

Circuit, Interval And Traditional Training Method Approaches Towards Motivation And Mental Toughness Of Elementary School Hockey Athletes

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Abstract: In undergoing high intensity and high performance training, an athlete will sometimes face issues involving physical or mental aspects. Things that have been observed or have no researches on it are related to training methods with the impact of motivation and mental toughness. This study is intended to look at the effects of specific training methods such as circuit training methods, interval training methods and traditional training methods on motivation and mental toughness and their contributions upon primary school hockey athletes. Based on the references from previous studies, the researcher has used the combined design of two research methods, namely quasi-experimental and survey method. Sports Motivation Scale (SMS) 28 Items and Mental Toughness Questionnaire (MTQ) 48 Items have been used as a tool of motivational and mental toughness measurement instruments in pre and post-test. A total of 30 respondents of 11 and 12-year-old primary school hockey athletes were selected in purposive sampling and distributed equally into two training methods treatment groups (circuits, R1 and interval, R2) and one control group (traditional, K) and had undergone pre-test, intervention (for treatment group) and post-test. The study data obtained were analyzed with non-parametric methods by using Spearman's Correlation analysis method for training methods with motivation and mental toughness and Chi-Square Test for contribution of training methods to motivation and mental toughness. The results of the analysis found that there was a negative significant relationship [$p = .937, r = -.016$ (pre); $p = .483, r = -.138$ (post)] between training methods with motivation and a positive significant relationship [$p = .474, r = -.136$ (pre); $p = .634, r = -.091$ (post)] between training methods and mental toughness. Whereas the contribution of training methods to motivation and mental toughness shows the value of Pearson Chi-Square on Asymptotic Significance (2-sided) is .157 which provides significant relevance and contribution.

Keywords: circuit, interval, mental toughness, motivation, traditional, training methods

1. INTRODUCTION

Circuit training is one of the methods commonly used in planning and implementing sports training. Circuit training is implemented to build, test, and improve physical fitness. Hardiansyah, S. (2017), in his study, stated that the implementation of circuit training in improving physical fitness is very influential. Circuit training is also seen to produce positive changes, especially in overall appearance assessment, health/fitness assessment, health/fitness influence, and reduction of negative affect (Henry, R. N., Anshel, M. H. & Micheal, T., 2006). In addition, circuit training is seen to help individuals with Multiple Sclerosis (MS) problems by planning training needs that are appropriate to the sufferer's level (Lyons, 2021).

Next, interval training is a physical training method involving repetitive work pressure interspersed with sufficient rest. Buchheit, M. and Laursen, P. B. (2013) stated that interval training with high intensity is a well-known and time-efficient training method that helps improve the cardiorespiratory system and metabolic function, which then improves athlete performance. It is suitable for use in a variety of sports and can be combined with sports skills. This opinion is also supported by MacInnis, M. J. and Gibala, M. J. (2017), who found in their study that high-intensity and supra-intensity interval training have an effect on the physiological construction of athletes and improve cardiorespiratory abilities. It is clear that this well-known training method affects the physical and physiological

changes of the athlete and allows the athlete to improve performance. In another study, it was noted that high-intensity interval training helped reduce the potential risk of cardiometabolic disease. It better improves or maintains cardiovascular health (Kessler, H. S., Sisson, S. B. & Short, K. R., 2012).

One of the things to pay attention to is the grassroots hockey development process, which is the core of National Hockey Development. The method of finding talent among students as young as 5 to 8 years old is the most effective way to unearth and shape personality, especially in physical, psychological, mental, decision-making, and tactical development. This group should be united and given the full attention of the government by providing various facilities, initiatives, welfare, training centers, and infrastructure. Therefore, the actions taken by the Malaysian government through the Malaysian Ministry of Education (KPM) in placing talented and skilled students with potential through the Talent Identification Test (TID) to continue the success of the national hockey sport at the Malaysian Sports School in Bukit Jalil and Bandar Penawar and the State Sports School/Project School as well as the establishment of District Training Centers (PLD) throughout Malaysia are a wise move. With this, the quality of hockey can be continued and improved, and it can produce new players to achieve and maintain its success.

This study aims to examine the relationship between the circuit, interval, and traditional training methods towards motivation and mental toughness of primary school hockey athletes, as well as evaluate the contribution of training methods to motivation and mental toughness.

2. REVIEW OF PAST STUDIES

Yudiana, Y., Subardjah, H. and Juliantine, T. (2012), in their study on Physical Training, explained the important elements of physical fitness training, which are (1) Strength, (2) Isometric contraction, and (3) Isotonic contraction. Circuit training is the most efficient form of training because this method includes all the necessary training elements, namely muscle strength and endurance, flexibility, agility, balance, and cardiovascular endurance. Interval training is an exercise recommended by most trainers because it can improve the overall endurance and stamina of the athlete. S. Hardiansyah (2017), in his study on the Influence of Circuit Training Methods on Improving the Physical Fitness of Sports Science Faculty students, explained that in the pre-test, the physical fitness level of the respondents was moderate. After the measurement at the post-test, the respondent's physical fitness level increased and was in a good category. The circuit training method can improve the respondent's physical fitness as well as their emotional intelligence. Physical training methods have a significant influence on the physical fitness of university students. Rengasamy, Lee, and Syed Kamaruzaman (2014), in their study on the Effectiveness of a Fitness Intervention Program on the Flexibility of Form Four Male Students in a School in Malaysia, explained that the ANCOVA analysis after 10 weeks showed that the treatment group was significant with $F(1, 83) = 38.82, p < .05$. An additional four minutes in the form of circuit training after five minutes of warm-up activities in 40 minutes of Physical Education teaching and learning for 10 weeks has improved the level of flexibility of fourth-grade secondary school students in Malaysia. Martin, L. J. et al. (2016) in their study on an Enhanced Group Sprint Interval Training Program for Amateur Athletes, explained that there was no significant difference in physiological domains between groups but there was a significant effect on increasing maximal oxygen, time trial performance, and anaerobic power with improved training from baseline for all respondents regardless of condition. In the psychological domain, there is a significant effect on motivation, self-task effectiveness, and self-management effectiveness. Foster, C. et al. (2015), in their study on the Effects of High-Intensity Interval Training versus Steady State Training on Aerobic and Anaerobic Capacity, explained that there was a significant increase in VO₂max and Peak Power Output (PPO) for each training group. Measurements of exercise programme enjoyment showed that the Tabata protocol was less enjoyable than the Mayer protocol, and that steady state and enjoyment in all protocols declined over the course of the study. Although the High-Intensity Interval Training protocol is time efficient, it cannot outperform conventional/traditional training in less active early adults.

Gardner, L. A., Vella S. A. and Magee, C. A. (2017), in their study on Continued Participation in Youth Sports: The Role of Achievement Motivation explain why people with high extrapersonal beliefs have more fun and are more likely to continue. This may be due to supporting the goal mastery approach. Individuals who are relatively high in entity trust

report relatively less enjoyment. This may be due to supporting performance-avoidance goals. Sari, I. (2015), in his study on Imagery Method Research, Intrinsic Motivation, Self-Efficacy and Performance in Athletes, explained the results obtained for any variable by gender and winning medals. Several significant positive relationships were found between imagery, intrinsic motivation, and self-efficacy. In addition, it was found that general mastery of imagery explained 12 percent of the variance in self-efficacy. Also, general mastery imagery, motivation, and cognitive imagery explained 31.2% of the variance in intrinsic motivation. Sato, N., Khan, T. K. A. and Jusoh, N. (2017), in their study on the Combined Effects of Self-Talk, Imagery, and Video-Modeling on Anaerobic Performance, Pulse Rate Response, and Self-Efficacy, explained that there was a significant difference only for the instructional group, which showed a specific increase in their peak power scores as well as work volume in two time periods (pre-test and post-test). For the self-efficacy measure, both the instructional and motivational groups showed main effects and increases in self-efficacy scores in the two time periods. However, no significant differences were found for the fatigue index, maximum heart rate, or average heart rate. Thus, during the 30-second Wingate test, instructional and motivational self-talk combined with imagery and video modelling were found to be beneficial for improving individuals' specific tasks and increasing their level of self-efficacy. In their study on Intrinsic and Extrinsic Motivation That Affects UKM Student Engagement to Perform Physical Activity, Abd Aziz, Z. F., and Salamuddin, N. (2018) explain that the factor related to health and fitness has the highest mean value for intrinsic motivation factors, while the factor related to friendship has the highest mean value for extrinsic motivation factors. There is a significant difference between engagement motivated by intrinsic motivational factors of health and fitness and motivational factors related to the body based on gender. The intrinsic motivation factor related to the body (52%) is the motivation factor that contributes the most to the impact of student engagement, while the extrinsic motivation factor shows that the role of the university (40%) is the factor that contributes the most to student engagement. Krouse, R. Z., Ransdell, L. B., Lucas, S. B. and Pritchard, M. E. (2011), in their study on Motivation, Goal Setting, Coaching and Training Habits of Female Ultrarunners, described general health orientation and psychological coping as the two strongest motivational factors. Participants were higher in task orientation (e.g., finishing a race or achieving multiple goals) than ego orientation (e.g., finishing in the top 3 overall or beating an opponent). Women train an average of 12.49 hours per week and spend 64% of their time on training alone. Over three-quarters of participants (80%) did not use a coach due to cost and lack of need. The female ultrarunners in this study were task-oriented, intrinsically motivated, health-conscious, and financially conscientious individuals.

Crust, L. et al. (2014), through their study on "Mental Toughness in Higher Education: The Relationship Between Achievement and Progress in First Year University Students," explained that a significant and positive correlation was found between total mental strength, grades, and progress. Linear regression analysis found the subscales of mental strength in life control and interpersonal confidence to be significant predictors of academic

achievement. Significantly higher levels of overall mental strength, life control, and interpersonal confidence were found in students who passed compared to those who failed. Nazri, N. and Salamuddin, N. (2019), through their study on "Mental Toughness and Emotional Intelligence Among Team and Individual Athletes," explain that the study shows that there is a relationship between mental toughness and emotional intelligence among athletes as a whole. Next, the study shows that there is no relationship between mental toughness and emotional intelligence among team athletes. However, the results of the study found that the constructs of mental toughness and emotional intelligence have a significant relationship with individual athletes. Zeiger, J. S. and Zeiger, R. S. (2018), through their study on the Latent Profile of Mental Toughness in Endurance Athletes explained that significant differences between the three classes on all 8 factors were obtained from the SMTQ, PPI-A, and RSE. There was an increased likelihood of being in the High MT class compared to the Low MT class for men, athletes older than 55 compared to those aged 18–34, high sport satisfaction, and high division placement. The data show that endurance athletes have a latent profile of mental strength.

2.1. Theoretical Framework

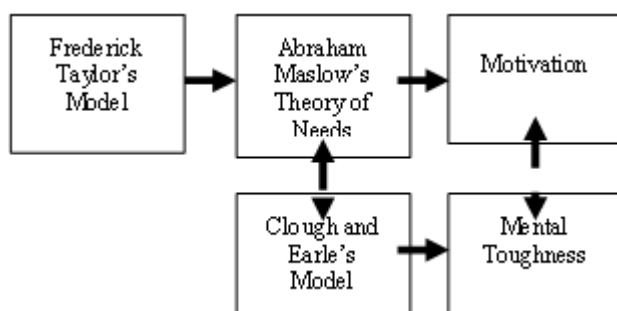


Figure 1: Theoretical Framework of the study based on the obtained and related models and theories

3. METHODOLOGY

3.1. Research design

Based on references from past studies that have been presented in Chapter 2 Review of Past Studies, it was found that most studies that have been carried out by researchers are a combination of two research methods, namely the quasi-experimental type and the survey type. This can be seen from the study of Hardiansyah (2017), who stated that the study is a quasi-experimental study combined with a survey method through the Indonesian Physical Fitness Level Test (IPFLT) questionnaire instrument. In addition to this study, another past study that uses a combination of two research methods is from Rengasamy, Lee, and Syed Kamaruzaman (2014), which states the use of quasi-experimental methods and survey methods. Martin, L. J. et al. (2016) also used a quasi-experimental and survey method in their study, with the survey method using the Physical Activity Readiness health questionnaire instrument.

As such, the researcher bases this study on past studies that are a combination of two research methods, namely quasi-experimental and survey methods. This is because the researcher studied the relationship between the circuit,

interval, and traditional training methods on the motivation and mental toughness of primary school hockey athletes and evaluated the effectiveness of training methods on the motivation and mental toughness of primary school hockey athletes. This study combines two research methods, namely the quasi-experimental method and the survey method, to see the relationship between motivation and mental toughness and the results of the intervention among the three groups involved, which are two treatment groups, namely the Circuit group (R1) and the Interval group (R2), and one control group, the Traditional group (K). According to Chan (2014), the quasi-experimental method is used to evaluate the effectiveness of a programme when the study respondents cannot be randomly distributed. He added this method uses different control and treatment respondents. While the design of the quasi-experimental method used by the researcher is the design of the Pre-Post Test for the Unbalanced Groups; the respondents were obtained through the researcher's own sampling procedure.

3.2. Study Instrument

Referring to past studies regarding motivation and mental toughness, the researcher found that they had used survey methods in their studies. The survey method was accompanied by an instrument to measure and evaluate the motivation and mental toughness levels among the targeted respondents. A questionnaire on motivation was developed by Pelletier, Fortier, Vallerand, Tuson, Briere, and Blais, 1995 (Mallet, C. et al., 2007) to measure the level of intrinsic, extrinsic, and motivation in sports. This questionnaire called the Sports Motivation Scale (SMS), is widely used in studies related to sports motivation. Ihsan Sari (2015) used the Sports Motivation Scale (SMS) in his study as a data collection tool on the relationship between imagery and intrinsic motivation, self-efficacy, and performance of martial art athletes. This instrument has been found to have consistent validity and reliability in various studies, allowing researcher to use it for this planned and implemented study.

In addition, another instrument found as a result of references from past studies used by researchers is the Mental Toughness Questionnaire (MTQ). This instrument was developed by Clough, Earle, and Sewell (2002) (Gucciardi, D. F., Hanton, S., & Mallet, C. J., 2012) in an effort to present mental toughness. L. Crust et al. (2014) have used this instrument in measuring and evaluating the mental toughness of first-year sports students at a university in the United Kingdom and have suggested that this instrument is useful for detecting students at risk of failure and dropping out of the program. In addition, Nurnadhira and Norlena (2019) also used this instrument in their study to examine the relationship between mental toughness and emotional intelligence among individual and team athletes. That is, the researcher used this questionnaire in the study after referring to previous studies related to the planned and implemented study.

3.3. Study Respondents

The study that was planned and implemented was determined by the researcher's population and sample. The researcher has chosen to carry out the study in a primary school managed by the Malaysian Ministry of Education, located in the state of Johore, in the district of Batu Pahat. The primary school, Sekolah Kebangsaan Limpoon 1, is a

category B school (moderately large number of students), with a total of 450 students; 60% of students are male and 40% are female, with the main ethnicity being Malay. This school is located in the middle of Batu Pahat town, surrounded by several housing estates, and the average student comes from an educated family in the B40 and M40 category. The typical student has a basic educational background, having attended preschool, which is an early childhood education institution that builds and develops students' physical, emotional, spiritual, intellectual, and personality traits.

The respondents chosen by the researcher are students from the age range of 11 to 12 years, which are students who are currently in Year 5 and 6 in the Malaysian education system. A total of 30 students involved in the game of hockey, who are called hockey athletes, were selected based on the purposive sampling method. According to Chan (2014), purposive sampling is a group of subjects with certain characteristics selected as study respondents. Respondents were then divided into three groups as stated in the study design and underwent a pre-test (with no input), treatment (for the treatment group), and post-test (after being given input).

4. RESEARCH FINDINGS

4.1. Descriptive Analysis

A quasi-experimental research design with a survey method is the research design used in this study, as has been used in previous studies by Hardiansyah (2017); Rengasamy, Lee, & Syed Kamaruzaman (2014); and Martin et. al. (2016). A quasi-experimental design involves two types of testing, i.e. pre and post-tests for two (or more) groups that are divided into two categories, namely treatment and control group.

In this study, three groups of 30 respondents were formed through a purposive sampling process; namely group R1 of circuit training method, R2 of interval training method, and K of traditional training method. Each group has 10 respondents and undergoes pre-testing before the treatment/intervention is implemented in groups R1 and R2. After getting the pre-test data, the data is then analyzed descriptively and inferentially. All the groups involved have gone through a period of training sessions lasting 8 weeks, with treatment groups R1 and R2 having been given treatment/intervention with each other through the systematic circuit and interval training methods. The control group remained through the traditional training method, which is free play without a proper training system.

These groups were then again tested after completing intervention and non-intervention training sessions (control group). A post-test was carried out, and the data obtained were analyzed descriptively and inferentially. The tests carried out in the pre- and post-test include the Sports Motivation Scale (SMS28) and Mental Endurance Questionnaire (MTQ48) questionnaires. Two sets of the same questionnaire were given before and after the intervention was implemented in the treatment group and after it was implemented in the control group through free play. The obtained data are presented as follows:

Table 1: Demographic Descriptive Statistics of Respondents

Demographic Characteristics	Variables	Frequency
Age (years)	11 years old	18
	12 years old	12
Body Mass Index (BMI)	< 18.5 (under weight)	3
	> 18.5 – 24.9 (normal weight)	27
Experience (in hockey; years)	1	6
	2	15
	3	9

The first demographic characteristic, which is Age, shows that 11-year-old respondents have a frequency of 18 times equal to 60% compared to 12-year-old respondents. The second demographic characteristic is Body Mass Index (BMI), showing a frequency of 27 times equal to 90% for respondents with a BMI of more than 18.5 to 24.9 who are in the normal weight category. The final demographic characteristic is Experience (hockey sport; years), which indicates 2 years of experience in hockey sport with a frequency of 15 times, or 50%.

Regarding the testing instrument, the Sports Motivation Scale (SMS) has 28 items, while the Mental Toughness Questionnaire (MTQ) has 48 items. Testing was done twice, namely pre-test and post-test. All respondents answered each item for both testing instruments and the pre- and post-test. The analysis was carried out, and the findings are presented as the average mean score along with the average standard deviation.

Table 2: Descriptive Statistics of Pre- and Post-Test of SMS28 and MTQ48

Instrument	Test	Mean	Standard Deviation
Sports Motivation Scale 28	Pre	3.30	0.61
	Post	3.79	0.82
Mental Toughness Questionnaire 48	Pre	3.27	0.82
	Post	3.57	0.94

Sports Motivation Scale Instrument 28 respondents on the pre-test, recorded an average mean score of 3.30 with a standard deviation of 0.61. There was a change in the post-test, where the average mean score was 3.79 with a standard deviation of 0.82. Mental Toughness Questionnaire Instrument 48 respondents on the pre-test, recorded an average mean score of 3.27 with a standard deviation of 0.82. The change occurred on the post-test, where the average mean score increased to 3.57 with a standard deviation of 0.94.

4.2. Normality Test

The normality test is conducted against each item according to the domain found in SMS28. There are 28 items that have been divided into 7 domains, and each domain has 4 items. For the normality test based on Shapiro-Wilk for pre- and post-test SMS28, the significant value to determine that the data distribution is normal or close to normal is .000. This value is significantly lower than the Shapiro-Wilk requirement for data analysis using parametric analysis, which is .05. However, there is still another feature that needs to be looked at to enable data to be analyzed parametrically, which is to look at skewness and kurtosis. Based on the results of the data analysis, almost all items have negative skewness and kurtosis, and the value exceeds the value of -/+

1.96 which is the agreed value to allow parametric analysis to be used [skewness $> -0.6 - < 1.6$, kurtosis $> -2.1 - < 0.6$ (pre); skewness $> -1.7 - < 0.93$, kurtosis $> -2.1 - < 1.96$ (post)].

A normality test was also conducted against each item according to the domain found in the MTQ48. For the MTQ48, there are 48 items that have been divided into 4 domains, with two domains, namely the Control domain, divided into two, namely Emotion and Life, and the Confidence domain, also divided into two, namely Ability and Interpersonal. Following the Shapiro-Wilk normality test for the pre- and post-test MTQ48, it was discovered that the significant value to determine that the data distribution is normal or close to normal is .000. As with the SMS28 normality test results, the value obtained is low for the data analyzed using parametric analysis, which is .05. However, the researcher looks at the next condition, which is looking at skewness and kurtosis. Based on the results of the data analysis, almost all items have negative skewness and kurtosis and the value exceeds the value of $-/+ 1.96$ which is the agreed value to allow parametric analysis to be used [skewness $> -2.8 - < 1.1$, kurtosis $> -2.1 - < 6.3$ (pre); skewness $> -1.6 - < 3.6$, kurtosis $> -2.1 - < 12.2$ (post)].

4.3. Inferential Analysis

For this study, after testing the normality of the data distribution for SMS28 and MTQ48, the researcher found that the data distribution is not normal and the parametric analysis method cannot be used. This is so because the significant value is less than .05 and the skewness and kurtosis exceed the agreed value of $-/+ 1.96$ for both instruments for the pre- and post-test. As a result, the researcher has decided to employ a non-parametric analysis method, namely Spearman's R_{H0} Correlation Test, to determine whether there is a significant relationship between training methods and motivation, as well as training methods and mental toughness, in primary school hockey athletes. To see the contribution of training methods to motivation and mental toughness, the researcher used Chi-Square Test, whether or not training methods contributed to the motivation and mental toughness of primary school hockey athletes.

In this section, the researcher will conduct a Spearman's Correlation Test for the research question and the first null hypothesis for the pre- and post-test of the SMS28 and MTQ48 instruments. First, we will look at the correlation between training methods and motivation.

Table 3: Spearman Correlation Analysis SMS28 Pre-Test

	Mean Score Respondent Pre	Correlation Coefficient Sig. (2-tail)	Mean Score SMS 28
Spearman R_{H0}			-.016 .937

Table 4: Spearman Correlation Analysis SMS28 Post-Test

	Mean Score Respondent Post	Correlation Coefficient Sig. (2-tail)	Mean Score SMS 28
Spearman R_{H0}			-.138 .483

In Spearman's Correlation, it is explained that there are three values that describe a certain value of the correlation coefficient of the variable that is obtained to achieve the results of the analysis, namely:

- If the value of the correlation coefficient is close to or at +1, then the variables involved are in a perfect positive relationship; that is if one variable increases then the opposite variable will also increase.
- If the value of the correlation coefficient is close to or at 0, then the variables involved do not have any relationship.
- If the correlation coefficient is close to or equal to -1, the variables involved have a perfect negative relationship, which means that if one variable increases, the opposite variable decreases.

Based on the correlation analysis table presented, the researcher interprets that there is a significant relationship between training methods and motivation based on significant values of .937 (pre-test) and .483 (post-test). However, the significant relationship is a negative relationship based on Spearman's Correlation analysis, with a correlation coefficient value of -.016 (pre-test) and -.138 (post-test). The researcher was able to conclude that increased training methods (long periods) had an effect on the decrease in motivation for primary school hockey athletes.

Second, we will see the correlation between training methods and mental toughness.

Table 5: Spearman Correlation Analysis MTQ48 Pre-Test

	Mean Score Respondent Pre	Correlation Coefficient Sig. (2-tail)	Mean Score MTQ48
Spearman R_{H0}			-.136 .474

Table 6: Spearman Correlation Analysis MTQ48 Post-Test

	Mean Score Respondent Post	Correlation Coefficient Sig. (2-tail)	Mean Score MTQ48
Spearman R_{H0}			-.091 .634

Based on the correlation analysis table presented, the researcher interprets that there is a significant relationship between training methods and mental toughness based on significant values of .474 (pre-test) and .634 (post-test). However, the significant relationship is a positive relationship based on Spearman's correlation analysis, with a correlation coefficient value of -.136 (pre-test) and -.091 (post-test). Researchers were able to conclude that increased training methods (longer periods) had an effect on improving mental toughness for primary school hockey athletes.

The Chi-Square Test is one method of analyzing data in a non-parametric form. It is used to measure the data from the study model compared to the actual study data. The data used in performing the chi-square test must be random, raw, obtained from independent variables and from a large sample size. This test also compares the size of the discrepancy between the expected results and the actual results, based on the sample size and the number of variables involved.

In this test, the researcher will present an analysis of the contribution of the training methods implemented in the treatment group (R1 and R2) and the control group (K) on the motivation and mental toughness of primary school hockey athletes. This analysis will look at the correlation of the respondent's mean score for circuit, interval, and

traditional training methods pre and post test SMS28 and MTQ48 to the mean score of pre and post test items SMS28 and MTQ48, which, if the correlation value is high, means circuit, interval, or traditional training methods make a significant contribution to the motivation and mental endurance of primary school hockey athletes.

Table 7: Chi-Square Test Training Method-SMS28

Chi-Square Test										
Training Method		Circuit (R1) SMS28			Interval (R2) SMS28			Traditional (K) SMS28		
		Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square		2.000a	1	.157	2.000a	1	.157	2.000a	1	.157
Likelihood Ratio		2.773	1	.096	2.773	1	.096	2.773	1	.096
Linear-by-linear Association		1.000	1	.317	1.000	1	.317	1.000	1	.317

Table 8: Chi-Square Test Training Method-MTQ48

Chi-Square Test										
Training Method		Circuit (R1) MTQ48			Interval (R2) MTQ48			Traditional (K) MTQ48		
		Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square		2.000a	1	.157	2.000a	1	.157	2.000a	1	.157
Likelihood Ratio		2.773	1	.096	2.773	1	.096	2.773	1	.096
Linear-by-linear Association		1.000	1	.317	1.000	1	.317	1.000	1	.317

Tables 7 and 8 present the results of the Chi-Square Test that has been carried out to see the relationship and contribution of training methods to motivation (SMS28) and mental toughness (MTQ48). The results of the analysis found that, based on Pearson Chi-Square, the p value found in the Asymptotic Significance (2-sided) is .157, exceeding the alpha value of .05. This means the relevance and contribution of training methods to motivation and mental toughness is significant.

5. DISCUSSION AND CONCLUSION

5.1. Discussion

Discussion is one of the important aspects of the study to see the validity, achievement, and effectiveness of the study that has been carried out to prove or disprove the opinions expressed in the previous study, which is the conceptual framework and reference for the current study. The purpose of the discussion is to explain the findings of the research analysis that has been obtained and analyzed, find common ground to support past studies, increase the number of sources regarding related studies, or deny opinions from past studies based on certain factors according to the current study situation. In this discussion, the researcher will discuss in stages the questions and hypotheses of the study regarding the relationship between the variables and the type of relationship between them, as well as the relationship and contribution between the variables of training methods and the variables of motivation and mental endurance.

The results of the analysis of the research data obtained to answer the research questions and confirm the null hypothesis 1 prove that there is a significant relationship between the circuit, interval, and traditional training methods and motivation. This is based on the significant value obtained from the non-parametric Spearman's R_{ho} Correlation Test, which is a significant value for the pre-test $p = .937$ and a significant value for the post-test $p = .483$ for the entire training method carried out. This coincides with a study conducted by Yudiana, Subardjah, and Juliantine

(2012), who said that physical training methods can improve not only physical fitness but also physical and mental health; referring to mental health here is in terms of an athlete's motivation in training and life. Hardiansyah's (2017) study also supports the findings of the study analysis regarding the relationship between training methods and motivation, saying that systematic physical training methods can improve physical fitness and improve emotional intelligence, which refers to the motivation of athletes to do sports and live life. Furthermore, Martin, L. J., et al. (2016) reported in their study that certain training methods can improve not only the physical ability to do a physical activity but also psychological abilities such as motivation to do a physical activity, self-management, and daily activities. Opinions from Martin et al.'s study support this study's analysis findings that there is a significant relationship between training methods and motivation.

Nevertheless, although there is a significant relationship between training methods and motivation, as supported by the studies that have been stated, there are issues that arise about the kind of relationship that exists between training methods and motivation. Is this a positive or negative relationship? From the research findings that have been analyzed through Spearman's R_{ho} Correlation, the correlation coefficient values obtained for the R1, R2, and K groups are the average value of the negative correlation coefficient. As explained in Chapter 4, if the value of the correlation coefficient obtained for the Spearman Correlation Test is less than or equal to -1, then the relationship between

the variables is opposite, i.e. if one variable increases, then the opposite variable will decrease. This can be proven by the value obtained at $p = -.016$ in the pre-test and $p = -.138$ in the post-test. It is clear from the values stated here that we can see that the relationship between training methods and motivation is negative, and the stated values are decreasing in the post-test. This is contrary to the findings of Yudiana, Subardjah, & Juliantine (2012), Hardiansyah (2017), and Martin, L. J. et. al (2016), who said physical training methods can improve and increase motivation. Additionally, a study by Gardner, Vella, and Magee (2017) explains that individuals who are motivated to continue training or playing sports are those who have a goal-setting and mastery approach, while individuals who have a performance and achievement avoidance approach are less motivated to continue training or playing sports. Sari, I. (2015) also explained that motivational methods such as imagery methods can help increase motivation, but the study carried out by the researcher did not apply motivational methods such as goal setting, imagery, or self-talk. Nursahaniza, Tariq Khan, and Normah (2017) also explained in their study that the motivational method of self-talk with the help of imagery and video modelling can improve and increase motivation. It is clear here that without the implementation of certain motivational methods in carrying out this study, there would have been a negative impact on the significant relationship between training methods and motivation.

Like the results of the data analysis of the study regarding training methods with motivation, the results of the data analysis of the study regarding the second null hypothesis also answered the research question and confirmed null hypothesis 2. The results of the analysis proved that there is a significant relationship between the training method and mental toughness. This is based on the significant value obtained from the Spearman's R_{ho} Correlation Test analysis, which shows a value of $p = .474$ in the pre-test and increased in the post-test with a value of $p = .634$. This shows the relationship between the training methods involved in mental toughness is very strong. This is supported by the study of Crust et. al (2014), who explained that the Mental Toughness Questionnaire 48 is a competent instrument to detect the level and evaluate relationships related to mental toughness. Nurnadhira and Norlena (2019) explained in their study, which supports the results of this study's analysis, that there is a significant relationship between mental toughness and the sport they participate in and between mental toughness and emotional intelligence, especially among individual athletes. In addition, Joanna and Robert (2018) explained in their study that mental toughness has a significant relationship with involvement in sports, which also supports the findings of this study.

The findings of the data analysis for null hypothesis 2 also look at what kind of relationship exists between training methods and mental toughness. If the training method with motivation has a negative significant relationship, the training method with mental toughness has a positive significant relationship. This is stated because the value of the correlation coefficient obtained is $-.136$ for the pre-test, but in the post-test, the value increases to $-.091$ which is a shift to a positive value, although it is still in the third category of the Spearman Correlation evidence. The researcher took an approach to conclude that increased

training methods (longer periods) had an effect on increasing the mental toughness of the respondents. This is also agreed upon by Nurnadhira & Norlena (2019) and Joanna & Robert (2018) in their study, which explains that a period or level of training or involvement in sports that athletes go through has an effect on increasing mental toughness.

For the findings of the data analysis of null hypothesis 3, the Chi-Square Test was carried out to obtain a significant value of the association and contribution between training methods, motivation and mental toughness. As a result, there is a significant correlation and the training method contributes to the motivation and mental toughness of the respondents. This is consistent with the results of the data analysis regarding null hypotheses 1 and 2, which show that training methods have an impact on motivation and mental toughness. This can be proven by the significant value of the correlation and the contribution obtained, which is $p = .157$ for the training method against the treatment and control groups, showing how significant the contribution impacts respondents. This finding is supported by the findings of previous studies that have been stated, namely the studies of Yudiana, Subardjah, & Juliantine (2012), Hardiansyah (2017), and Martin et. al (2016) who said physical training methods can improve and increase motivation. In addition, Nurnadhira & Norlena (2019) and Joanna & Robert (2018) explain in their study that a period or level of training or involvement in sports that athletes go through has an effect on increasing mental toughness.

5.2. Conclusion

The study carried out is seen by the researcher as an important study in scientific writing related to the field of Sports Science from the point of view of Sports Psychology and Coaching. This is because aspects of sports psychology such as motivation and mental toughness are seen to lack scientific research, especially in relation to training methods. This can be seen from past studies that are used as references, mostly looking only at the motivation angle and the effect on involvement in certain activities, as well as mental toughness. The relationship between training methods, motivation, and mental toughness is quite difficult to find scientific studies on. This is important because the training method is the basic stage in developing athletes, and from here, the coaches need to know how to assess the level and achievement of the athlete's motivation and mental toughness to enable the athlete to continue enthusiastically following training and being involved in sports (Moy, B., Renshaw, I. and Davids, K., 2016). In addition, studies like this can, to some extent, add to scientific writing for the field and help researchers in the future to make references in their studies. With that, knowledge in this field can be expanded, and allowing the field of Sports Science to develop better in Malaysia.

Each study conducted has its own issues and is not perfect. For a researcher, it may be that, in his observation, the research carried out meets the requirements and proves something, but in the observation of another researcher, it is the opposite. These differences create various opinions and actions to explore the issues that arise because there is a gap in the study, and the gap needs to be explored to complete the relevant studies. The research conducted cannot be separated from having issues and leaving gaps in the

research that need to be explored further by future researchers. The researcher thinks that among the improvements that can be made for this study is to reduce the number of items in the selected questionnaire, namely the Sports Motivation Scale 28 and the Mental Toughness Questionnaire 48. In addition, increasing the number of samples from the number found in this study is also among the improvements that can be made. The type of training method that wants to be studied in relation to motivation and mental toughness can be chosen as the two methods that are most suitable, which is one of the improvements from this study.

The study that will be carried out in the future based on this study or using this study as a reference certainly needs some suitable suggestions to improve and develop the study. The first suggestion is to select a specific domain from the questionnaire used in this study, namely SMS28, and MTQ48. Apart from reducing the number of questionnaire items, the chosen domain can focus on aspects of motivation and mental toughness that the researcher wishes to investigate. Accordingly, the administration and management of the instrument are easier and more organized if the design of the study carried out is the same as this study. In addition, in planning the implementation of the intervention, motivational methods such as goal setting, imagery, or self-talk can be applied to enable respondents to focus more on the intervention session and subsequently produce the desired research findings. The second suggestion is to choose respondents who have a more mature sports background and experience, as well as more respondents compared to this study. A large number of respondents can help improve the analysis's results. This is based on the number of samples seen in previous related studies. Accordingly, the sampling method can also be changed so that the data obtained is more correct and robust. The last suggestion is to plan the most accurate and appropriate training method for the sample, which can have an impact on motivation and mental toughness. Choose two suitable training methods and be able to form a treatment group and a control group based on the training method that has been chosen. With that, it is easier for the groups involved to be managed despite a large number of respondents, and the pre- and post-tests run smoothly. In addition, better analysis methods can be used to see if the relationship and contribution between training methods with motivation and mental toughness can be interpreted better and more clearly.

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