

## The Effect of Life Kinetic Number Training on the Concentration Level of Female Volleyball Athletes Aged 13-15 Years

### El efecto del entrenamiento de números cinéticos de la vida en el nivel de concentración de las atletas de voleibol de 13 a 15 años

Fauzi, SB Pranatahadi, Riky Dwihandaka, Muhamad Ichsan Sabillah, Dyah Ayu Intan Rohmah, Laila Affianti Fauzi  
Universitas Negeri Yogyakarta (Indonesia)

**Abstract.** The purpose of this study was to determine the effect of life kinetic number training on the concentration level of female volleyball athletes aged 13-15 years. This study used an experimental method with a one group pretest-posttest design. The sample in this study amounted to 22 athletes, which was taken through purposive sampling techniques. Data collection techniques in this study are tests and measurements. The instrument in this study uses a concentration test, namely the concentration grid test. The data analysis technique uses a t test (Paired Sample Test) which is analyzed using SPSS 25. The results of this study showed that the calculated t value of 13.791 was greater than the table t of 2.080, and the paired sample t test showed that the result of Sig. (2-tailed) 0.000 was less than 0.05 which means that there was a significant influence between life kinetic number training on the concentration level of female volleyball athletes aged 13-15 years. So it can be concluded in this study that life kinetic number training is one of the most effective exercise models in order to increase the concentration of female volleyball athletes aged 13-15.

**Keywords:** kinetic life, concentration, volleyball.

**Abstracto.** El propósito de este estudio fue determinar el efecto del entrenamiento de números cinéticos de vida en el nivel de concentración de atletas de voleibol femenino de 13 a 15 años. En este estudio se utilizó un método experimental con un diseño pretest-posttest de un grupo. La muestra en este estudio fue de 22 atletas, la cual fue tomada a través de técnicas de muestreo intencional. Las técnicas de recolección de datos en este estudio son pruebas y mediciones. El instrumento de este estudio utiliza una prueba de concentración, a saber, la prueba de la rejilla de concentración. La técnica de análisis de datos utiliza una prueba t (Paired Sample Test) que se analiza con el programa SPSS 25. Los resultados de este estudio mostraron que el valor t calculado de 13,791 fue mayor que la tabla t de 2,080, y la prueba t de muestra pareada mostró que el resultado de Sig. (2 colas) 0,000 fue menor que 0,05, lo que significa que hubo una influencia significativa entre el entrenamiento del número cinético de vida en el nivel de concentración de las atletas de voleibol femenino de 13 a 15 años. Por lo tanto, se puede concluir en este estudio que el entrenamiento numérico cinético de la vida es uno de los modelos de ejercicio más efectivos para aumentar la concentración de las atletas de voleibol de 13 a 15 años.

**Palabras clave:** vida cinética, concentración, voleibol.

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Fauzi

fauzi@uny.ac.id

### Introduction

Volleyball is a game played by two teams with each team of 6 people starting with hitting the ball over the net to get a point, but each team can play three touches to return the ball (Marques Junior, 2020; Zhou et al., 2020). Volleyball has become a sport that is quite popular with the people of Indonesia. Evidenced by the introduction of volleyball in schools as a recreational and achievement sport. Things that need to be prepared to become champions or achievers are technical, physical, tactical, and mental (Martins et al., 2022; Nicholls, 2021).

Furthermore, the position of mental aspects is important in making athletes achieve, apart from the technical, physical and tactical aspects, this is because mentality really determines an athlete's performance on the field (M. N. Ramadhan et al., 2024; Singh, 2022). An athlete who has good technique, physicality and tactics if not balanced with a good mentality will not succeed in the match. This is in line with opinion Schinke et al., (2018), that achievements can be obtained if technical and mental aspects can be fulfilled because technique and mental are closely related. Valk et al.,

(2017) stated that mental training programs emphasize the development of psychological skills and techniques such as: concentration, managing anxiety, imagination, setting goals, talking to yourself (selftalk), stopping wrong thoughts, organizing daily activities, self-confidence, and so on.

One of the things that determines the performance of athletes on the field in terms of mentality is to concentrate. Concentration is the ability of a selected stimulus (an object) to focus attention in a certain time (Moran, 2016). Concentration is a mental aspect in sports and plays an important role when athletes are competing and training. The main component of concentration is a person's ability to focus on a particular thing and not be distracted by irrelevant internal (interference from oneself) or external (outside interference) stimuli (Stambulova et al., 2021). Internal disorders that can interfere with the concentration of an athlete are fatigue, unstable emotions, technical abilities do not appear. While the external disturbances are the cheers of the audience, referee decisions, and input from the coach who only focuses on his technical skills, so that it is not balanced between mental ability and technical skills.

Results of previous research by Jiang et al., (2021), revealing that the portion of training between technical training

and mental training is still not balanced, trainers who emphasize training more on the physical aspect and technique only but the mental aspect is not given good training. As revealed Dohme et al., (2019), players who are mentally trained will certainly be more skilled in overcoming emotional mental dilemmas that come to them, because the atmosphere and requirements of players when competing on the field can change at any time.

Concentration is needed in a volleyball match, to finish one match a team requires a lot of rally (Gp et al., 2019). A volleyball match can take 151 minutes to rally (Silva et al., 2016). This time if divided into 5 sets will take 30.2 minutes / set. Each point generated takes a rally time of approximately 37.75 seconds resulting from a set time of 30.2 minutes divided by accumulated points if the final points are 25-23 or 48 points. So, within 37.75 seconds the volleyball athlete must concentrate on the ball from the whistle sounded to the dead ball (in/out/foul). Ideally, a volleyball athlete should have optimal concentration skills, in order to improve performance in matches.

But in reality, the ability to concentrate has not been able to be achieved optimally. Based on observations at the DIY volleyball club in October 2023, it was found that concentration ability is still low. This is evidenced when researchers take initial concentration data using the Concentration Grid Test. The test obtained the average results of athletes' concentration ability worth 4, when viewed from the normative data of concentration then it is included in the less category. This is due to the lack of concentration training for DIY female volleyball athletes. Current ongoing training focuses only on techniques such as passing, defending, receiving, serving, and smashing as well as physical exercises such as strength, speed, and power. So that technical and physical training is not balanced with mental exercise or concentration. If the concentration of athletes decreases then the chances of a team getting points will be less. Therefore, concentration on female volleyball athletes must be increased, so as not to decrease achievement in volleyball athletes. Though concentration is an important aspect in a match (Silva et al., 2016).

Based on some previous literature, there have been several training models to improve the concentration of athletes. Previous training models were still monotonous, such as: hypnotherapy and positive self talk, and there was no more innovative and effective concentration exercise model. From these problems, researchers provide solutions to this study by providing one of the more innovative and interesting concentration training models to improve the concentration of volleyball athletes, namely through kinetic life training. Life kinetic is a new and unique mental training while the working principles of the brain start from simple to complex (Pietsch et al., 2017). Life kinetic is an exercise performed in a systematic pattern of motion that combines physical activity,

cognition challenges, and visual perception (Iqbal & Tafaqur, 2020). Life kinetic exercise has benefits for improving cognition function, reducing stress, increasing physical relaxation, concentration, confidence, and encouraging the ability to work independently (Tejada et al., 2017).

Life kinetic training material is a combination of movements from one movement with another. So, one's concentration will be boosted when carrying out this exercise. That way kinetic life training can be applied to train one's concentration, especially athletes.

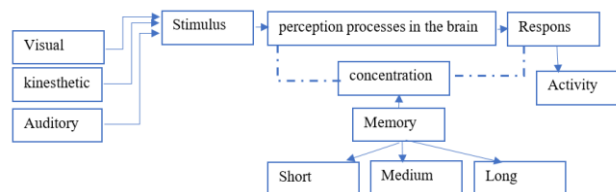


Figure 1. Flow of Concentration

The difficulty level of life kinetic training has differences, ranging from easy to difficult and from simple to complex. There are several models of life kinetic exercises, namely ladder exercises, jumping line exercises, cognition reaction exercises, jumping cross exercises, juggling exercises, and rainbow run exercises (K. Komarudin et al., 2021). In this case, researchers are interested in providing a number life kinetic exercise model, which is the development of life kinetic exercises from existing life kinetic models. Based on the problems described above, the researchers aimed to determine the effectiveness of the effect of life kinetic number training on increasing the concentration of women's volleyball athletes aged 13-15 years.

## Research Methods

### Studi Design

This research uses an experimental method. The research design used was "One-Group Pretest-Posttest Design. The flow of research to be carried out is by identifying problems, reviewing theories, selecting participants, taking data, analyzing data, reporting, and evaluating research (Sugiyono, 2015 ; Allen, 2017). This study is part of a general study conducted with the results of the validity of the life kinetic exercise model instrument  $V^{\text{count}} 0.91 \geq V^{\text{table}} 0.79$  with valid categories, while the reliability test results of 0.89 with reliable categories (Gito Supriadi, 2006)

### Subject

This research will be conducted at GOR(Sport Hall) Tirtomartani Kalasan Yogyakarta in December 2023. The population in this study is female volleyball athletes of the Special Region of Yogyakarta totaling approximately 100 athletes. The sampling technique of this study uses purposive

sampling techniques or purposive sampling, which is a sampling technique based on certain goals and considerations. The criteria in determining this sample include: a) athletes are still actively participating in training, b) aged 13-15 years, c) the duration of training is at least 3 years, d) attendance list is at least 75% (activeness in participating in training), and e) willing to be a research sample. Based on these criteria, there were 22 athletes. This research has received approval from all samples who have filled out a statement of ability to become a research sample and have met the requirements of the research code of ethics.

### Procedure

The instrument used is a concentration test using the Concentration Grid Test method. The validation value of this instrument is 0.87 and the reliability is 0.70. Data collection techniques in this study were carried out in 3 stages, namely; (a) pretest using CGT with the aim that the initial athlete's concentration level is known, (b) given life kinetic exercise treatment for 18 meetings or 6 weeks with a frequency of exercise 3 times a week. The duration of exercise is about 30 minutes from 120 minutes each meeting, (c) the last posttest is done using CGT to determine whether or not there is an increase in concentration of treated subjects.

### Statistical Analysis

The data analysis technique in this study is to conduct a hypothesis test using a t test (paired sample t test), and continue the product-moment correlation test to determine the relationship between two variables and the relationship between more than two variables can be in the form of symmetric relationships, causal relationships, or interactive relationships (mutual influence). Before the hypothesis test is carried out, a prerequisite analysis test will be carried out, namely the normality test and homogeneity test. The data processing application in this study uses SPSS Version 24.

## Results

After conducting research pretests and the result data has been obtained, data analysis is carried out aimed at proving the hypothesis. The SPSS 24 program is used to analyze data for normality tests, homogeneity tests, and t tests. Here are the test results for data analysis.

### Prerequisite Test Results

#### Normality Test

One of the requirements for the t-test is that the data must be normally distributed. Therefore, to find out whether the

data is normally distributed or not is to do a normality test. Testing with normality tests using the Shapiro-Wilk formula. The distribution of data is declared normal if the p value (significance)  $> 0.05$ , and the data is declared abnormal if the p value  $< 0.05$  in accordance with the rules used. The following normality test data are presented in table 1.

Table 1.

Shapiro Wilk Normality Test

Group	Statistic	df	Sig.	Information
Pre Test	.958	22	.455	Usual
Post Test	.928	22	.113	Usual

Based on the results of the normality test with the Shapiro-Wilk formula in table 1, it shows that all pretest-posttest significance values  $> 0.05$ . The Pretest data of the Shapiro-Wilk formula has a significance value of  $0.455 > 0.05$ . While the posttest data with the Shapiro-Wilk formula has a significance value of  $0.113 > 0.05$ . So that the data is declared normally distributed, then the analysis can proceed to the homogeneity test for further Paired Sample T Test (Test t).

### Homogeneity Test

The homogeneity test is another requirement for performing a t test. The homogeneity test is useful for testing whether population variants are the same or not. Testing with homogeneity test using Levene Statistic method. The results of the analysis can be said to be homogeneous if the p value  $> 0.05$  and said to be inhomogeneous if the p value  $< 0.05$ . The following homogeneity test data are presented in table 2:

Table 2

Homogeneity Test

	Levene Statistic	df1	df2	Sig.
Pre test-Post test	.470	1	42	.497

Based on the results of the analysis in table 2, it can be seen that the value of data significance  $> 0.05$ , namely with a value of  $0.497 > 0.05$ . Thus, the data is declared homogeneous and then a Paired Sample T Test (t test) is carried out.

### Test the hypothesis

#### Paired Sample T-test

Paired Sample T test is a hypothesis test included in parametric statistical tests. Testing of this hypothesis is done to find out whether The hypothesis proposed in the previous chapter is acceptable or not. The main requirement for the T-test is that the data must be normally distributed and homogeneous. The data tested previously has been normally distributed and homogeneous, so the T-test can be done. This test uses a paired sample t test. The following are the results of the hypothesis test with paired sample t test, presented in table 3.

Table 3.

The paired sample test results of the life kinetic exercise t-test number on the concentration level of female volleyball athletes aged 13-15 years.

		Paired Samples Test				
		Paired Differences		t	df	Sig. (2-tailed)
		95% Confidence Interval of the Difference				
		Upper				
Pair 1	Pre test Concentration - Post test Concentration	-3.6091		-13.791	21	.000

From the paired sample test results of Table 2 above, it can be seen that the significance value of p is 0.000 and the value of t is -13,791. Since the significance value of p is 0.000 < 0.05, it means that H0 is rejected. Thus, it can be stated that there is a significant influence between life kinetic training numbers on the concentration level of female volleyball athletes aged 13-15 years. This means that the research hypothesis that states that "There is a significant effect between life kinetic training numbers on the concentration level of DIY female volleyball athletes aged 13-15 years", has been proven.

*Product Moment Correlation Test*

The data tested for correlation using the product-moment technique is pretest-posttest data in this study. The purpose of the correlation test using product-moment is to determine the degree of mutual influence between variable X and variable Y (pretest data with posttest). The formula used in calculating the product-moment correlation test is a correlation formula with rough numbers. The following are the results of the Product Moment correlation test calculation, presented in table 4:

Table 4.  
Product Moment Correlation Test

Pretest	Posttest	ΣX <sup>2</sup>	ΣY <sup>2</sup>	Σ X.Y	Hasil Korelasi
X	Y				
261,5	355	3168,25	5795	4261	0,69

Based on the table above, it can be seen that the correlation results between variable X and variable Y or pretest and posttest data produce a correlation value of 0.69. So it can be concluded that the correlation value of this study is categorized as high, which is between 0.60 - 0.80.

**Discussion**

Based on the results of hypothesis testing using the SPSS 24 program shows that there is a significant influence between life kinetic training numbers on the concentration level of female volleyball athletes aged 13-15 years. Life kinetic exercises affect the level of concentration reinforced by the theory of brain working principles. This finding is supported by several previous studies by M. Komarudin, (2019) which revealed that kinetic life exercises can significantly improve concentration and brain intelligence. This is also in line with the results of the study by J. T. P. Ramadhan, (2022) stated that kinetic life train-

ing for 4-6 weeks is an effective method to improve concentration through multimodel cognitive training.

Furthermore, K. Komarudin et al., (2020) explains that life kinetic is an exercise performed in a systematic movement pattern that combines physical activity, cognition challenges, and visual perception. One of the benefits of life kinetic exercise is that it improves concentration. In this study, the exercise model used was a life kinetic number which is a development of an existing life kinetic model. The procedure for implementing life kinetic numbers involves physical activity in the form of foot movements, cognition challenges in the form of looking for numbers sequentially, and visual perception in the form of number sequence patterns for each exercise. That way the athlete's concentration will continue to be trained when doing life kinetic number exercises. The other hand, Gordon, (2016) explains that information will enter through stimuli in the form of a sense of sight and be passed on to the central nerve (brain) carried by neurons (nerve cells). There are 3 brain structures that are influenced by physical activity, namely the cerebellum, motor cortex, prefrontal cortex, and hippocampus (Reinhold & Rittner, 2017).

The cerebellum is a brain structure that has an important role as a motion controller, and manages the development of motion appropriately (Sokolov et al., 2017). Then, an information will be continued to the peripheral nerves that function to communicate between the central nerve and other parts of the body (Louis et al., 2021). Furthermore, Snyder et al., (2021) explains that peripheral nerves work in two directions, namely sensory nerves and motor nerves. This motor nerve will work to give orders to the muscles so as to produce motion. Then, the sense of sight will channel information so that it produces motion repeatedly. The influence of life kinetics on concentration is also reinforced by opinions Mulyadi et al., (2021), which states that the hippocampus which is part of the brain has an important role in memory and learning so that it will also affect the function of cognition including concentration.

If athletes are able to concentrate well, athletes will find patterns contained in training media, but conversely athletes who are not able to concentrate properly will have difficulty analyzing patterns contained in training media. So, the number achieved in one minute will determine the good concentration and absence of each athlete during training.

**Conclusion**

Based on the results of the research that has been done, the following conclusions were obtained: There is a significant effect of life kinetic training numbers on the concentration level of female athletes aged 13-15 years in DIY. The results showed that the life kinetic number training method affected the concentration level of female athletes aged 13-15 years in DIY. The implication of the results of this study is that to increase concentration can be done by Strive for the application of the Life Kinetic Number training model. This means that athletes are given a training model that suits their characteristics so that in the training process athletes feel motivated to follow the training, so that training goals will be achieved. Then another implication is to encourage the trainer to apply a suitable number kinetic life exercise model that can improve concentration when following the exercise.

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#### Datos de los/as autores/as:

Fauzi	<a href="mailto:fauzi@uny.ac.id">fauzi@uny.ac.id</a>	Autor/a
SB Pranatahadi	<a href="mailto:s_pranatahadi@uny.ac.id">s_pranatahadi@uny.ac.id</a>	Autor/a
Riky Dwihandaka	<a href="mailto:rikydwihandaka@uny.ac.id">rikydwihandaka@uny.ac.id</a>	Autor/a
Muhamad Ichsan Sabillah	<a href="mailto:muhamadichsan.2021@student.uny.ac.id">muhamadichsan.2021@student.uny.ac.id</a>	Autor/a
Dyah Ayu Intan Rohmah	<a href="mailto:dyah106fik.2019@student.uny.ac.id">dyah106fik.2019@student.uny.ac.id</a>	Autor/a