

# Effects of Intensive Training in Enhancing Performance Among Taekwondo Athletes

Siti Faezah binti Ahmad Sazali<sup>1</sup>, Mohd Faiz bin Ahmad Mawardi<sup>2</sup>

<sup>1</sup>Politeknik METro Johor Bahru  
<sup>2</sup>Universiti Tun Hussein Onn Malaysia

## ABSTRACT

In many sports, intensive training is required to enhance athletic performance especially in combat sports. This study analysed the experience of seven taekwondo athletes from Politeknik Ibrahim Sultan in undergoing intensive training for the preparation of Malaysian Polytechnic Taekwondo Championship 2019. It aimed to identify the effectiveness of intensive training in maximising the athletes' performance in taekwondo especially sparring techniques. Apart from that, it also identified the relationship between athletes' body mass index (BMI) and performance in intensive training. Quantitative study was applied in this study. As a result, there was improvement in kicking ability and sparring technique as well as agility among the athletes after four weeks of intensive training and there was significant negative association between BMI and training performance.

**Kata Kunci:** Taekwondo, Intensive Training, Performance

## 1.0 INTRODUCTION

Taekwondo (TKD) is one of popular martial arts that is practiced worldwide and introduced as combat sport in Olympic competition 1994 (WTF, 2009 in Chung, P., & Ng, G. 2012). Apart of advantageous to health, the athletes also are demanded to be fit and skilled in some fitness aspects as a physical and physiological requirement in Taekwondo competition. In addition, agility is much required especially when it comes to combat sports. It demonstrates technical and tactical movements in various positions in the same time sustaining optimum speed, dynamic balance and accuracy.

The demand of undergoing intensive training is to actually help in improving athletes' body composition as well as their physical fitness, technical skill and psychological skill. Other objective that can be seen is to boost up athletic performance (Rhyu, H. S., & Cho, S. Y., 2014). In addition, intensive training helps to retain athletes' endurance and stamina during the game. What most important is their agility in attacking their opponents or defending themselves from the opponents. It requires high focus to stay in the game. The fitness assessment at the end of the training are meant to forecast athletes' performance during the competition that leads to achievement of programme goals.

In preparing the students to represent their institution in Malaysian Polytechnic Taekwondo Championship 2019, the athletes were familiar with some routines in intensive training. The purposes of undergoing the intensive training are to maintain their stamina as well as to equip themselves with some technical skills in order to be tactical during sparring.

## 2.0 BACKGROUND PROBLEM

The training routine in taekwondo is systematic, on-going and involves long-term span. It consists general basic skills such as kicking and punching as well as sparring techniques (Fong, S. S., & Ng, G. Y. (2011). It is believed that through intensive training, it could help to enhance

athletes' discipline as well as fitness level and health (Zeng, Howard & Cynarski, Wojciech & Baatz, Shannon & Park, Shawn. (2015).

Although there were studies indicated that intensive training influences athletes' performance (Altavilla, G., D'isanto, T., Di Tore, P. A., & Raiola, G., (2018), Ouergui, I., Messaoudi, H., Chtourou, H., Wagner, M. O., Bouassida, A., Bouhlel, E., & Engel, F. A. (2020), it could be concluded that the results were general; not having specific focus in which aspect athletes improved. Apart from that, some studies argued that intensive training in short period affects the athletes' physical and emotional condition in the sense that it is harmful to them. Some conditions such as fatigue state and lack of appropriate recovery period are seen to be the effects of intensive training (Pichot, V., Busso, T., Roche, F., Garet, M., Costes, F., Duverney, D., & Barthélémy, J. C. (2002), Committee on Sports Medicine and Fitness, (2000).

The performance of the Politeknik Ibrahim Sultan's athletes showed no any better when they participated in any taekwondo tournaments. Although intensive training such as sprint test and kicking techniques were carried out before every tournament still they did not accomplish excellent performance in the games. If there was any, they were easily running out of stamina thus, led to slow speed and not concentrating during sparring.

In light of the mutual belief that undergoing intensive training could give impact on athletes' performance in taekwondo competition, there is a need to identify effective procedures in intensive training in terms of kicking and sparring techniques; and agility among taekwondo athletes. This paper, therefore, focuses on the effects of intensive training in enhancing performance among taekwondo athletes.

### **3.0 OBJECTIVES**

The objectives of this study are as follow:

- i. to identify the effectiveness of intensive training in maximising the athletes' performance in taekwondo especially sparring techniques and agility.
- ii. to identify the relationship between athletes' body mass index (BMI) and performance in intensive training

### **4.0 METHODOLOGY**

#### **4.1 Sample**

There were seven (7) black-belt taekwondo athletes ( $M \pm SD$ ; age:  $21 \pm 0.81$  years; height:  $171 \pm 9.2$  cm; body mass:  $24.6 \pm 5.5$  kg) who participated in this study. They were selected students who represented Politeknik Ibrahim Sultan for the Malaysian Polytechnic Taekwondo Championship 2019. Most of them had the experience of competing for state or prominent levels such as national and international level. Besides, they participated consistently in training session every week which took 1 -2 times per week and each lasted for two hours, only when they were selected for any tournament, they underwent intensive training phase. They did not also face any lower body injury during the study.

#### **4.2 Procedure**

The research design applied in this study was repeated measures. It is to identify the effects of intensive training which emphasizing on performance of conditioning training routine's intensity on Half-squat Resistance Exercise (HSRE), Countermovement Jump (CMJ), Repeated Sprint Training (RST) and Multiple Frequency Speed of Kick Test (MFSKT)

## Anthropometrics test

Before the experimental procedure, anthropometrics tests were used before and after the four week training. They comprised of; measuring the athletes' height (cm), weight (kg) and Body Mass Index or BMI (kg). They were recorded in each phase before implementing the procedure.

## Physical Skills Procedure

The athletes were required to undergo three (3) experimental procedures for four weeks in this study. Every procedure consisted of 1x4 repetitions at 90% of one repetition maximum (1RM) which emphasized on high volume and high intensity. Later, they were required to do sparring sessions with different partners for one hour. The athletes implemented the procedures with minimum interval of 24 hours between every experimental session.

In first week, the athletes were given exposure of the procedures in order to be familiarized with the routines. It aimed to expose them with the correct technique and skill of HSRE, CMJ and MFSKT. Besides, it helped the athletes to pose the effective body position while performing the routines as well as in sparring sessions.

Half-Squat Resistance Exercise (HRSE) was done according to the standard procedures. Before they began with, they had to do warm-up such as body stretching and long and speed running. It then followed by two-minute rest interval. Later, they performed four sets of HRSE with one minute duration each. After completing these , two-minute rest interval was given.

Countermovement Jump (CMJ) was performed in order to measure the athletes' explosive lower body power (Owen W., 2016). The athletes were required to perform four sets of CMJ. Athletes' maximal jump height and mean jump height were recorded during the procedure. The jump routine was done without arm-swing where they kept their hands behind their waist and jump as high as possible throughout the procedure. Besides, they had to attempt to land in the same position as they took off; this is to test whether they can maintain their same position back after kicking. They had to do minimum of three jumps within one minute and given two-minute rest after two sets.

Repeated Sprint Training (RST) were performed in the procedures for four weeks. The purpose of this training to train athletes' agility and speed in using legs for kicking (Ouergui, I., Messaoudi, H., Chtourou, H., Wagner, M. O., Bouassida, A., Bouhlel, E., ... & Engel, F. A., 2020). It comprised of three (3) sets x 35m sprint running with 2 minutes rest interval and continued with another 3 sets. This included the shuttle run and back test and Taekwondo-specific Agility Test (TSAT). The assessment were performed by recording the students number of rounds they completed in both procedures within one (1) minute. In addition to the training, the athletes had to do technical-tactical based training to focus on their technical skill in sparring.



Figure 1: Athletes of PIS were having the Repeated Sprint test

Multiple Frequency Speed of Kick Test (MFSKT) was done using both right and left foot. They were five types of kicking carried out by the athletes; front kick (*ap chagi*), turning kick (*bandal chagi*), side kick (*yeop chagi*), chopping/axe kick (*naeryo chagi*) and reverse turning kick (*bandae dollyeo chagi*). During FSKT session, athletes positioned themselves in front of freestanding punching bag. The performance of the test was evaluated by the total number of kicks done within one minute and the maximal impact generated during the test.

### Technical Skills Procedure

After finishing the above procedures, the athletes focused on doing technical-tactical based training. The purpose was to guide them in tackling opponent during sparring. It took one hour for the sparring to be done. They did the sparring for two minutes for each different opponent. This training focused on how to counterfight the opponent as well as to block from the opponent. The rest interval of two minutes was given after one set and continued with another one set.

## 5.0 RESULTS AND ANALYSIS

The data were analysed using repeated ANOVA. *P*-value was considered as significant when it was equal or less than 0.05. The results of the anthropometrics test are as follow:

Table 5.1: Anthropometrics Test Results

Athlete	Height (cm)	Weight (kg)	BMI
1	157	55	22.3
2	178	100	31.6
3	175	95	31
4	183	90	26.9
5	173	52	17.4
6	170	70	24.2
7	161	49	18.9
Mean (m)	171	73	24.6
Standard Deviation (SD)	9.2	21.8	5.5

All results are generated as mean and standard deviation ( $M \pm SD$ ). From table 5.1, it indicates that the mean and standard deviation ( $M \pm SD$ ) of height is  $171 \pm 9.2$  cm; meanwhile, for athletes' weight is  $73 \pm 21.8$  kg; and for body mass index (BMI) is  $24.6 \pm 5.5$  kg.

Table 5.2: Countermovement Jump (CMJ) Before And After Results

Athlete	24 June 2019 (A)		14 July 2019 (B)		Difference (B-A)
	No of jumps (1min)	Mean (cm)	No of jumps (1min)	Mean (cm)	
1	90	37	91	37	0
2	80	35	80	34	-1
3	25	41	30	42	1
4	40	35	42	35	0
5	60	29	63	33	4
6	15	39.5	20	40	0.5
7	30	38	30	41	3
Mean (m)	48.5	36.3	50.8	37.4	1.07
Standard Deviation (SD)	28.6	3.9	27.4	3.5	1.78

Meanwhile, table 5.2 indicates that the countermovement jump (CMJ) results before (A) and after (B) for the athletes. It shows the number of jumps that can be done within one minute; and also the jump height average or mean (m) results that in centimetres (cm). The results of the difference jump height average or mean are also shown in the table to indicate the athletes' performance in CMJ after intensive training procedures done. Generally, it shows that there were improvement in athletes' jump performance.

Table 5.3: Repeated Sprint Training (RST) Before And After Results

Athlete	Before		After		Difference (B-A)
	Shuttle run and back test	Taekwondo-specific Agility Test	Shuttle run and back test	Taekwondo-specific Agility Test	
1	34	28	35	29	1, 1
2	27	23	29	24	2, 1
3	26	22	30	24	4, 2
4	28	26	28	26	0, 0
5	37	27	39	28	2, 1
6	31	25	32	27	1, 2
7	32	31	35	33	3, 2
Mean (m)	30.7	26	32.5	27.2	1.8, 1.2
Standard Deviation (SD)	3.9	3.05	3.95	3.14	0.05, 0.09

In table 5.3 above, the Repeated Sprint Test (RST) results are shown. For shuttle run and back test, it shows improvement before and after intensive training. For Shuttle run and back test, there were improvement (m) shown by the athletes by 1.8, meanwhile, for Taekwondo-specific Agility Test (TSAT) an improvement was also performed by them, in which different by 1.2. It can be concluded the athletes progressed better in their speed and agility in both sprint test.

Table 5.4: Multiple Frequency Speed Of Kick Test (MFSKT) Before And After Results

Athlete	Before					After				
	1	2	3	4	5	1	2	3	4	5
1	30	21	24	29	26	31	24	26	34	27
2	25	15	21	25	23	26	20	25	28	23
3	27	16	23	25	24	28	23	24	29	26
4	25	17	25	24	23	25	23	26	27	24
5	32	18	25	30	30	34	21	28	31	34
6	22	19	21	26	25	24	24	24	27	30
7	31	23	27	31	26	33	25	31	32	33
Mean (m)	27.4	18.4	23.7	27.1	25.2	28.7	22.8	26.2	29.7	28.1
Standard Deviation (SD)	3.6	2.8	2.2	2.7	2.4	3.9	1.7	2.4	2.6	4.2

Table 5.4 shows the Multiple Frequency Speed of Kick Test (MFSKT) before and after results. They are five types of kicking in taekwondo performed during the procedures. They included 1- front kick (*ap chagi*), 2- turning kick (*bandal chagi*), 3- side kick (*yeop chagi*), 4- chopping/axe kick (*naeryo chagi*) and 5- reverse turning kick (*bandae dollyeo chagi*). The data recorded were the accumulated number of kicks that were performed during one minute. Overall, the data show that students progressed better in every kicking style regardless of their weight.

Table 5.5: Pearson Correlation table between BMI and Training Performance in Intensive Training

		BMI	training performance
<b>BMI</b>	Correlation	1	-0.865
	p-value 2-tailed		0.012
<b>training performance</b>	Correlation	-0.865	1
	p-value 2-tailed	0.012	

A Pearson correlation was performed to test if there is a relationship between BMI and training performance. The Results of the Pearson correlation indicated that there was a significant negative association between BMI and training performance,  $r(5) = -0.865$ ,  $p = 0.012$ .

## 6.0 CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

Through the prior statistical analysis done, it can be concluded that there were improvement in terms of the athletes' performance after the intensive training procedures. It can be seen that the more intense and higher volume training procedure performed, the more they were effective in enhancing the students' performance. It could be seen from the various training procedures that the athletes had to undergo and most of the training focusing on the athletes' stamina, endurance, agility and technical skills of lower body parts. It therefore, answering the first objective of the study. Besides, there was a significant negative association between BMI of the athletes and the training performance. Hence, this also answers the second objective of the study.

There were some limitations found in this study. The equipment or gears used to evaluate the athletes performance were not effectively used such as the body trunk, contact mat and others. Besides, the rest interval given are not valid as they performed intensively for the procedures.

As for recommendations, additional routine in some procedures could be upgraded in other to have more reliable data. Apart from that, samples of the study could be added more to have more reliable data. The researcher also should record data on transition recovery period, overload training period and recovery period data to gain an inclusive data and reliable result for the study.

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