



P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIF): 5.38
IJPESH 2023; 10(3): 483-487
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www.kheljournal.com
Received: 08-02-2023
Accepted: 11-03-2023

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Sports injuries to Indian wrestlers: A prospective study

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DOI: <https://doi.org/10.22271/kheljournal.2023.v10.i3g.2996>

Abstract

A lot of persons in the world involve themselves in physical activities, some participate in the activities for fun and enjoyment and also to improve their physical standard and health while other perform professional sports activities. Wrestling is one of sports and training thereof is an important factor stimulating psychophysical development and contributes to the improvement of the physical condition and mental health. As wrestling is a combat sports so the chances of injuries are more because it involves direct contact with opponent and movement with high intensity and high stress level in competition with insufficient recovery leads to muscle damage. Throwing, twisting, sudden change in direction leads to extra pressure on musculoskeletal system which results in injuries, many a times. The purpose of this study is to find out some common reasons for sports injuries to Indian wrestlers. Objectives of this study are to find out relation between training age and injury, ratio of injuries encountered to various part of body and proportion of injuries in various modes i.e., attacking, defensive or accidental. Study also tries to find the possible reasons for injury including faulty technique, malnutrition, conditioning level, duration of sessions and recovery period between sessions.

Keywords: Wrestling, training age, combat sports, injury, Greco-Roman, free-style

1. Introduction

Wrestling is one of the world's oldest combat sports. Traces of wrestling are found in cave drawings of France around 15000 years ago. In many sacred books like Book of Genesis, the Patriarch Jacob is said to have wrestled with God or angel. In Indian mythology, the Ramayana and the Mahabharata also have mention of wrestling. In ancient Greece, wrestling occupied a prominent place and wrestlers were treated with great respect and considered as warriors. Even in ancient Olympic, wrestling was the decisive sport of the event ^[15]. In ancient time, Greco-Roman was the only wrestling style. Wrestling is widely considered as world's toughest sport and wrestlers as the toughest human being both physically and mentally.

Wrestling was played all over the world with small variation in rules as per local tradition, but main theme of wrestling was same all over the world i.e., to pin down the opponent. In ancient India, wrestling was played with name "Malla Yudha". As to India, wrestling was popular all over the India because it demonstrated strength and mental stamina both. In North India and many parts of South west region of sub- continent, wrestling is played in almost in every village in local Akhadas (Traditional wrestling training centers). At world level, Olympic Wrestling has two styles: Greco Roman and Free Style. But in the countryside, it is Free-style wrestling that is more popular and played on both mat and sand. Wrestling requires tremendous strength, speed, balance, foot work, quick reaction to stimulus and endurance (aerobic and anaerobic). With all that it requires a high level of neuromuscular coordination and above all mental grit. It requires very little equipment, but a lot of will power and dedication to excel.

In modern Olympics also wrestling was the part of first modern Olympic in 1896, Athens. It was the Greco Roman wrestling that was introduced in 1896. Free Style was introduced in 1904 Olympics at St. Louis, USA and Women Wrestling in 2004 Olympics at Athens. Wrestling is a combat sport and fall under the category of injury prone sports such as wrestling, Judo, Kabaddi, Rugby etc. As it involves explosive throwing and manipulative movements so body encountered a lot of stress which results in injuries many a times.

As the duration of bout is just only 6 min (3 min- 30 sec-3 min) so the requirement of sport also makes it aggressive sport and results in sports injuries.

2. Objectives

In view of the said points, the study was necessitated on “Sports Injuries to Indian Wrestlers: A Prospective Study” with the following objectives:

1. To find out the relationship between training age and injuries occurred to wrestlers.
2. To calculate ratio of injuries encountered to various parts of the body.
3. To study the proportion of injuries in various modes of wrestling i.e., attacking, defensive and accidental.

3. Definitions

Sports Injury: A sports injury may be defined as damage to the tissue of the body that occurs as a result to sport or exercise.

Greco-Roman style: This is an Olympic style of wrestling wherein it is strictly forbidden to grasp the opponent below the belt line, or to trip him or to use the legs actively on his opponent to perform any action.

Free Style: In Freestyle Wrestling and in Women’s wrestling, however, it is permissible to grasp the legs of the opponent, to trip him/her and to use the legs actively to perform any action. Women’s Wrestling follows the rules of Freestyle Wrestling, forbidding however the Double Nelsons.

Akhada: Akhada is an Indian word that is used for a traditional wrestling training center. It has the facilities of boarding and lodging.

Training Age: It is the total no. of years a person spent in performing sports specific activities and drills.

Combat Sport: A combat sport is a competitive sport that usually involves one on one combat. The winner will be declared by more scored point than opponent or attacking the opponent in specific or designated technique. Ex: Boxing, Wrestling, Martial Art.

4. Material and methods

4.1 Participants

This study includes total 100 wrestlers of age group 12 years to 39 years (mean age – 24.3±6.10 years). The study includes grass root level wrestlers to Olympic medalist with training age from 6 months to 22 years (mean training age- 9.74±5.47 yrs.). It includes total 64 male wrestlers and 36 female wrestlers. Out of 100 wrestlers, 30 wrestlers are of Greco-Roman style and 70 are that of Free Style wrestling.

4.2 Method

Standard questionnaire was distributed to all the wrestlers under the supervision of either a coach or trainer. The questionnaire included personal information: age, gender, height, weight and sport specific information which includes training age, type of injury, mechanism of injury, bio motor abilities most affected, return to sport, location of injury, diagnostic method for injury treatment, session duration, and recovery period between sessions.

The data collected from respondents in terms of location of injury mainly divided into three parts; upper extremities which include clavicle, shoulder, elbow, hand (including wrist) and arm. Lower extremities include knee, hip, thigh (including hamstring) and ankle. Trunk includes vertebrae, abdomen and ribs. Rib’s injuries include fractures to ribs, damage to cartilage and intercostal muscles. Skin injuries like

bruises, mat burns, contusions and cartilage injuries like cauliflower ear are excluded from the study. Training age is sub divided in 5 years’ time-slot of training to find out percentage of maximum injuries as per training age.

4.3 Statistical Analysis

Outcomes from the study were analyzed on percentage distribution of injury with training age, percentage distribution of location of injury in body parts and percentage distribution of attacking, defensive and accidental wrestling injuries. Descriptive statistic was used for variables collected. Case rate was calculated by dividing total no. of injuries by total no of players.

$$\text{Case Rate} = \frac{\text{total Number of Injuries}}{\text{total Number of players}}$$

Player rate was calculated by dividing no. of players with atleast one injury divided by total no. of players.

$$\text{Player rate} = \frac{\text{Number of players with atleast one injury}}{\text{total number of players}}$$

5. Results

The study included total 100 wrestlers of all levels including both styles of wrestling and all genders. The study included age ranges from 12 years to 39 years (mean age -24.3±6.10 years) including currently active and non- active wrestlers. Their height ranges from 150cm to 182cm (mean height-167.31±8.40 cm) and weight ranges from 41kg to 110 kg (mean weight- 68.19±15.78 kg). Training age ranges from 6 months to 22 years (mean training age -9.74±5.47 years).

Total 122 sports injuries were reported by 100 wrestlers. Thus, the case rate was 1.22 and player rate 0.83. Case rate and player rate were different as 31 wrestlers suffered with more than one injury.

Training age with 0-5 years suffered N = 72 injuries (59%), 5-10 years with N = 37 injuries (30%), 10-15 years with N = 10 injuries (8%), 15-20 years suffered total N=3 injuries (2%), 20-25 years with no injury (Fig 1).

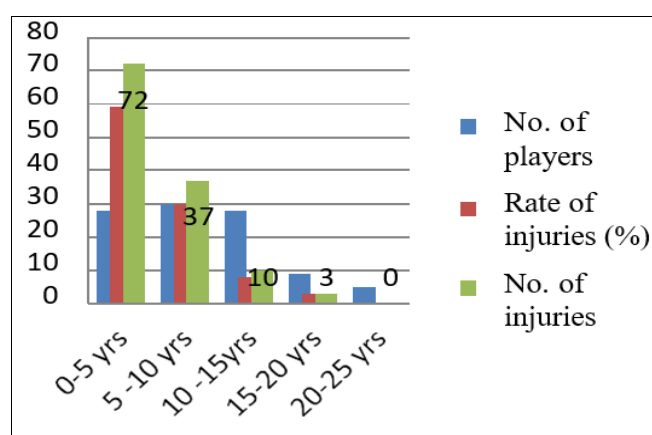


Fig 1: Training age with 0-5 years suffered n=72 injuries (59%), 5-10 years with n=37 injuries (30%), 10-15 years with N=10 injuries (8%), 15-20 years suffered total N=3 injuries (2%), 20-25 years with no injury

Lower extremities had more injury rate (N = 53, 43.4%) as compared to upper extremities (N = 49, 40.1%) and the trunk region had lowest injury rate (N = 20, 16.3%). In lower extremities knee suffered with maximum no. of injuries (N =

42, 34.4%) followed by ankle (N = 8, 6.5%), thigh (N = 2, 1.6%) and hip (N = 1, 0.8%). In upper extremities, shoulders have maximum injuries (N = 30, 24.5%), hand and wrist (N = 8, 6.5%), elbow (N = 07, 5.7%), clavicle (N = 3, 2.4%) and lowest no. of injuries to upper arm (N = 1, 0.8%). In trunk region maximum injuries suffered by Lumber region of vertebrae (N = 13, 10.6%), ribs (N = 7, 5.7%), no injuries to abdomen are reported (Fig. 2).

More injuries occurred during attacking wrestling (N = 67, 54.91%). While in defensive wrestling (N = 45, 36.8%) and total N = 10, 8.1% injuries occurred accidentally. This data included injuries occurred in practice, competition and during drills also which included conditioning exercises, weight training, technique practice and other outdoor activities (Fig.3).

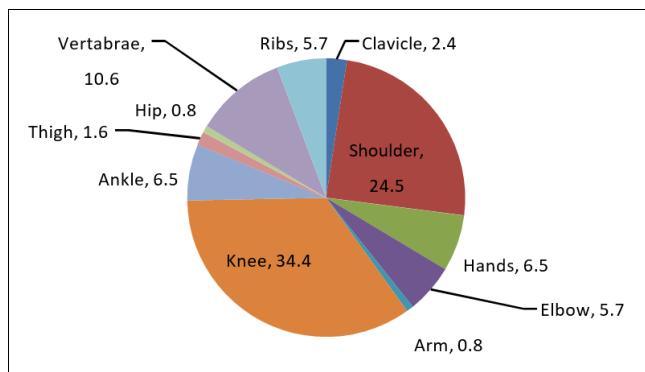


Fig 2: In trunk region maximum injuries suffered by Lumber region of vertebrae (N = 13, 10.6%), ribs (N = 7, 5.7%), no injuries to abdomen

In this study knee injuries are reported highest (N = 42, 34.4%) followed by shoulder injuries (N = 30, 24.5%). Only these two regions contribute to 58.9% of total injuries occurred to wrestlers. Knee had more injuries due to more foot work in the sport and maximum leg attacks in Free Style wrestling while shoulder had more injuries due to its anatomical structure with maximum mobility and least

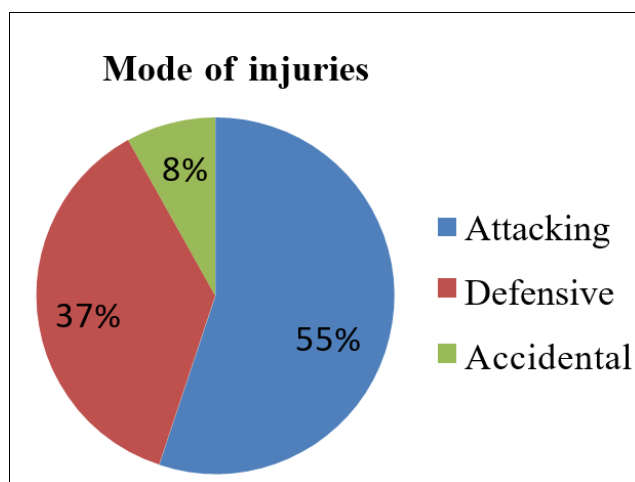


Fig 3: This data included injuries occurred in practice, competition and during drills also which included conditioning exercises, weight training, technique practice and other outdoor activities

6. Discussion

As wrestling is a body contact sport so it has higher rate of injuries. There is a variation in type and location of injury as per the style of wrestling^[6]. The study found that maximum injuries occurred in the early period of training age (N = 72,

0-5 yrs).

Barrosa BG *et al.* (2011) observed that 85.3% of the athlete referred to musculoskeletal injuries in their careers and all the wrestlers who had not suffered injuries had been practicing the sport for less than 24 months^[7]. In our study also total 17 out of 100 wrestlers didn't have any history of injury; out of them 12 had less than 4 years of training age. In the same context, Goodman *et al.* (2018)^[5], in his study, exposed the prevalence of shoulder and elbow injuries in the wrestlers of collegiate athlete's academy. They revealed a rate of 21.59% injuries per 100000 exercises. Moreover, the first-year collegiate wrestler experienced more injuries than the senior ones, which illustrated the relation between training age and injury risk.^[5] As, training age increased, more proficiency in techniques, improved body conditioning and increased load bearing capacity reduced the injury rate. Sajjan Pal *et al.* (2020)^[1] discovered that upper body had more injuries in shoulder area and lower had in knee and ankle^[1]. As per findings of Sergio Luiz *et al.* (2018)^[3], Olympic wrestling injuries were having a higher incidence of lower limbs injuries, more frequent involvement of the knee, shoulder, thigh and ankle. The anatomical regions with most frequent diagnosis being sprains, muscle injuries and bruises^[3]. A two-year study conducted on total 196 Indian wrestlers on knee injuries by Dr. Agarwal S. *et al.* (2016)^[9] suggested in her prospective study on Indian wrestlers that more no. of injuries to the knee (47.88%) occurred in attack position. This was also statistically significant (P=0.0000). The injury percentage occurring in defense position was (40.88%), while 11.26% injuries occurred accidentally. In the support of our finding a research by Daneshmandi H. Also found same results of more injuries occurrence in attacking phase in wrestling bouts. Daneshmandi H *et al.* (2020)^[6] found in his study that practicing with opponent was most common injury causing variable (91.86%) among study groups. Most injuries in the study in both Greco Roman and Free-Style wrestlers occurred in attacking status (39.53%)^[6].

Our findings showed that wrestling had higher injury rate. Separate studies conducted by Powell and Jorrett in two different years also suggested wrestling with higher rate of injury sport. Powell *et al.* (1999)^[11] in a study found that the highest proportion of injuries for which a player missed more than 7 days was for baseball (31.0%) and wrestling (32.6%).^[11] Jorrett GJ *et al.* (1998)^[22], the Olympic fights present high injury rates being considered the second sport with highest no. of injuries, behind only American football^[2]. Pasque *et al.* (2018) found that the lower extremities were classically the most commonly injured area in wrestling with more number of injuries occurring at knee followed by ankle. It also states that, of all wrestling injuries, those to the knee and shoulder joint were most common^[8]. Park *et al.* (2019)^[4], conducted a 10 years epidemiological study on the prevalence of injuries in elite male and female Korean athletes. They found that most injuries were respectively in the lower limb (37.7%), upper limb (27.4%)^[4]. Wroble *et al.* (1986) stated that wrestlers with previous knee injuries were at risk of re-injury^[10]. In our study also, we found that knee and shoulder of wrestlers were re-injured at the same location resulting in surgical diagnosis.

From the above discussion, it was found that maximum findings of all research had common outcome that more no. of injuries encountered with wrestlers were in attacking phase of wrestling and lower limb especially knee was the most injured part of body. Less studies were found on training age and injury proportion, but study by Barrosa BG^[7] and Goodman

[5] had clearly showed that injury rate decreases with experience and more no. of years of sports specific training.

7. Conclusions

1. In our study we found that lower limb especially knee was most injured part (N=42) followed by shoulder (N = 30).
2. No significant difference found between pattern of male and female injuries.
3. Most common type of injuries were ligament lesions and shoulder dislocation in both Greco-Roman and Free-style.
4. Maximum knee injuries occurred during defensive phase of wrestling of which the majority were due to twisting.
5. More injuries were observed in early stages of career and many of them were of chronic nature so it seemed, either the reason be faulty techniques or excessive training load as per age.
6. In vertebrae column, Lumber region was most injured part (N = 13). No cervical and abdomen injuries were reported.
7. Maximum injuries were of acute nature, incidences of overuse injuries were found to be rare.
8. All the wrestlers had good nutritional intake and good conditioning of body with adequate recovery (7-8 hrs.) between two sessions at the time of injuries.

8. Suggestions

1. Our study found that maximum injuries were suffered by the wrestlers in early stages of their careers. So, coaches and trainers are suggested to conduct screening test of wrestlers for conditioning level and technique proficiency, then design a scientific warm up and age-appropriate training programs.
2. As knee was most injured part so special training structure of exercises is to be designed to strengthen the part and promote wearing knee protective guards to reduce injury rate.
3. Anthropometric research is to be conducted to determine internal factors for injury.
4. More studies on injury as per training age are to be conducted.
5. More studies are to be conducted on female wrestlers.

9. Limitations of Study

1. Study was based on the data provided by the respondents, so there may be chances of errors in provided information.
2. Many wrestlers showed ignorance in reporting injuries so exact time of injury might not be identified.
3. Many wrestlers followed traditional methods of injury treatment resulting acute injuries to chronic.
4. Many wrestlers changed their style from Free-Style to Greco-Roman after knee injuries. So, injuries as per style may not be clear.

10. Acknowledgement

It is my privilege to express my deepest sense of gratitude and sincere thanks to Ravi Dahiya (2020 Tokyo Olympic silver medalist), Anshu Malik (Olympian), Anita Sheoran (Commonwealth Games, 2010 Gold medalist), Johny Chaudhary (National games, 2011 Gold medalist), Arun Kumar (Commonwealth championship, 2017 silver medalist) and all the participant wrestlers in this study for their contributions.

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