

# THE COMPARISON OF MENTAL TOUGHNESS BETWEEN 2017 SEA GAMES ATHLETIC ATHLETES AND 2017 ASEAN PARA GAMES PARALYMPIC ATHLETIC ATHLETES

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## Abstract

In the context of deepening the mental toughness between athletic athletes, this study aims to identify the mental toughness of athletic athletes involved in 2017 SEA Games and 2017 ASEAN Para Games by comparing the mental toughness level between the normal and Paralympic athletic athletes. This is a descriptive study using purposive sampling method. The overall respondents for this study consist of 50 athletic athletes, with 25 normal and 25 paralympic athletic athletes. Their ages are between 18 to 43 years and they participate in 2017 SEA Games and 2017 ASEAN Para Games. Sports Mental Toughness Questionnaire (SMTQ) developed by Sheard in 2009 has been adapted and used as the study instrument to measure the mental toughness level based on three sub scales namely confident, constancy and control. Study found out that the mental toughness for the 2017 SEA Games athletic athletes and 2017 ASEAN Para Games Paralympic athletic athletes are at high level. Mental toughness value reports are 41.32+5.67 and 43.00+6.88 respectively. However, there is no significant difference reported for the mental toughness between the groups with the value  $t(48)=-.942$ ,  $p=.351$ . The question is does higher mental toughness level of 2017 ASEAN Para Games Paralympic athletic athletes' acts as their success determinant in the previous 2016 Paralympic Games? This situation shall be explored deeper because in elite level a small difference from the mental toughness aspect is able to change a competition's final result outcome.

**Keywords:** mental toughness, athletic athletes, Paralympic athletic athletes, 2017 SEA Games, 2017 ASEAN Para Games

In the modern sports era, an athlete's or team's psychological preparation is as important as teaching the skills needed in a sport. Mental toughness has been widely applied in modern sports. It is the quality that differentiates the winner and the others in a competition (Dahlan & Muhammad, 2017). It also implies that mental toughness gives athletes the concentration they need to improve their performance before, during and after the competition. Mental toughness is an important component in the success of a sport (Omar Fauzee et al., 2012) while Powell and Myers (2017) state that mental toughness is a psychological variable related to the athletes' success in performance domain. Creasy (2005) also concludes that athletes' mental toughness is an important component in the peak of sports' performance. According to Gucciardi, Hanton and Fleming (2017) mental strength is an aspect of psychological personality that includes the integration of one's experience with stress and difficulties. Kumar, Singh and Mitra (2016) explain, mental strength means psychological advantage that enables a person to generally challenge the opponent; and specifically, more consistent, more focused, more confident and able to control any stress. According to Nicholls, Polman, Levy & Backhouse (2008), the definition of mental strength is attitude, emotion and thought that influence an individual to react towards stress, challenge and difficulties to achieve his goals. Mack and Ragan (2008), define mental strength as an individual tendency to overcome external stress. Middleton, Marsh, Martin, Richards & Perry (2004) define mental strength as solidity and confidence towards a small goal although there are stress and difficulties. Meanwhile, Jones (2002) defines that mental strength comprises four main factors namely mental preparation and behavior before the competition, during the competition, during the overall duration in the competition and after competition. Clough, Earle & Sewell (2002) explain that mental strength comprises a few criteria such as confidence, commitment, challenge and ability to

face stress. Meanwhile, according to Fourier and Potgieter (2001), mental strength comprises 12 components namely motivation, coping skill, to maintain confidence, cognitive skill, discipline and goal towards, competitive, special physical and mental needs, team association, preparation skill, psychological perseverance and ethics. Loehr (1986) defines mental strength as the ability to consistently accomplishing to the optimum level during competition when needed.

Athletics or track and field are sports that involve three main types of disciplines namely run, jump and throw (Timpka et al., 2014). This sport is administered by World Athletics while in Malaysia this sport is administered by Malaysia Athletics Federations (MAF). Recently, Malaysia became the host for the 2017 SEA Games from 19 August 2017 to 31 August 2017 and 2017 ASEAN Para Games from 17 to 23 September 2017. SEA Games and ASEAN Para Games are the sports attended by the South East Asian countries like Vietnam, Philippines, Thailand, Laos, Indonesia, Myanmar, Singapore and Malaysia.

The rise of Malaysia athletic squad in athletic sports has been seen few years ago after Badrul Hisyam's success in breaking Watson Nyambek's national record of 100 metre, Khairul Hafiz Jantan breaks 200 metre national record belonged to Tan Sri M. Jegathesan and Elena Goh breaks the national record of 1000 metre in walking. Other than that, Nauraj Singh is also eligible in merit to Rio De Janeiro 2016 Olympic Games. However, there is no medal contributed by the athletic squad until now. In contrary, the Paralympic athletic squad, Muhamad Ridzuan Puzi, Ziyad Zolkefli and Abdul Latif Romly contributed gold medals in their respective categories in 2016 Rio De Janeiro Paralympic Games. Both teams attended the similar training sessions. However, we can see the final results of both teams are completely different. Does mental toughness factor influence the Paralympic athletes that they are able to contribute medals in the most prestigious stage of the competition?

In addition, there are limitations in the study by previous researchers from overseas and in Malaysia on mental toughness in athletic sports. In overseas, the study is done in tennis sport (Kumer & Ahmed, 2013), volleyball (Kumer et al., 2016) hockey (Gayatri, Saon & Gireesh, 2016), and cricket (Yadav et al., 2013). In the context of mental toughness study in Malaysia, this can be seen in studies by Morazuki & Bakar (2008), Suhaila (2008), Omar Fauzee et al. (2012) and Zainal Abidin et al. (2016) that were conducted in silat, karate and football. However, all of the studies only focused on the normal athletes. The researchers also note that there are lack of studies in comparison of mental toughness between normal and Paralympic athletes where Rostami & Mohammadi (2015) conducted a comparative study on gender-based mental toughness for visually impaired athletes and Macdougall et al. (2015) which focus on the comparison of paralympic athletes and Olympic athletes. Based on the previous studies, it is found that comparative studies on mental toughness were widely conducted between genders and not between normal and paralympic athletes especially in athletic sports. Therefore a comparative study to determine mental toughness among normal and paralympic athletes need to be carried out to identify whether there is a difference in mental toughness between them.

Gucciardi Mental Strength Model Theory (2008)

In this study, there is a relationship between Mental Toughness Model addressed by Gucciardi et al. (2008). This model is based on Personal Construct Theory (Kelly, 1995). Although this model was built for Australian football players, there is a relationship among every sub scale in the model with Sport Mental Toughness Questionnaire (SMTQ). Figure 1 shows Mental Toughness Model built by Gucciardi et al. (2008).

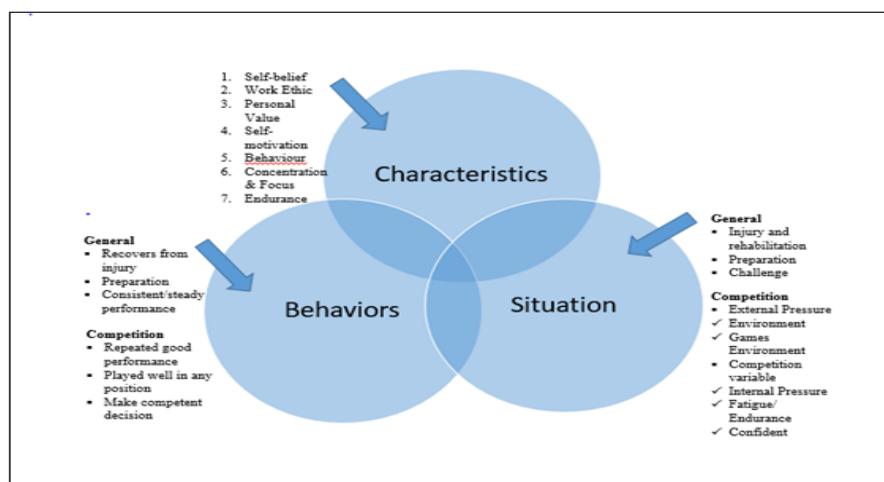


Figure 1: Mental Toughness Model introduced by Gucciardi et al. (2008)

Mental Strength Model founded by Gucciardi et al. (2008) is explained in Figure 1, for better understanding. The findings identify mental strength main characteristics with the situation that needs high mental strength. In this mental strength model, Gucciardi thinks that mental strength is divided into three sub namely character, behaviour and situation. There are six characters criteria in character namely self-belief, work ethic, personal value, self-motivation, behavior and concentration and focus. Situation is divided into two; general and competition. In general, there are few criteria that fulfill which are injury and recovery, preparation and challenge, while in competition, the criteria are external stress, environment, play environment, match variable, internal pressure and fatigue. Third, behaviour. This sub is also divided into general and competition. General sub is divided into recovery from injury, preparation and fixed and consistent performance while competition is divided into repeated good performance, play well in any position and make efficient decision.

Based on the model, the researcher see the relationship with Sport Mental Toughness Questionnaire (SMTQ) built by Sheard et al. (2009). The first subscale in Sport Mental Toughness Questionnaire (SMTQ) which is confidence is related with confidence in the competition for the situation component, fixed subscale is related with consistent performance in behavior component and control subscale control is related with controlling stress in criteria component. Based on Gucciardi et al. (2008), mental toughness consists of athlete, situation and athlete's behaviour criteria. These three components lead to mental toughness to achieve victory in the competition.

### Methodology

This is an exploratory research using descriptive analysis that uses purposive sampling and 50 respondents are chosen voluntarily among the track and field athletes who involved in 2017 SEA Games and 2017 Para ASEAN Games aged 18 to 43 years old.

#### Population

In this study, researchers' target population consists of athletic athletes who represent the country in 2017 SEA Games and 2017 Para ASEAN Games. Overall, the population for athletic athletes who represent the country in 2017 SEA Games are 63 athletes while paralympic athletes in athletic sports who represent the country in 2017 Para ASEAN Games are 80 athletes. However, the researchers only choose 25 athletes from the SEA Games athletic athletes and 25 paralympic athletes from 2017 ASEAN Para Games athletes.

#### Sample Selection Procedure

Sample selection procedure starts with the usage of sampling method. In this study, the researchers use purposive sampling technique. According to Idris (2013), purposive sampling can be used by the researchers to identify whether the sample represents the population or not. The researchers use this method to determine the chosen sample matches the criteria needed. In sampling count determination, the researchers refer to a few resources in determining sample count that represent the population. However, the researchers refer to Gay (1981) which in the exploratory research that used descriptive analysis, the minimum sample count needed is 10% from population. Based on Gay (1981), the minimum sample needed from athletic athletes population are 6 athletes while the minimum sample needed from paralympic athletic athletes population are 8 athletes. The researchers set to take 30% sample count from the population, where 25 athletes from each group with the purpose of representing the population. The sample criteria set by the researchers are athletic athletes who represent the country in 2017 SEA Games and paralympic athletic athletes who represent the country in 2017 Para ASEAN Games. Mohd. Latif Romly and Ziyad Zolkefli are permitted to participate in both sport event and exempted from this study.

#### Sport Mental Toughness Questionnaire (SMTQ) Instrument

This questionnaire built by Dr. Michael Sheard was published in 2009 in European Journal of Psychological Assessment 2009; Vol.25(3):186-193 and became a guideline in looking at mental strength level among the athletes. The researchers have requested permission from Dr. Michael Sheard to use this questionnaire through e-mail. This questionnaire was translated into Malay language by Zainal Abidin *et al.* (2016). The researchers chose the Sport Mental Toughness Questionnaire (SMTQ) developed by Sheard *et al.* (2009) to evaluate 2017 SEA Games and 2017 Para ASEAN Games athletic athletes' mental strength in this study. Rationally, this questionnaire was used by the researchers based on Mohd. Majid Konting's opinion (2000) who thinks that questionnaire is used to get information on facts, beliefs, feelings, wants and others. In the final phase of developing SMTQ, Sheard *et al.* (2009) used 14 items to 509 athletes with the mean age of 20 years, which involved athletes in the regional to international level. Three subscales in SMTQ have alpha value between .72 and .79 that showed good consistency. Therefore, this questionnaire is suitable as an instrument in this study in knowing mental strength level of athletic athletes who involved in 2017 SEA Games and 2017 Para ASEAN Games based on the total items and alpha value showed.

Sport Mental Toughness Questionnaire (SMTQ) has three subscale namely (i) confidence (stress is important for the athletes to believe their ability to achieve target and also believe that they are different and better than their opponents), (ii) fixed (demands of training and competition, the ability to take responsibility to prepare for training and competition goals, fearless and the ability to give attention) and (iii) control (measures that a person is an influencer in providing desired decision and able to control emotions and remain calm in situation that can be pressuring). Sport Mental Toughness Questionnaire (SMTQ) has 14 questions with the division of three subscales, namely confidence with six questions, while patience and control have four questions respectively. Item 1 to 6 test confidence construct, item 7 to 10 test consistent construct and item 11 to 14 test control construct. This questionnaire has six items valued negative and measured using 4 point Likert Scale; A) Absolutely True: B) Mostly True: C) A Bit True: and D) Absolutely Not True. Score for each confidence, patience and control are totaled up to determine the mental strength level of normal athletic athletes who involved in 2017 SEA Games and paralympic athletic athletes who involved in 2017 ASEAN Para Games.

Sport Mental Toughness Questionnaire (SMTQ) that tests the subjects' mental strength level has norm and marks interpretation for each criteria set by Sheard (2009). For item numbered 1 – 8, is a positive score where Scale A is 4, Scale B is 3, Scale C is 2 and Scale D is 1. Item numbered 9 – 14 is a negative score where Scale A is 1, Scale B is 2, Scale C is 3 and Scale D is 4. Besides that, Sheard (2009) also interpret overall marks for confidence construct starts from 6 to 24, for consistent construct and control starts from 4 to 16. Composite score marks is from 14 to 56. The researchers also categorized mental strength level to low, medium and high based on Zainal Abidin *et al.* (2016).

#### Data Analysis

High score shows that high mental strength level and vice versa. Descriptive statistics was used to know the mental strength level based on mean, frequency and percentage while inferential statistics was used to compare mental strength level for both groups using the Independent Sample T-Test in this study.

#### Data Collection Process

Universiti Putra Malaysia ethical committee approval was obtained before this study was carried out (UPM/TNCPI/RMC/JKEUM/1.4.18.2(JKEUPM)). The researchers also requested permission in verbal and written form from the National Sports Council officers and coaches of the athletes involved. This questionnaire was administered in various environment such as beside Bukit Jalil National Sports Council training tracks, National Sports Council Main Gymnasium and Kampung Pandan Paralympic Excellence Centre café. The respondents were asked to answer honestly for every question item. Confidentiality is emphasized so the athletes felt comfortable and transparent while giving their response. Any respondents who wanted to know his response answers, they can contact the researchers directly through the telephone numbers and address given. All research data was analysed using Statistical Packages for Social Sciences (SPSS) version 24.0. The data analysed based on the research questions given.

#### Findings

Table 1 shows mental toughness mean distribution and standard deviation by descriptive analysis and based on sub scale which covers confident, constancy and control. Based on the result obtained, overall the paralympic athletes group is higher (43+6.88) compare to the normal athletic athletes group. For confident sub scale, normal athletes group is higher (19.36+2.58) than paralympic athletic athletes group. For constancy sub scale, paralympic athletic athletes group is higher (13.68+1.97) than normal athletic athletes group. For control sub scale, paralympic athletic athletes group is higher (10.36+3.45) than normal athletic athletes group (9.20+2.80).

Table 1: Mean Distribution and Standard Deviation Based on Mental Toughness Factor

Mental Toughness Factor	Normal Athletic Athlete				Paralympic Athlete			
	f	%	Mean	SD	f	%	Mean	SD
<b>Confident</b>			19.36	2.58			18.96	2.77
Low	0	0%			0	0%		
Moderate	4	16%			7	28%		
High	21	84%			18	72%		
<b>Constancy</b>			12.76	2.05			13.68	1.97
Low	0	0%			0	0%		
Moderate	7	28%			4	16%		
High	18	72%			21	84%		

<b>Control</b>			9.20	2.80		10.36	3.45
Low	8	32%			7	28%	
Moderate	12	48%			7	28%	
High	5	20%			11	44%	
<b>Overall</b>			41.32	5.67		43.00	6.88
Low	0	0%			0	0%	
Moderate	12	48%			12	48%	
High	13	52%			13	52%	

For inferential analysis in comparing overall mental toughness level and sub scale, there is no difference between SEA Games athletic athletes group with ASEAN Para Games Paralympic athletic athletes groups, which  $t(48) = -.942, p=.351$ . For all sub scales studied, namely confident, constancy and control, the values reported are  $t(48)=.528, p=.60, t(48)=-1.618, p=.112$  and  $t(48)=-1.305, p=.198$  respectively.

### Discussion

From the descriptive analysis, it can be seen that majority from both groups have high mental toughness. This is different from the findings by Zainal Abidin et al. (2016) that football athletes were on moderate level. Based on the study by Zainal Abidin et al. (2016), the subjects were still in the sport school, whereas the subjects in this study are athletic athletes who represent the country. Other than that, in the researchers' opinions, this implies that the psychology trainings by the psychology branch from National Sports Institute (ISN) gives positive effect to the 2017 SEA Games athletic athletes and 2017 ASEAN Para Games Paralympic athletic athletes, which 2017 SEA Games athletic squad was at the third place overall with eight gold medals, eight silver medals and nine bronze medals while 2017 ASEAN Para Games Paralympic athletic squad was at the third place overall with 26 gold medals, 27 silver medals and 30 bronze medals. This is parallel with Devonport (2006) that mental toughness is able to help the athletes obtain success in sport.

However, if we look at the overall mean for both groups, there is a difference which 2017 ASEAN Para Games paralympic athletic group mean is a little higher than 2017 SEA Games athletic group mean. In the researchers' opinion, the small difference of mean influences paralympic athletes and give them the highest action advantage. Based on Sheard et al. (2009), confident means that the athletes believe their ability to achieve the target and believe they are different and better than the opponents. Constancy means the willingness for the athletes to take responsibility for training preparation and has the persevering attitude and the ability to focus. Control means to measure an individual influence to produce expected result, able to control his emotion and remain calm in a pressuring situation. Besides that, sub scale means – constancy and control show that the Paralympic athletes group is higher than the normal athlete group. The researchers think that among the Paralympic athletic squad success factors is higher constancy sub scale mean compared to normal athletic squad group. This is supported by Crivello (2015) which athletes who have high control level also have high mental toughness.

For confidence sub scale, SEA Games athletic group mean is higher than ASEAN Para Games Paralympic athletic group. This may due to the perfect physical factor that gives higher confident compared to the ASEAN Para Games Paralympic athletic athletes. This is in line with Macdougall et al. (2015) who stated specifically that paralympic athletes have lower self-acceptance and body perception compared to the Olympic athletes.

However, there are athletic athletes in both groups who have moderate mental toughness in confidence, constancy and control sub scale and low mental toughness in control sub scale. There is a need to reevaluate mental toughness level for both groups based on the three sub scale of mental toughness data. Loehr (1986) stated that athletes who have moderate and low mental toughness level should be given immediate rehabilitation to overcome the problem. Based on this study, according to Sheard et al. (2009), mental toughness is represented by three components, namely confidence, constancy and control. These components are interrelated and important to measure and determine athletes' mental toughness level. If one of the components is in moderate or low level, this will influence athletes' performance especially in overall mental toughness aspect.

Other than that, National Sports Institute needs to reevaluate mental toughness of both teams because there is a possibility the athletes from both groups will represent the country in the 2020 Olympic and Paralympic in Tokyo, Japan. This may influence athletes' performance in the sport's most prestigious stage. This is in line with Kuan & Roy (2007) that mental toughness is athletes' success factor when

participating in a tournament or competition. Mental toughness can be considered as one of the factors that influence athletes' psychology before, during and after competition.

### Conclusion

In conclusion, the study found that in majority, mental toughness for 2017 SEA Games athletic athletes and 2017 ASEAN Para Games Paralympic athletes are on high level. This shows that SEA Games athletic athletes and 2017 ASEAN Para Games Paralympic athletic athletes are in the best psychological state for the competition. There is no overall significant for the comparison of 2017 SEA Games athletic athletes and 2017 ASEAN Para Games Paralympic athletes in mental toughness, and also for each confident, constancy and control sub scale. This clearly shows that psychology trainings by National Sports Institute give positive effect to both groups. For future studies, it is suggested that this study to be carried out on other sports groups (normal and paralympic) that will represent the country in the Olympic Games and Paralympic Games in Tokyo in 2020. This is to see the athletes' mental toughness who will participate in the world's most prestigious sports event. However, Covid-19 plague that strikes the whole world sparks pandemic situation according to World Health Organization (WHO). Olympic and Paralympic Games that are scheduled to be held gloriously this year will be postponed next year. Will the athletics athletes' mental strength who are going to participate in 2021 Olympic and Paralympic Games increase or decrease because of Covid-19 pandemic?

### Reference

- Clough, P., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. *Solutions in sport psychology*, 32-43.
- Creasy Jr, J. W. (2005). *An analysis of the components of mental toughness in sport* (Doctoral dissertation).
- Crivello, K. (2015). The relationship between motivations, perceived control, and mental toughness among marathon runners. *Athletic Insight*, 7(3), 227.
- Dahlan, N., & Muhamad, T. (2017). Kekuatan mental dan prestasi akademik atlet bola sepak Universiti Kebangsaan Malaysia. 21-35. Retrieved from <https://ejournal.upsi.edu.my/article/2017AR001514>
- Devonport, T. J. (2006). Perceptions of the contribution of psychology to success in elite kickboxing. *Journal of sports science & medicine*, 5(CSSI), 99.
- Fourier, S., & Potgieter, J. R (2001). The nature of mental toughness in sport. *South African Journal for Research in Sport, Physical Education and Recreation*, 23, (pp. 63-72).
- Gay, L. R. (1981). Educational Research--: Charles E. *Merill Columbus Ohio*.
- Gayatri, P., Saon, S., & Gireesh, P. (2016). Comparative study of mental toughness between national and interuniversity level female hockey players. *International Journal of Sports Sciences & Fitness*, 6(1).
- Gucciardi, D. F., Gordon, S., & Dimmock, J. A. (2008). Towards an understanding of mental toughness in Australian football. *Journal of Applied Sport Psychology*, 20(3), 261-281.
- Gucciardi, D. F., Hanton, S., & Fleming, S. (2017). Are mental toughness and mental health contradictory concepts in elite sport? A narrative review of theory and evidence. *Journal of science and medicine in sport*, 20(3), 307-311.
- Idris, N. (2013). *Penyelidikan dalam pendidikan*. McGraw-Hill Education.
- Jones, G. (2002). What is this thing called mental toughness? An investigation of elite sport performers. *Journal of Applied Sport Psychology*, 14(3), 205-218.
- Kelly, G. A. (1955). *The psychology of personal constructs: A theory of personality*. London: Routledge.
- Kuan, G., & Roy, J. (2007). Goal profiles, mental toughness and its influence on performance outcomes among Wushu athletes. *Journal of sports science & medicine*, 6(CSSI-2), 28.
- Kumar, M. L., & Ahmed, S. (2013). Comparative study on mental toughness among male and female tennis players. *International Journal of Sports Sciences & Fitness*, 3(1).
- Kumar, S., Singh, N. S., & Mitra, S. (2016). Comparison of mental toughness between male and female volleyball players of 12th South Asian Games. *IJAR*, 2(6), 268-270.
- Loehr, J.E. (1986). *Mental toughness training for sport: Achieving athletic excellence*. Lexington, MA: Stephen Greene Press.
- Macdougall, H., O'Halloran, P., Shields, N., & Sherry, E. (2015). Comparing the well-being of para and olympic sport athletes: A systematic review. *Adapted Physical Activity Quarterly*, 32(3), 256-276.

- Mack, M. G., & Ragan, B. G. (2008). Development of the mental, emotional, and bodily toughness inventory in collegiate athletes and nonathletes. *Journal of Athletic Training, 43*(2), 125-132.
- Middleton, S. C., Marsh, H. M., Martin, A. J., Richards, G. E. & Perry, C. (2004). Discovering mental toughness: A qualitative study of mental toughness in elite athletes. *International Journal of Sport and Exercise Science*.
- Morazuki, S. R., & Bakar, O. N. A. (2008). Perbandingan tahap kekuatan mental atlet lelaki dan atlet perempuan dalam acara silat seni dan silat olahraga negeri Johor.
- Nicholls, A. R., Polman, R. C., Levy, A. R., & Backhouse, S. H. (2008). Mental toughness, optimism, pessimism, and coping among athletes. *Personality and individual differences, 44*(5), 1182-1192.
- Omar-Fauzee, M. S., Saputra, Y. H., Samad, N., Gheimi, Z., Asmuni, M. N., & Johar, M. (2012). Mental toughness among footballers: A case study. *International Journal of Academic Research in Business and Social Sciences, 2*(1), 639.
- Powell, A. J., & Myers, T. D. (2017). Developing mental toughness: Lessons from paralympians. *Frontiers in psychology, 8*, 1270.
- Rostami, R., & Mohammadi, N. (2015). A comparative study on emotional intelligence and mental toughness for visually impaired male and female athletes. *International Journal of Kinesiology & Sports Science, 3*(4), 74
- Sheard, M., Golby, J., & Van Wersch, A. (2009). Progress toward construct validation of the Sports Mental Toughness Questionnaire (SMTQ). *European Journal of Psychological Assessment, 25*(3), 186-193
- Suhaila S. (2008). A study of the level of mental strength among university-level karate athletes. Unpublished thesis, Selangor: Faculty of Education Universiti Teknologi Malaysia.
- Timpka, T., Alonso, J. M., Jacobsson, J., Junge, A., Branco, P., Clarsen, & Renström, P. (2014). Injury and illness definitions and data collection procedures for use in epidemiological studies in Athletics (track and field): consensus statement. *Br J Sports Med, 48*(7), 483-490
- Yadav, A., Mehtaa, D., Verma, B., & Bhagirathi, E. S. (2013). A study of mental toughness of high and low level cricket players of Madhya Pradesh. *International Journal of Sports Sciences & Fitness, 3*(1)
- Zainal Abidin, Z., Geok, S. K., Yusof, A., & Samsudin, S. (2016). Mental Toughness Among Negeri Sembilan Sports School Football Players Graduate Research in Education (GREduc) Seminar, 547-554