UNIVERSITI PUTRA MALAYSIA

COMPARING DIFFERENCES BETWEEN PSYCHOLOGICAL DISTRESS AND PHYSIOLOGICAL MARKERS IN FIRST DIVISION FOOTBALL PLAYERS

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By

FARAH LAYTH NAJI

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Master of Science

November 2017

DEDICATION

To
My grandma that I wish she was here to see me graduated
My parents Dr. Layth Naji & Dr. Shawoadh Alyasiri,
My beloved brother Ammar
The person who encouraged me most and pushed me to finish the study Mohammed Faiz
For their endless love support and encouragement
My friends and all the people in my life who touch my heart,
I dedicate this thesis.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

COMPARING DIFFERENCES BETWEEN PSYCHOLOGICAL DISTRESS AND PHYSIOLOGICAL MARKERS IN FIRST DIVISION FOOTBALL PLAYERS

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November 2017

Chairman : Tengku Fadilah Tengku Kamalden, PhD
Faculty : Educational Studies

This study aimed to determine the level of stress as measured through different stress measurement methods (DASS questionnaire, SIgA, pulse rate and oxygen saturation). The highest scores for depression, anxiety, stress, pulse rate was before the competition (M=8.365, SD=2.733), (M=8.689, SD=3.962), (M=10.068, SD=3.094), (M=63.27, SD=5.008) respectively. While for salivary IgA and oxygen saturation, the highest score was at resting time (M=112.147, SD=14.431), (M=98.3, SD=1.893) respectively. Descriptive method was used for data collection. Participants were 74 football players of all the first division clubs in Karbala, Iraq, aged between 18-22 years old.

Depression, anxiety and stress were measured at three different time points (resting time, before the training, before the competition), while salivary IgA, pulse rate, and oxygen saturation measurement were measured through five different time points (resting time, before the training, after the training, before the competition, after the competition). Comparison of variables across time points using a one-way repeated measures ANOVA was significant for all variables except depression (depression: p=0.108, anxiety: p=0.018, stress:p=0.008, salivary IgA:p=0.001, pulse rate:p=0.001, oxygen saturation:p=0.001). It can be concluded that the combination of psychological distress and physiological markers can provide accurate measurements of stress.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

PERBANDINGAN PERBEZAAN ANTARA KEMURUNGAN PSIKOLOGI DAN PENANDA FISIOLOGI PADA PEMAIN BOLA SEPAK BAHAGIAN PERTAMA

Oleh

FARAH LAYTH NAJI

November 2017

Pengerusi : Tengku Fadilah Tengku Kamalden, PhD
Fakulti : Pengajian Pendidikan

Kajian ini bertujuan untuk menentukan tahap stres yang diukur menggunakan kaedah mengukuran stres yang berbeza (soal selidik DASS, SIgA, kadar nadi dan oksigen tepu). Skor tertinggi untuk kemurungan, kebimbangan, stres, kadar nadi adalah sebelum pertandingan (M=8.365, SD=2.733), (M=8.689, SD=3.962), (M=10.068, SD=3.094), (M=63.27, SD=5.008) masing-masing. Sementara untuk salivary Iga dan oksigen tepu, skor tertinggi adalah semasa waktu rehat (M=112.147, SD=14.431), (M=98.3, SD=1.893) masing-masing. Kaedah diskriptif telah digunakan untuk pengumpulan data. Peserta adalah 74 orang pemain bola sepak dalam kelab bahagian pertama di Karbala, Iraq, berumur diantara 18 – 22 tahun.

Kemurungan, rasa bimbang dan stres diukur pada tiga masa yang berbeza (waktu rehat, sebelum latihan, sebelum pertandingan), sementara salivary Iga, kadar nadi dan oksigen tepu diukur melalui lima masa yang berbeza (waktu rehat, sebelum latihan, selepas latihan, sebelum pertandingan, selepas pertandingan). Perbandingan pembolehubah merentasi lima titik masa menggunakan pengukuran berulang satu-hala ANOVA adalah signifikan untuk semua pembolehubah kecuali kemurungan (kemurungan:p=0.108, kebimbangan: p=0.018, stres:p=0.008, salivary Iga:p=0.001, kadar nadi:p=0.001, oksigen tepu:p=0.001). Dapat disimpulkan bahawa kombinasi kedua-dua kemurungan psikologi dan penanda fisiologi dapat memberikan pengukuran stres yang tepat.

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This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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Date:

Declaration by graduate student

I hereby confirm that:

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Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) were adhered to.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Introduction

Football is one of the most popular sport and it is played practically in all parts of Iraq at various levels of competence (Shehata, 2004). A number of individuals, especially the young are excited about playing this game for different purposes. However, since 1990, it seems that the performance of footballers in Iraq has been at a low level due to the wars (Hammermeister, Pickering, McGraw, & Ohlson, 2012).

A wide range of factors such as physical fitness, stress, nutrition, game load, injuries, finance etc., have an impact on the performance of footballers (Ivarsson, Johnson & Podlog, 2013). Most of the players must participate in a large number of games within leagues. Therefore, the players are under high pressure before and during the game (Dahl, 2013).

Sies (2013) defined 'stress' as the psycho-physiological reaction of an individual caused by several factors which disturb their inner balance. The concept of 'psychophysiological' varies depending on the impatience and tolerance level of an individual to deal with stress. Dahl (2013) mentioned that environmental factors, illness and nutrition factors cause stress leading to anger, aggression, and fear (Gottlieb, 2013). Individual players are at high risk of injury at the time when they have stress due to the loss of their attention (Ekstrand & Torstveit, 2012).

Selye (2013) states that high levels of stress and anxiety including the feeling of fear occur at a particular incidence and situation. The possible symptoms of anxiety are nausea, low motor coordination, low aggression and loss of composure. Other possible factors that may cause anxiety among the players are climatic change, high temperature, and humidity. The level of stress depends on the inner experience and perception of the players. Ekstrand and Torstveit (2012) revealed the important role of attention of players in the match. Any possible factor that causes stress needs to be resolved or the performance of players will be affected. The majority of the players perform better when relaxed and they can make effective decisions during the match which may help them to win the game. Players with a high level of stress tend to make wrong decisions at crucial moments because their decisions are influenced by pressure. This is why successful players try to stay calm because high pressure reduces the ability of the individual and they need to be motivated and control their anxiety level in order to play in the matches effectively (Dahl, 2013; Johari & Marzuki, 2017; Masten, Tušak, & Faganel, 2006).

According to Liu, Hopkins, and Gómez (2016), stress is cumulative, and other types of stress may directly suppress the immune system. Exercise is not a single stress factor. Other stress factors include family obligations, job responsibilities, financial responsibilities, and social interaction along with other crucial aspects that shape the life of an individual. All these factors affect the body of individual players which could directly affect the immune system. However, when additional stress takes place, the immune system and the mental condition of the players will be affected. Gottlieb (2013) states that the chronic stress negatively affects the different systems in the body. As a result, it has multiple side effects from a short-term revelation on these hormones, which might result in physical damage and mental illness. Individual players who continuously suffer from chronic stress are expected to experience symptoms such as depression, anxiety, and sleep issues. Physical stress in the chronic stress includes the risk of heart diseases, high blood pressure and digestive problems (Hegberg & Tone, 2015; Nicholls, Polman, & Levy, 2012).

Different methods are used to measure psychological stress such as Standard Stress Scale (SSS), Perceived Stress Scale (PSS), Social Readjustment Rating Scale (SRRS), Depression Anxiety Stress Scale (DASS), etc., and physiological stress based on scientific measurements of hormones (cortisol), antibodies (IgA), heart-rate, blood pressure, oxygen saturation, etc. Sports psychologists examine psychological and psychophysiological stress levels of the individual through different measurement methods for the analysis of heart rate, oxygen saturation, salivary IgA, DASS questionnaire (Noyan & Cohen, 2013; Hegberg & Tone, 2015; Pennebaker, 2012).

1.2 Problem Statement

Iraqi football achieved great achievement during the period 1970-1989. However, the wars in 1990 had negatively impacted all fields such as health, education, economics, etc. (Levy & Sidel, 2008; Shehata, 2004). According to the latest international statistics, there was a low percentage of literate people in Iraq; more than seven million Iraqi adults must suffer from illiteracy due to the wars and the economic blockade for more than 13 years (Al-Iraqi, 2015). In Iraq, the DASS questionnaire is widely used to measure the level of stress. The questionnaire has been translated into Arabic (Kimbrel et al., 2014; Street, Gradus et al., 2013) but Iraqi football players still need to read and be able to understand the questions. Unfortunately, some of the players in Karbala province are illiterate and the presentation of questionnaire items may need to be adjusted accordingly.

Hectic playing schedules along with high-level competition could lead to high levels of stress. The players are under high pressure because of the expectations of fans and continuous media reports. The fans expect players to win matches, and the fear of losing games increases anxiety and stress levels. The majority of the players suffer from pre-match stress, and team captains make great effort to implement different ways to motivate players and prevent them from suffering stress issues.

As stated by Feige, Morimoto, and Polla (2013), athletic stress is known as physiological and emotional responses at the time of difficult situations. For instance, an individual perceives the competitive demand higher than the player's ability. The reaction of stress is prolonged and intense, which affects game performance. The physiological symptom of stress includes high heart rate, fatigue, muscle tightness, and sweating, etc. Meanwhile, emotional stress reaction includes difficulty in concentration, making wrong decisions, nervousness and frustration. During the games and competition, it is important for the players to know how to manage the reaction of stress and use it as an advantage to win the game.

The immune system works as a defense mechanism; and it is based on the tissues, organs, cells along with cell products that work together to fight against the damaging substances (Reed and Raison, 2016). The damaging substances include pathogens which can result in diseases and infection. There are two crucial ways stress negatively influences the immune system. The first is that it formulates chronic inflammatory illness; and the second is that it minimizes the immunity of those who have strong and healthy immune systems. Therefore, individuals who are suffering from chronic social conflict are expected to have high stress; and it weakens the overall immune system to infectious and autoimmune illness (Jones & Thomsen, 2013).

Psychological distress is to measure psychological stress, depression and anxiety in general by using questionnaire such as Standard Stress Scale (SSS), Perceived Stress Scale (PSS), Social Readjustment Rating Scale (SRRS), Depression Anxiety Stress Scale (DASS), etc. Despite the significant impact of stress on psychological and physical aspects of the players, the common method used in the sports field to measure stress in Iraq is the DASS questionnaire. Nevertheless, it takes a long time to collect and analyze data through the questionnaire due to the relatively high number of illiterate respondents. According to Bourgeois, LeUnes and Meyers (2010), using the DASS questionnaire is an old method for measuring stress among individuals. This method is also regarded as complex because it has numerous domains associated with stress among individuals. Moreover, the DASS permits quantifying the seriousness of a patient's indications yet, the methods by which a patient's reaction to treatment can be measured. This approach is commonly used and can add to the analysis of anxiety or depression using other instruments. However, the DASS instrument is unable to assess the various side effects of depression and it is not intended to supplant a thorough clinical meeting (Masten, 2006). Additionally, due to its complexity and the poor literary used among Iraqi footballers, the use of the DASS questionnaire alone may not be appropriate for the measurement of the stress levels among Iraqi football players.

With the above in mind, alternative methods of measuring stress should be used concurrently. These methods include the measurement of physiological markers such as hormones (cortisol), antibodies (IgA), heart-rate, blood pressure, oxygen saturation, etc. However, some of these methods are expensive, and it is difficult to carry out in Iraq. Therefore, it will be more effective if there are alternative methods to measure stress levels of players via physiological markers. The suggested alternatives are the

measurement of salivary IgA, pulse rate, and oxygen saturation (Aşçı, 2016). For this reason, the main aim of the current research was to determine and compare the differences between psychological distress as measured through the DASS questionnaire with physiological markers measured through salivary IgA (SIgA), pulse rate and oxygen saturation during football training and competitive matches.

1.3 Objectives of the Study

The objective of this study is to determine the level of stress among the football players of the first division clubs in Karbala using different stress measurement methods (DASS questionnaire, SIgA, Pulse rate and Oxygen Saturation) at different stages (during resting time, before training match, after training match, before competition match and after competition match).

1.4 Research Questions and Hypotheses

To achieve the research objectives, one research question was addressed to determine and investigate the changing levels of DASS questionnaire, SIgA, Pulse Rate and Oxygen saturation of the football players. The hypotheses are also stated based on the measured variables. The details of research questions and hypotheses based on research objectives are presented as follows:

Research Questions:

RQ1: What is the depression level among the football players of the first division clubs in Karbala measured using the DASS questionnaire during resting time, before training matches, and before competition matches?
RQ2: What is the anxiety level among the football players of the first division clubs in Karbala measured using the DASS questionnaire during resting time, before training matches, and before competition matches?
RQ3: What is the stress level among the football players of the first division clubs in Karbala measured using the DASS questionnaire during resting time, before training matches, and before competition matches?
RQ4: What is the stress level among the football players of the first division clubs in Karbala measured using SIgA during resting time, before training matches, and before competition matches?
RQ5: What is the stress level among the football players of the first division clubs in Karbala measured using pulse rate during resting time, before training matches, and before competition matches?
RQ6: What is the stress level among the football players of the first division clubs in Karbala measured using oxygen saturation during resting time, before training matches, and before competition matches?

Research Hypothesis:

H_{o1}: There are no significant differences in Depression during resting time, before the training and before the competition among football players of the first division clubs in Karbala.
H_{o2}: There are no significant differences in Anxiety during resting time, before the training and before the competition among football players of the first division clubs in Karbala.
H_{o3}: There are no significant differences in Stress during resting time, before the training and before the competition among football players of the first division clubs in Karbala.
H_{o4}: There are no significant differences in Salivary IgA during resting time, before the training, after the training, before the competition and after the competition among the football players of the first division clubs in Karbala.
H_{o5}: There are no significant differences in Pulse rate during resting time, before the training, after the training, before the competition and after the competition among the football players of the first division clubs in Karbala.
H_{o6}: There are no significant differences in Oxygen saturation during resting time, before the training, after the training, before the competition and after the competition among the football players of the first division clubs in Karbala.

1.5 Significance of the Study

The researcher conducted this study because the researcher emphasizes the impact of stress on the performance and health of the players. This research aims to determine the levels and investigate the changes between the psychological distress and physiological markers among the football players of the first division clubs in Karbala during the resting time, before the training, after the training, before the competition, and after the competition. It is believed that the findings of the research are useful as it can contribute and help improve the knowledge of the coaches and football players to deal with stress. Moreover, it identifies how the level of stress affects the immune system of athletes along with the changes in their pulse rate, oxygen saturation, depression, anxiety and stress levels. Therefore, this study gives an idea if physiological markers can be used to measure stress and can be used in a combination with the DASS questionnaire to provide more accurate results.

1.6 Limitations of Study

Although the results of this research are practical and have useful implications, some limitations should be considered when interpreting the results. It is very difficult to control the circumstances of the surrounding areas such as the weather temperature, pollution, and samples. Some studies showed that high external temperature on can increase heart rate (Dahl, 2013; El Helou et al., 2012; Rushall, 1990), and, if the organs of the body are stressed at high levels, the performance of the players is negatively affected (Cahill et. al. 2013; Dahl, 2013). Pollution also affects the pulmonary and

vascular systems which in turn, impact blood pressure and heart rate. El Helou et al. (2012) indicated that weather temperature has a strong impact on heart rate and performance of the athletes. The results of marathon runners from 2001 to 2010 indicated that when air temperature increases, the speed of runners decreases, and the withdrawal rates increase. On the other hand, this study conducted in the first division clubs of Karbala province in the first division league season (2016-2017).

1.7 Delimitations of the Study

The following delimitation was set by the researcher. First, this study included only the first division clubs of Karbala province in the first division league season (2016-2017), between 18 and 22 of age male. Second, since Iraq is one of the war regions, only a few provinces are safe, and Karbala is the safest province to do the research. As such, the results may not be generalizable to other age, gender, and place.

1.8 Definition of the Terms

The following definitions contribute to a better understanding of the basic terms used in the current study.

1.8.1 Psychological Distress

According to Segrin and Badger (2014), Psychological Distress is defined as the unpleasant feelings and emotions which impact a person's level of function. It is a situation where human mind's activity is conflicting due to the external pressure and internal logic. Psychological distress causes physical unfitness and health issues. In the current study, psychological distress includes depression, anxiety, and stress. To measure psychological stress in general, DASS questionnaire 21 was used among football players during the resting time, before training match, and before competitions match.

1.8.2 Physiological Markers

Physiological markers are different methods to measure physiological stress.

1.8.2.1 Salivary IgA (SIgA)

It is the main immunoglobulin found in secretions such as mucus by tears, salivary and mammary glands. SIgA plays an important role in the protection of lungs, oral cavity, and guts. The level of SIgA varies within human's body, and it is high in salivary glands. SIgA has a direct interaction with the nervous system; the saliva level varies when a person gives a response to mental and physical stress (Pfaffe, 2011). In

this study, salivary IgA was gathered from the mouth by letting saliva drop in a special tube for collecting saliva to measure physical stress by using Salivary Secretory IgA Indirect Enzyme Immunoassay Kit among football players during the resting time, before the training match, after the training match, before the competition match, and after the competition match.

1.8.2.2 Pulse rate

It is the measurement of heart rate by counting how many times a person's heart is beaten in one minute. Pulse is the measurement which shows the beats of the heart per minute. A healthy person's heart beats have 40 to 60 pulse rate per minute. Pulse rate and heartbeat occur when a heart pushes blood to arteries and then arteries expand and contract because of the blood flow (Karmakar et al., 2011). In this study, pulse rate is a person's heartbeat that was measured from the sample's index finger to measure physical stress by using pulse oximeter among football players during the resting time, before the training match, after the training match, before the competition match, and after the competition match.

1.8.2.3 Oxygen saturation

Oxygen saturation is defined as the fraction of oxygen saturated hemoglobin relative to the total hemoglobin (unsaturated + saturated) in the blood. From previous studies, it is analyzed that a minimum level of oxygen in blood is required by the human body. The normal blood oxygen levels in the human body are in a range of 96- 99 or 100%. However, stress related to sports can significantly influence the oxygen saturation in blood (Casey, 2011). In the current study, oxygen saturation is the level of oxygen saturated in a person's hemoglobin that was measured from the sample's index finger to measure physical stress by using pulse oximeter among football players during the resting time, before the training match, after the training match, before the competition match, and after the competition match.

1.8.3 Football Players

Sharab (2011) defined a football player as someone who plays football, especially who considers playing football as their job. In this study, football players include all the first division clubs in Karbala province, namely Al-husseinya club, Al-hur club, Al-gadharah club and Al-hindiea club. The total football players of the four clubs in season (2016-2017) were (n=114). However, only (n=74) players were included in this study after excluding those who were injured, unhealthy, addicted to the drug, smokers, drink alcohol, received antibiotic therapy within two months before the study, took anti-inflammatory drugs, took supplementation, or had a cold. Their age range is between 18-22 years old, and all of them have 3 or more years of football playing experiences. All the players are males.

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