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Characteristics of Sports Injuries Experienced by Throwing Athletes at the PASI Papua Athletics Invitational Event

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ABSTRACT

The risk of injury to athletes tends to be greater during competition. This study aims to determine the characteristics of sports injuries that are dominantly experienced by athletic athletes in Papua. This study uses descriptive quantitative research with survey methods. The population in this study were 409 athletes. The sampling technique in this study used purposive sampling with the provisions of athletes who entered the final round in throwing as many as 93 athletes. The data collection technique uses a sports injury identification questionnaire for athletes. The results of data analysis show that the characteristics of sports injuries based on the type of injury are sprain 64.5%, strain 47.3%, lesions 28%, bruises 9.7%, and dislocation 3.2%. Injury characteristics based on injury location occurred in the ankle at 59.2%, lower extremity 42%, upper extremity 21.5%, and toe 23.6%. Injury characteristics based on the cause of injury are dominant due to overuse at 40%, less than optimal warm-up 25%, technical errors 22%, collisions 5%, facilities and infrastructure do not support 5%, and other causes 3%. Based on the results of data analysis, it can be concluded that the dominant injury characteristics experienced by athletes are sprain caused by overuse and most athletes experience more than two types of injuries.

Keywords: *Sports injuries, athletics, throwing*

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INTRODUCTION

Sport is basically all activities that involve mind, body, and soul in an integrated and systematic manner in order to support, encourage, foster, and develop physical, spiritual, social, and cultural potential (UU Keolahragaan, 2022). The world of sports achievement is so unique because the results of the competition obtained by athletes are observed in detail, measured, and published either through print media or social media documented as sports achievement data (Lutan, 2013). In the process of reaching peak performance, each athlete goes through a long process through training to competition. Similarly, it is stated that each athlete carries out a heavy and specific training program according to the sport to face competition, where in the training process there will be a tendency for injury to occur (Boltz et al., 2021). The results of the study revealed that athletes basically consider injuries as limitations in performing athlete performance, limitations in certain movements that cause athletes to not be able to participate

in competitions due to the pain felt (Bolling et al, 2018). Injury is a significant problem for athletes, especially when faced with the decision to continue or stop when injured (Bullock et al., 2020). Basically, the kinds of injuries that are likely to occur during exercise include lessions, bruises, dislocations, strains, sprain, fractures, and concussions.

Athletics is a sport consisting of track numbers including fast walking, sprinting, middle distance running, long distance running, relay running, and hurdling and field numbers including javelin throwing, discus throwing, shot put, hammer throwing, long jump, high jump, and pole vault (Kardi et al, 2022). The world's elite athletes are inseparable from injuries, for example at the 2020 Olympics the Great Britain 200 meter runner suffered a hamstring injury which resulted in failure to run to the finish line (Kumparansport, 2021). Previously at the 2017 athletics world championships, the world legendary runner from Jamaica suffered a hamstring injury which caused him to fall during a relay run (Dinayanti, 2017). Similarly, at the 2019 athletics world championships in Qatar, the United States runner in the men's 400 meter relay failed to reach the final due to a back injury suffered in the semifinals (Sidik, 2019). Some Indonesian athletes who have suffered injuries include, among others, female hurdlers who suffered waist injuries which resulted in canceling the Tokyo Olympics, Japan in 2012 (Ramdan, 2021). Indonesian sprinter athletes also suffered hamstring injuries while running 60 meters in Serbia (Wicaksono, 2022). At Porprov XIV West Java 2022, female athletes in the 20 km sprint number suffered leg injuries (Nuraini, 2022). Likewise, West Sumatra athletes who failed to get on the podium of the men's marathon running number due to muscle injuries that caused the heel to hurt when standing and radiating to the upper leg or thigh during PON Papua XX 2021 (Nasution, 2021).

Athlete injuries in sports at the School with Special Sports Classes in Surakarta were found to be dominant due to incorrect techniques (Pratama, 2022). Basically, every sport, both body contact and non-body contact categories, has a risk of injury cases. Sports injuries are events that occur suddenly either during the training process or competition. Every physical activity has the potential to cause injury, the higher the physical activity performed, the higher the potential for injury. The results of other studies reveal that cases of sports injuries in athletes predominantly occur in the upper extremities and lower extremities with moderate levels of injury (Cahyo, 2020). The results revealed that javelin throwers experienced a high prevalence of shoulder, elbow, lower back and knee injuries with the most common type of injury being a medial ulnar collateral ligament sprain at the elbow caused by poor throwing biomechanics leading to compensatory movement patterns (Duvenage et al, 2017). Another study revealed

that one in 12 elite athletes who sustained injuries during international competition were unable to continue competing with the predominant muscle injuries occurring at >40% in the lower extremities (Close et al., 2019).

When competing athletes are at their peak performance to break records, the heavy physical stress causes athletes to be more likely to suffer sports injuries (Shashidhara & Krinshnaswamy, 2017). The need to generate high throwing velocities places significant musculoskeletal stress on multiple joints, which can lead to acute and overuse injuries, so it is important to understand the interplay between technique, performance and injury in throwing sports (Leigh, 2012). Knowing the characteristics of sports injuries experienced by athletes is very important in the prevention, treatment and rehabilitation of injuries experienced by athletes (Fonseca et al, 2020). Achievement of athlete achievement is influenced by various factors, one of which is physical. Physical if injured will have a detrimental effect on athletes because injuries can reduce athlete performance. The cause of decreased achievement is caused by many factors (Kardi, 2019).

The problem that occurs if an athlete's injury is not treated properly and completely is that it has an impact on the athlete's performance, thus affecting the athlete's achievement. One of the things that must be known in providing proper handling, namely the type of injury experienced by athletes. Based on this, it is necessary to conduct research to identify the characteristics of the dominant injuries experienced by athletic athletes in Papua.

METHODS

This study uses descriptive quantitative research with survey methods to determine the characteristics of the types of injuries experienced by athletic athletes in the PASI Papua athletic invitation event in order to recruit athletes who will take part in PON XXI. The population in this study were all athletes who participated in the athletic invitation totaling 409 athletes consisting of 313 male athletes and 96 female athletes. The technique of determining the sample using purposive sampling with the criteria of athletes who made it into the final round in the field number totaling 93 athletes consisting of discus throwing 24 athletes (15 male athletes and 9 female athletes), javelin throw 36 athletes (26 male athletes and 10 female athletes), and shot put 33 athletes (21 male athletes and 12 female athletes). The average sample was 20 years and 9 months old. Data collection uses a sports injury identification instrument in athletes in the form of a questionnaire. Questionnaire filling is done online using google form which consists of athlete biodata and instrument content with a total of 16 statement items.

The data analysis technique uses quantitative description analysis using SPSS version 26.

RESULTS AND DISCUSSION

Results

Data obtained through the sports injury identification instrument in athletes filled out online by 93 athletes to identify the characteristics of injuries experienced by athletes who participated in the PASI Papua athletics invitation event in 2023. The data is then processed using the SPSS version 26 application.

1. Results of Descriptive Data Analysis of Respondents

Table 1. Characteristics of Respondents.

Type of Gender	*F*	*(%)*	*Javelin Throw*	*Discus Throw*	*Shot Put*	*Mean Age*
Male	62	66.7	15	26	21	20 years and 9 months old
Female	31	33.3	9	10	12	
Total	93	100	24	36	33	

Based on the results obtained in table 1 that the respondents total 93 athletes consisting of 62 male athletes and 31 female athletes. The number of male athletes is more dominant than the number of female athletes. Athletes come from field number athletics including javelin throw 24 athletes, discus throw 36 athletes, and shot put 33 athletes. The average age of respondents who took part in the PASI Papua athletics invitation was 20 years and 9 months old with a participant age range of 18 - 35 years.

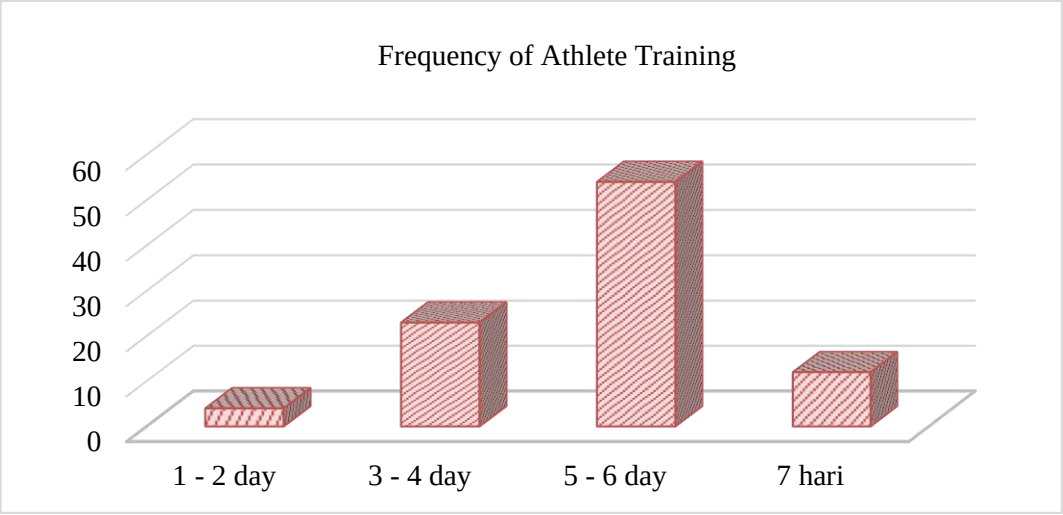

Figure 1. Frequency of Athlete Training

Based on the diagram shown in Figure 1, it is revealed that throwing athletes who take part

in the Papua Athletics Invitation event dominantly do training with a training frequency of 5-6 days, namely 54 athletes (58.06%). The frequency of training 3 -4 days as many as 23 athletes (24.73%). Athletes with a training frequency of 12 athletes (12.90%), and athletes who practice with a frequency of 1 - 2 days as many as (4.3%).

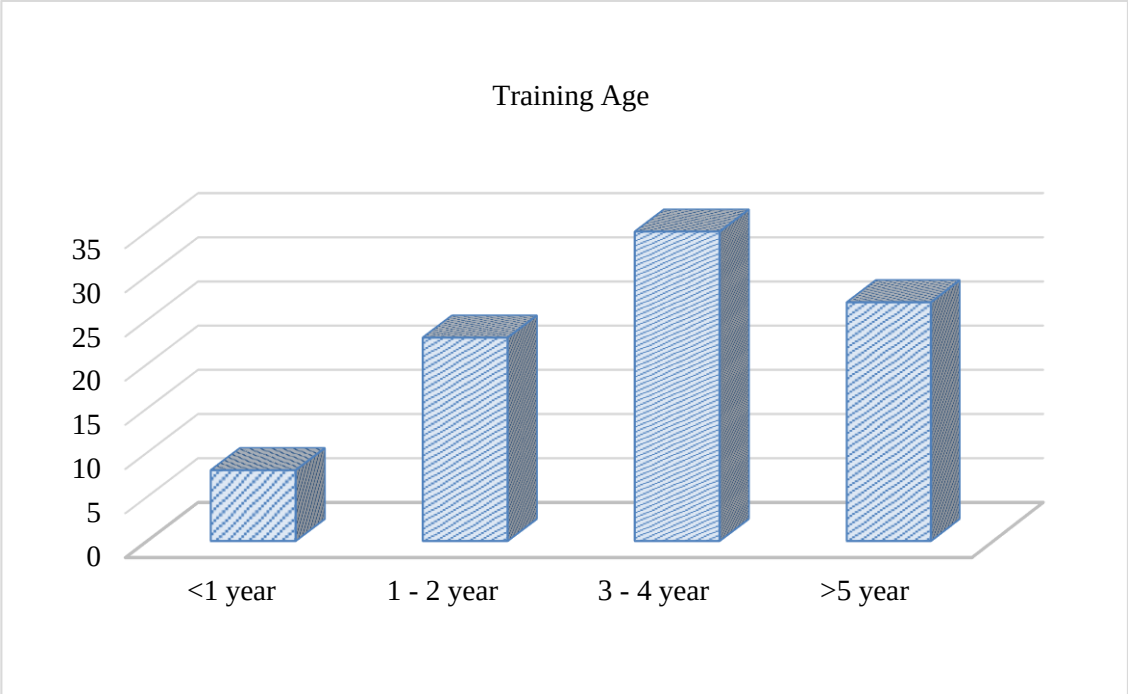

Figure 2. Training Age

Based on the diagram shown in Figure 2, it is revealed that throwing athletes who take part in the Papua Athletics Invitation event have predominantly practiced for 3 - 4 years, namely 35 athletes (37.63%). Athletes with training age >5 years as many as 27 athletes (29.03%). Athletes with 1 - 2 years of training as many as 23 athletes (24.73%), and athletes with <1 year of training as many as 8 athletes (4.3%).

2. Results of Data Analysis of Sports Injury Characteristics Experienced by Athletes

Table 2. Sports Injury Characteristics of Athletes at the Papua Athletics Invitational Event

Injury Type	***Upper Extremity (F)***	***%***	***Lower Extremity (F)***	***%***	***Ankle (F)***	***%***	***Toes (F)***	***%***	***Total (%)***
Lesions	8	8.6	7	7.5	4	4.3	7	7.5	28.0
Bruises	0	0	2	2.2	4	4.3	3	3.2	9.7
Dislocation	0	0	0	0	2	2.2	1	1.1	3.2
Strain	12	12.9	32	32.3	0	0	0	0	47.3
Sprain	0	0	0	0	48	48.4	12	11.8	64.5
Total	20	21.5	41	42	58	59.2	23	23.6	

Based on the results shown in table 2, it is illustrated that the dominant types of injuries

experienced by athletes are sprain at 64.5%, strain 47.3%, lesions 28%, bruises 9.7%, and dislocation 3.2%. The dominant sprain occurred predominantly in the ankle 48.4% and toes 11.8%. Strains were predominant in the lower extremity 32.3% and upper extremity 12.9%. Lesions were predominant in the upper extremity 8.6% and the lower extremity and toes equally 7.5%. The dominant bruise occurred in the ankle 4.3% and dislocation occurred quite minimally experienced by athletes at 1.1%. In this study it was found that most athletes experienced more than two types of injury.

Table 3. Causes of Sports Injuries in Athletes

Causes of Injury	*F*	*(%)*
Overuse	37	40
Less Warm-Up	23	25
Incorrect Technique	20	22
Collisions	5	5
Unsupportive Infrastructure	5	5
Others	3	3
Total	93	100

Based on the results shown in table 3, it is illustrated that the cause of sports injuries in athletes is dominantly caused by overuse or excessive use without being balanced with optimal recovery, which is 40%. Furthermore, the cause of sports injuries due to lack of warm-up or less than optimal warm-up is 23%. The cause of sports injuries caused by technical errors amounted to 20%. In addition, injuries caused by collisions and unsupportive facilities and infrastructure each amounted to 5%, while the types of injuries caused by other factors amounted to 3%.

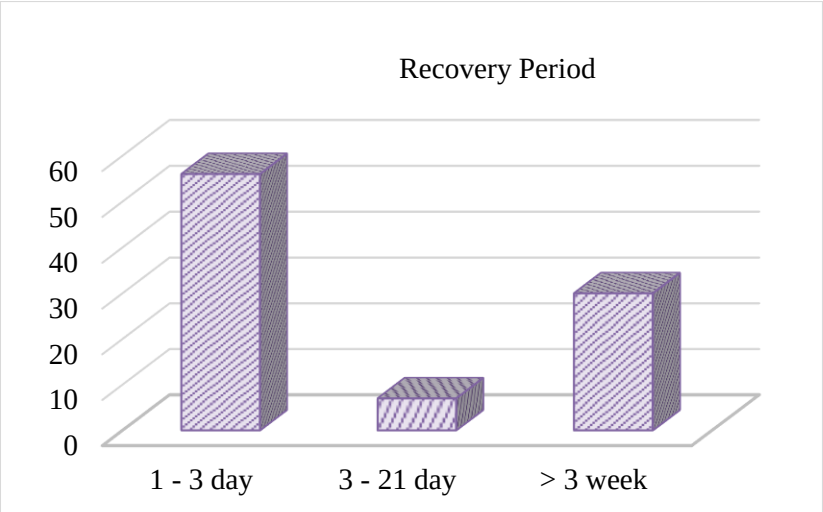

Figure 3. The length of the athlete's post-injury recovery period

Discussion

The results showed that athletes who participated in the Papua Athletics Invitation event predominantly experienced sprain in the lower extremities, especially the dominant ankle caused by overuse. In agreement with the results of previous research which revealed that overuse is the main cause of sports injuries 44.1% and most of the injuries experienced by athletes during competition, which amounted to 85% (Alonso et al., 2010). Similar to the results of previous research which revealed that overuse injuries are the result of a complex interaction between many factors (Tranaeus et al., 2022). Reinforced by the results of other studies that overuse is an injury that often occurs in athletes with repetitive movements such as in athletic sports. Another study also revealed as many as 386 (29.3%) injuries due to overuse (Yang et al., 2012).

The incidence of injury among adolescent and adult elite athletic athletes is quite high which is related to the high intensity of training, the number of hours of training and a history of previous severe injury is a predictor of injury (Jacobsson et al., 2013). Frequent injury due to continuous repetitive loading of the musculoskeletal system without adequate rest is a trigger for injury (Timpka et al., 2014). Studies in youth athletics have shown the incidence of musculoskeletal injuries to range from 35%-65% and the majority of injuries ranging from 65%-95% are related to overuse affecting the lower extremities (Ek et al., 2022). The results also revealed that overuse injuries resulted in lost time for training and even missed competitions and 64% of athletes had at least one injury (Lambert et al, 2022). The results of another study also showed that 178 boys (14.9 ± 1.8 years) completed 391 competitive seasons experiencing 290 injuries (Silvan et al, 2021).

Based on the results of this research, it was identified that the dominant injuries were due to overuse as most athletes have been training for many years with repetitive movement. In addition, it was found that the dominant strains occurred in the lower extremities and upper extremities in throwing athletes. It was also found that the frequency of training athletes was dominant 5-6 days per week, there were even some athletes who practiced with a frequency of 7 days per week. The density of the training program that is not balanced with optimal recovery triggers an increased risk of injury. Intrinsic risk factors such as age, gender, neuromuscular control, muscle strength, psychological factors, and previous injuries and extrinsic risk factors such as sport, equipment and environmental factors affect the risk of injury (Sonesson et al., 2023).

Basically, in athletics, especially throwing, are non-body contact sports, but the risk of injury is also potentially experienced by athletes. As has been stated that traumatic injuries occur in certain identified events with or without contact with other athletes or objects, for example ankle sprains. The results of this study reveal that athletes who take part in the Papua Athletics Invitation event have the characteristics of a sprain injury which is dominantly experienced by athletes with the location of the injury to the ankle. The most commonly reported types of injuries in youth athletics are hamstring strains, fractures and ankle sprains. These were caused by overuse, less warm-up, and incorrect technical accompanied by heavy training frequency, high intensity, and long time working on throwing. Sports injuries are prone to occur in movements that require high speed, especially during competition as athletes try to exert all their abilities optimally (Maradona et al., 2021). Similarly, it has been revealed that incorrect or inappropriate training postures and training methods result in damage to body tissues (Liu, 2022). Other studies have revealed and identified deficits in passive hamstring and ankle dorsiflexion range of motion as weak risk factors for hamstring injuries (Dyk et al, 2018).

The risk of injury during international athletics championships differs between female and male athletes based on the location, type, and number of competitions (Edouard et al., 2015). Therefore, injury prevention strategies should be gender-specific, given the differences in injury location and type. Injuries are common in every sport, especially team sports and negatively impact the team's success in national or international competitions (Hulin et al., 2016). Throwing sports involve high stress on the lower back and shoulder joints, which can result in injury to the rotator cuff muscles especially in javelin throwing during the javelin release motion (Walden, 2022). In addition, in throwing athletes, it was found that in the final stage of javelin throwing strength, the left leg stretches, which is a factor in the tendency of lower extremity injuries (Wei & Yalong, 2021).

In this study, it is only limited to discussing the characteristics of injuries experienced by athletes who take part in the Papua Athletics Invitation event towards PON XXI which is described descriptively. The limitation of the research is that it only examines throwing numbers, so further research is needed to minimize the occurrence of injuries to athletic athletes in all race numbers. In addition, promotive, curative, and rehabilitative measures also need to be applied in further research. So that it has a positive impact on athletes.

CONCLUSION

Based on the results obtained, it is concluded that throwing athletes who participated in

the PASI Papua Invitation event were identified as having several types of injuries, namely lesions, bruises, dislocations, sprain, and strains. Of the five types of injuries experienced by athletes it was found that throwing athletes predominantly experienced sprain type injuries that occurred in the ankle. It was also identified that the cause of injury to throwing athletes was due to overuse. Based on the results found, it is recommended to further researchers to conduct research on the handling of sprain injuries in athletics, especially in throwing athletes.

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