

## Identification of sports injuries in senior volleyball athlete age 17-24 years

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### Abstract

The problem of this study is the frequent occurrence of injury in volleyball in athletes aged 17-24 years old at PBV Vita Solo, the frequent occurrence is possibly caused by the lack of knowledge of the coach on the type and cause of the injury. The type of this research is qualitative research. To identify the type and cause of injury in volleyball athlete is by using closed questionnaire and interview. The result of this research is the injuries occurred in volleyball athletes at PBV Vita Solo are: minor injury 85.33% consists of bruises and cramps, moderate injury 12.36% consists of detached joint injury as an injury that ever occurred and strain and sprain injuries as uncommon injury, severe injury 2.32% consists of fracture, strain, and sprain where these three injuries are uncommon. The occurrence of injuries to female athletes has a percentage of injuries of minor injury 85.56%, moderate injury 12.83%, meanwhile male athletes have a higher percentage of severe injury 4.17%. In internal and external factors there are similarities as the most common cause of injury where internal factor is 66.48% and external factor is 33.52%.

**Keywords:** Sport Injuries; Athlete; Ages 17-24; Volleyball

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### INTRODUCTION

Volleyball is an achievement sport that is quite popular all over the world, including Indonesia. Volleyball is one of the sports requires a diversity of movements in the implementation of techniques, skills, endurance, concentration and quick decision making (Arjuna, 2020). Volleyball is also a complex sport and has several basic techniques including service, passing, smash, dan block (Fadhli, 2020) In its implementation, players are required to have good physical condition because volleyball has the characteristics of jumping and shifting in different directions to attack or defend. Judging from the basic technique of playing volleyball, which includes several movements such as starting, pushing, jumping, hitting the ball, and landing, this sport is categorized as a sport that is prone to sports injuries in athletes (Anas, 2018). Sports injuries are all forms of activity as a result of sports which are caused by excessive use of force. Sports injuries namely all types of injuries that appear, both during training, matches and after matches. For most athletes, when an injury occurs, it becomes a condition of morbidity that cannot be avoided, because during their sports career they are still involved in sports injuries, which is one of the things they have to face (Abdullah et al., 2020).

Based on light weight, injuries are divided into 3, namely light injuries, moderate injuries and serious injuries. Minor injuries are injuries that occur to sufferers without experiencing

significant damage to body tissue. Examples include fatigue and muscle stiffness. This minor injury generally does not require any treatment, and will recover by itself after a period of rest. Moderate injuries usually occur due to imperfect muscle and joint coordination, causing errors in movement and injury. In this injury the level of tissue damage is more obvious and causes pain, swelling, redness, heat and functional disorders (signs of inflammation) so that it can affect performance athlete. For example, torn muscles, strained muscles, and torn ligaments (sprain grade II), and Severe injury occurs as a result of tissue damage that is severe enough to result in complete or nearly complete ligament tears or fractures characterized by severe swelling, unusual pain, loss of substance or continuity, damaged or torn blood vessels, and local inflammation (discharge with heat, redness, tumor, pain and funsiolaesae). Therefore, if a serious injury occurs, it requires intensive care, complete rest, and may require surgery or surgery. Based on the cause, sports injuries are divided into two, namely internal factors and external factors. Internal factors are factors that come from within the athlete himself, including warm-up, age, poor physical condition, errors in movement technique, inadequate nutritional intake, and excessive training. Meanwhile, external factors are factors that come from outside the athlete, such as field conditions, wrong tactics and anticipation, as well as training time that is too long and too little time to rest. Based on this, the majority of causes of sports injuries in senior athletes are due to errors in movement techniques made during training or competitions.

According to Prasetyo (2015) sports injuries can affect the entire body, especially areas that have a movement function or provide support during activities, characterized by symptoms of pain, swelling, bruising, abrasions, cuts and broken bones. For sports players who have high physical activity, the risk of sports injury is certainly quite large, therefore there is a need for preventive (prevention) measures rather than curative (treatment) measures (Setiawan & Rustiana, 2014). Facts in the United States show that there are high cases of sports injuries in both adults and children. For adults, it reaches 1.5 million times a year, half of which are serious injuries, while for children and teenagers the cases are higher, namely 3-4.3 million times a year. In the same case between men and women, it was found that contact sports were twice as high as non-contact sports. This is in accordance with Sukarmin's (2015) statement that around four million children in the United States are taken to the emergency room every year due to injuries while playing sports. The average number of sports injuries was found to be significantly higher during competitions (13.8 injuries per 1000 athletes) than during training (4 injuries per 1000 athletes) (Setyaningrum, 2019).

Based on survey results among female volleyball players in Surabaya, the most common injuries were knee injuries at 30%, leg injuries at 26%, finger injuries at 24%, and shoulder

injuries at 20% of 50 athletes and it was said that female volleyball athletes in Surabaya often experienced injuries to their bodies. in the knee (Widyati, 2012).

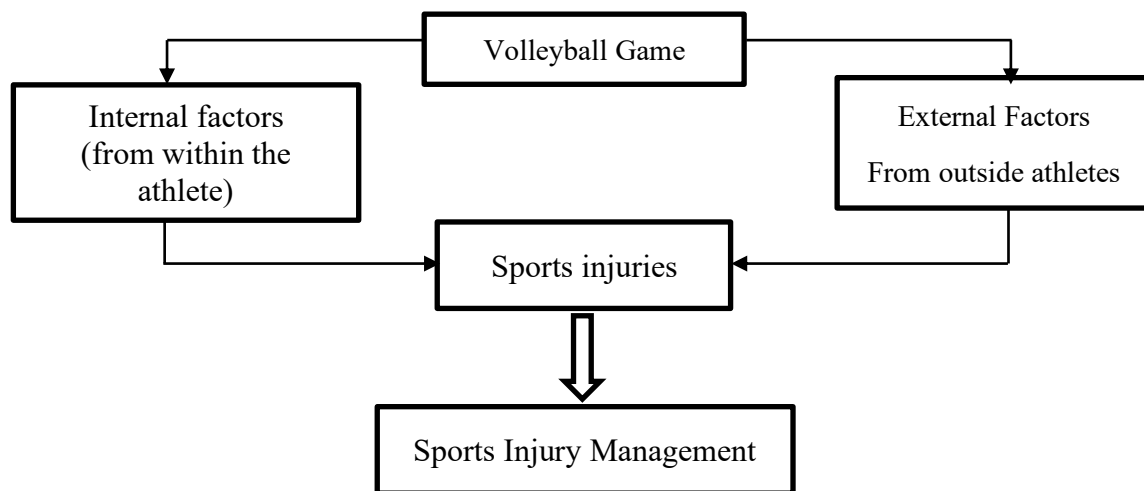
In the city of Solo there is a club which is already known outside the city, namely PBV Vita Solo. PBV Vita Solo is one of them club The superior training location is located at the Bung Karno Youth Center (GBK) which is on Jalan Adi Sucipto No. 1, Manahan, Banjarsari District, Surakarta City, Central Java. The training ground is still in the same area as the Manahan Stadium. PBV Vita Solo was founded in the 1960s by (the late) Mr. Haryono and is currently chaired by Drs. Agus Suyanto with a total of 15 coaches, namely 8 coaches for men and 7 coaches for women. Meanwhile, the total number of athletes who are members of PBV Vita Solo is approximately 200-300 athletes. If we look at the year it was founded and the infrastructure that has been met, PBV Vita Solo is included club Very experienced volleyball player, as evidenced by the many senior athletes who have participated in competitions at national and international levels. The facilities and infrastructure owned by PBV Vita Solo are quite good and adequate.

Based on the results of the pre-survey at PBV Vita Solo, so far there has been no research discussing the identification of sports injuries at PBV Vita Solo, especially in senior volleyball athletes. This is certainly in the spotlight because it is a very unfortunate thing. However, as we know, sports injuries are something that is very important to pay attention to. Therefore, this research needs to be carried out as an effort to identify injuries in order to increase knowledge and awareness for sports players regarding the identification of sports injuries. If at any time an injury occurs, they must get help as early as possible in order to avoid the risk of a more fatal or even fatal injury. resulting in a risk of disability. Factors that cause sports injuries in athletes can originate from within or outside. Here the role of the trainer is very important in minimizing the possibility of sports injuries in athletes, even senior athletes. Based on these problems, researchers are interested in researching the types and causes of sports injuries in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023. So this research is entitled "Identification of Sports Injuries in Senior Volleyball Athletes Aged 17-24 Years at PBV Vita Solo 2023".

Volleyball is a team game that requires good cooperation and cohesiveness between one player and another. In this case, each individual can carry out effective and efficient movements both in training and in matches. When practicing or competing, the risk of injury is very likely for athletes, as is the case with senior volleyball athlete PBV Vita Solo who has experienced an injury.

The risk of injury is an event that cannot be avoided by all athletes. Factors that cause injury can come from within and outside the athlete. Injuries can occur when there is an error when the foot lands during a movement service, block, and smash, or a mistake in making a fall when taking the ball. Apart from that, field conditions or facilities and infrastructure that are not suitable for use are things that can result in injuries.

Therefore, it is necessary to identify all injuries that have occurred during volleyball training to minimize the potential for injury and create a safer, more comfortable and conducive training atmosphere. See schematic below for more details.



So that the problems in this research are not too broad, there should be limitations so that the scope of this research is certain. Based on several problems mentioned above, this research only discusses "Identification of Sports Injuries in Senior Volleyball Athletes Aged 17-24 Years at PBV VITA Solo in 2023" which aims to find out and examine the types and factors that cause sports injuries that occur most often occurs in senior volleyball athletes aged 17-24 years. Which in the future can be useful for athletes, coaches and Club PBV Vita itself.

## METHOD

This research is descriptive quantitative research. Sugiyono, (2019) explains that quantitative research is a type of research that contains numbers and statistical analysis. Quantitative research is a type of research whose specifications are systematic, planned and structured, clearly from the start until the creation of the research design (Garaika, 2019). Next, regarding the method used in this research, namely the survey method (Sugiyono, 2019). This research contains an overview of the percentage of types of injuries and the causes of injury in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023 by giving closed questionnaires to respondents. The sampling technique used in this research is nonprobability

sampling. Nonprobability sampling is a sampling technique that does not provide equal opportunities for each element or member of the population to be selected as a sample (Sugiyono, 2019). In this research, the data collection technique used was a questionnaire with a closed questionnaire technique. According to Sugiyono, (2019), "A questionnaire is a data collection technique that is carried out by giving a set of written questions or statements to respondents for them to answer." Before this instrument is used, it is necessary to carry out trial actions first. Therefore, questionnaire testing was carried out on 15 Banyumas volleyball athletes aged 17-24 years. The trial aims to obtain an instrument that is truly valid and reliable.

**RESULTS**

The research results were then described based on the number of respondents who had experienced injuries and to determine the factors causing injuries in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023.

***Types of Injuries in Senior Volleyball Athletes Aged 17-24 Years at PBV Vita Solo in 2023***

Based on the results of the analysis of various types of injuries which can be seen in the master data and frequency distribution data of various types of injuries which are presented in table 1 below.

Table 1. Frequency Distribution Data for Each Indicator of Various Injuries

Variable	Factor	Indicator	Item		Amount				
			Item	Amount	Of	Pers (%)	No	Pers (%)	
All kinds of things Injury	Architect		1	5	42	84	8	16	
			2		38	76	12	24	
			3		17	34	33	66	
			4		43	86	7	14	
			5		9	18	41	82	
	Minor injury		<b>Frequency distribution. out of a total of 259 frequencies of various injuries</b>		<b>149</b>	<b>57,53%</b>			
			Hug	6	2	45	90	5	10
	7	27		54		23	46		
	Moderate Injury		<b>Frequency distribution. out of a total of 259 frequencies of various injuries</b>		<b>72</b>	<b>27,80%</b>			
			Strain	8	1	5	10	45	90
			<b>Frequency distribution. out of a total of 259 frequencies of various injuries</b>		<b>5</b>	<b>1,93%</b>			
			Sprain	9	1	1	2	49	98

Variable	Factor	Indicator	Item	Amount	Amount			
					Of	Pers (%)	No	Pers (%)
					<b>Frequency distribution. from a total of 259 frequencies of various injuries</b>			
					<b>1</b>		<b>0,39%</b>	
			Remove	12	5	10	45	90
			Joints	13	5	10	45	90
			(dislocati	14	5	9	18	41
			on)	15		0	0	50
				16	7	14	43	86
					<b>Frequency distribution. out of a total of 259 frequencies of various injuries</b>			
					<b>26</b>		<b>10,04%</b>	
			Strain	10	1	0	0	50
					<b>Frequency distribution. out of a total of 259 frequencies of various injuries</b>			
					<b>0</b>		<b>0,00%</b>	
			Sprain	11	1	1	2	49
					<b>Frequency distribution. out of a total of 259 frequencies of various injuries</b>			
					<b>1</b>		<b>0,39%</b>	
			Broken	17	1	5	10	45
			Bones					
					<b>Frequency distribution. out of a total of 259 frequencies of various injuries</b>			
					<b>5</b>		<b>1,93%</b>	
			<b>TOTAL</b>		<b>259</b>		<b>100%</b>	

From the table above, the injuries that most often occur in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023, as many as 50 respondents, are minor injuries which have 221 frequencies or 85.33% of the total 259 frequencies of types of injuries. The type of light injury that has the highest frequency is bruising with 149 frequencies or 57.53%, while cramp injuries have 72 frequencies or 27.80%. Then moderate injuries are included in the category of injuries that have occurred which has a frequency of 32 or 12.36%. The type of moderate injury which has the highest frequency is joint injury which has 26 frequencies or 10.04%, followed by strain injuries which have 5 frequencies or 1.93%, and sprain injuries which have 1 frequency or 0.39%. Serious injuries are injuries that fall into the rare category because they only have 6 frequencies or 2.32% of the total frequency of various types of injuries. The types of serious injuries that occurred in senior athletes aged 17-24 years at PBV Vita Solo in 2023 were fracture injuries with a frequency of 5 or 1.93%, sprain injuries with a frequency of 1 or 0.39%, and strain injuries which had no frequency or 0%.

The results of this research are in accordance with the statement put forward by (Wibowo (2017; Zech et.al. 2022) that one of the injuries that most often occurs in volleyball athletes is bruising, thus this research is in accordance with this statement.

### ***Causes of Injuries in Senior Volleyball Athletes Aged 17-24 Years at PBV Vita Solo in 2023***

Based on the results of achieving the scores presented in tables 2 and 3

Table 2. Guidelines and Score Categorization

No	Score Range (%)	Category
1	$15,64 \leq X$	Often
2	$8,92 \leq X \leq 15,64$	Once
3	$X \leq 8,92$	Seldom

Based on the table above, it can be seen the achievement of scores for various injuries and causes of injury in senior volleyball athletes aged 17-24 years at PBV Vita Solo which are presented in table 3 below:

Table 3. Summary of Score Achievement Results (%) Per Indicator of Various Injuries and Causes of Injury in Senior Volleyball Athletes Aged 17-24 Years at PBV Vita Solo in 2023

Variable	Factor	Indicator	Score Achievement (%)	Category
Various Injuries	Minor injury	Architect	57,53	Often
		Hug	27,80	Often
		Strain	1,93	Seldom
	Moderate Injury	Sprain	0,39	Seldom
		Remove Joints (dislocation)	10,04	Once
	Serious Injury	Strain	0	Seldom
		Sprain	0,39	Seldom
		Broken Bones	1,93	Seldom
	<b>Total</b>			<b>100%</b>
Causes of Injury	Internal factors	Lack of heating	13,24	Once
		Physical and mental condition	41,13	Often
		Practice level	12,11	Once
	External Factors	Field conditions	18,31	Often
		Equipment	4,79	Seldom
		Body contact	10,42	Once
<b>Total</b>			<b>100%</b>	

From the table above, it can be seen that the causes of injuries in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023 were 50 respondents caused by internal and external factors which both have a high percentage. Therefore, internal and external factors are included

in the category of frequent causes of injury, where internal factors have a higher frequency, namely 236 frequencies or 66.48%, while external factors have 119 frequencies or 33.52% of the total 355 frequencies that cause injuries.

Internal factors that cause injury have the highest frequency, namely due to physical and mental conditions which have 146 frequencies or 41.13% in the frequent category, lack of warm-up has 47 frequencies or 13.24% in the never category, and the level of exercise has 43 frequencies. or 12.11% in the never category. Meanwhile, the external factors causing injury which have the highest frequency are due to field conditions with 65 frequencies or 18.31% in the frequent category, *body contact* with 37 frequencies or 10.42% in the never category, and equipment with 17 frequencies or 4.79% in the rarely category.

**Comparison of Types of Injuries and Causes of Injuries in Men and Women in Senior Volleyball Athletes Aged 17-24 Years at PBV Vita Solo in 2023**

Based on data on comparison of types of injuries and causes of injuries in men and women in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023 obtained as in the table below

Table 4. Comparison of Types of Injuries and Causes of Injuries in Men and Women in Senior Volleyball Athletes Aged 17-24 Years at PBV Vita Solo in 2023

Variable	Factor	Indicator	Woman	Man
Minor injury		Architect	56,68%	59,72%
		Hug	28,88%	25%
		<b>Total</b>	<b>85,56%</b>	<b>84,72%</b>
Moderate Injury		Strain	1,07%	4,17%
		Sprain	0,53%	0%
		Remove Joints (dislocation)	11,23%	6,94%
		<b>Total</b>	<b>12,83%</b>	<b>11,11%</b>
Various Injuries		Strain	0%	0%
		Sprain	0,53%	0%
		Broken bones	1,07%	4,17
		<b>Total</b>	<b>1,60%</b>	<b>4,17%</b>
<b>Overall Total Various Injuries</b>			<b>100%</b>	
Causes of Injury	Internal	Lack of heating	12,89%	14,14%
		Physical condition and mental	41,80%	39,39%
		Practice Level	11,72%	13,13%
	<b>Total</b>	<b>66,41%</b>	<b>66,67%</b>	
	External	Field conditions	18,36%	18,18%
		Equipment	4,69%	5,05%
<i>Body contact</i>		10,55%	10,10%	



<b>Variable</b>	<b>Factor</b>	<b>Indicator</b>	<b>Woman</b>	<b>Man</b>
		<b>Total</b>	<b>33,59%</b>	<b>33,33%</b>
	<b>Overall Total</b>		<b>100%</b>	
	<b>Causes of Injury</b>			

We can conclude that the occurrence of injuries in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023 is dominated by female athletes who have 187 frequencies while male athletes have 72 frequencies out of a total of 259 frequencies of various types of injuries.

## **DISCUSSION**

The type of injury that most often occurs in athletes, both male and female, is minor injury with a frequency of 221 or 85.33% consisting of bruises and cramps. The types of minor injuries that occurred in male athletes were 61 frequencies or 84.72%, dominated by bruises on the feet and legs with 12 frequencies or 85.71%, followed by cramp injuries with the same 18 frequencies or 25%. -the same occurs in the feet and legs with 12 frequencies or 85.71%. In contrast to female athletes, the types of minor injuries that occur most frequently are bruises on body parts with 34 frequencies or 94.44% and cramp injuries with 33 frequencies or 91.67%. so that to prevent injuries that occur or Range of motion, rotator cuff muscle weakness, and training load are important factors that can be modified related to injury ( Tooth et al. 2023).

Moderate injuries are included in the injury category that has occurred in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023 with a total of 32 frequencies or 12.36%. In male and female athletes, there are similarities in the types of moderate injuries that have occurred, namely strains and dislocations, but in different parts. In male athletes, the moderate injuries that occurred were dominated by strain injuries with 3 frequencies or 21.43%, followed by joint injuries to the wrist with 2 frequencies or 14.29%. Meanwhile, among female athletes, the types of moderate injuries that have occurred tend to be dislocated injuries to the wrist which have 7 frequencies or 19.44% and disjoint injuries to the ankle with 6 frequencies or 16.67%.

The type of injury that is in the rare category occurs in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023, namely serious injuries which have only 6 frequencies or 2.32% consisting of sprains and fractures. The occurrence of serious injuries in men is higher than in women. In male athletes, the types of serious injuries that occurred were fractures with 3 frequencies or 21.43%, while in female athletes there were 2 frequencies or 5.56%, followed by sprain injuries with 1 frequency or 2.78%.

The causes of injuries in senior volleyball athletes aged 17-24 years at PBV Vita Solo are caused by internal and external factors. Where the cause of injury in male athletes is more often caused by internal factors with a percentage of 66.48% and female athletes at 66.41%. However, internal factors for female athletes have a higher percentage of physical and mental condition factors with a total of 170 frequencies or 41.80% and 39 frequencies or 39.39% for male athletes, so these factors are included in the category of frequent causes of injury. happen. In second place is the cause of injury due to lack of warm-up, with 33 frequencies or 12.89% in female athletes and 14 frequencies or 14.14% in male athletes so that both are in the same category as causes of injuries that have occurred. Then in third place is the cause of injury due to training level factors with a total of 30 frequencies or 11.72% in female athletes and 13 frequencies or 13.13% in male athletes, so that this factor is included in the category of causes of injuries that have occurred.

In female athletes, it is more dominant due to external factors with a percentage gain of 33.59% and in male athletes it is 33.33%, namely the field condition factor is 47 frequencies or 18.36% in female athletes and 18 frequencies or 18.18% in male athletes so that the cause of this injury is in the frequently occurring category. Then in second place there are causes of injury caused by factors *body contact* which obtained 27 frequencies or 10.55 in female athletes, while male athletes only had 10 frequencies or 10.10% so that the cause of the injury was included in the category of causes of injuries that have occurred. Then the next factor that causes injury is equipment which has 12 frequencies or 4.69% in female athletes and 5 frequencies or 5.05% in male athletes, so that this causal factor is in the rare category. In accordance with the opinion of several experts with various Meta-analyses providing evidence of sex-specific differences in injury rates in team sports (Zech et,al. 2022; Tooth et al. 2023). However, volleyball is a sport with a relatively low prevalence of injuries compared to other team sports (Pastor et al.2015).

## CONCLUSION

Based on the results of data analysis and previous discussion, it can be concluded as follows minor injuries to senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023 are included in the category of types of injuries that often occur with a frequency of 221 or 85.33% consisting of bruises and cramps. Moderate injuries in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023 are included in the category of types of injuries that have occurred with a total of 32 frequencies or 12.36% consisting of joint injuries as injuries that have occurred, and strains and injuries. sprains are a rare injury. Serious injuries in senior

volleyball athletes aged 17-24 years at PBV Vita Solo in 2023 are included in the category of types of injuries that rarely occur with a total of 6 frequencies or 2.32% consisting of fractures, strains and sprains where these three injuries are rare injuries. The occurrence of injuries in male and female senior athletes aged 17-24 years at PBV Vita Solo in 2023, there are differences in each type of injury that occurs. Female athletes have a higher percentage of minor injuries with 160 frequencies or 85.56% and moderate injuries with 24 frequencies or 12.83%, while male athletes have a higher percentage of serious injuries with 3 frequencies or 4.17%. In internal factors and external factors, there are similarities as the causes of injuries that most often occur in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023. Where internal factors contribute 66.48%, while external factors account for 33.52%. The causes of injuries that often occur due to internal factors are physical and mental conditions which have a frequency of 146 or 41.13% which is included in the frequent category. In second place was the lack of warm-up factor with 47 frequencies or 13.24% which was in the never category, and in third place was the level of exercise factor with 43 frequencies or 12.11% which was in the never category. Meanwhile, external factors are in first place due to field condition factors which received 65 frequencies or 18.31% in the frequent category, followed by factors *body contact* in second place with 37 frequencies or 10.42% which is in the never category, and in third place in the equipment factor with 17 frequencies or 4.79% which is in the rarely category. Comparison of the causes of injuries to male athletes and female athletes in senior volleyball athletes aged 17-24 years at PBV Vita Solo in 2023 shows that internal factors occur more often in male athletes with a few 66.67% and in female athletes with 66.41%. Meanwhile, for external factors, female athletes obtained a percentage of 33.59% and male athletes 33.33%.

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