THE INFLUENCE OF MENTAL TOUGHNESS AND SKILL UNDERGOING THE REHABILITATION PROGRAM

Fatin Razak¹, Siti Fairuz binti Mohd Yusof², Pg Ahmad Hasanuddin Pg Tejudin³, Syahrul Anuar Ali⁴, Senin M.S⁵, Siti Azura binti Bahadin⁶, Santibuana binti Abd Rahman⁷
¹Faculty of Sports Science and Recreation, Universiti Teknologi MARA Pahang, Jengka Campus, Malaysia
²Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia
³Universiti Kebangsaan Malaysia (UKM), Malaysia
⁴Ministry of Defence, Brunei Darussalam
⁵Johor Islamic Studies College, Malaysia
⁶Independent Researcher, Malaysia
⁷School of Applied Psychology, Social Work and Policy, Universiti Utara Malaysia (UUM), Malaysia
fatinaqilah@uitm.edu.my

ABSTRACT

The investigation of mental toughness and skill focused undergoing rehabilitation program still in open question. The problem of drop-out patients in rehabilitation program cannot be solved by increase the intensity of the exercise, but psychological state must be improved as well. The aim of this research was to identify factor influences of mental toughness and skill undergoing the rehabilitation program. In addition, forty patients (N=40) from Shah Alam Physiotherapy Center involved in this research. This research is based on data obtained from Mental Toughness Questionnaires 48-item (MTQ48) by Clough, Earle and Sewell (2002) and Bull’s Mental Skill Questionnaires (1996) that collected the mental toughness and skill state between patients undergoing rehabilitation program. The data were analyzed to evaluate and determine the main outcome in MTQ48 and influences of mental skill undergoing rehabilitation program. The results of the study also suggested that outcome of MTQ48 influenced in male (511.14 ± 44.61), age 19-25 (507.69 ± 35.22), three to six weeks duration of the injury (524.5 ± 38.73), four to five times per week sport or physical activity (517.73 ± 37.46), above six years of sport experiences (607 ± 36.45) and normal in Body Mass Index (BMI) status (507.07 ± 26.87). MQS also was involved in the rehabilitation program which is imagery abilities (51.25 ± 3.43), mental preparation (57.28 ± 4.79), concentration (34.23 ± 7.42), self-confidence (45.05 ± 4.36), anxiety and worry management (38.33 ± 6.5), motivation (58.98 ± 3.06) and relaxation (48.38 ± 3.36). In conclusion, there are influences in mental toughness and skill in the rehabilitation program. Suggestion of this research, mental skill training may improve the mental toughness patients to encounter the stressful environment. Therefore, patients able to commitment toward the program and reduce the severity and period of recovery.

Keywords: MTQ48, Mental Toughness, Mental Skill, Rehabilitation.

I. INTRODUCTION

Every year, an expected 10 million people with combination several level population include children and older age experience an injury related to sport activities (Galli, Utley, Visek, Durhan, Staples & Zeplin, 2013). Medical awareness should be implemented first after injury and recovery phase involves the rehabilitation to heal and regain the ability of the injured part. In addition, the rehabilitation program may challenge the physical and psychological with intensity of the exercise. Therefore, certain people refuse to follow the program recommended due to lack of psychological strength (Nicholls, Levy, Polman & Backhouse, 2009). An organization needs effective management and leadership, including in sports (Abdul Jalil et al., 2021; Mohd Noh et al., 2021; Mustafa et al., 2021; Roszi et al., 2021; Tumisah et al., 2021). The early days, sports were restricted to physical activities.
activities, but today it has become the annual and common event in every world. A common sport that is usually practiced such as football has influences attracted world to the game. The occurrence of variation of physical activity leads to the growing number of injuries. Wrong technique or overtraining in exercise commonly expose the people to getting the injuries. Moreover, this phenomena offer variety types of injuries depending on the sport that they are involved in. The injuries should be treated and managed by rehabilitation center and sign-up for the treatment. In addition to a strong organization, self-management should also be implemented as best as possible (Irma et al., 2021; Suzana et al., 2021; Rohanida et al., 2021; Nazrah et al., 2021; Shahrulliza et al., 2021).

In general, rehabilitation is the procedure to recover the maximum ability after injury and includes returning power, strength and flexibility (Pashabadi, Kashanai Heidari, Shahbazi & Hoseini, 2011). It is completed through several exercise drills depending on the injured part. Typically, the rehabilitation program sought by athletes in purpose of returning to their normal condition. Rehabilitation is a crucial program does not only recover the injuries. It allows people to develop more strength in terms of mental which will lead to better performance (Wangman & Khelifa, 1998).

The management of injuries includes assessment of severity, screening and follow-up evaluation by medical or physiotherapy team to plan effectively in the rehabilitation program (Mohd Arafat et al., 2021; Sumaiyah et al., 2021; Hifzan et al., 2021; Shahrul et al., 2021; Helme et al., 2021). However, some people do not adhere to the rehabilitation program because of several outcomes related to psychology (Nicholls et al., 2009). Disobedience can effect in severity of the injury, improper injury management and reduce mental toughness. It has been presented that athletes refuse the treatment has constant harmful effects on rehabilitation outcomes (Marino, 2014). According to Crust and Keegan (2010), mental toughness components give effect to a successful rehabilitation program. Mental implementation with performance functions to improve the physical strength and ability. In addition, most studies look at in competition and practice environment that offered athletes stressful condition (Ford & Gordon, 1996). The investigation of mental toughness focused undergoing rehabilitation patients is still an open question.

Several strategies improve mental toughness related rehabilitation is self-talk and imagery to improve from failure by offering effective decision and perspective (Xiong, 2014; Farah et al., 2021; Syahrul et al., 2021; Quah et al., 2021; Ahmad Syarifuddin et al., 2021; Jumiah et al., 2021). A study by Evan and Hardy (2008) found that mental skill training could be an assistive factor in the recovery process. It was found that athletes adhere more to the program and improve their psychological ability when they expose to these strategies. Therefore, further study should implement and focus the component of mental skill to measure the mental toughness level. Qualities of psychological state such as anxiety and depression can encourage rehabilitation adherence and achievement (Marino, 2014). It related to mental toughness that be most essential psychological strategies for the effective rehabilitation program. Besides that, sport psychology examiners struggling to recognize how mental toughness influences the achievement in athletes (Crust & Azadi, 2010). A research from Globy and Sheard (2007), characteristics of mental toughness in rehabilitation involved survive the stress and difficulty of the program, get back from failure and commitment to rehabilitation goal. Therefore, patients may improve their ability and recovery from injury after completed the program. Injury occurrence caused patients decrease their physical and psychological state to perform the daily routine.

In another study, psychologist identifies that people with hardy traits were tougher and capable to stay fit when encountered with high intensities of pressure than people who have a less hardiness (Crust & Azadi, 2010). Psychologically, tough characters tend to be friendly as they are capable to stay peaceful and stress-free because they are competitive and have lesser anxiety levels. In addition, people with a great sense of self-belief tend to have better control of themselves (Mohd Ali et al., 2021; Parimala et al., 2021; Siti Jamilah et al., 2021; Nor Fauziyana et al., 2021; Noel et al., 2021). Thus, these people are positively leads to improved pain acceptance during rehabilitation.

Commonly, athletes require the high level of mental toughness whether in competition or rehabilitation. This is because sport activities offer intense situation to achieve the task goal. Thus, mental toughness is athletes act with the proper manner in faced difficulties of the environment (Crampton, 2014). Furthermore, athletes may improve their attitude and personality in order to perform the greatest of skill in daily routine. Mental skill training is development preparation to encouragement athletes’ mental toughness by regulating their behavior by promoting positive psychological state (Ahmad Shafarin et al., 2021; Junaidah et al., 2021; Farah Adibah et al., 2021;
Ahmad Shakani et al., 2021; Muhamad Amin et al., 2021). Moreover, commonly planned exercise only focuses the physical ability development, while overlooking the mental training. In the early 1990’s, people are involved in sports increased quickly and caused the competition is more pressure (Teodor & Claudin, 2013). Due to these phenomena, mental influences become significant ways to achieve outstanding successes in sports.

Moreover, mental skill training may implement in short or long term program to constantly maintain positive psychological state. Findings from research by Mleziwa (2014) found that mental skill training leads to improve the level of mental toughness. It had been beneficial to injured athletes through a rehabilitation program in order offer less stressful environment and avoid re-injury. In terms of sport activities, people more encourage to perform activities that may enhance their healthy state. Besides that, mental skill training may be practiced frequently to improve the experiences in a stressful environment (Santibuana et al., 2021; Nor Diana et al., 2021; Zarina et al., 2021; Khairul et al., 2021; Rohani et al., 2021). Previous study stated that mental training is most successful strategies in sports after prolonged practice and implementation (Sponholz, 2012). The practice develops more mental qualities with improved focus by managing anxiety and emotion while dealing with intense situations. It will increase the experiences of people in performing activities and may be responding in similar intense situations (Badaruddin et al., 2021, Abdul Rasid et al., 2021).

Furthermore, in rehabilitation programs, physiotherapist starts to implement mental skill training to injury management. It may speed up bodily and mental regaining from injury (Reese, Pittsinger & Yang, 2012). Thus, injury duration for recovery should be shortened and as for athletes, they rapidly return to play. The positive psychological factor may increase during the treatment by reducing the negative psychological state.

Experimental design

The research design for this study longitudinal design to identify the influences of mental toughness and skill undergoing rehabilitation patients. Two sets of questionnaires were used to evaluate influences of mental toughness and skill by used longitudinal result base on three periods of test (initial, transition & finale).

Conversion sampling method was used to complete this study. A total of forty (N=40) subjects which included male and women gender range under 18 to 40 years old. In addition, subjects must follow their recovery routine with physiotherapist more than six weeks rehabilitation program.

To evaluate mental toughness, the MTQ48 by Clough, Earle and Sewell (2002) was used. The validity of MTQ48 had been established with total trial-retest coefficient of 0.9 and able to create authority in indicate mental toughness level. This 48-items were answered based on a 5-point Likert measurement consisting 1 as a “strongly disagree” to 5 as “strongly agree” and completed between 10 and 15 min (Crampton, 2014).

The best complete existing evaluation of mental skills is a Bull’s mental skills questionnaire (1986) which was taken at the consequence evaluation to measure mental skill implementation undergoing rehabilitation program. Furthermore, this questionnaire was evaluated “relaxation, imagery, anxiety and worry management, goal setting, motivation, self-confidence and concentration” (Tibbert, 2013). There are 28 statements and answered based on a six point Likert scale starting with as “strongly agree” to 6 as “strongly disagree”.

Statistical analysis

Mean and standard deviation were used as to indicate represent result of descriptive statistics. Information of result data may be used in correlation of mental toughness on aspects gender and age. In addition, type and duration of their injury were taken in order to identify the differences each type of injuries. Physical activity frequency result may predict the characteristics among subjects that approach to higher mental toughness. Thus, physiotherapists understanding in avoid the re-injury among their patients. Repeated measure Anova with Bonferani adjustment to compare two or more factors in matched group. Besides that, the measurement assumes overall mean and standard deviation between independent data in random sampling. Mental toughness and skill consists several outcomes as parameters that studied.

Result

In result, data had been reasonably normally distributed, with most scores occurring in the center, tapering out towards the extremes. Criteria for normal distribution of scores which are a symmetrical and bell-shaped curve
Data were reported using mean and standard deviation based on scoring in questionnaire responses. In the beginning of the table had stated mean score for gender factor. Results had indicated male score high overall mean with 511.04 ± 44.62, than female for MTQ48 and MSQ. Besides that, subjects aged from nineteen to twenty-five years old had scored highest mean in MTQ48 as 507.69 ± 35.22. In Mental Skill Questionnaires, subjects under eighteen year old scored highest result with 339.75 ± 17.32.

Furthermore, duration of injury represents subject who suffered injury range in four to six weeks highest score 524.5 ± 38.73, 339.75 ± 17.38534 for both questionnaires. Subjects who perform one to three times per weeks physical activity had scored lowest mean for MTQ48 as 496.33 ± 33.17 and MSQ with 327.95 ± 13.95. Experiences in sports may affect the mental toughness and skill when subjects who had more than six years’ experience were resulted highest mean score in MTQ48 as 607 ± 36.46. While, subjects that had below than three years’ experience score highest mean 336.52 ± 22.8. In addition, BMI status shows subjects that normal weight scores slightly higher mean as 507.07 ± 26.87 in MTQ48 and MSQ as 335.97 ± 17.69.

Graph 1: Mental Toughness Questionnaires (Initial, Transition, Finale)
The graph above shows the interaction of mean scores on three periods of test (initial, transition, finale). Overall, mean plot of three period of test were showed dramatically inconsistent between factors. In addition, commitment was scored higher mean in three periods of the test. However, the life control and confidence factor was slightly declined after transition compare to other factors.

**Graph 2: Mental Skill Questionnaires (Initial, Transition, Finale)**

Based on the graph, there is interaction between MTQ48 outcomes with the period of the test. In result, the graph was revealed a motivation score higher mean for three periods of time. Through this, concentration and anxiety factor was slightly declined after transition. Otherwise, other outcomes which are imagery abilities, mental preparation and relaxation were slightly inclined on the graph.

Besides that, MSQ Table shows motivation outcome was presented greatest significant differences as value .072, $F (40,000) = 243.994^b$ with strong effect size .928. But, self-confidence seems had no significant differences between the period of the test.

**II. DISCUSSION**

Mental Toughness Questionnaires 48-Item (MTQ48) outcomes.

According to present data results, there are significant differences in outcomes of MTQ48 undergoing rehabilitation program. As the previous study, the mental toughness has been stated to certainly associate with injury recovery and physical strength, coping strategies and function of mental skills (Crust & Keegan, 2010). This is because when our physical has been injured, whether severe or not, mental also been interfered to perform any activity.

The result was indicated commitment as the main outcomes of MTQ48 that influenced in rehabilitation programs. The study concludes that subjects adhere to a rehabilitation program and success in performing exercise recommendation from a physiotherapist. In addition, recent studies had stated that an MTQ48 subscale, commitment has been frequently challenged to athletes for performance strategies (Crust & Azadi, 2013). Moreover, commitment was encouraged subjects to follow properly the rehabilitation program. The commitment able to manage the complex goal in the activities with enhanced positive emotional state to achieve high performance level. Previous study was found that deficiency of commitment contributed to drop-out from the rehabilitation program (Perry, Clough, Crust, Earle & Nicholls, 2013). They cannot survive the program and always give excuses, although for their recovery in injury phase.

In the rehabilitation program, subjects were experienced the stressful and difficult task. Therefore, challenge outcome was measured while subjects encounter the negative psychological state to complete the treatment. As recent studies had stated challenge seeker which means people who not avoid the difficult and unexpected condition, whether in daily life or physical activities (Wann, 2013). Moreover, challenge had been encountered by the subjects with enhanced their confidence level in completed the task. Past study was stated that the challenge may be disturbing the patient in rehabilitation, but it may improve their experiences toward similar intense environment (Marino, 2014).

Besides that, MTQ48 was shows emotional control had been identified in this study. These happen when the subjects were encounter the high intensity exercise that may decrease their positive expectation. Based on the study by Guillen and Laborde (2013), mentally high people may develop their positive psychological state toward intense environment and change negative emotional to positive outcome performance. Furthermore, subjects was
began to accept the injury and practice more in physical recovery exercise. In same recent study stated that sport or exercise activities offer adequate learning situation in to develop the positive emotional state (Guillen & Laborde, 2013).

In terms of confidence abilities, subjects show slightly increase their confidence level toward the rehabilitation because they able to completed high level of exercise. This supported by previous studies by Mleziza (2014), mental toughness contributed the confidence level to interact with surroundings and avoid from intimidated. The present study was revealed subjects capable to continue the practice without supervise from physiotherapist. They may increase the intensity the exercise while they at home and abilities of physical should be improved. Thus, mentally high people may enhance their confidence level in the exercise, whether for novice or professional athletes (Wann & Garden, 2013).

In rehabilitation, life control has own function of manages the critical decision toward positive performance outcome. The present study was shown the subjects tend to regulate their treatment routine with properly followed the instruction from the physiotherapist. The study by Wangman and Khelifa (1998) was presented that higher mentally patients in rehabilitation more capable of coping the stressful environment and maintaining the positive expectation. Besides that, the present study was identified the subjects able to complete the rehabilitation program in followed duration of recovery. The subjects may predict their recovery time before return to play. Previous study was stated that mentally tough people were enhanced abilities to prevent the unwanted information that may disturb the critical decision (Perry et al, 2013).

Next, for interpersonal confidence outcome was shows significant difference in this study. This is because the subjects being positive and less likely to be apprehensive while the rehabilitation program. Therefore, the subjects able adhere to the rehabilitation program and increase confidence level. Based on the study Coulter, Mallet and Singer (2016), people that have low mental toughness resulted less collaboration with social context and reduce confidence and commitment to the task goal. In addition, physiotherapist was being factored in the development of interpersonal confidence by inspiring the subject to achieve the goal. The findings of a recent study were revealed that coaches are capable to give confidence and mental preparation in encounter the stressful condition (Stamp, Crust, Swann, Perry & Clough, 2015).

**Mental Skill Questionnaires (MSQ) outcomes.**

Mental skill training offers the simple procedure to perform in the rehabilitation program. According to Reese et al (2012) had concluded study in mental training toward rehabilitation to improve mental ability and physical as well. Overall, the present study shows there are significant differences between “imagery ability, mental preparation, and anxiety and worry management, concentration, relaxation and motivation”. In addition, data were revealed there are significant differences between initial, transition and finale. The study concludes that subjects were improving their mental skill undergoing rehabilitation program. Moreover, subjects more understand about the mental skill due to frequently remind by the researcher while collecting the data.

Besides that, the result was revealed motivation was scored higher mean for three periods of time. Subjects were motivated by the researcher about the understanding of mental skill every time collected data. Previous studies had shown that coaches or personal advisor are the most effective way to improve the mental skill (Wann & Garden, 2013). Others outcome may be motivated from their relation by always give encourage and support to the subjects. Futhermore, subjects were used the motivation to encounter their stressful and difficult task toward rehabilitation. Previous studies had stated desire and encouragement from motivation skill develop a sense of control (Jackson et al, 2015). Motivation may improve their experiences in stressful condition.

Meanwhile, imagery ability was related to the rehabilitation program by offer perfection in exercise performance. In this study, subjects were initiated the visualization before began the treatment routine. Thus, subjects were increased their mental toughness level to follow the program. A study by Reese, Pittsinger and Yang (2012) had stated imagery abilities may be potential in sport and rehabilitation activities to improved attention to achieve task goal. The present study shows subjects slightly increase the skill in three periods of MSQ. The subjects were used the imagery to reduce the adversity in an intense situation and offer them to shorten the duration of treatment routine. Recent study had supported that development of mental toughness through mental skill exercise may reduce the complexity and recovery time (Hardy, Imose & Day, 2014).
Moreover, the present study shows that mental preparation had been used in the rehabilitation program. Previous study was found that people in high mentally tough more struggling to achieve the task goal through mental preparation (Sponholz, 2012). It revealed peoples may change the negative expectation to positive outcome performances. In addition, mental preparation offers the subject motivation to complete the exercise and able push themselves to positive outcomes. Therefore, the energy and spirit of the subjects may enhance in encounter the impossible task goals. Based on the study Pashabadi et al (2011), mental skill training such as mental preparation had improved the mental toughness level to maintain focus and attention during competition or intense environment.

In the rehabilitation program, anxiety and worry may influence the subjects while intense condition (Chein, Hsu, Ting & Wu, 2014). Moreover, the present study was shown subjects seems anxiety to perform the exercise due to pain feeling on initial phase. After implemented the skill, subjects able to ignore the negative psychological state such anger and fear. Besides that, anxiety and worry management was offer experience in intense stimulation and able to enhance activities performances. The common technique to implement anxiety and worry management such as breathing by taking time before performs the exercise. Previous studies had stated, anxiety may be increased when people inconsistently encourage to perform the activities without prepare their psychological state (Ibrahim, Jaafar, Kassim & Isa, 2016).

Furthermore, concentration was influenced in the duration of the rehabilitation program. The subjects maintain the attention while performs the rehabilitation routine and being aware of the environment. Thus, subjects able to regulate the energy in encounter the intense condition. Recent study had stated concentration ability cope with the demands of intense condition by increase and reduce the impact of physiological stress on performance (Anton, Howley, Pimental. Davis & Brown, 2016). Interestingly, the subjects able to completed the routine in time due to concentration. They were not delayed their exercise and strived to recovery the injury. The mental skill training offers the guidance that may help them develop the concentration level and encourage understanding of attention strategies. Previous study was supported that concentration is assistive for strengthening the mental toughness, quality (Xiong, 2014).

Relaxation had used to focus concentration and manage anxiety, so that muscles can lessen and people able control the central nervous system. In addition, there are several methods of relaxation in this study by imagery or biofeedback relaxation. A study by Teodor and Claudia (2013) had stated relaxation be helpful in manages the anxiety and tension. Due to this, the subjects able to reduce their fatigue level by perform properly with effective technique in the rehabilitation program. Exercise may affect physiological and psychological tension. Thus, mental skill implementation is important to encounter the intense condition. The findings of the study had reinforced by Xiong (2014), relaxation provides more passion and encouragement while people in tired to continue the activities.

Unfortunately, self-confidence technique in mental skill implementation was insignificantly related in this study. This is because the subjects were influenced by other mental skill such as motivation that adequate enough in mental toughness development. Previous studies had stated imagery abilities and motivation may improve the confidence level to perform in unexpected condition (Edward, 2007). Moreover, demographic factor such as gender (e.g.: male and female) also had influenced the self-confidence level to achieve positive outcome performance. Male are more confident than female due to genetic characteristic in males that have hardy personalities. A recent study by Nicholls et al (2009) had revealed self-confidence are develop through the variation in the fundamental level of mental toughness to difference socialization processes.

In conclusion, mental skill training may influence in the rehabilitation program to develop mental toughness. The training should perform frequently and difference intense condition. Therefore, physiotherapist able to structure the rehabilitation program and duration of injury may be reduces. Besides that, statistics of patients that drop-out from the program decreases due to adherence in perform the exercise.

III. CONCLUSION

Overall, mental toughness and skill contribute the high performance outcome. It can perform even in our daily life to achieve task goal. But, these strategies should be practiced frequently by experience different level of the situation. Due to that, people able to respond toward task rapidly and changes the negative perception of a positive outcome.
Furthermore, present study presented that people may improve their mental toughness by implementing the mental strategies such as motivation. While, commitment may improves to increase adherence among patients in the rehabilitation program. A challenge could be experienced in the intensive treatment procedure, but with practices of mental skill, people may encounter the difficulty.

Besides that, mental skill training is reliable to use in variation of the population. This is because the method in training may be performed by their own and easy to implement in daily activities. In critical decision, people may regulate the positive performance outcome by encourages psychological state in high levels of mental toughness.

In terms of MTQ48 and MSQ, there are significantly related to undergoing the rehabilitation program. Mental toughness and skill may be internal factors that influence the psychological state and adversity of the program. If people in high mentally tough, they capable to challenge themselves in intense condition. But for people in less mentally tough should be practices the mental skill in for mental toughness improvement. Moreover, sports and physical activities are able to be an arena to measure mental toughness and skill. The variation of the environment in activities was given the challenge and stress to people improves their mental toughness level. Thus, people may encounter the negative psychological state and perform the activities in high performance.

In conclusion, report for observation physiotherapist toward their patients had been offered in this study. There are influences of mental toughness and skill undergoing rehabilitation program. Future studies should be more specific the injury or subject’s category to indicate the main criteria to improve their achievement in the rehabilitation program.

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