INTI JOURNAL | eISSN:2600-7320
Vol.2021:11

Association of Psychological Stress and Mood in Ankle Injuries among Basketball Players during Conditional Movement Control Order

Puah Jia Qi[1], Edwin Gaspar[1], Nur Fadhilah B. Faiz[1], Viswanath Sundar[2], Vinodhkumar Ramalingam[1*]

[1]Faculty of Health and Life Sciences, INTI International University Malaysia, 71800 Nilai, Malaysia
[2]Department of Biomechanics, National Sports Institute, Kuala Lumpur, Malaysia

[*]**Email:** vinodh.ramalingam@newinti.edu.my

Abstract

Background: Ankle injuries in basketball are very common and have been increasing drastically over the past several decades. Based on studies, it believed that psychological effects play an important role in affecting sports injuries. In addition, during the conditional movement control order (CMCO), the athletes are forced to train at a reduced volume and intensity, which impairs performance and may lead to injury.
Objective: This study aims to find the association between psychological stress and mood in ankle injuries among basketball players during CMCO.
Methodology: An online questionnaire distributed via Google form links to basketball players who were involved in individual practice in Selangor, Malaysia. The collected data then analyzed using IBM SPSS Statistics 25. The Spearman correlation coefficient used to analyze the association between the Perceived Stress Scale (PSS), Profile of Mood State-Short form (POMS-SF) and the Foot Ankle Disability Index (FADI).
Results: Prevalence of ankle injuries among basketball players during CMCO was reported at 84.4%. Among the 151 participants, 7.9% had low perceived stress and 92.1% had moderate perceived stress. The association between FADI and PSS did not reach statistical significance, while the association between POMS-SF and FADI was significant at 0.01 and 0.05 level.
Conclusion: According to the findings, basketball players are more likely to get ankle injuries, and most players are in a negative mood during CMCO, which affects their regular training and may increase the injury rate.

Keywords

Ankle sprains, Basketball, Covid-19 pandemic, Mood, psychological stress.

Submission: 11 October 2021; **Acceptance:** 28 November 2021

Introduction

In Malaysia, a movement control order (MCO) introduced on 18 March 2020. During this period, most Malaysians have changed their daily routine, including their physical activity and exercise. Physical inactivity is known as the fourth risk factor of death (WHO, 2020), and the current COVID-19 pandemic has increased the probability of society becoming less physically active. Bortz II, (1984) stated that quarantine leads to physical inactivity, contributing to adverse mental and physical health changes. As of 19 Nov 2020, Malaysia had 50,390 cases with 37,254 recovered and 322 deaths. In order to prevent the further spread of the virus, Malaysia has implemented a conditional movement control order (CMCO) and extended based on the direction of Ministry of Health. The lockdown leads to a reduction in physical activity (PA) in the general population (Füzéki et al., 2020), and it is shown that physical inactivity can lead to certain psychological disorders such as anxiety, depression, and post-traumatic stress disorder. In order to control negative moods among the players, proper planning in maintaining PA and good emotional management were vital, as training and competition are limited (Lorenzo Calvo et al., 2021). Many psychological and social factors can also influence the occurrence of an injury. A study by Harmon et al., (1970) using the Social Readjustment Rating Scale (SRRS) discovered that football players with high life stress were more prone to be injured. In addition, a study found that high-stress among high school and college football players had a higher incidence of injury than low-stress players, and there appears to be a significant link between stress history and the likelihood of sports injury (Renee N Appaneal & Habif, 2013). Approximately 80-90% of studies have found a link between stress and sports injuries (Renee et al., 2009). A study among handball players reported a significant decrease in the training volume and intensity of practice in competitive and recreational sport, which has an impact on PA (Mon-López et al., 2020). Further physical inactivity might develop chronic musculoskeletal problems in sporting community (Holth et al., 2008).

Basketball is a popular sport practised all over the world, and according to (Moore et al., 2021) ankle injuries are the most affected condition suffered by basketball players. Ankle injuries can leave a player disabled with long-term symptoms, the most prevalent of which are pain, instability, crepitus, and weakness (McKay, 2001). The ankle is one of the most commonly injured parts in any sport (Fong et al., 2007) with lateral ankle sprain accounting for more than 75% of all ankle injuries (Nuhmani & Khan, 2013). According to the literature, studies extensively focused on intrinsic factors including a history of ankle sprains, anatomical variations, the size of the foot, the flexibility of the foot, the individual's weight, and gender (Beynnon et al., 2002). Extrinsic elements in any sport include the existence of air cells in the heel of the shoes, the landing surface, stretching before exercise, player posture, and equipment use (Kennedy et al., 2005; McKay, 2001). Whereas the psychological and emotional factors in relation to ankle injury during COVID-19 CMCO, have not been extensively studied.

Therefore, this study is needed to fill a research gap by determining the prevalence and association of ankle injuries, psychological stress, and mood states among basketball players.

Methodology

This quantitative, cross-sectional study conducted among basketball players in Selangor between March and April 2021 using an electronic questionnaire via social media portals such as Facebook, WhatsApp, Instagram, and Messenger etc. The minimum sample size estimated as 323 using the Epi Info 7 with a population size of 657,000 in Selangor, Malaysia. The estimated proportion was 0.3 and the confidence level was set at 0.95. The recreational and competitive basketball players were recruited aged between 18 and 35 years old. Those who were active in training and had a history of ankle injuries were included as the study participants. The players with a history of any traumatic injuries or injuries that not caused by playing basketball and who are not active in training were excluded from this study. The 179 participants who met the inclusion criteria with informed consent responded to the Foot and Ankle Disability Index (FADI), Perceived Stress Scale (PSS) and Profile of mood states-short form (POMS-SF) questionnaire. The study obtained ethical clearance from the INTI International University research and ethical panel from Malaysia (INTI-IU/FHLS-RC/BPHTI/7NY12020/021) before recruiting participants.

Outcome Measures of This Study

Foot and Ankle Disability Index

FADI is a 34-item questionnaire with two subscales: FADI and FADI Sport. In this present study, the 26-item in the FADI was applied with a 4-item linked to pain and a 22-item linked to functional activity with the intraclass correlation coefficient for the FADI was 0.89 (Hale & Hertel, 2005). Whereas the 8-item in the FADI Sport represented the participant's level of sport activities that involve challenging tasks that are important in sports was not the scope of the present study.

Perceived Stress Scale

PSS is a 10-item questionnaire commonly used in psychological tests to assess the stress perception of participants' feelings and thoughts. This scale is simple to comprehend and encompasses various levels of stress. According to (Cohen, 1988), PSS-10 scores had adequate internal consistency reliability 0.78 and moderate concurrent criterion validity with the amount of stress experienced in a typical week ($r = 0.39$, $p = 0.001$).

Profile of Mood States- Short Form

Profile of Mood States-short form (POMS-SF) is a standard validated questionnaire commonly used for psychological testing with 39 statements that describe the mood of the participants. Each item in POMS-SF registered as zero for "not at all" and four for "extremely", with the internal consistency grade ranging from 0.80 to 0.91. A Total Mood Disturbance (TMD) score of participants was determined by summing the negative subscale totals (tension, depression, exhaustion, confusion, and anger) and then subtracting the positive subscale totals (impact related to vigour and esteem).

Statistical Analysis

The data was analyzed using IBM SPSS software version 25. The participant's demographic data such as age, gender, BMI and level of players calculated as frequency of percentages. The outcome variables such as FADI, psychological stress, and mood were assessed using frequency distribution, mean, and standard deviation. Since the data was not normally distributed, the spearman correlation was used to measure of ankle stability and the direction of association between the two variables (psychological stress and mood subscales). The Spearman's correlation with a 2-tailed test used to analyze the association of psychological stress and mood subscales with FADI among basketball players with ankle injuries during CMCO. The significance value was set as $p<0.05$ while 95% was set as the confidence interval.

Results and Discussion

In total, 179 participants were involved in this study based on meeting the inclusion criteria, of which 53.1% were female and 46.9% were male. 52.5% of the participants were active in carrying out the individual training, and 47.5% stopped their training and physical activity due to CMCO. From the participants' responses, 84.4% (n=151) had experienced ankle injuries during CMCO and 15.6% (n=28) of the participants did not have ankle injuries.

Table 1. Demographic data of the study participants

		Frequency (%)
Gender	Female	95(53.1)
	Male	84(46.9)
Age	18-22	73(40.8)
	23-27	66(36.9)
	28-32	32(17.9)
	33-35	8(4.5)
BMI	Ideal	112(62.6)
	Obese	3(1.7)
	Overweight	27(15.1)
	Underweight	37(20.7)
Level of sports	Recreational	148(82.7)
	Competition	31(17.3)

The 151 participants with ankle injuries reported having a lower FADI score (66.16 ± 27.67), which indicates higher disability. Among the injured participants, 12 (7.9%) reported low perceived stress, while the remaining 139 (92.1%) reported moderate perceived stress, whereas there was no presence of high stress among the injured participants. Table 2 shows the results of the mean and SD of the POM-SF score among the 151 participants. The TMD of the participants was (20.30 ± 13.60) calculated by summing the totals of the negative subscales and then subtracting the totals of the positive subscales. Among the subscales in POM-SF, depression got the highest mean and SD (7.25 ± 6.33) and confusion got the lowest mean and SD (3.54 ± 3.48).

Table 2. Demonstrates the participants Mood States

Profile of Mood States- short form	n=151 Mean	Std. Deviation
Total Mood Disturbance	20.30	13.60
Tense	6.23	3.05
Depression	7.25	6.33
Anger	4.07	3.22
Fatigue	4.67	3.13
Confusion	3.54	3.48
Vigor	5.46	6.30

Based on the results, the Spearman's Correlation analysis of FADI and PSS among basketball players does not reach the statistical significance of r=-0.055, p=0.464. On the other hand, the FADI and POMS-SF subscales showed a significant correlation level of 0.01 and 0.05 (Table 3). This indicates that participants' mood, such as anger, fatigue, and vigor, cause functional impairments in ankle-injured participants.

Table 3. Correlation coefficient values (Spearman's rho) between FADI and POMS-SF subscales

	Tense	Depression	Anger	Fatigue	Confusion	Vigor	FADI
Tense							
Depression	.765**						
Anger	.777**	.704**					
Fatigue	.857**	.832**	.788**				
Confusion	.730**	.822**	.787**	.787**			
Vigor	.309**	.256**	.558**	.439**	.549**		
FADI	.055	.012	.185*	.195**	.069	.343**	

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

Basketball has the highest rate of ankle injuries, estimating around 92% reported in elite players (Tummala et al., 2018). Likewise, the present study reported 84.4% of ankle injuries with higher functional impairments among recreational and competitive basketball players. Studies reported that stress responses and the history of stressors had the strongest associations with injury rates (Renee N Appaneal & Habif, 2013; Ivarsson et al., 2017). In contrast, the present study results showed there was no significant link between psychological stress and FADI. Though the incidence of ankle injuries is high during CMCO, psychological stress is not the major factor that affects the FADI. Furthermore, due to the cancellation of major competitions during the CMCO, the incidence of ankle injuries reported among the recreational players (82.7%) was higher than among competitive basketball players (17.3%).

The association of mood subscales with FADI in the present study supports the idea that psychological measures can help in predicting athletic injury (Galambos et al., 2005). Besides that, a study by (Galambos et al., 2005) showed that mood scores could predict 50% of the variance in stress scores, particularly vigor, depression, and tension. In contrast, another study found that injured athletes' psychological attributions and emotional representations are generally poor and

the mood subscales such as tension, anger, depression, frustration, and boredom are emotional responses to sports injuries (van Wilgen et al., 2010). Previous research has found that athletes who report negative mood states are more likely to be injured (Renee N Appaneal & Habif, 2013; Galambos et al., 2005; Wiese ‐ Bjornstal, 2010) and that athletes who receive support from their athletic trainers are less likely to have these symptoms (Grant, 2018). However, the ankle injury participants in the current study had disturbed moods and did not have the opportunity to receive support from the trainers due to the CMCO.

The study was limited by the fact that the sample size requirement (n = 323) was not achieved. Furthermore, because the study participants did not participate in sports activities during the CMCO, the study was limited to not using the FADI Sport's 8-item, which represented the participant's level of sports activities. The authors recommend the need to explore the various levels of basketball players and their psychological parameters. Since the different structures in the lower extremities are associated with various risk factors that cause ankle injuries (Kang & Ramalingam, 2018) , investigating their association will give a new insight into basketball injuries.

Conclusion

This research showed that there is an association between psychological moods and ankle instability, which indicates participants with mood disturbance were highly prevalent for ankle injury.

Conflict of interest

The author(s) declare(s) that there is no conflict of interest.

References

Appaneal, Renee N, & Habif, S. (2013). Psychological antecedents to sport injury. In *The psychology of sport injury and rehabilitation* (pp. 26–42). Routledge.

Appaneal, Renee Newcomer, Levine, B. R., Perna, F. M., & Roh, J. L. (2009). Measuring postinjury depression among male and female competitive athletes. *Journal of Sport and Exercise Psychology*, *31*(1), 60–76.

Beynnon, B. D., Murphy, D. F., & Alosa, D. M. (2002). Predictive factors for lateral ankle sprains: a literature review. *Journal of Athletic Training*, *37*(4), 376.

Bortz II, W. M. (1984). The disuse syndrome. *Western Journal of Medicine*, *141*(5), 691.

Cohen, S. (1988). Perceived stress in a probability sample of the United States.

Fong, D. T.-P., Hong, Y., Chan, L.-K., Yung, P. S.-H., & Chan, K.-M. (2007). A systematic review on ankle injury and ankle sprain in sports. *Sports Medicine*, *37*(1), 73–94.

Füzéki, E., Groneberg, D. A., & Banzer, W. (2020). Physical activity during COVID-19 induced lockdown: recommendations. *Journal of Occupational Medicine and Toxicology*, *15*(1), 1–5.

Galambos, S. A., Terry, P. C., Moyle, G. M., & Locke, S. A. (2005). Psychological predictors of injury among elite athletes. *British Journal of Sports Medicine*, *39*(6), 351–354.

Grant, T. (2018). The Effect of Psychological Response on Recovery of Sport Injury: A Review of the Literature.

Hale, S. A., & Hertel, J. (2005). Reliability and sensitivity of the Foot and Ankle Disability Index in subjects with chronic ankle instability. *Journal of Athletic Training*, *40*(1), 35.

Harmon, D. K., Masuda, M., & Holmes, T. H. (1970). The social readjustment rating scale: a cross-cultural study of Western Europeans and Americans. *Journal of Psychosomatic Research*, *14*(4), 391–400.

Holth, H. S., Werpen, H. K. B., Zwart, J.-A., & Hagen, K. (2008). Physical inactivity is associated with chronic musculoskeletal complaints 11 years later: results from the Nord-Trøndelag Health Study. *BMC Musculoskeletal Disorders*, *9*(1), 1–7.

Ivarsson, A., Johnson, U., Andersen, M. B., Tranaeus, U., Stenling, A., & Lindwall, M. (2017). Psychosocial factors and sport injuries: meta-analyses for prediction and prevention. *Sports Medicine*, *47*(2), 353–365.

Kang, A. L., & Ramalingam, V. (2018). Risk factors for lower extremity injuries in young badminton players. *Scientia Medica*. https://doi.org/10.15448/1980-6108.2018.2.28939

Kennedy, J. G., Knowles, B., Dolan, M., & Bohne, W. (2005). Foot and ankle injuries in the adolescent runner. *Current Opinion in Pediatrics*, *17*(1), 34–42.

Lorenzo Calvo, J., Granado-Peinado, M., De la Rubia, A., Muriarte, D., Lorenzo, A., & Mon-López, D. (2021). Psychological States and Training Habits during the COVID-19 Pandemic Lockdown in Spanish Basketball Athletes. *International Journal of Environmental Research and Public Health*, *18*(17), 9025.

McKay, G. D. (2001). Ankle injuries in basketball: injury rate and risk factors. *British Journal of Sports Medicine*, *35*(2), 103–108. https://doi.org/10.1136/bjsm.35.2.103

Mon-López, D., de la Rubia Riaza, A., Hontoria Galán, M., & Refoyo Roman, I. (2020). The impact of Covid-19 and the effect of psychological factors on training conditions of Handball Players. *International Journal of Environmental Research and Public Health*, *17*(18), 6471.

Moore, M. L., Haglin, J. M., Hassebrock, J. D., Anastasi, M. B., & Chhabra, A. (2021). Management of ankle injuries in professional basketball players: Prevalence and rehabilitation. *Orthopedic Reviews*, *13*(1).

Nuhmani, S., & Khan, M. H. (2013). LATERAL ANKLE SPRAIN—AN UPDATE. *Journal of Musculoskeletal Research*, *16*(04), 1330003.

Tummala, S. V., Hartigan, D. E., Makovicka, J. L., Patel, K. A., & Chhabra, A. (2018). 10-Year Epidemiology of Ankle Injuries in Men's and Women's Collegiate Basketball. *Orthopaedic Journal of Sports Medicine*, *6*(11), 1–9. https://doi.org/10.1177/2325967118805400

van Wilgen, C. P., Kaptein, A. A., & Brink, M. S. (2010). Illness perceptions and mood states are associated with injury-related outcomes in athletes. *Disability and Rehabilitation*, *32*(19), 1576–1585.

Wiese-Bjornstal, D. M. (2010). Psychology and socioculture affect injury risk, response, and recovery in high-intensity athletes: a consensus statement. *Scandinavian Journal of Medicine & Science in Sports*, *20*, 103–111.

World Health Organization (WHO). (29 December 2020). Retrieved from https://www.who.int/news-room/fact-sheets/detail/physical-activity