Relationship Between Mental Toughness, Sports Competition Anxiety and Performance among Women’s Hockey Team

Abstract—Psychological factors such as mental toughness and competition anxiety is important psychological attribute in determining success. The objective of this study was to examine the relationship between mental toughness, sports competition anxiety and performance among women’s hockey team. Instruments used in this study were Mental Toughness Questionnaire, Sport Competition Anxiety Test, and basic skills test in hockey. Results showed that the players had low level of mental toughness and moderate to high level of anxiety. Pearson Correlation analysis revealed that overall mental toughness was negatively related to competition anxiety. For the skill tests, results showed that players had high skills on Multi Target Push and moderate skills on Straight Drive Hit, and Shooting from 16 Yards. Analysis of correlation showed that there was no significant correlation between the mental toughness and competition anxiety with all the skill tests. In conclusion, the study showed that the players had low level of mental toughness, moderate to high level of anxiety and basic skills in hockey. This study suggests that the players need to undergo psychological skill training to improve their mental toughness and to ensure that anxiety is at an optimal level in order to achieve excellent performance in competitions.

Keywords—mental toughness, competition anxiety, hockey.

I. INTRODUCTION

Research in applied sport sciences agree that there is a great need for mental training in addition to technical, tactical and physical training to help athletes to reach their peak performance and excel during competition [1-3]. At highest level of competition, almost every athlete possesses the same physical, technical, tactical and skill level. However, only one winner emerges. According to Cox [4], the world class athletes can be differentiated from less skilled athletes by their psychological profiles. Psychological profiles that include situational measures of psychological states have been shown to be the most accurate in predicting level of athletic performance. Most top athletes and coaches believe that psychological factors play a crucial role to become a champion. Many people believe that mental toughness and competition anxiety is an important psychological attributes in determining success [5, 3, 6].

The athletes who possesses high mental toughness are more capable to regulate negative and potentially debilitating emotions such as competition anxiety. According to [7] mental toughness is define as having the natural or developed psychological edge that enables athletes to cope better than opponents in focused, confident, and in control under pressure.

Anxiety is negative emotional state in which feelings of nervousness, worry and apprehension are associated with activation or arousal of the body [8]. Competition anxiety occurs when an athlete perceives a competitive situation as potentially threatening, resulting in an aversive emotional response [9]. Although some level of competition anxiety is considered to be normal, when competition anxiety exceeds a threshold level it can become detrimental to performance, motivation, and enjoyment [10, 11]. These negative effects may be particularly important in hockey, where levels of competition anxiety are relatively high and can be detrimental to performance. Despite widespread agreement on the importance of mental toughness and anxiety in sports performance, research in this area remain largely unexplored [12]. Therefore, focus in this study was to examine mental toughness and competition anxiety among women’s hockey players. We also examine if there is any relationship between anxiety, mental toughness and hockey performances among the players.

II. METHODS

A total of 18 SUKMA women’s hockey players from a state team preparing for the Sukuk Malaysia (SUKMA) games 2018 participated in the study. Mental toughness of the players were measured by using the Mental Toughness Questionnaire...
(MTQ) developed by [13] translated to Bahasa Malaysia by [14]. Sport Competition Anxiety Test (SCAT) developed by [15] translated by [16] used to measure competition anxiety of the players. The questionnaires was found to be valid and reliable [14, 16]. Three basic skill tests from a test battery of the hockey skills, developed by [17] were used to evaluate the basic skills performance in hockey.

Mental Toughness Questionnaire (MTQ) consists of five categories namely: reboundability, handling pressure, concentration ability, level of confidence, motivation. The MTQ questionnaire consists of thirty items. Every statement has two possible responses which are True or False. A score of 6 in any one of the five sections indicates a special strength in that area. A score of 5 indicates solid skill and 4 or less highlights that particular area as a mental weakness that needs to be addressed. A score of 26-30 indicates strength in overall mental toughness. A score of 23-25 indicates average to moderate skill in mental toughness. A score of 22 or below means athletes have low mental toughness and need to start putting more time into the mental training area.

The Sport Competition Anxiety Test [15] commonly known as SCAT test, is a self-reporting questionnaire about trait anxiety. The SCAT analyses an athlete’s responses to a series of statements about how they feel in a competitive situation. The SCAT contain 15 items, 10 of which measure symptoms associated with anxiety, with five others that are not scored included to reduce the likelihood of an internal response-set bias. The scores for the 10 items are summed to provide an overall measure, with a high score reflecting a greater tendency to experience competitive anxiety. A score of less than 17 indicates a low level of anxiety, 17 to 24 an average level of anxiety, and more than 24 a high level of anxiety. The SCAT has demonstrated adequate psychometric properties [15].

The study used three basic skill tests from a test battery of the hockey skills, developed by [17]. The test designed to evaluate fundamentals skills in hockey such as hitting, pushing and goal shooting skills. Skill tests battery selected for this study were Straight Drive Hit to evaluate the hitting skill, Multi Target Push to evaluate the pushing skill and Shooting from 16 Yards to examine the goal shooting skills. Validity, reliability and objectivity of the skill tests were established on all selected test items [17].

Descriptive statistics were used to measure the mean and standard deviation of mental toughness, anxiety and performance of the hockey skill tests. Pearson Correlation was used to examine the relationship between mental toughness, competition anxiety and performance of hockey skill tests. A significant value was set at p<0.05.

### III. RESULTS AND DISCUSSION

A summary of mental toughness scores are presented in Table I. Results showed that all respondents scored below 21, indicates that they had low skills of mental toughness and need to start putting more time into the mental training area.

<table>
<thead>
<tr>
<th>Score</th>
<th>Number of players</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 - 30 (High)</td>
<td>None</td>
</tr>
<tr>
<td>2-25 (Moderate)</td>
<td>None</td>
</tr>
<tr>
<td>21 and below (Low)</td>
<td>18</td>
</tr>
</tbody>
</table>

The mean values and standard deviation of each of the five subscales of MTQ are presented in Table II. Descriptive analysis showed that all players had low mental toughness in concentration (M=3.83, SD=.70), reboundability (M=2.78 SD=1.0), handling pressure (M=2.94 SD=1.26), confidence (M=2.44, SD=.78), and motivation (M=1.44, SD=.98). Overall score of mental toughness (M=13.44, SD=.38) indicated that they had low level mental toughness.

<table>
<thead>
<tr>
<th>Subscales</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration</td>
<td>3.83</td>
<td>0.70</td>
</tr>
<tr>
<td>Reboundability</td>
<td>2.78</td>
<td>1.00</td>
</tr>
<tr>
<td>Handling Pressure</td>
<td>2.94</td>
<td>1.26</td>
</tr>
<tr>
<td>Level of Confidence</td>
<td>2.44</td>
<td>0.78</td>
</tr>
<tr>
<td>Motivation</td>
<td>1.44</td>
<td>0.98</td>
</tr>
<tr>
<td>Overall Mental Toughness</td>
<td>13.44</td>
<td>2.38</td>
</tr>
</tbody>
</table>

Analysis of sport competition anxiety showed that the players had moderate to high level of anxiety (M=23.83 SD=2.96). Descriptive analysis revealed that 12 (66.6%) of the players scored high level of anxiety while 6 (33.4%) of them scored moderate level (Table III).

<table>
<thead>
<tr>
<th>Score</th>
<th>n</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 - 30 (High)</td>
<td>12</td>
<td>66.6</td>
</tr>
<tr>
<td>17 - 23 (Moderate)</td>
<td>6</td>
<td>33.4</td>
</tr>
<tr>
<td>16 and below (Low)</td>
<td>none</td>
<td>-</td>
</tr>
</tbody>
</table>

A Pearson product-moment correlation coefficient was computed to assess the relationship between the mental toughness and competition anxiety. The analysis revealed that overall mental toughness was significantly and negatively related to competition anxiety (r=-0.64, n=18, p<0.04). Thus, the results indicates that players with low mental toughness had higher competition anxiety.

For the skill test, only 16 out of 18 players took the test as two of the goalkeepers were excluded. Table IV showed the descriptive data of the Hockey Skill Tests. The results showed that players had high skills on Multi Target Push (M=28.31,
SD=2.68) and moderate skills on Straight Drive Hit (M=13.75, SD=5.63), and Shooting from 16 Yards (M=6.31, SD=2.73).

### TABLE IV. DESCRIPTIVE SCORE OF THE SKILL TEST

<table>
<thead>
<tr>
<th>Skills Test</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight drive hit</td>
<td>13.75</td>
<td>5.63</td>
</tr>
<tr>
<td>Multi target push</td>
<td>28.31</td>
<td>2.68</td>
</tr>
<tr>
<td>Shooting from 16 yards</td>
<td>6.31</td>
<td>2.73</td>
</tr>
</tbody>
</table>

A Pearson product-moment correlation coefficient was computed to assess the relationship between the mental toughness, competition anxiety and skills test performance of the players. Results showed that there was no significant correlation between the mental toughness with all the skill tests. Likewise there was no significant correlation between competitive anxiety and the skill tests. Correlation analysis showed that there is no significant correlation between mental toughness and straight drive hit (r=0.07, n=16, p=0.78), multi target push (r=0.08, n=16, p=0.75) and shooting from 16 yards (r=0.08, n=16, p=0.76). There was also no significant correlation between anxiety level and performance of straight drive hit (r=-0.26, n=16, p=0.33), multi target push (r=0.18, n=16, p=0.51) and shooting from 16 yards (r=0.14, n=16, p=0.60).

### IV. CONCLUSION AND SUGGESTION

This study seeks to examine the relationship between mental toughness, competition anxiety and hockey performance among women’s hockey players. Results showed that the players had low level of mental toughness in all the subscales which were concentration, reboundability, handling pressure, confidence, and motivation. This is something to worry since many researchers had reported that mental toughness as a significant contributor to sports performance [18]. Previous research on mental toughness and performance has consistently shown that better performances of both cognitive and motor skills are associated with higher levels of mental toughness [19, 20] and that elite athletes have higher mental toughness than lower level performers [21, 22]. In this study, the findings showed that all the players scored less than 4 for all the subscales of mental toughness which means the players have low mental toughness. Therefore it is suggested that the players should have proper psychological skills training session.

Results showed that women’s hockey players have moderate to high level of competition anxiety. A total of 12 out of 18 players had high level of anxiety. This results showed somewhat worrying because previous research had proven that the experience of anxiety before and during athletic competitions can have a variety of unwanted outcomes, including poor athletic performance [23-24]. Although some level of competition anxiety is considered to be normal, when competition anxiety exceeds a threshold level it can become detrimental to performance, motivation, and enjoyment [25, 9]. Various anxiety reduction technics in sports and exercise settings can be introduced to help the players to cope with anxiety.

Pearson Correlation analysis showed a significantly negative correlation between mental toughness and competition anxiety. Low score in mental toughness is found to be related with high score of competition anxiety. This result is consistent with earlier studies that reported athletes who are not strong mentally have higher anxiety level than others [12, 3, 6]. Our findings parallel to the definition of trait anxiety that is associated with a maladaptive tendency to interpret ambiguous information in a threatening way [8]. Thus, individuals with high trait anxiety are expected to have less ability to cope with the resultant anxiety associated with high pressure competitive situations. Previous research has shown highly trait-anxious subjects perceived more situations as threatening and faced more frequently intense and sustained anxiety states compared to subjects with low trait anxiety [25, 11]. Theoretically, this kind of dysfunctional thoughts and maladaptive behaviour tendencies seem to be conflicting with the attributes of control, challenge, commitment and confidence, which thought characterize a mentally tough individual as widely accepted in sport psychology [26]. Mentally tough individuals are characterized by a tendency to view their personal environment as controllable, to perceive themselves as capable and influential, to stay committed even under adverse circumstances and to consider problems as natural challenges [27]. Women’s hockey team who have low level of mental toughness and high level of anxiety are recommended to undergo psychological skill training to improve their mental toughness and to ensure that anxiety is at an optimal level in order to achieve excellent performance in competitions.

Our study revealed that there was no significant correlation between the mental toughness and competition anxiety with all the basic skill tests in hockey. There is no relationship between mental toughness and competitive anxiety with straight drive hit, multi target push and shooting from 16 yards test. The empirical research examining relationship between psychological variables such as mental toughness and anxiety with performances has inconsistent findings [28, 23]. Some research suggested that there is a relationship between anxiety and performance such as [23-24, and 9]. However other studies failed to find any relationship between the anxiety and performance such as [29-32]. Research on mental toughness and performance has consistently shown that better performances of both cognitive and motor skills are associated with higher levels of mental toughness [26, 20] and that elite athletes have higher mental toughness than lower level performers [21, 22]. The effects of mental toughness and anxiety on performance are currently unclear, but research concerning the related concept of hardiness suggests successful interventions might be possible [33]. To this end, research from a broad range of perspectives such as cognitive-behavioural, psychophysiological and developmental is likely.
to advance the understanding of mental toughness and anxiety and its importance in sport. If practitioners are to intervene effectively and enhance athletes’ mental toughness and optimal level of anxiety, then a better understanding of how mental toughness develops and how to cope with the anxiety in specific sports is necessary.

REFERENCES


