Biological Forum – An International Journal **7**(2): 09-12(2015)

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Studying of Winning or Losing on the Quality of Mood and Salivary Cortisol Concentrations in Female Futsalists

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(Received 29 May, 2015, Accepted 27 June, 2015)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: The purpose of this study is to evaluate the effect of the losing and wining on the profile of mood quality and on the salivary cortisol concentrations in female futsal players. Stress increases the competition in any sport. Stress, both physical and psychological, and pressures of competition and tolerance of these pressures change the secretion of stress hormones such as cortisol. Dangerous physiological effects caused by these changes may be very disturbing. The purpose of this research is to study the impact of losing and winning on the quality of mood profile and on the salivary cortisol concentrations in female futsal players. The design of this study is quasi-experimental and 18 female futsalists in Club Competitions participated in this study. *Saliva* samples were taken 30 minutes after the end of the competition in one winning game and in one loosing game. The athletes completed questionnaires related to emotional states s after the race. The quality of mood states of subjects was assessed by questionnaire of Brooms with 32 questions of mood states and salivary cortisol of athletes were assessed by ELIZA method. Single-group study design and Student t-test and Pearson's correlation coefficient were used to analyze the data. The results showed that cortisol levels and Broomz test scores of emotional states had significant difference at the end of the race. The data showed that winning and losing have significant effect on cortisol which is the indicator of stress and participation in the competition increased the mood states of female futsalists and this enhancement is more evident in losing.

Keywords: Cortisol, Profile, Mood, Winning or losing

INTRODUCTION

Sport is a science in which the scientific and professional issues of sport are concerned and the purpose of this science is that sport enthusiasts should consider all matters relating to sport sciences and apply them to be less affected and increase their skills in each sport through sport science (Free, 1389).

The ultimate goal of exercises is to improve performance. All athletes in each sport must work hard to develop performance. The success in the performance due to the adaptations made to the tissue and cellular level will be accomplished in the subsequent practice. The importance of winning or losing at the end of the official competition and hormonal changes, particularly hormones associated with stress after the sport events, attracted the attention of many researchers. Exposure to a variety of competitive conditions and the importance of winning result in changing of hormonal response of athletes and increase the frequency and severity of stress.

On the other hand the mood is one of the psychological variables that is sensitive to changes in amount and intensity of practice. The initial investigations in the field of swimming have shown that negative components of mood such as tension, depression, anger, fatigue and confusion increase and the vigor decreases following the periods of intense training. Even the three-day sudden increase in the intensity of practice enhances the overall mood disorders. In general, investigating the data in this area suggests that mood response to changes in the amount and intensity of exercise is not clear. Increasing and even decreasing the lack of change have been reported as mood disorders. Although many studies have been done about the effect of practice intensity changes on the hormonal response and mood, there is conflicting information due to differences in methodology (intensity, duration and type of program of study subjects) (Michael *et al.*, 2003, Ebrahimpur, 2003, Rietjens *et al.*, 2005, Amiri and Morandi (2003).

Stress of winning increased the number and severity of stressful collisions during the game so players have to cope with stressful life events during the competition. The studies have shown that stress, whether physical or mental, changes the function of heart and stress hormones. Cortisol which is one of the most important indicators of stress releases from the adrenal cortical section in response to the pressures on the mechanism (physical and mental) and enhances the effect of the catecholamine.

Cortisol raises the blood sugar and helps to break down the fat in the fat tissue, breaks down the protein, stimulates gluconeogenesis and reduces consumption of glucose by peripheral tissue. The most important drivers of the secretion of this hormone are the vigorous physical activity and the changes of this hormone depend on the intensity and duration of physical activity and nutrition of the individual (Vaez *et al.*, 2004, Limoee and Ghofranipour 2010).

The aim of the present study is to determine the changes in cortisol levels after success and failure in female futsal players during the tournament. However, the following topics will be discussed; 1) Winning and losing affects salivary cortisol concentration of women futsal players. 2) There is a relationship between salivary cortisol concentration and mood disorders of female futsal players in the competition.

MATERIALS AND METHODS

A questionnaire of mood states of Booms: A standardized questionnaire of mood states of Booms was used in this study. The validity and reliability of the questionnaire were verified before it is distributed among the participants. The questionnaire consists of 8 subscales and 32 questions. The minimum score in this questionnaire is zero and a maximum score is 128. The reliability of the researcher-made questionnaire was determined by calculating Cronbach's alpha coefficient. Cronbach's alpha for each subscale of the questionnaire including vitality, relaxation, happiness, tension, depression, anger, fatigue and confusion were 0.82, 0.77, 0.78, 0.79, 0.81, 0.83, 0.79 and 0.78 respectively. Cronbach's alpha for the questionnaire as a whole was 0.80.

Cortisol kit: The kits which are used in this study to measure the concentration of salivary cortisol were DEMEDITEC commercial kits which have been made in Germany. According to the manufacturer's instructions using ELISA, Start Fax 2100 model which is manufactured in company of Awareness was determined as an instrument in this study.

Data collection procedures: *Salvia* samples were taken as a pretest in resting days of athletes (24 hours without training and competition). In order to prevent the intervening factors in each stage, the athletes were asked to wash their mouth and then spit some of their saliva in to the sampling tube. Athletes' saliva samples collected in tubes were transferred to the laboratory immediately after sampling and they were frozen at -20°C. Questionnaires were filled by futsalists after losing and winning in order to get the post-test data. Salivary cortisol test was taken half an hour after losing and a winning in the dressing room.

Data analysis: The data were analyzed by SPSS version 18. The table of frequency, percentage, mean and variance were used in this study. The study hypotheses were tested according to the results using inferential statistics.

Methodology: Due to the fact that the purpose and nature of the stud y is quasi -experimental that includes pre-test and post -test, the theoretical studies of this research have been collected through library research methods including articles, books, magazines and reputable sites. In order to collect information related to the test of hypotheses, questionnaire and field study have been used. The statistical population of this study was total number of female futsalists and the sampling was done according to the higher number of female futsalists. The total number of players at the club for the Premier League and the base is 25 people. Of this number, according to the method which will be described in the next section, sampling is done. The available sample size was 22 participants who were ready for the study. The criteria for selecting subjects include: 1) physical health 2) no history of mental illness and hormonal disorders, 3) the history of sports, 4) a normal monthly period (28 days) and 6) absence of menstrual cramps. By considering these conditions, 4 participants who were ready for this study have been removed due to hormonal disorders and menstrual irregularities and remained 18 persons were considered as participants in this study.

RESULTS

Given that the confidence interval for changing the tension, depression, anger, and confusion is negative indicating that the mean in the losing state is high. The confidence interval for variables of vitality, peace and happiness is positive, indicating that the mean is higher in winning state.

According to the above table, it can be concluded that there is a positive relationship between cortisol and stress in the competition (winning and losing). It can be concluded that there is a significant and positive relationship between concentration of cortisol and anger.

It can be concluded that there is a significant and negative relationship between concentration of cortisol and vitality in competition. It can be concluded that there is a positive and significant relationship between cortisol concentration and fatigue in competition.

It can be concluded that there is significant and positive relationship between the concentration of cortisol and confusion. There is a significant and negative relationship between cortisol concentration and relaxation in competition. There is a significant and negative relationship between cortisol concentration and happiness in competition.

Table 1: Height distribution groups.

Height (cm)	Frequency	Percentage
Height < 170	3	16.7
170 < Height < 180	10	55.5
180 < Height	5	27.8
Total	18	100

Table 2: Distribution of exercise history of studied subjects.

History (year)	Frequency	Percentage
Year < 5	8	44.4
5 < year < 10	6	33.4
10 < year	4	22.2
Total	18	100

Table 3: Description of studied variables in won games.

Variable	Mean	SD	Lower	Upper
Tension	2.3	0.772	1.00	4.00
Depression	2.27	0.817	1.00	3.75
Anger	2.38	0.921	1.25	4.00
Vitality	3.59	1.06	2.25	5.00
Fatigue	2.44	0.976	1.00	4.00
Confusion	2.06	0.699	1.25	3.75
Relaxation	4.01	0.769	2.25	5.00
Welfare	3.87	0.858	1.25	4.75
Cortisol	5.74	0.489	5.00	6.67

DISCUSSION AND CONCLUSION

The results show that there is a relationship between losing winning and cortisol concentration. These results are based on many findings. Filer (2001) investigated the salivary cortisol in humans after losing and winning and their relationship with each other and with power of implicit motivation and he reported that there is a relationship between losing winning and salivary cortisil concentration. He also found out that the level of cortisol before and after the starting of game is more than the cortisol level at the start of competition (Filaire *et al.,* 2001).

Suttvn *et al* (1975) suggest that emotional stress associated with competition is a key factor for cortisol secretion. However, in line with these results, Kugler *et al* (1996) studied the effects of stress and cortisol in sport competitions on Myoglobin A and cortisol in football coaches. Their results showed that emotion significantly increase in salivary cortisol levels. The peak of cortisol concentration was observed between the two halves, which rose 100% and an hour after the game returned to the normal state.

Pantelidis (1997), in line with the previous findings, investigated the anxiety in tennis players and found out that the level of salivary cortisol didn't change during the practice session but this level increased during the game and similarly increased between first period of time in the break and after the game. Filler *et al* (2002), in line with current findings, investigated psychological stress of Judo athletes during the game. The results of the study showed that the cortisol concentration increased accurately, at the time of both games, compared to the time of rest but there was no change in the level of testosterone.

These results were in line with reports of Aguilar *et al* (2013) who studied testosterone, cortisol and anxiety in hockey players and argued that the cortisol of the defeated persons decreased dramatically and the cortisol of victorious people gradually increased. The adrenal central sympathetic system with the secretion of epinephrine and nor epinephrine and hypothalamic - pituitary adrenal with cortisol secretion are used as the objective index of stress. Cortisol which is known as a regulator of the immune response is a hormone secreted by the adrenal cortical glands. This powerful hormone is known as glucocorticoids, Hydrocortisol and simply name of cortisol. The most important action of cortisol is its metabolic action (Lac and Berthon 2000).

Cortisol with its metabolic action causes the muscle breakdown and tissues. The effects of cortisol secretion are appropriate for coping with severe psychological stress. In fact the stress or emotional stress, when faced with physical exercise, Induced nerve response from the periphery of the body to the hypothalamus. The hypothalamus secretes corticotrophin-releasing factor that stimulate the anterior pituitary gland to release the adrenocorticotropin. This hormone, in turn, causes the release of cortisol from the adrenal cortical to blood flow (William, 1379).

All researchers agree on the fact that, other than physical activity hat is associated with the competition, psychological arousal associated with competition affects on hypothalamic - pituitary - adrenal and enhances the production and secretion of cortisol. The results showed that there is a relationship between the win-lose and the mood quality of female soccer players. So that the variables of tension, depression, anger, confusion and fatigue were higher in losing state and variables of vitality, peace and happiness were higher winning state (Hasegawa, 2008).

In line with these results, Harris *et al* (1989) studied the relationship between salivary steroids and psychological parameters in male marathon runners. The results showed that the anxiety and aggressive behavior, in the game day, was significantly higher than the day before. The depression did not change compared to previous days. Cortisol levels were negatively correlated with aggressive behavior on the game day. Cortisol changes in the days before the game were correlated with changes in anxiety.

According to competition studied in this research, the results obtained in this study are consistent with a lot of previous studies. The current situations show that the competition stress, the anxiety level and excitement along with competition are the main factors affecting the secretion of cortisol. Since the difference of changes in cortisol of subjects in losing game was more than winning game, this was probably due to differences in public mood states and anxiety of participants in the losing game. In these studies, high levels of anxiety were associated with high levels of cortisol (Haneishi *et al.*, 2007). Based on the results, winning and losing affect the hormone cortisol which is an indicator of stress. It seems that cortisol reaction is the function of psychological stress along with competition since this hormone releases more in losing game and this competition stress is affected by stress hormones and hormonal changes are affected by physical and psychological stress during the competition.

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