal-Wallis Test Result.

Independent-Samples Kruskal-Wallis Test Summary	
Total N	399
Test Statistic	8.450[a]
Degree Of Freedom	2
Asymptotic Sig.(2-sided test)	0,015

a. The test statistic is adjusted for ties.

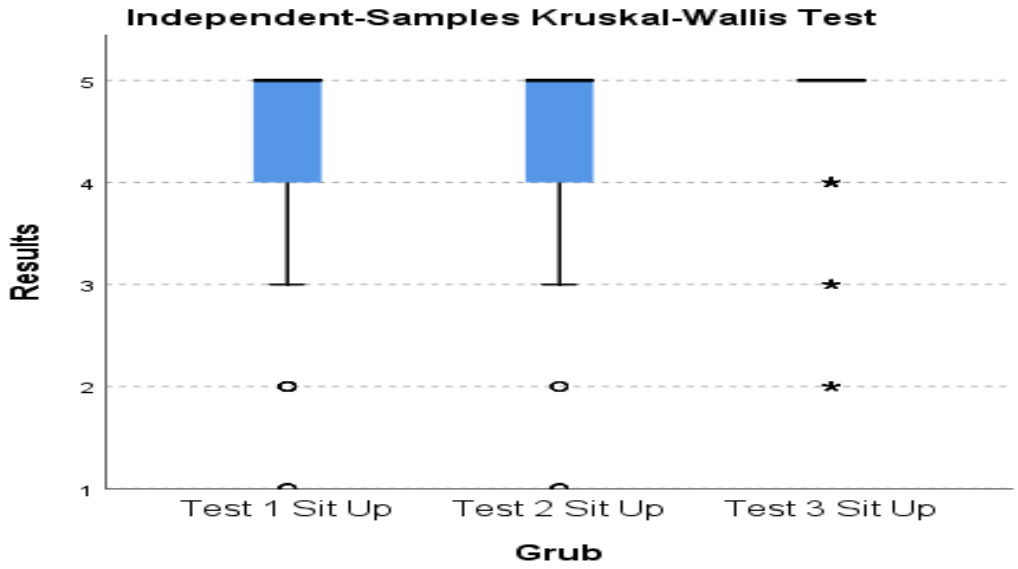

Figure 4. Independent-Samples Kruskal-Wallis Test

Based on the results of the Kruskal-Wallis test, it shows a significance value of 0.015 <0.05, so there is a significant difference. The results can be concluded that there are significant differences between test-1, test-2 and test-3 for students. The results can be seen in table 5 and figure 4, next you can carry out further tests to see the differences in each test.

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Table 6. Pairwise Comparisons of Grub

Sample 1-Sample 2	*Test Statistic*	*Std. Error*	*Std. Test Statistic*	*Sig.*	*Adj. Sig.[a]*
Test-1 Test-2	-4,970	10,817	-0,459	0,646	1,000
Test-1 Test-3	-29,372	10,817	-2,715	0,007	0,020
Test-2 Test-3	-24,402	10,817	-2,256	0,024	0,072

Based on the results in table 6 showing the significance value of test-1 and test-2 of 1,000 > 0.05, it can be concluded that there is no significant difference between test-1 and test-2. Furthermore, test-1 and test-3 show a significance value of 0.020 <0.05, so it can be concluded that there is a significant difference between test-1 and test-3. The results of test-2 and test-3 show a significance value of 0.072 > 0.05, so it can be concluded that there is no significant difference between test-2 and test-3.

Table 7. Descriptive Results of Abdominal Muscle Endurance Test Data for Students

Results	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Test 1	133	4,38	1,113	0,096	4,19	4,57	1	5
Test 2	133	4,47	1,027	0,089	4,30	4,65	1	5
Test 3	133	4,70	0,759	0,066	4,57	4,83	2	5
Total	399	4,52	0,984	0,049	4,42	4,62	1	5

The results of the descriptive data provide information that there has been an increase in the mean values of test-1, test-2 and test-3. These results show that the mean value in test 3, namely 4.70, is greater than in test-2, namely 4.47 and test-1, namely 4.38. The results can be seen in table 7 and figure 5.

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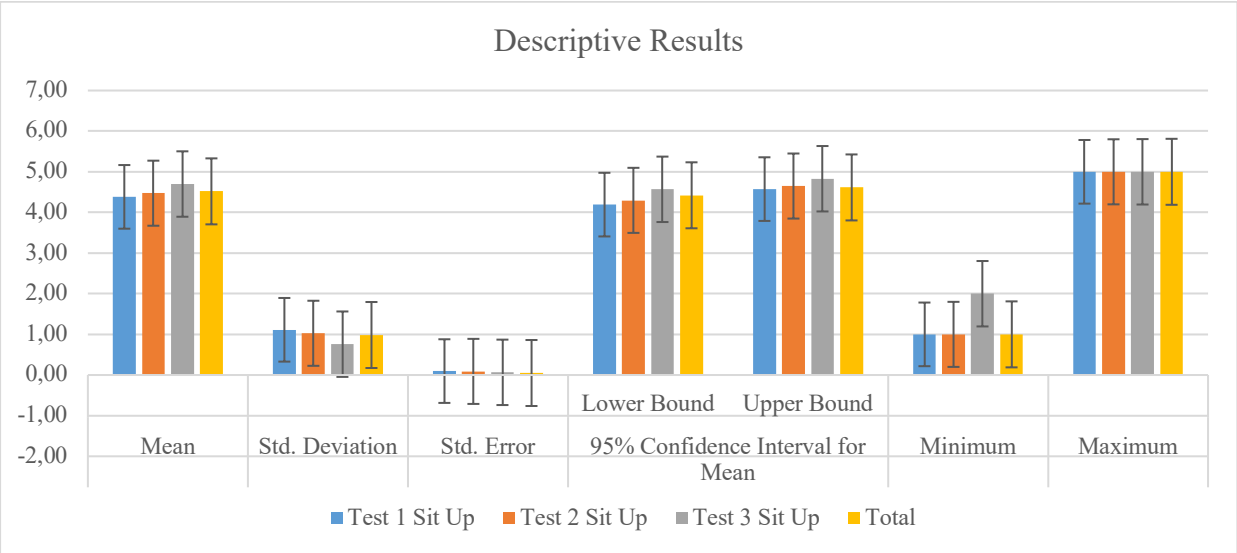

Figure 5. Descriptive Results of the Abdominal Muscle Endurance Test in Students

Discussion

Based on the results of data analysis of students' abdominal muscle endurance, it was found that; 1) it was concluded that there was no significant difference in abdominal muscle endurance in test-1 and test-2; 2) it was concluded that there was a significant difference in abdominal muscle endurance in test-1 and test-3; 3) it was concluded that there was no significant difference in abdominal muscle endurance in test-2 and test-3. There is sufficient evidence to conclude that the students' abdominal muscle endurance ability has increased through the physical literacy awareness program provided.

Based on the experimental times series method where the test is carried out 3 times, namely test-1 in the first week, test-2 is carried out in the fourth week, and test-3 is carried out in the eighth week. A very clear increase occurred after students carried out the physical literacy awareness program for eight weeks or two months (Bompa & Haff, 2009). The physical literacy awareness program can increase the endurance of students' abdominal muscles because this program provides clear stages for practitioners to carry out exercises regularly, according to the abilities of each participant, the training schedule can be determined personally/flexibly (Mandigo et al., 2009). The most important thing in the physical literacy awareness program is that the perpetrators carry out physical activities/exercises based on their understanding, not being told or told to do certain types of exercises by the trainer (Lounsbery & McKenzie, 2015).

Over time, as the physical literacy awareness program is consistently implemented and perceived as beneficial by the participant, it will enhance motivation, fostering a desire to sustain engagement in physical activities or exercises (Hardinata et al., 2023; Rozi et al., 2023). Furthermore, over a specific duration, when the participant experiences the advantages of the physical activities or exercises, this not only strengthens motivation but also contributes to the development of the participant's self-confidence. If the perpetrator's self-confidence is formed, the habit of living an active life will be built. Physical activity/exercise will become a necessity of life (Silverman & Mercier, 2015).

However, the physical literacy awareness program is well aware that this program is not easy. At the beginning of the program, it is necessary to control, reprimand, provide direction

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and provide corrections to what students do, just like training. Self-awareness and building a training commitment and understanding of what activities are being carried out require time and patience. So the results of physical activity/exercise also take a relatively long time compared to training to apply certain training methods through close supervision. However, if physical activity/exercise is formed as a result of the perpetrator's understanding accompanied by high motivation and self-confidence, then the results of the exercise/physical activity carried out will bring extraordinary results, beneficial throughout the life of the perpetrator (Roetert & MacDonald, 2015).

Research on the effect of physical literacy on increasing abdominal muscle endurance is still rare, this indicates that the application of physical literacy has not been widely studied and implemented. Lounsbery & McKenzie (2015) and physical literacy and differential learning can improve basketball motor, technical and tactical skills. In this research, it is explained that the improvement in motor skills (technical and tactical basketball) is a result of training carried out by students for a relatively long time independently and training based on the students' own will and motivation. Lounsbery & McKenzie (2015) found on other variables, that the long-term application of physical literacy can improve students' cognitive performance. Although no research results have been found regarding the effect of physical literacy on increasing abdominal muscle endurance, these two research results are quite helpful in saying that a physical literacy program over a certain period of time will be able to have a positive impact on improving the physical condition of individual humans and the cognitive performance of students.

Based on the research results and review of the application of the physical literacy program mentioned above, it can be recommended that exercise/physical activity to achieve the goal of abdominal muscle endurance and overall physical quality (body fitness) requires a training method that provides a basic conceptual understanding of what will be trained. (knowledge and understanding) is not an exercise that is only ordered or commanded by a trainer. Exercise or physical activity that does not depend on other people, the schedule can be determined independently accompanied by strong motivation and self-confidence to practice. Of course, also practice at least to meet the FITT principle (frequency, intensity, time, and type). The frequency of training in one week is at least 3 times with an intensity according to the ability of each participant's body, carried out for a minimum of 60 minutes, with the type/model of training according to the training objectives.

5. CONCLUSION

Based on the research results and discussion, it can be concluded that physical literacy awareness can increase students' abdominal muscle endurance. The students' abdominal muscle endurance increased after doing physical activity/exercise for eight weeks. Increased abdominal muscle endurance as a result of independent physical activity/exercise without being trained or following someone else's training program. Frequency, intensity, time and type of exercise are arranged, carried out, evaluated and followed up independently by students. Based on supervision during the research process, researchers suggest that implementing this physical literacy awareness program is not easy, students need insight and understanding of what types of exercise are suitable for training certain goals, they still need to control the continuity of training, and strengthen motivation and self-confidence. However, when the physical literacy awareness program had been running for a month, students had begun to develop a constructive attitude in carrying out the program. The most

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important thing is not to be too obsessed with fast, high training results, but the orientation of the physical activity/exercise process continuously and sustainably is very important

6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

7. REFERENCES

Aziz, I., Okilanda, A., Permadi, A. A., Tjahyanto, T., Prabowo, T. A., Rozi, M. F., Suganda, M. A., & Suryadi, D. (2023). Correlational study: Sports Students' special test results and basic athletic training learning outcomes. *Retos*, *49*, 519–524. https://doi.org/10.47197/retos.v49.98820

Aziz, I., Okilanda, A., Rozi, M. F., Suganda, M. A., & Suryadi, D. (2023). Results of Special Tests on Sports Students: Does It Have a Relationship with Learning Outcomes of Basic Athletic Practice? *International Journal of Human Movement and Sports Sciences*, *11*(3), 676–682. https://doi.org/0.13189/saj.2023.110322

Bompa, O. T., & Haff, G. G. (2009). Periodization: Theory and Methodology of Training, 6th Edition. Fifth Edition. In *Human Kinetics*.

Hardinata, R., B, P. S., Okilanda, A., Tjahyanto, T., Prabowo, T. A., Rozi, M. F., Suganda, M. A., & Suryadi, D. (2023). Analysis of the physical condition of soccer athletes through the yo-yo test: a survey study on preparation for the provincial sports week. *Retos*, *50*, 1091–1097. https://doi.org/10.47197/retos.v50.100300

Harrison, R. L., Reilly, T. M., & Creswell, J. W. (2020). Methodological Rigor in Mixed Methods: An Application in Management Studies. *Journal of Mixed Methods Research*, *14*(4), 473–495. https://doi.org/10.1177/1558689819900585

Herawan, I., Kardani, G., & Nurzaman, M. (2022). Pengaruh Latihan Bent Arm Twists dengan Straight Arm Twists. *Jurnal Keolahragaan*, *8*(2), 111–118.

Herly, H., Ramadi, R., Vai, A., & Gusdernawati, A. (2022). Pengaruh latihan twisted bicycle crunch terhadap daya tahan otot perut atlet sepak bola. *Sepakbola*, *2*(1), 35. https://doi.org/10.33292/sepakbola.v2i1.174

Isnanta, R., Moelyadi, A., Rusdiana, A., Wiriawan, O., Ronald, H., Hadi, Guntur, Komarudin, Darmadi, D., Ardha, M. A. Al, Wicaksono, A., Fitranto, N., Nurulfa, R., Rochmani, K. W., Taufik, M., & Zamil, A. (2022). *Pedoman Tes Kebugaran Pelajar Nusantara*. KEMENPORA RI.

Leppink, J. (2019). Statistical Methods for Experimental Research in Education and Psychology. In *Springer Text in Education*.

Lounsbery, M. A. F., & McKenzie, T. L. (2015). Physically literate and physically educated: A rose by any other name? *Journal of Sport and Health Science*, *4*(2), 139–144. https://doi.org/10.1016/j.jshs.2015.02.002

Maeo, S., Takahashi, T., Takai, Y., & Kanehisa, H. (2013). Trunk muscle activities during abdominal bracing: Comparison among muscles and exercises. *Journal of Sports Science and Medicine*, *12*(3), 467.

Mandigo, J., Francis, N., Lodewyk, K., & Lopez, R. (2009). Physical Literacy for Educators. *Sport Research Intelligence Sportive*, *75*(3), 27–30.

Mashud, Warni, H., Putra, M. F. P., Haris, M. Al, Samodra, Y. T. J., Tantri, A., Kristiyandaru, A., & Suryadi, D. (2023). Integrating the Project-Based Learning and the Inclusive Teaching Style: An Innovation to Improve Freestyle Swimming Skills. *International Journal of Human Movement and Sports Sciences*, *11*(5), 956–964. https://doi.org/10.13189/saj.2023.110503

Pramita, I., & Dewi, Putu, Agustina, S. (2023). Latihan Core Strengthening Meningkatkan Kekuatan Otot Perut Pada Wanita Multipara Core Strengthening Exercise Increases Abdominal Muscle Strength in Multiparous Women. *Jurnal Fisioterapi Dan Rehabilitasi*, *7*(2), 164–169.

Pratama, I. G. (2020). Pengaruh Latihan Sirkuit Menggunakan Core Stability Static Exercise Terhadap Keseimbangan dan Daya Tahan Otot Perut. *Briliant: Jurnal Riset Dan Konseptual*, *5*(1), 44. https://doi.org/10.28926/briliant.v5i1.417

Roetert, E. P., & MacDonald, L. C. (2015). Unpacking the physical literacy concept for K-12 physical education: Whatshould we expect the learner to master? *Journal of Sport and Health Science*, *4*(2), 108–112. https://doi.org/10.1016/j.jshs.2015.03.002

Rozi, M. F., Resmana, R., Selviani, I., Okilanda, A., Sumantri, R. J., Suganda, M. A., & Suryadi, D. (2023). Imagery and Agility Training: How do They Affect the Reaction Ability of Futsal Goalkeepers? *Physical Education Theory and Methodology*, *23*(3), 325–332. https://doi.org/10.17309/tmfv.2023.3.02

Sayap Sukarno, Hidayatullah, M. F., Riyadi, S., & Ronysyaifullah. (2023). Effect of high intensity interval training on cardiorespiratory endurance, abdominal muscle strength and arm muscle strength in indonesian air force soldiers at adi soemarmo air field. *Russian Law Journal*, *11*(6s), 332–342. https://doi.org/10.52783/rlj.v11i6s.1004

Silverman, S., & Mercier, K. (2015). Teaching for physical literacy: Implications to instructional design and PETE. *Journal of Sport and Health Science*, *4*(2), 150–155. https://doi.org/10.1016/j.jshs.2015.03.003

Zulkifli, A. F., & Danis, A. (2021). Individual knowledge of, perceptions about, and barriers to physical literacy (PL) in Malaysia. *Physical Culture and Sport, Studies and Research*, *90*(1), 26–38. https://doi.org/10.2478/pcssr-2021-0011