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Research Article

STUDYING THE PREVALENCE, TYPES AND CAUSES OF INJURIES IN ELITE COLLEGIATE WRESTLERS

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ABSTRACT

The current study aims to investigate the prevalence, types and causes of injuries in elite collegiate wrestlers. The sample consists of all wrestlers participated in national students olimpiyad held in Shahid Bahonar University of Kerman during summer, 2006. The sample consists of freestyle wrestlers. The tools used in this study have been: 1 – A questionnaire to collect data about injuries, 2 - A questionnaire on causes and consequences of injuries, 3 - A questionnaire on athletes personal information, 4 - Data collected by physiotherapists and 5 - Data collected by medical staff. Testing the research hypotheses on ($0 \leq P \leq 0.05$) level showed the highest percentage of injuries goes to the head and face with a 35.74 % with the lowest percentage of zero injuries to internal limbs. Statistical analysis shows no significant difference on injuries occurred to various limbs of the body. According to the calculations on ($P \leq .05$) level, some of the research findings include: there is no significant difference among freestyle wrestlers regarding the percentage of prevalence of injury in various limbs of the body. Moreover, there is no significant difference among freestyle wrestlers regarding the percentage of prevalence of injury and the type of injury. Furthermore, there is a significant difference between injuries occurred to the upper limbs and the lower ones between defender wrestlers and attacker ones, and there is no significant difference between the incidences of injuries in different stages.

Overall, the data in this study show that wrestling is a contact sport with the high risk of injury in comparison to other sports. Physical Fitness plays a decisive role in reducing the extent of injury. Weight loss plays a decisive role in increasing the rate of injuries.

Keywords: Injury, Wrestling, Students, Elite, Sport.

INTRODUCTION

Nowadays we drastically witness flourished scientific and research aspects of physical education. So that, the validity and value of this global phenomenon is increasing more and more. We need to realize the main goal of the exercise which is the health of all members of the society, and this development path could be started by giving awareness to coaches, teachers, sportspeople, athletes and parents. If we call the present century the century of preventative measures, all physical activity scientists should collaborate on offering scientific physical programs to prevent ailments, disabilities, physical disorders and loss of public health, with regard to the fact that prevention is better than cure⁸. Wrestling is one of the sports that rank high among people who like sports. This sport is widespread around the world with its attractions and has drawn the interest of many. Nowadays, there are lots of various wrestling competitions at the national, continental, international, worldwide and Olympic levels. Regarding the

popularity of this sport all around the nation and especially eye-catching development of Iranian wrestlers internationally, there is more need felt for careful observation to identify current obstacles to development to pave the path. Injury is one of the aspects that always worry coaches and wrestlers. Heavy physical exercise endurance to achieve physical fitness and achieving great victories may increase the risk of sports injuries. Coaches and wrestlers increased awareness and understanding of injuries due to incorrect exercise and over exercising can be effective in preventing injuries. This can ensure the athlete health boost and longevity⁵.

Due to the fact that wrestling is among the most popular sports nationwide in one hand and in the other hand it is among most contact sports with high incidence of injuries, therefore, the pain and discomfort makes athletes to avoid exercises and competitions which in turn decreases the likelihood of championship; thus, it is necessary to study the prevalence and causes of injuries to help in increasing the awareness of

athletes and instructors in order to prevent injuries. Considering safety measures including theoretical trainings and applied ones in sporting can be counted on as one of basic aspects of coaching in various sports. According to studies, out of 100 athletes, 8 athletes suffer from injury in sports activities. In some sports the possibility of further injury is more than others while in some other sports it is less due to less direct contact¹². So many reasons may cause injuries during sports activities. Whatever safety of sporting environment and athletic condition is favorable; there is still the possibility of injury during these activities. The injuries occur by athletic contacts as well as athletes collisions with the floors, the ground or sports equipment. Loss of body control may cause injuries to the body and the severity of injuries varies from minor to severe, although most of them are minor. Many sports injuries are preventable, but real emergencies and sports injuries will increase without preventive measures. For instance, athletes may be placed in an inappropriate situation that may not be aware of and so the situation causes injuries. Also, an athlete with prior injury may not enjoy from a complete rehabilitation before returning to the game resulting in frequent new sprain and strain and injuries. It is likely that the athletic skills needed to participate in the tournament is not won during the pre-season training with a good physical condition, and or fallen short during the acquisition of physical fitness and as a result suffer more injury than others⁹.

Athletes are sensitive to their physical fitness balance. This is not because of that they feel pain better in the general population, but this is because their body is so proportioned that the least damaging to their mechanism is immediately apparent. Clearly, these factors must be quickly identified and resolved. Pain characterization in a reasonable fashion, even when persistent enough to stop person from the practice is not always possible².

A good program for prevention of sports injuries include: medical support, competitor behavior, safe environment, protective equipment and physical fitness¹.

Medical support: All athletes, regardless of age and health status in the past, need to be examined before the season. Although it is possible that in some cases athletes do not qualify to compete, but its main aim is to detect potential problems that should be considered by physicians, athletes, parents and coaches. A suitable physical examination includes the history of previous soft-peddling, reevaluation of the past issues and assessment of the present ones⁹.

Competitor behavior: It is the responsibility of the coach to improve athlete's behavior in order to prevent injury, and this requires the knowledge of that they are serious in preventing injuries by athletes. You should explain what types of injuries are common in sports and what preventive measures can reduce their occurrence. It is then necessary to notifying athletes of more possible serious injuries and steps taken to prevent them. The success of these measures depends on the cooperation of athletes. Prevention is not practical unless athletes believe that prevention is part of the sport and it requires cooperation⁹.

Safe environment: The coach task is to ensure that all playgrounds and sport equipments are safe for training and

competition. This principle shall always be applied in indoor and outdoor plays. All equipments must comply with the standards and principles of health improvement⁹.

Physical fitness: When an athlete physical fitness is poor, the risk of injury is increased drastically, except in cases where athletes have the physical ability and flexibility to tolerate. Pressures exerted on the body may cause injuries during participation in sports. Coaches should emphasize the importance of physical fitness and its use in sports injury prevention. Some athletes are resisting body builder's plans, and instead call for a greater focus on skills development. They need special attention to realize the importance of the real values of physical fitness. Physical fitness programs include specific training designed for the preparation of pre-season games, athletic seasons and sport timeouts⁹.

The causes of injuries are too extensive and can be studied in 9 areas. These areas include: the use of non-standard and unfavorable equipment, poor technique and wrong procedure of the skill, irregular exercise, fatigue, opponents technical fault, previous injury, lack of fitness, lack of mental readiness or poor mental condition, weight loss issues. The time when injury occurs is also important and it should be investigated to see the injury occurs in which of the following stages: during the bodybuilding exercises and weight training, while warming up the body, during the competition or when techniques are being trained¹¹.

Evaluation of athletic injuries: sometimes it is necessary for the coach a preliminary assessment to determine the nature of injury or a sudden illness of athletes. Here, the following information including pre-season physical examination of athletes, observers, the place in which injury occurred and the athlete examination results should be considered⁹.

Physical injuries include injuries to bone, soft tissue injury, muscle injury, joint injury, and internal organs and limbs injury.

Bone and joint injuries: common injuries include bone fractures, bone dislocation and bone sprains⁹.

Soft tissue injuries: structures that make up the endocrine organs and body systems are composed of soft tissues. Therefore, the injuries occur to these structures are minor and their diagnosis is difficult because there are no external signs⁹.

Muscle injury is of the most common injuries in sports due to the lack of proper and timely treatment. These injuries often do not receive much attention because patients can perform their daily activities even after injury. According to some studies, 10 to 30 percent of the entire sport related injuries are muscle injuries^{13, 14}. Internal organ injuries include injuries inflicted on organs such as the heart, stomach, lungs, kidneys, spleen, intestine, testis, genital and abdominal muscles.

METHODOLOGY

Statistical population consists of all wrestlers participated in national students olampiyad held in Shahid Bahonar University of Kerman during summer 2006. In this study, purposive or available sampling is used in which the sample consisted of all freestyle wrestlers, given that all of these students have already participated in the qualifying

tournament and then managed to obtain permission to participate in this tournament. In this research, the research method is of causal method after the occurrence. The following instruments were used to collect data.

Data collection method used in this research is of field questionnaire data collection. Thus, preparing the questionnaire, the researcher personally collects data participating in tournament by immediately recording any injury occurs on the ground. It should be noted that recording injuries is assisted by the medical staff at the time of injury.

Research tools:

The tools used in this study have been: 1 – A questionnaire to collect data about injuries, 2 - A questionnaire on causes and consequences of injuries, 3 - A questionnaire on athletes personal information, 4 - Data collected by physiotherapists and 5 - Data collected by medical staff.

Statistical methods:

Data presented in descriptive statistics describes the percentage of overall generally known injuries; and inferential statistics with nonparametric level of data measurement is at a nominal scale level of measurement. Therefore, univariate and two variables χ^2 are used to test research hypotheses.

RESULTS

Based on Table, the maximum weight is that of 55 kg and 84 kg and the minimum weight is about 60 kg. A total number of 14 incidences of injuries have been reported for 80 wrestling events, i.e., there have been a number of 17.5 injuries per 100 wrestling events.

Table 1: Wrestlers weight distribution

120	96	84	74	66	60	55	WEIGHT (KG)
9	9	11	9	9	10	11	The number of participants

The amount of injuries to the wrestler’s description Measured parameters including the areas of injury, cause of injury, type of injury and differences between the defense and the attacker injured were investigated. In addition, other factors such problematic factors, readiness from the person and their instructor perspective, the stages of injury and the weight difference between the wrestling weight and wrestlers weight and its relation to the degree of injury were evaluated. The results were then separated. Percent of injuries in different limbs is presented in the diagram (1).

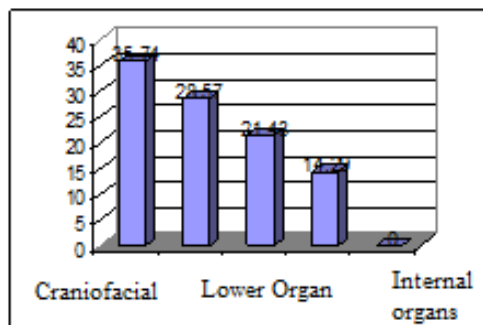


Diagram 1: Injured limbs

Based on Table, the highest percentage of injuries of 35.74% occurs to the head and face and the lowest injuries percentage which is zero goes to internal organs. Statistical analysis revealed no significant difference in injury rates between different parts of the body. According to Table 2, the calculated χ^2 at ($P \leq 0.5$) level is less than table χ^2 , so the difference is not statistically significant

Table (2)

χ^2 table	Calculated χ^2
81.7	1.22
3 Df=	699.
Sig=	

The number and percentage of occurred injuries and their types are shown in diagram (2).

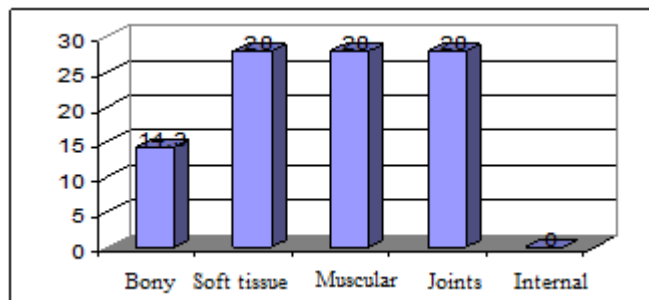


Diagram 2: The type of injury

Based on the results of diagram, bone injuries, soft tissue injuries, muscle injuries and joint injuries have been 14.3%, 28%, 28%, and 28%, respectively. According to calculations, calculated χ^2 at ($P \leq .05$) is less than table χ^2 . So, there is no significant difference in the distribution of various injuries.

Table 3

χ^2 TABLE	CALCULATED χ^2
815.7	8.0
670Sig=.	3Df=

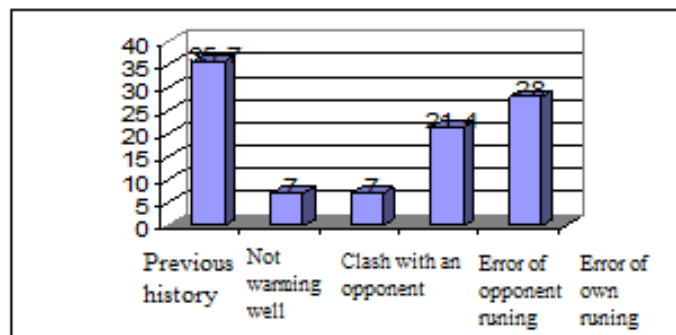


Diagram 3 injury causes

Table shows that the maximum percentage of injures causes is related to previous history of injury by 35.7% while the minimum goes to insufficient warming up and contact with opponent by 7%. According to calculations, calculated χ^2 at ($P \leq .05$) is less than table χ^2 . So, there is no significant relation between the injury types and the prevalence of problematic factors.

Table 4

X ² TABLE	CALCULATED X ²
488.9	57.4
=334.0Sig	4Df =

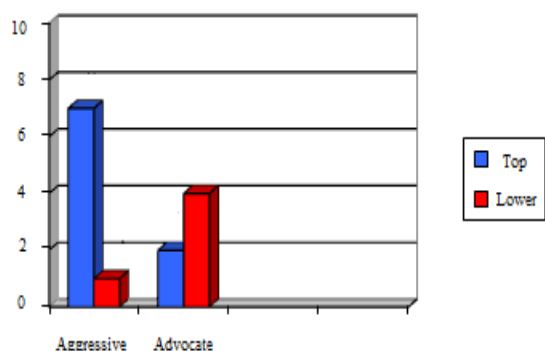


Diagram 4: The difference between the lower and upper injured areas of the defensive and attacker wrestlers

Table shows that 57% of injuries relate to attackers and 43% of them are related to the defenders. 87% of injuries in the attackers are in upper limbs while 12.5% lower limbs are being affected, respectively. Also, 33.3% of injuries in the defenders are in upper limbs while 66.7% are affected in lower limbs. Calculated χ^2 at ($P \leq .05$) is greater than the table χ^2 , so there is a significant relationship between the two groups of the attacker and the defender wrestlers regarding the affected areas.

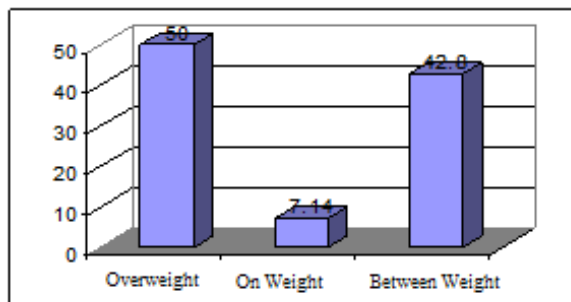


Diagram 5: Stages in which wrestlers injured

Diagram (5) shows that the maximum percentage of injuries occur in the second stage by 50 %, and the minimum to the third stage with a 14.3%, respectively. Calculated χ^2 at ($P \leq .05$) levels was not significant, i.e., there is no significant difference between the various stages of wrestling.

DISCUSSION

Today, all wrestling competitions at all levels from regional and provincial level to the Olympics are being held in seven weights in two different sessions (days). Thus all competitions on the three weights of (60, 74 and 96 kg) are held in the first day of the tournament and other four weights of (55, 65, 85 and 120 kg) will compete the next day. Clearly, each wrestler must finish all his competitions in one day. Due to the compact nature of the competitions, the researcher studied the prevalence and causes of injury occurred in the defenders and the attackers, as well as the differences between injuries in a tournament with the following results achieved.

There is no significant difference regarding the rate of injuries in different limbs of the freestyle wrestlers with the maximum injuries of 35.75 to head and face, and then upper limbs, lower limbs and spine show the lowest injuries of 28.57%, 21.43% and 14.29%, respectively. The minimum injuries occur to internal organs with zero percent. On 458 high school wrestlers of 14 different high schools 2.9% injury have been detected during a season and the most were injured in the shoulder (24%) and the knee (17%)^{3,4,6}.

In a research by Lourish et al (1992) on 1742 wrestlers aged 16-6 the maximum injuries of 33% in tournament were occurred on head and neck. Most injuries occur due to direct contact with opponent in head and neck; his results are in consistent with Ramazani results on wrestlers. Organ distribution of injuries has been: head and face (32%), upper limbs (29%), trunk and spine (19%), lower limbs (15%), internal organs (5%). Rovanel and Kresti (1983) studying a wrestling tournament found that among 353 wrestlers participating in a wrestling tournament, most injuries are to the head face and neck with a 36.4%, respectively. Most studies show that the maximum injuries occur to head and face and upper limbs suffer next^{7, 10}. The reason is the direct contact of the area with the opponent; this sport do not uses any protective headwear, so head suffers from more injuries.

Injury type: there is no significant difference in the prevalence of injury types among freestyle wrestlers. In this tournament the maximum injuries occurred to muscles, bones, and joints all by 28% and the soft tissue by 14.3% while minimum injuries occurred to internal organs by 0%, respectively, with the least damage to internal organs. Mr. Ansari study results regarding this context are: Soft tissue (65%), muscles (20%), joints (6%), internal organs (5%), and bone (4%), respectively. David. J and Bergeron in the book of sports injuries say that most injuries occur in soft tissues during sport activities are related to the skin because the skin is the biggest organ in terms of the size of the body. Muscle injuries have become as one of the most common injuries in sports because of the lack of proper and timely treatment and attention, and because most of the patients can do daily activity after injuries.

There is no significant relationship between harmful factors and various types of injuries in wrestlers. The maximum percentage of injury goes to an injury with a history by 35.7%, and then are personal faults by 28% and opponents faults by 21%, respectively. The minimum percentage of injury goes to insufficient warming up and contact with opponent by 7%. Ansari indicates that 64% of injuries occur during techniques

training, 20% during competition, 8% during warm up and 7% in the gym during weight training.

Wrestlers with the history of injuries had the highest risk of re-injury. In the book of sports injuries farajzadeh says that a sportsperson with a history of injury is more likely to suffer from new twists and stretches if not fully rehabilitated in appropriate manner. It can be concluded that in this tournament the highest number of injury was related to the previous injuries and this shows that most of the injured athletes have not been treated fully and are probably left with chronic injuries^{9,15}.

Difference between upper and lower limbs injuries in defender and attacker wrestlers showed significant differences between the attacker and the defender in regard to injured limbs. Our findings show that 57% of injuries go to attackers and 43% of them go for defenders. Attackers show about 87% of injuries in upper limbs while this is 12.5 for lower limbs. 33.3% of injuries in the defensive wrestler occur at upper limbs and 66.7% are at lower ones.

Harry et.al (1992) on a study conducted on wrestlers found that attackers face with injuries different from that of defenders. For example, attacker wrestlers are more vulnerable to neck injuries while instead defenders are more prone to the knee joint hurt. It can be concluded that attackers when attacking attempt for under run, so the chances are higher to collide their head and face with the opponent's legs, causing injuries in their upper limbs. Conversely, the opposing defenders, because of more pressure placed on their foot, are more prone to lower limbs hurt¹⁵.

The results of this study indicate that there have been 14 injury cases in 80 competitions, i.e. 17.5 per cent. Harry et.al (1992) studying wrestlers stated that the number of injuries is drastically higher in wrestling compared to other sports¹⁵. Analyzing results of studying the world championship competitions documents concluded that 110 athletes out of 353 wrestlers have been injured in competitions which shows 31.2% rate of injury. Hadavi states that according to studies conducted 8 athlete face with injuries out of 100 ones, in some sports the possibility of injury is less than others due to less direct contacts. Statistics show that wrestling is among high contact sports with higher possibility of injury¹².

Another issue considered in this study is the wrestlers' preparation that was estimated using athletes and their coach's point of views as well as questionnaires. The results show that 7.14% considered being poor, 64.29% intermediate, 14.29 % good and 14.29 % excellent from athletes and their coach's point of views.

In other study, 39% of the injuries occur during continuous and regular trainings and 61% occur during discontinuous and irregular training. Given the above stated we conclude that physical fitness plays a decisive role in reducing the rate of injuries, so athletes should participate in sport activities with full preparation to reduce the possibility of injuries¹⁰⁻¹⁴.

Wrestler's regular weight and their wrestling weight was another aspect of this study. 50% of wrestlers were overweight, 7.14 percent had the proper weight and 42.86 percent were lower than wrestling weight. These statistics indicate a decisive role of weight loss in increasing the rate of injuries. Gareth physiology explains the effects of weight loss

as given: decreased muscle strength, decreased anaerobic capacity, decreased plasma and blood volume, increased sub maximal heart rate, decreased stroke volume, decreased volume capacity, decreased oxygen consumption, decreased blood flow to the kidneys resulting in a decrease in blood purification, liver and muscle glycogen depleted and decreases the body's ability to maintain blood glucose, accelerates protein breaking, electrolytes decreased, which leads to impaired muscle function and coordination. The above confirm our findings. Also to wrestle at a higher weight increases the risk of injury due to weight differences with the opposing wrestlers and therefore exerts higher pressure.

Injury stages are the next issue examined in this study. According to calculations, there is no significant difference between the different stages of the wrestling. Accordingly, the highest injury percentage equal to 50% goes to the second stage with the least amount of 14.3% to the third stage, respectively. More injuries occurred during the second stages is perhaps due to the interval between two first and second stages. Because the wrestlers body warms down then, and the wrestlers do not warm up such that of the first stage and or the third stage was held in the afternoon.

CONCLUSION

The study data shows that there is no significant difference between incidences of injury in various limbs among freestyle wrestlers. And, there is no significant difference between the rates of injury types among freestyle wrestlers, as well. In addition there is a significant difference between the injured lower limbs and upper limbs between defensive wrestlers and offensive ones, with no significant difference in injury rates at different stages. Wrestling is a contact sport with higher risk of injury in comparison to other sports. Fitness plays a decisive role in reducing the extent of injury. Weight loss plays a decisive role in increasing the rate of injury.

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