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A STUDY ON THE PREVALENCE OF EATING DISORDERS AMONG NATIONAL LEVEL FEMALE BOXING PLAYERS IN SRI LANKA

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ABSTRACT

According to the Diagnostic and Statistical Manual of Mental and Behavioral Disorders (DSM IV) eating disorders include Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Eating Disorders Not Otherwise Specified (EDNOS). Athletes who take part in weight category sports often feel pressure to lose weight rapidly and they follow abnormal eating patterns to reduce their weight. Therefore, this study examined the prevalence of eating disorders among national level female boxing players. Subjects included were forty-five national level female boxing players in Sri Lanka, aged between 18 to 32 years. All the players were administered SCOFF questionnaire for screening and Eating Attitude Test (EAT- 26) to classify individuals at risk for eating disorders. Further female Athlete Screening Tool (FAST) questionnaire was used to identify the player's eating behaviors, physical activity level and personal beliefs regarding their eating habits. Body Mass Index (BMI) was taken as an anthropometric parameter of the players. Chi squared was used to find the relationship between eating disorders and the value of BMI. Results of SCOFF questionnaire showed > 2 marks by 53.34% and were screened as at risk. According to EAT- 26 and DSM VI criteria, 53.34% were found at risk and 46.66% were not. Among the risk players, 95.84% were Anorexia Nervosa 4.16% were Bulimia Nervosa. Considering the BMI level 26.66% players were within normal limit and 73.34% players were in the underweight, overweight and obese categories. Chi squared test results shows that there was a significant relationship between eating disorders and the value of BMI ($p<0.05$). This study revealed that there was high prevalence of eating disorders among national level female boxing players and it is important to each national level sports team should have the access to the service of a qualified nutritionist / dietitian to get dietary advices for minimize the risk of eating disorders.

Key Words: Eating Disorders, Female Boxing Players, SCOFF, EAT- 26, Body Mass Index

INTRODUCTION

Background of the study

Mental illnesses such as eating disorders can seriously disrupt a person's behaviors and daily diet. They are actual, curable medical conditions. It may distinguish between eating incredibly little food and greatly overeating. A people with an eating disorder might first only consume more or less of the food they enjoy, but eventually they will be forced to do so against their will. Apart from abnormal eating patterns, people who suffer from eating disorders are distress and also concerned about their body weight or shape. These disorders

frequently cooperate with other mental illnesses such as depression, substance abuse, or anxiety disorders. They are related to an extensive variety of negative psychological, physical, and social consequences. According to the "National Institute of Mental Health (NIMH)," eating disorders can seriously damage a person's growth, development, fertility, and general mental and social well-being when they first appear in children. Those with anorexia nervosa are 18 times more likely than people of similar age from the general population to die young. Both sexes are susceptible to eating disorders, however rates are 2.5 times higher in women and girls than in boys and men. If not treated properly, these eating disorders can become life-threatening, as demonstrated by anorexia nervosa's association with the highest mortality rate of any psychiatric condition.

Overly worrying about weight, especially when under pressure from others or for a job (such as ballet dancers, models, or athletes), having an addictive personality, an anxiety disorder, having low self-esteem, or being a completest, unique experiences (such as sexual or emotional abuse, the loss of a loved one), having a tense relationship with family or friends, being in a stressful situation, etc. (National Health Standards, UK). Eating disorders including Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Eating Disorders Not Otherwise Specified (EDNOS) are a group of mental illnesses which defined according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) published by the American Psychiatric Association. Those are,

Anorexia Nervosa:

Self-imposed starvation characterizes anorexia nervosa. It is a dangerous, sometimes fatal illness that typically has underlying emotional roots. In addition to restricting their intake of food, individuals with anorexia nervosa frequently also limit or avoid engaging in relationships, social activities, or pleasure. Serious health problems and even fatal medical complications can arise from anorexia nervosa.

Symptoms of anorexia nervosa include:

- Very low body weight
- Severe dietary restriction
- Obsession with thinness and refusal to maintain a healthy weight;
- Anxiety and dread of gaining body weight
- Misaligned perceptions of one's body's shape and weight, which have a significant impact on one's self-esteem and body image; denial of the seriousness of low body weight
- The absence or lack or absence of menstruation among girls and women.

There are some other symptoms and medical complications may develop, including:

- Bone thinning and deterioration (osteopenia or osteoporosis)
- Fragile hair and nails
- Dried and pale/yellowish skin
- Development of fine body hair (lanugo)
- Low blood pressure or diminished respiration and pulse
- Mild anemia, muscle wasting, and also weakness
- May occur brain damage and multi organ failure
- Severe damage to the heart's structure and function
- Lethargy, feeling drowsy or always weary
- a reduction in body temperature that causes a person to feel cold all the time
- Damage to the structure and operation of the heart
- Infertility.

Bulimia Nervosa

Patients with bulimia nervosa experience recurrent episodes of binge

eating and feel unable to stop. After engaging in this unrealistic eating, a person may fast, overexert themselves physically, force themselves to vomit, take laxatives or diuretics excessively, or a combination of these. Bulimia nervosa patients, unlike anorexics, often maintain a healthy or average weight, but some are somewhat overweight. Yet, individuals usually experience significant dissatisfaction with their size and look, a fear of gaining weight, and a strong desire to lose weight, similar to those who have anorexia nervosa.

Other symptoms include:

- Persistence sore throat and swelling
- Can swollen salivary glands in the neck and jaw
- The enamel on your teeth has worn away as a result of contact to stomach acid, leaving them more sensitive and susceptible to cavities
- Heartburn and other gastrointestinal problems
- Constipation-related abdominal pain and inflammation
- Severe dehydration as a results of fluid leaks
- Electrolyte imbalance, which can induce a heart attack or stroke due to too little or too much sodium, calcium, potassium, and other minerals.

Eating Disorders Not Otherwise Specified (EDNOS):

The diagnostic standards for anorexia nervosa or bulimia nervosa are not universally applicable to all forms of eating disorders. They are eating disorders as well, and they demand the appropriate care. This group includes a sizable portion of those with eating disorders. For instance, individuals who fulfill the criteria for anorexia nervosa but still have menstruation, those who urinate frequently but are not bulimic, and those who fit the criteria for bulimia nervosa but engage in binge eating twice a week. Having an "eating disorder not Otherwise Specified" diagnosis does not make someone less at risk or less suffering, though. (National Institute of Mental Health, U.S). As a sports person from school days, the researcher noticed that the players who take part in weight category sports normally refrain from taking meals in close to competitions for getting the advantage of falling into lower weight category classes. But it may have adverse effects on their health and also sports performance. Athletes who take part in weight category sports often feel pressure to lose weight rapidly in order to reach weight standards set by the coach. Boxing is one of such famous weight category sports among both male and female players in Sri Lanka. According to my observations, female boxing players competing at national level also have the same habit of controlling or losing body weight.

This study was carried out with the aim of examining the effect of not or abnormal eating behaviors practiced by players in weight category sports. Anthropometric measurements of the players were taken to study the relationship of them with eating disorders. Many foreign researchers have conducted researches under the topics related to eating disorders among players in different types of sports. But in Sri Lanka little research has been done on this subject and findings of foreign research have also not been disseminated among players. This may be the reason that the players as well as the coaches adopt this type of unrealistic methods in achieving drastic changes in body weight. According to the 4th edition of Diagnostic & Statistical Manual of Mental Disorders “DSM- IV” (Annex 1) which published by the American Psychiatric Association, there are three basic types of eating disorders. Those are Anorexia Nervosa, Bulimia Nervosa and Eating Disorders Not Otherwise Specified (EDNOS). In this

study, the researcher identified two types of eating disorders i.e. Anorexia Nervosa and Bulimia Nervosa.

Disordered eating is a phrase that is frequently used to refer to the area of unusual and dangerous eating behaviors that are utilized in an unsuccessful effort to maintain an unhealthy or low body weight or to reduce weight (Otis et al., 1997). The word "anorexia," which literally translates to "loss of appetite," is where the name "anorexia nervosa" comes from. The term Bulimia Nervosa is derived from the Greek word bulimia which literally means "ox hunger" (Fairburn & Brownell, 2001). Studies have shown that pressures regarding body size and shape characteristic of aesthetic and weight dependent sports were influential in eating disorders (Sundgot-Borgen, 1993). In addition, adolescent athletes who participate in sports where weight and lean body type important are prone to eating disorders (Patel et al., 2003). Instances of eating disorders and excessive preoccupation with weight are on the rise among female athletes. The demands placed on female athletes to enhance their abilities and appearance, as well as the sociocultural ideals that all women should be slender (Beals and Manore, 1994). The primary aim of this study was to examining the prevalence of eating disorders along with some anthropometric parameters that may have a relationship to those eating disorders. National level female boxing players were studied in order to identify the prevalence of Anorexia Nervosa and Bulimia Nervosa.

Rationale and justification

Most coaches and players who involve in the field of weight category sports such as boxing do not know about the eating disorders and their adverse effects. But they tend to lose their weight to meet expected weight categories by using abnormal eating behaviors. There are even no appropriate procedures to identify eating disorders among players especially among female because female athletes are more prone to have an eating disorder. In adolescence female athletes as well as non-athletes need considerable amount of nutrients to develop physically and mentally. Especially in a sport such as boxing players expend much energy for competitions and their usual practices. So identify the risk of eating disorders especially among female players are very important to develop their performance as well as their health. Before treat to the eating disorders, it should be needed to identify the prevalence among players who involve in weight category sports. Therefore because of the limited time it is difficult to identify the prevalence of eating disorders among the female players who belong to all age groups in all around the country. So that's the researcher has selected forty-five national level female boxing players as the first step. To develop this study can select the whole female players who are engaging all weight category sports to identify the prevalence of eating disorders among them.

This will be a great support to pay much more attention towards the eating disorders which affect to the future performance level and also the health of the female players who belong to weight category sports. Identify the prevalence of eating disorders among female players and give proper treatments for them is a necessary need of all players in the country. Identify the prevalence of eating disorders among female players who engage in weight category sports will help to provide proper treatments for the players who suffer from eating disorders and improve their performance levels. This study will help the players to get an idea about their eating behaviors and weather they affect their health or not. Not only the players but also the coaches can have an idea about eating disorders among

their players and can develop suitable plans for prevent them from those disorders. And also the findings of this research will motivate different kind of groups in community such as athletes as well as non-athletes to pay their attention regarding the area of eating disorders.So it can help to develop their performance as well as their health conditions.

This research will provide a great support to implement further research to identify the prevalence of eating disorders among female players who engage in all weight category sports in all around the country. Anyone who keen on to continue this all around the country can use this as a literature.So this research will help to clear the path which related to the field of eating disorders and also help the other researchers to carry out further researches regarding this field.

Definition of technical terms

Eating Disorders- eating disorders are kind of mental illnesses that cause critical disturbances in a person's everyday diet. Those are real, treatable medical illnesses.

DSM-IV- Diagnostic and Statistical Manual of Mental Disorders published by the American Psychiatric Association.

Anorexia Nervosa (AN) -This is imposed starvation. It is a serious, life-threatening disorder.

Bulimia Nervosa (BN) - Recurrent and frequent periods of eating unusually large amounts of food and feel a lack of control over these periods.

Eating Disorders Not Otherwise Specified (EDNOS) - There are variants of disordered eating that do not meet the diagnostic criteria for anorexia nervosa or bulimia nervosa.

Binge eating - The practice of eating a lot of food quickly, often in conjunction with an eating disorder.

Recurrent purging - (self-induced vomiting, misuse of laxatives, diuretics, or enemas) to control weight or shape in the absence of consumption of large quantity of foods in a short period of time that occurs in people with normal or near-normal weight.

Lanugo - Fine hair on the face and body.

National Institute of Mental Health (NIMH) - This is the National Institute of Mental Health in the United States.

Limitations

- Since time was not enough to concern about all the national level female boxing players the researcher selected forty five national level female boxing players as the study sample.
- Players who suffer from eating disorders usually did not like to tell their condition to the outside parties. So it was difficult to conduct interviews with them.
- It was difficult to find out research papers to study the prevalence of eating disorders among female players who engage in weight category sports in Sri Lanka.
- It was difficult to find an exact time for data collection because of the players tight training schedules and tours.

Research Objectives

Overall Objective

- To identify the prevalence of eating disorders among national level female boxing players in Sri Lanka

Specific objectives

- To identify the existing dietary practices among female boxing players to determine any disordered eating pattern

- To determine which type of eating disorder commonly exists among female boxing players

- To identify the relationship between risk due to disordered eating and anthropometric parameters

THEORETICAL FRAMEWORK AND THE LITERATURE REVIEW

Theoretical framework

This study was conducted under mixed research method. Combination of both qualitative and quantitative research methods was used in this study. Not as the other fields, most of the times sports researches may have to deal with human behaviors. Moreover, creating an appropriate quantitative measure is frequently challenging and time-consuming. Using qualitative data might save more time. "Because of its logical and intuitive appeal, providing a bridge between the qualitative and quantitative paradigms, an increasing number of researchers are utilizing mixed methods research to undertake their studies" (Leech and Onwuegbuzie, 2006, p. 474).

The ability to triangulate the data and assure its validity and level of variance can also be invaluable. Other benefits include the complimentary relationship between qualitative and quantitative data, one clarifying the other throughout the study. This addition of a supplemental data set bolsters the effectiveness of the research (Migiro, 2011). Some authors have given other examples or beneficial uses for this methodology other articles attribute the ability to explain complex or contradictory survey responses as a benefit of using mixed methods research (Driscoll, 2007). This study was involved pre assessment using two standardized questionnaires for finding out the players who has the risk of eating disorders. Those were Eating Attitude Test (EAT-26) developed by Garner & Garfinkel (1979) and Garner et al., 1982) (Annex 2) and Female Athlete Screening Tool (McNulty et al., 2001) (Annex 3) which has been developed specifically for athletes. By using the scoring systems of Eating Attitude Test (EAT- 26) marks were given for each player to determine any eating disorder.

After identifying the players with eating disorders, they were classified into two types, Anorexia Nervosa and Bulimia Nervosa. This was done according to the Diagnostic and Statistical Manual of Mental Disorders (DSM- IV) criteria published by the American Psychiatric Association.

Anthropometric measurements of the players were taken on Body Mass Index (BMI).

Not only the questionnaires but also observations, structured interviews (SCOFF Questionnaire) (Annex 5) and discussions were used for gathering qualitative data. Interviews were held for all the players who included in the sample.

Literature Review

Athletes suffer from eating disorders, particularly competing in sports in which leanness or a specific weight was considered important. The development of eating disorders was influenced by pressures related to body shape and size that are typical of weight-dependent and aesthetically pleasing sports. There are specific trigger factors that appeared to put the athlete to at risk of developing an eating disorder (Sundgot-Borgen, 1993). Athletes are someone who more at risk for eating problems than non-athletes. This was mostly true for dancers. Elite athletes especially those in sports related thinness were at risk than non-elite athletes (Smolak et al., 2000). Prevalence of eating disorders & excessive body weight among female athletes are increasing. The pressure on female athletes to improve their performance & physique along with the sociocultural believes place on all women to be thin. Some female athlete pressure to achieve & maintain a low body weight that lead to potentially harmful. Some female suffer from subclinical eating disorders such as "Anorexia Athletica" (Beals and Manore, 1994).

Prevalence of subclinical & clinical eating disorders is high among female athletes & those eating disorders are higher among female athletes than non-athletes. More prone to develop eating disorders among the athletes competing sports where leanness or a specific body weight is concerned than the sports do not consider those factors. Because of the methodological weaknesses in the existing studies, the best instrument or interview method for find eating disorders is not known (Sundgot-Borgen, 1994). Adolescent athletes who participate in sports where weight & lean body type important are prone to eating disorders. Risk factors for eating disorders include participation in sports where weight & lean body type are important, high intensity training, pressure from coaches, & also training & dieting beginning at an early age. Medical complications associated with these eating disorders potentially dangerous (Patel et al., 2003).

Coaches including the six sports such as gymnastics, swimming, basketball, softball, track & volleyball have different ideas regarding their monitoring of athletes eating & weight gymnastic coaches had more experience with athletes exhibiting eating disturbances. Many gymnastic coaches have encountered disturbed eating among their athletes than other coaches (Heffner et al., 2003). Number of studies has investigated eating disorders in adolescence girls & among female athletes. But there also can find the eating disorders among adolescent boys too (Muise et al., 2003). Feelings of staying in shape was the powerful reason for dieting among non-athletes than athletes. No differences were found between weight loss and non-weight loss athletes with respect to diet or eating disorders (Martinsen et al., 2010). Promote an understanding of suitable factors to the development of eating disorders in sport; indicate how to recognize an eating or weight loss problem. And also discuss treatment issues with athletes, and provide a brief guide to the prevention of eating disorders in sport, with an emphasis on healthy weight management techniques for athletes and their coaches (Swoap and Murphy, 1995). Nutritional wishes for top athletic overall performance consist of enough calorie intake, good enough hydration, and interest to timing of meals. Student athletes and their advisors regularly are misinformed or have misconceptions approximately sports nutrition. Other issues addressed include "making weight" and other ergogenic aids. Proper nutrition for young athletes is more important to their growth, development and overall health than just their success (Cotugna et al., 2005).

Differences were more pronounced among athletes than among non-athletes, and there were statistically significant differences in most intra-individual factors, including self-esteem and self-actualization. Disordered eating attitudes were significantly positively correlated with anxiety levels and with self-classified weight. Athletes had better stages of emotional intelligence and a healthier body image in comparison to non-athletes, but there were no significant differences in terms of disordered eating attitudes (Costarelli and Stamou, 2009). The athletes who participating both thin and normal builds sports are at an increased risk for eating disorders (Berry and Home, 2000). Over concern with body size was the primary risk factor in the development of an eating disorder in intercollegiate athletes participating in a variety of sports (Williamson et al., 1995). For both men and women, adolescents who participated in weight-related sports ate breakfast more often than adolescents who did not exercise. Adolescents participating in weight and strength team sports had higher mean protein, calcium, iron and zinc intakes than their non-exercising peers. Intake was low (Croll et al., 2006)

The athletes at higher levels of competition showed more signs of pathological eating and were at an increased risk for the development of eating disorders. Athletes in sports emphasizing a lean physique and in weight-restricting sports were also more vulnerable than athletes in other types of sports and non-athlete controls (Picard, Christy L, 1999).

Tests

The EAT is a standardized, self-report scale of symptoms and that concerns characteristic of eating disorders. Designed to be economical in both dosing time and evaluation time. EAT can used as a screening and case-finding tool in nonclinical populations. A factor analysis of the original 40-item (Garner & Garfinkel, 1979) resulted in a shortened 26-item scale, the EAT-26 (Garner, Olmsted, Bohr, & Garfinkel, 1982). The EAT-26 is highly correlated with the EAT-40 and three factors form subscales which are meaningfully related to bulimia, weight, body-image variables and psychological symptoms. Although there is no difference in total EAT-26 and EAT-40 between patients with bulimia and those with limited anorexia nervosa, these groups show significant differences in the EAT-26 factor. It is concluded that EAT-26 is a reliable, valid, and economical tool useful as an objective measure of anorexia nervosa symptoms (Garner et al., 1982).

The Eating Disorders Examination (EDE), the Structured Interview, and the Questionnaire Version of the EDE (EDE-Q) are considered the preeminent assessment of eating disorder symptoms and are comparable to the interview and questionnaire-based instruments. It offers a unique opportunity to find out consistent article content (Berg, Kelly et al., 2011). Reliability indicated a high internal consistency of the Female Athlete Screening Tool (FAST). When compared to athletes without eating disorders and non-athletes with eating disorders, athletes with eating disorders scored much higher on the FAST, proving discriminant validity. Correlation showed that the FAST was strongly correlated to the Eating Disorder Examination-Questionnaire and Eating Disorder Inventory (Alberta, Frank et al., 2010).

The SCOFF questionnaire is a succinct and easy-to-remember screening tool for eating disorders. It demonstrated outstanding reliability in a student group and great validity in a clinical population (Luck et al., 2002).

METHODOLOGY AND MATERIALS

Problem Specification

Disordered eating patterns are becoming one of the major medical problems among the players who compete for weight category sports. Most coaches and players who involve in the field of weight category sports such as boxing do not know about the eating disorders and their adverse effects. But they tend to lose their weight to meet expected weight categories by using abnormal eating behaviors. There are even no appropriate procedures to identify eating disorders among players especially among female because female athletes are more prone to have an eating disorders due to over concern about body weight and shape. So identify the risk of eating disorders especially among female players are very important to develop their performance as well as their health

Methodology

Method

The national level female boxing players' were accessed after explaining the importance of the project to their coaches. The value of identifying the prevalence of eating disorders was also explained to the players. A date was fixed to conduct the

interviews and collect data based on a questionnaire.

Research Study Design

The primary aim of this study was to identify the prevalence of eating disorders along with its relationship to the anthropometric parameters. National level female boxing players were studied to identify the prevalence of Anorexia Nervosa and Bulimia Nervosa. Mixed method design which includes both qualitative and quantitative data was used in implementing the research.

Study Area

This research aims at identifying the prevalence of eating disorders among national level female boxing players in Sri Lanka. Eating behaviors and disordered eating patterns, anthropometric parameters of the players and the relationship between eating disorders and anthropometric parameters of the female boxing players were studied. This study carried out in Pannala and Panagoda training premises of Sri Lanka.

Study Population

The national level female boxing players in Sri Lanka

Sample and Sampling Technique

Sample

The subject population of this study consisted of national level female boxing players. The forty five female boxing players were taken from this population as the sample. In this study, the national level boxing player was defined as one who qualifies for the national pool at junior or senior level or one who competes for the national boxing tournament. They had to be in the age between eighteen and thirty two years, and train at least eight hours per week.

Sampling Technique

The sample was selected on random sampling method.

Materials

- Journals
- Standardized questionnaires (EAT-26, Female Athlete Screening Tool, SCOFF)

Apparatus

- Digital weight scale (unique)
- Stadiometer
- Papers
- Pen

Software Tools

- Microsoft Office 2010
- SPSS 21 software
- Minitab14
- End Note

Data gathering Technique

The prevalence of eating disorders was identified using standardized questionnaires. Eating Attitude Test (EAT 26) questionnaire consisted of questions regarding the players' eating behaviors and attitudes. Then each player was given marks to find out whether they suffer from eating disorders or not. Female Athlete Screening Tool (FAST) consisted of not only player's eating behaviors but also their physical activity level, personal beliefs regarding their eating habits as well. Female athlete screening tool is a questionnaire which consists of thirty three questions. But in this study, twelve questions were used for identifying the player's attitudes, because other questions were same as those in EAT 26 (Annex 4). All players were asked to fill those two questionnaires completely.

Data were also collected by interviewing the players and observing their behaviors as well. A structured interview was conducted by using the SCOFF questionnaire. Interviews were

conducted for all subjects. SCOFF questionnaire consists of five questions. One mark was given for each positive answer. Physical tests were conducted to assess the players' anthropometric parameters including height and weight. Height and weight were taken to assess the BMI value.

BMI

Weight in kilograms

Height in meters

BMI = weight (kg) / {height (m)} 2

Data Analysis

The players who have identified with eating disorders were categorized into Anorexia Nervosa and Bulimia Nervosa, the two basic types of eating disorders, according to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition "DSM-IV" criteria published by the American Psychiatric Association. The collected data through questionnaires and those on physical tests were analyzed using Microsoft Excel 2010. The relationships between given parameters were analyzed using the chi squared test with the application of Minitab 14 software and further analyzed by using SPSS 21 software.

The data were presented by using descriptive statistics.

Ethical Consideration

The researcher guaranteed the participants that the personal details were not disclosed to any outside party. The information was used only for this research purpose and was kept confidential. The researcher got the permission from the Department of Sports Sciences and Physical Education to conduct the research and also from the coaches and relevant authorities of the players who took part in the study.

RESULTS AND DISCUSSION

Results

Distribution of BMI in the sample

According to the World Health Organization (WHO), there are four classifications of BMI;

Table 4.1 Standardized BMI values

BMI	Classification
< 18.5	Underweight
18.5- 24.9	Normal
25- 29.9	Over weight
> 30	Obese

According to the 45 players;

Table 4.2 Distribution of BMI in the sample

BMI	Percentage of the players (%)
< 18.5	24.44
18.5- 24.9	26.66
25- 29.9	24.44
> 30	24.44

Only 26.66% of players were categorized under normal BMI level and other 73.34% of players were categorized under underweight, overweight and obese.

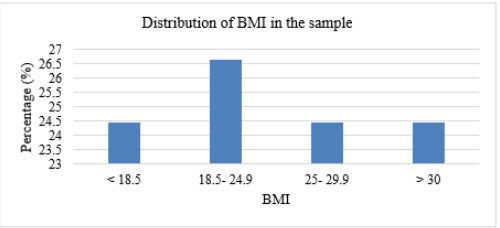

Figure 4.1 Distribution of BMI in the sample

EAT- 26 Test Results

The sample of this study consisted of 45 national level female boxing players and standardized questionnaires were used to identify the risk of eating disorders among

them. The Eating Attitude Test (EAT- 26) was used accordingly.

24 players (53.33%) have the risk of eating disorders, (scored more than 20)

21 players (46.66%) have no risk of eating disorders. (Scored less than 20)

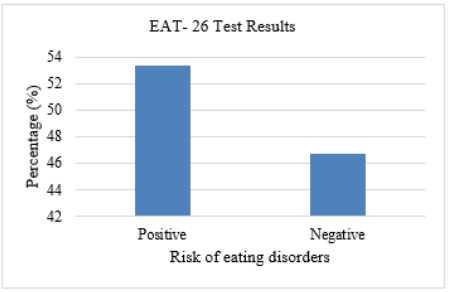

Figure 4.2 EAT- 26 Test Results

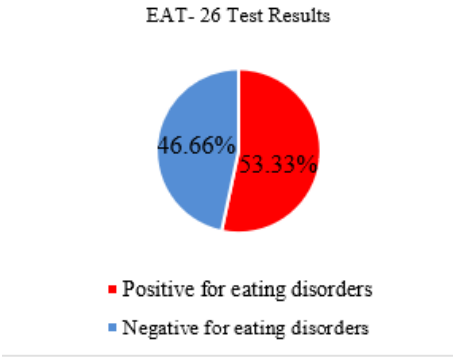

Figure 4.3 EAT- 26 Test Results Further More

This result shows that more than half of the players from the sample have the risk of eating disorders. Other players do not have the risk of eating disorders yet. But among them some players scored near 20 and they should also consider about their eating habits as well as eating attitudes.

Results according to the DSM- IV criteria

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM- IV) criteria published by the American Psychiatric Association;

Among the 24 players who have the risk of eating disorders;

23 players (95.83%) have the risk of Anorexia Nervosa and

Only 1 player (4.16%) has the risk of Bulimia Nervosa.

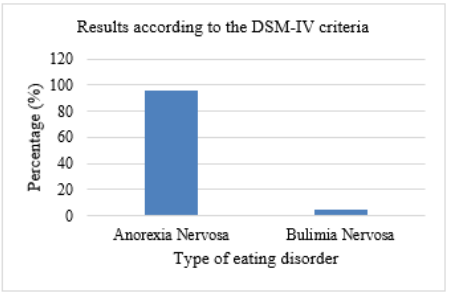

Figure 4.4 Results According to the DSM- IV Criteria

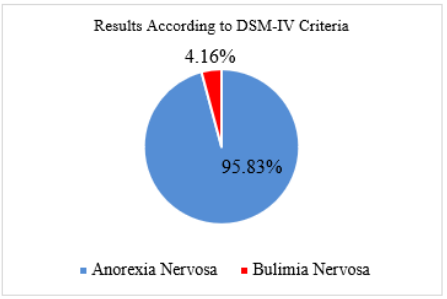

Figure 4.5 Results According to the DSM- IV Criteria further more

Both Anorexia Nervosa and Bulimia Nervosa are eating disorders which need special medical attention and also both are treatable medical conditions. But early diagnosis is very important. Above results showed that more players were suffering from Anorexia Nervosa than Bulimia Nervosa. It simply means that most female boxing players included in this sample had a wrong eating practice of skipping meals for losing their body weight. Only one player was suffering from Bulimia Nervosa which is due to self-induced vomiting after taking meals.

EAT- 26 Vs SCOFF questionnaire results

All the players who have the risk of eating disorders scored more than two marks in the structured interview conducted using SCOFF questionnaire.

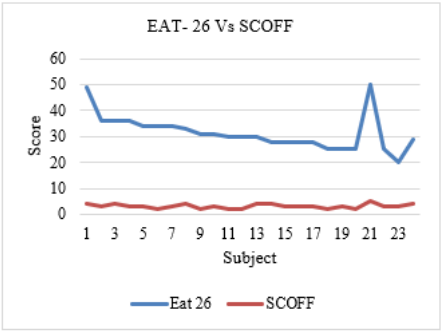

Figure 4.6 EAT- 26 Vs SCOFF questionnaire test results

SCOFF is also a simple standard questionnaire used to find out the risk of eating disorders and it consists of only five questions. All five questions have two answers "yes" or "no". If the answer is "yes" the participant gains one mark and if the answer is "no" he/she gets no marks.

58.33% players were given "yes" answer for same three questions. Those are;

Do you make yourself sick because you feel uncomfortably full?

Do you worry you have lost control over how much you eat?

Do you believe yourself to be fat when others say you are thin?

All the players who have the risk of eating disorders were given the answer "yes" for the question, "Do you make yourself sick because you feel uncomfortably full?"

Eating Attitude Test (EAT- 26) along with the SCOFF questionnaire shows that 24 players have the risk of eating disorders.

Players who do not have the risk of eating disorders scored less than two marks for the SCOFF questionnaire.

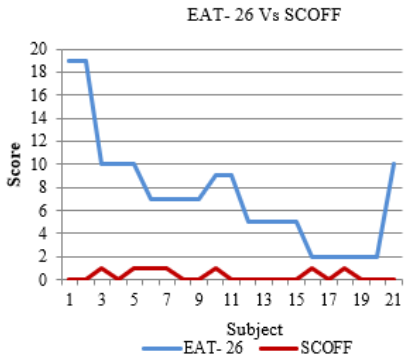

Figure 4.7 EAT- 26 Vs SCOFF questionnaire test results

For the structured interview 33.33% players who do not have the risk of eating disorders were given "yes" answer for the question "Do you worry you have lost control over how much you eat?".

All the other 66.67% players who do not have the risk of eating disorders according to the Eating Attitude Test (EAT- 26) were given answer "no" for the all questions which included in SCOFF questionnaire.

Distribution of BMI and risk of eating disorders

Table 4.3 Distribution of BMI and risk of eating disorders

BMI	Positive for eating disorders (%)	Negative for eating disorders (%)
< 18.5	20	4.44
18.5- 24.9	17.77	8.88
25- 29.9	6.66	17.77
> 30	8.88	15.55

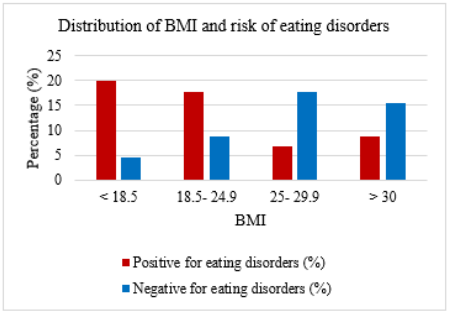

Figure 4.8 Distribution of BMI and risk of eating disorders

According to the results showed in above graph among the players who have the risk of eating disorders only 17.77% of players were categorized under 'normal' BMI level. They are the national level players and that was not good for their sport performances and their health. There were more players (20%) categorized under 'underweight' than 'normal'. Not only above categories but also 6.66% and 8.88% players were categorized under overweight and obese.

Results according to the Female Athlete Screening Tool (FAST) questionnaire

Female Athlete Screening Tool (FAST) is a questionnaire which can find out the players attitudes regarding their eating habits and sports performance. This questionnaire is specially designed for female athletes. In this study only ten questions from the Female athlete Screening Tool (FAST) were used and the other two questions were regarding the female players' menstrual history.

Players who have risk of eating disorders have given the answer "frequently" for many questions. The questionnaire carried following questions; "I participate in additional physical activity > 20 minutes in length on days that I have practice or competition."

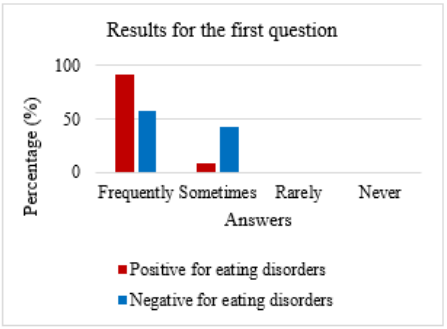

Figure 4.9 Results for the first question in FAST

91.66% players have given the answer "frequently" and 8.32% have given the answer "sometimes". They try to do additional physical activities to reduce their weight. This is not a good practice for the players who restrict to take meals and also not good for the muscle development as well as the health.

Among the players who do not have the risk of eating disorders 57.14% were answered as "frequently" and 42.86% players were answered as "sometimes"

"If I cannot exercise, I find myself worrying that I will gain weight."

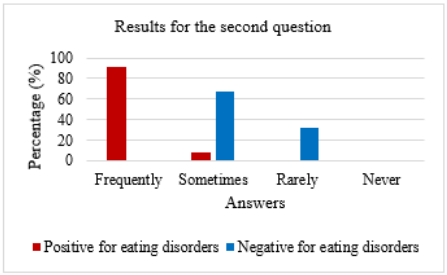

Figure 4.10 Results for the second question in FAST

These eating disorders are psychiatric conditions and worried about weight gain.91.66% players have given answer "frequently" and 8.34% have given the answer "sometimes"

The players who do not have the risk of eating disorders (66.66%) have given the

answer “sometimes” and 33.34% players have answered as “rarely”

“During training, I control my fat and calorie intake carefully.”

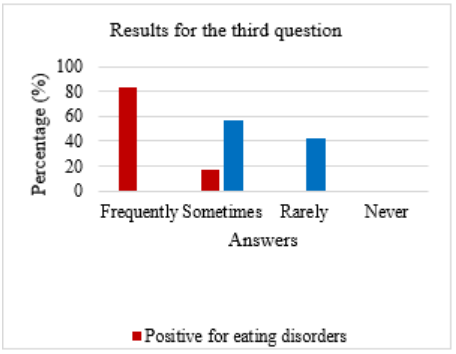

Figure 4.11 Results for the third question in FAST

In this question 83.33% players have answered “frequently” and 16.67% have answered “sometimes”. Most players were restrict to take fat and calories either they participate for regular exercises.

Among the players who do not have the risk of eating disorders, 57.14% have answered as “sometimes” and 42.86% players have answered “rarely”

“I do not eat foods that have more than 3 grams of fat.”

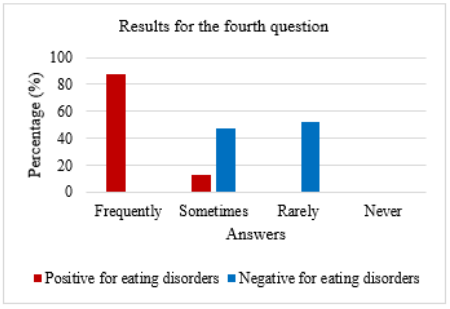

Figure 4.12 Results for the fourth question in FAST

In this question also 87.5% of players have answered as “frequently” and 12.5% have answered as “sometimes”. Players who have risk of eating disorders were fear to take meals which contain fat.

Among the players who do not have the risk of eating disorders 47.61% have answered as “sometimes” and 52.39% players have answered as “rarely”

“My performance would improve if I lose weight.”

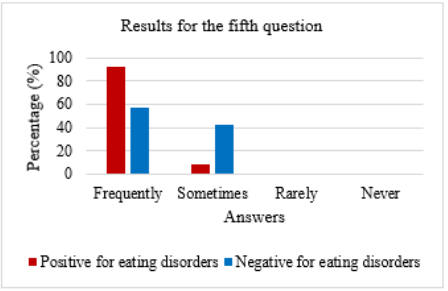

Figure 4.13 Results for the fifth question in FAST

In this question 91.66% players who have the risk of eating disorders have answered as “frequently” and 8.34% players have answered as “sometimes”. They were restrict to take meals because they believe that it may help to improve their performances.

Among the players who do not have the risk of eating disorders 57.14% have answered as “sometimes” and 42.85% players have answered as “rarely”

“I am worried that if I were to gain weight, my performance would decrease.

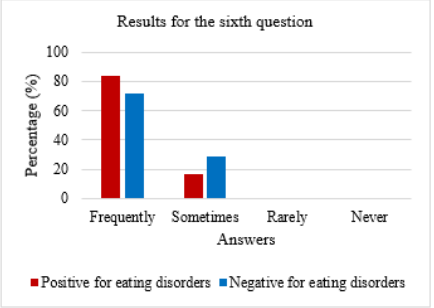

Figure 4.14 Results for the sixth question in FAST

This question is also related to the previous question and this attitude showed the athletes believes regarding their weight.

In this question 83.33% players who have the risk of eating disorders have answered as “frequently” and 16.64% players’ have answered as “sometimes”.

Among the players who do not have the risk of eating disorders 71.42% have answered as “sometimes” and 28.58% players have answered as “rarely”

“I feel uncomfortable eating around others.”

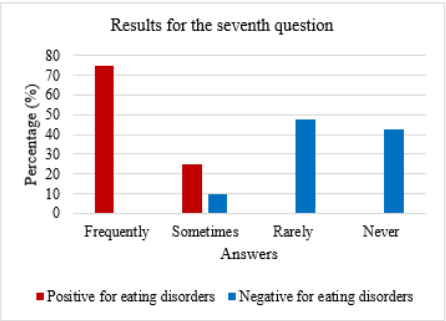

Figure 4.15 Results for the seventh question in FAST

The players who have the eating disorders did not like to take meals in front of others.

In this question 75% players who have the risk of eating disorders have answered as “frequently” and 25% players have answered as “sometimes”.

Among the players who do not have the risk of eating disorders 9.25% have answered as “sometimes”, 47.61% players have answered as “rarely” and 42.85% were answered as “never”.

“I have done things to keep my weight down that I believe are unhealthy.”

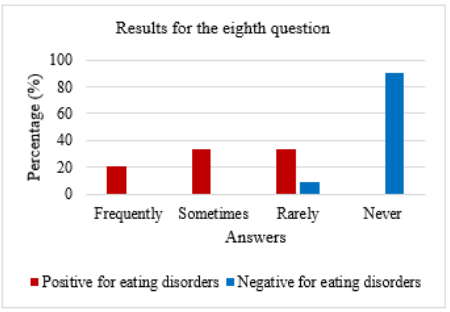

Figure 4.16 Results for the eighth question in FAST

Players who have the risk of eating disorders use some methods and practices to lose their weight. Although they knew that those methods and practices might harm for their health.

In this question 20.83% players who have the risk of eating disorders have answered as “frequently”, 33.33% players were answered as “sometimes” and 33.33% have answered as “rarely”.

Among the players who do not have the risk of eating disorders 9.52% have answered as “sometimes” and 90.47% have answered as “never”.

“If I were to be injured, I would still exercise even if I was instructed not to do so by my athletic trainer or physician.”

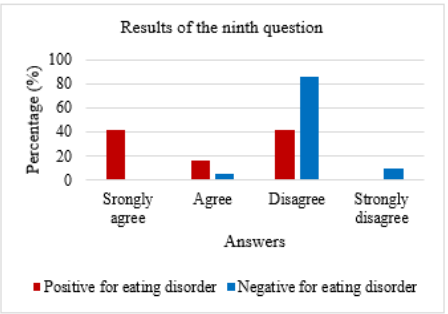

Figure 4.17 Results for the ninth question in FAST

In this question 41.67% players who have the risk of eating disorders have answered as “strongly agree”, 16.66% players have answered as “agree” and 41.67% have answered as “disagree”.

Among the players who do not have the risk of eating disorders 4.76% have answered as “agree”, 85.71% have answered as “disagree” and 9.52% have answered as “strongly disagree”.

“I am happy with my present weight.”

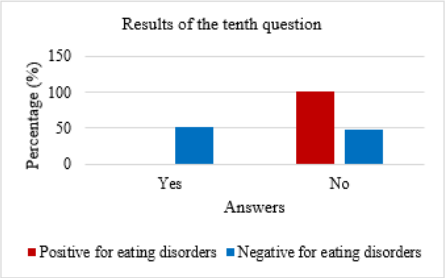

Figure 4.18 Results for the tenth question in FAST

For this question 100% players who have the risk of eating disorders have answered as “no” and there were no players answered as “yes”. This shows that all the players who have risk of eating disorders did not happy with their present weight and somehow try to reduce their weight.

Among the players who do not have the risk of eating disorders, 52.38% have answered as “yes” and 47.62% were answered as “no”.

In this questionnaire there were two additional questions regarding the player’s menstrual history.

“Over the past few months have you missed any menstrual periods?”

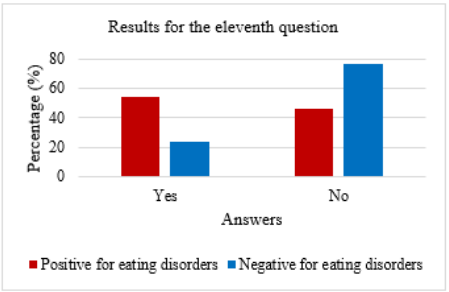

Figure 4.19 Results for the eleventh question in FAST

Among the players who have the risk of eating disorders, 54.16% players have answered as “yes” and 45.84% players answered as “no”.

Among the players who do not have the risk of eating disorders, 23.8% players have answered as “yes” and 76.19% have answered as “no”.

“Have you been taking any medication for menstrual regulations?”

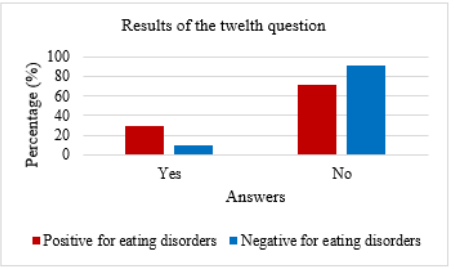

Figure 4.20 Results for the twelfth question in FAST

Among the players who have the risk of eating disorders, 29.16% players have answered as “yes” and 70.84% players answered as “no”.

Among the players who do not have the risk of eating disorders, 9.53% players have answered as “yes” and 90.47% have answered as “no”.

Table 4.4 Summary of first eight questions in FAST for the players who have risk of eating disorders

Question	Frequently	Sometimes	Rarely	Never
I participate in additional physical activity > 20 minutes in length on days that I have practice or competition	91.66 %	8.33 %		
If I cannot exercise, I find myself worrying that I will gain weight	91.66 %	8.33 %		
During training, I control my fat and calorie intake carefully	83.33 %	16.66 %		
I do not eat foods that have more than 3 grams of fat	87.5 %	12.5 %		
My performance would improve if I lose weight	91.66 %	8.33 %		
I am worried that if I were to gain weight, my performance would decrease	83.33 %	16.66 %		
I feel uncomfortable eating around others	75 %	25 %		
I have done things to keep my weight down that I believe are unhealthy	20.83 %	33.33%	33.33 %	

Table 4.5 Summary of ninth question in FAST for the players who have risk of eating disorders

Question	Strongly agree	Agree	Disagree	Strongly disagree
If I were to be injured, I would still exercise even if I was instructed not to do so by my athletic trainer or physician	16.66 %	41.66 %	58.33 %	

Table 4.6 Summary of last three questions in FAST for the players who have risk of eating disorders

Question	Yes	No
I am happy with my present weight		100 %
Over the past few months have you missed any menstrual periods	54.16 %	45.83 %
Have you been taking any medication for menstrual regulations	29.16 %	70.83 %

Table 4.7 Summary of first eight questions in FAST for the players who do not have risk of eating disorders

Question	Frequently	Sometimes	Rarely	Never
I participate in additional physical activity > 20 minutes in length on days that I have practice or competition	57.14 %	42.85 %		
If I cannot exercise, I find myself worrying that I will gain weight		66.66 %	33.33 %	
During training, I control my fat and calorie intake carefully		57.14 %	42.85 %	
I do not eat foods that have more than 3 grams of fat		47.61 %	52.28 %	
My performance would improve if I lose weight		57.14 %	42.85 %	
I am worried that if I were to gain weight, my performance would decrease		71.42 %	28.57 %	
I feel uncomfortable eating around others		9.52 %	47.61 %	42.85 %
I have done things to keep my weight down that I believe are unhealthy			9.52 %	90.47 %

Table 4.8 Summary of ninth question in FAST for the players who do not have risk of eating disorders

Question	Strongly agree	Agree	Disagree	Strongly disagree
If I were to be injured, I would still exercise even if I was instructed not to do so by my athletic trainer or physician		4.76 %	85.71 %	9.52 %

Table 4.9 Summary of last three questions in FAST for the players who do not have risk of eating disorders

Question	Yes	No
I am happy with my present weight	52.38 %	47.62 %
Over the past few months have you missed any menstrual periods	23.8 %	76.19 %
Have you been taking any medication for menstrual regulations	9.52 %	90.47 %

Relationship between presence of eating disorders and BMI

Hypothesis

- H0: Eating disorders are not associated with the value of BMI
- H1: Eating disorders are associated with the value of BMI

Table 4.10 BMI values

BMI	Positive for eating disorders	Negative for eating disorders
< 18.5	9	2
18.5- 24.9	8	4
25- 29.9	3	8
> 30	4	7

Table 4.11 Relationship between presence of eating disorders and BMI

BMI / Eating disorders	< 18.5	18.5- 24.9	25- 29.9	>30	Total
Positive	9 (5.86)	8 (6.4)	3 (5.86)	4 (5.86)	24
Negative	2 (5.13)	4 (5.6)	8 (5.13)	7 (5.13)	21
Total	11	12	11	11	45

Chi squared Test = $\Sigma \frac{(\text{Observed value- Expected value})^2}{\text{Expected value}}$

$$= \frac{(9- 5.86)^2}{5.86} + \frac{(2- 5.13)^2}{5.13} + \frac{(8- 6.4)^2}{6.4} + \frac{(4- 5.6)^2}{5.6} + \frac{(3- 5.86)^2}{5.86} + \frac{(8- 5.13)^2}{5.13} + \frac{(4- 5.86)^2}{5.86} + \frac{(7-5.13)^2}{5.13}$$

$$= 8.7$$

Degree of freedom= (no of rows- 1) (no of columns- 1)

$$= (2- 1) (4-1)$$

$$= 3$$

Table value for 0.05 significant level = 7.81
Calculated value > Table value
8.7 > 7. 81
So there is a significant relationship between the eating disorders and value of BMI.

Chi-Square Test: < 18.5, 18.5- 24.9, 25- 29.9, >30

Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

	< 18.5	18.5- 24.9	25- 29.9	>30	Total
1	9	8	3	4	24
	5.87	6.40	5.87	5.87	
	1.673	0.400	1.401	0.594	
2	2	4	8	7	21
	5.13	5.60	5.13	5.13	
	1.913	0.457	1.601	0.679	
Total	11	12	11	11	45

Chi-Sq = 8.718, DF = 3, P-Value = 0.033

P 0.033< 0.05

So, H_0 is rejected and H1 is accepted. Therefore, eating disorders are associated with the BMI.

Discussion

This study was carried out with the objectives of studying the prevalence of eating disorders among national level female boxing players in Sri Lanka. Since boxing is a weight category sport, players mostly seen either not eating or vomiting after eating in order to maintain the body weight to get the advantage of falling into lower weight category class. This study shows the seriousness of eating disorders in performance and physiological functions of female players.

EAT- 26 questionnaire and the subsequent interview data shows that 53.33% players have the risk of eating disorders. Among them 95.83% players suffer from Anorexia Nervosa and 4.16% players suffer from Bulimia Nervosa. More than 50% is a considerable amount and it can affect the player's performance levels too.

Several steps were taken in this study to ensure truthful responding. The coaches were not informed about the contents of the questionnaires. The players were guaranteed 100% confidentiality. They also understood that no information about the study or the results would be given to coaches or parents.

Among the national level boxing players, forty five players were randomly selected for this study. Following observations were noticed from the study.

- High incidence of players without normal BMI

From the players with risk of eating disorders,

- High incidence of underweight players
- Low incidence of overweight and obese players

BMI does not differentiate the extra weight is due to excessive fat weight or the

muscle weight. Even though these players are fallen into overweight and obese categories based on the results of the BMI analysis, their additional weight is mostly due to muscular development and not due to extra fat weight.

The sample includes players in the age between 18 and 32 years. Therefore all of them are adults and normal BMI demarcations are applicable. High incidence of underweight players in this type of strength sport is a factor to be concerned. A strength sport needs adequate muscle strength and muscle power for better performance. When a person has lower BMI, adequate muscle mass development cannot be expected and therefore it has effects on performance. These players who are engaged in national level sports training get their meals from the Sri Lanka Army and the Slimline Sports Club. Therefore, the players get better meals and nutrition. Their low body weight is not because of inadequate food intake as in poor people. Their low body weight despite better food intake and nutrition is mostly due to wrong dietary practice they adopt. It is obvious that their muscles are wasted because of eating disorders.

The chi squared test results show that there is a significant relationship between eating disorder and BMI. BMI is a parameter which shows whether there is an appropriate body weight for the height. For this to achieve proper nutrition is extremely required. In fact, with the consumption of meals, the secretion of insulin hormone promotes the synthesis of muscular mass from the amino acids received from the meal. When a person does not eat, the insulin hormone level will be minimizing in the blood and as a result muscle breakdown will take place. This has adverse effects on muscular strength and power of players resulting in reduction of performance. The players adopt the practice of not eating for achieving lower body weight for getting the advantage of falling into the lower weight class. However this is not the way they have to do. They should try to limit nutrients in their meals. In order to limit the amount of nutrients in meals, they should increase the content of fiber rich food. To maintain the body weight, proper meal pattern is also an important factor. They should take three major meals and two light meals in between. Skipping meals is a wrong practice. When a person skips meals, there is a reduction in metabolic rate and as a result, most of the nutrients will eventually be transformed to fat leading to extra body weight. When there is adequate nutrients in blood, insulin level will not drop and it will prevent tissue damage.

According to the Female Athlete Screening Tool (FAST) questionnaire, 91.66% players who have the risk of eating disorders frequently engaged in the extra practices to reduce the body weight more than the recommendation. 41.66% players who have the risk of eating disorders answered that they still do exercise even if they have injuries despite the instructions of the trainer or physician not to do exercise. It is not a good practice and it may affect the recovery process in healing wounds. Not only the extra practices that they engage in, they also control fat and calorie intake during their practices. This is not good for their performance level as well as their health. Another critical condition is that 20.83% of players who have the risk of eating disorders answered “frequently” and 33.33% players who have the risk of eating disorders answered “sometimes” have used methods and practices to keep their weight down even though they knew that those are unhealthy. It is important that coaches and trainers monitor the meal patterns of the players. Otherwise the players adopt wrong practices which lead to reduction in performance. Especially in the case of national level players, proper nutrition knowledge is important. The involvement of a qualified nutritionist to

design their meals and regular supervision by the coach are significant in performance improvement from nutritional point of view.

CONCLUSION AND RECOMMENDATIONS FOR FURTHER STUDIES

Conclusion

Among national level boxing players, high prevalence of eating disorders were observed. This may be due to wrong practice of not eating since they have the wrong idea that their body weight will increase with food consumption. But it is not always true when we consider the training load that a person will undertake. Especially in a group of national level sports players, they undertake heavy training at least eight hours per week. This needs a large amount of energy and the additional calories in the diet have no chances of being transformed to fat. Additional carbohydrate will mostly be transformed to muscle glycogen and it is ideal fuel for muscular activities. In fact muscle proteins are broken down in absence of the required level of muscle glycogen. This adversely affects the sports performance.

Inadequate nutrition interferes with healthy body processes like menstruation and bone development. Female athletes who play sport and exercise intensely without proper nutrition are at risk for female athlete triad. When they refrain from certain types of food especially fat containing food will lead to decreased estrogen levels resulting in irregular menstruation or amenorrhea. Low estrogen level and poor nutrition (especially low Calcium intake) can lead to osteoporosis. Not building up the peak bone mass during younger ages may have long term effect resulting in bone fragility and risk for stress fractures. As the researcher what I saw in this study is that many young people adopt the common practice that it is important to prevent from high calorie food because of its unhealthy effects. But it is not always true. This is a shortcoming of giving common dietary advice. In fact, different people undertake different amounts of physical activity. Therefore, it is important to give individual dietary advice concerning the workload of individual.

Recommendations

In order to improve the condition, following recommendations are suggested.

1. It is important to make sports personnel knowledgeable on high calorie requirement that they need for extensive type of sports training, and the adverse effects that they face when the calorie requirement is not fulfilled by the diet.
2. It is important to make sports coaches and trainers knowledgeable on importance of concerning proper nutritional practices especially during younger ages and the importance of regular monitoring to see whether they adopt the proper practices. Then coaches can make the athletes aware of the effects of unhealthy weight loss practices.
3. It is important to make parents knowledgeable on nutrition of their girl child concerning the physiological impact of improper nutrition. Regular monitoring is important especially during the periods when they take heavy training loads.
4. Athletes should be screened for clinical manifestations i.e. disordered eating pattern, amenorrhea and osteoporosis from time to time and proper treatment should be given.
5. Each national level sports team should have the access to the service of a qualified nutritionist / dietitian to get dietary advices.

REFERENCES

Beals, K. A. & Manore, M. M. (1994). The prevalence and consequences of subclinical eating disorders in female athletes. International journal of sport nutrition, 4, 175-195.

Beals, K. A. (2004). Disordered eating among athletes: a comprehensive guide for health professionals, Human Kinetics.

Berg, Kelly C., et al.(2011). "Convergence of scores on the interview and questionnaire versions of the Eating Disorder Examination: A meta-analytic review." Psychological assessment 23.3, 714.

Button, E. (1993). Eating disorders: personal construct therapy and change, John Wiley & Sons Ltd

Costarelli, V. & Stamou, D. (2009). Emotional intelligence, body image and disordered eating attitudes in combat sport athletes. Journal of Exercise Science & Fitness, 7, 104-111.

Cotugna, N., Vickery, C. E. & Mcbee, S. (2005). Sports nutrition for young athletes. The Journal of School Nursing, 21, 323-328.

Croll, J. K., Neumark-Sztainer, D., Story, M., Wall, M., Perry, C. & Harnack, L. (2006). Adolescents involved in weight-related and power team sports have better eating patterns and nutrient intakes than non–sport-involved adolescents. Journal of the American Dietetic Association, 106, 709-717.

Garner, D. M., Olmsted, M. P., Bohr, Y. & Garfinkel, P. E. (1982). The eating attitudes test: psychometric features and clinical correlates. Psychological medicine, 12, 871-878.

Gordon, R. A. (2000). Eating disorders: anatomy of a social epidemic, Blackwell Publishers.

Heffner, J. L., Ogles, B. M., Gold, E., Marsden, K. & Johnson, M. (2003). Nutrition and eating in female college athletes: A survey of coaches. Eating Disorders, 11, 209-220.

Martinsen, M., Bratland-Sanda, S., Eriksson, A. K. & Sundgot-Borgen, J. (2010). Dieting to win or to be thin? A study of dieting and disordered eating among adolescent elite athletes and non-athlete controls. British Journal of Sports Medicine, 44, 70-76.

Muise, A. M., Stein, D. G. & Arbess, G. (2003). Eating disorders in adolescent boys: a review of the adolescent and young adult literature. Journal of Adolescent Health, 33, 427-435.

Muscat, A. C. & Long, B. C. (2008). Critical comments about body shape and weight: Disordered eating of female athletes and sport participants. Journal of Applied Sport Psychology, 20, 1-24.

Patel, D. R., Greydanus, D. E., Pratt, H. D. & Phillips, E. L. (2003). Eating disorders in adolescent athletes. Journal of Adolescent Research, 18, 280-296.

Picard, Christy L.(1999). "The level of competition as a factor for the development of eating disorders in female collegiate athletes."Journal of youth and adolescence 28.5, 583-594

Smolak, L., Murnen, S. K. & Ruble, A. E. (2000). Female athletes and eating problems: a meta-analysis. International journal of eating disorders, 371-80.

Sundgot-Borgen, J. (1993). Prevalence of eating disorders in elite female athletes. International journal of sport nutrition, 29-40.

Sundgot-Borgen, J. (1994). Eating disorders in female athletes. Sports Medicine, 17, 176-188.

Swoap, R. & Murphy, S. (1995). Eating disorders and weight management in athletes. Sport psychology interventions., 307-329.

Thompson, R. A. & Sherman, R. T. 1993. Helping athletes with eating disorders, Human Kinetics Publishers.