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The Relationship Between Price Knowledge and the Application of Ankle Sprain Management in Basketball Athletes in Ternate

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Abstract
Ankle sprain is damage to ligaments due to excessive stress, with an incidence rate of 2-7 cases per 1000 people per year based on emergency department data. Basketball athletes have a high risk of developing an ankle sprain. Good knowledge of handling, especially the PRICE method, is essential for athletes. Against this background and the lack of similar research, this study was conducted to fill this knowledge gap by analyzing the relationship between PRICE knowledge and the application of ankle sprain treatment in basketball athletes in Ternate. This study used an observational analytic design with a cross-sectional approach and applied Fisher's exact test. The research was conducted in Ternate City in January 2024. The research sample consisted of 60 participants selected using accidental sampling techniques. Data were collected through interviews using questionnaires. Among the 60 participants, the majority were male (86.7%), aged 17-25 years (75%), had good PRICE knowledge (51.7%), and demonstrated adequate application of ankle sprain treatment (61.7%). Bivariate analysis yielded a p-value of 0.003 ($p<0.05$), indicating a significant relationship between PRICE knowledge and the application of ankle sprain treatment in basketball athletes in Ternate.

Keywords: *Ankle Sprain;* Basketball Athletes*;* PRICE Knowledge

INTRODUCTION

Ankle sprain is a type of injury that involves a tear or stretch of the ligament. This can occur due to excessive stress on the ankle. Physically active individuals have a higher risk of developing acute ankle sprain, which is a common musculoskeletal injury characterized by damage or stretching of the ankle ligament (Wiharja and Nilawati, 2018; Dias et al., 2022). About 85% of ankle sprains involve lateral ligaments. In approximately 65% of cases, it occurs in the anterior talofibular ligament (ATFL), in 20% in the calcaneofibular ligament, while in the posterior talofibular ligament it is rare. The remaining cases involve syndesmotic and medial ankle sprains (15%) (Halabchi et al., 2020).

About 2 million acute ankle sprains occur each year in the United States. Data from emergency department visits show an incidence rate of 2–7 acute ankle sprains per 1,000 people per year. Based on secondary data from the Indonesian National Sports Committee (KONI) Jakarta polyclinic in September–October 2012, this study involved the population of all PON 2012 athletes

in Jakarta. The results showed 85 injuries in 2009, 146 injuries in 2010, 353 injuries in 2011, and 419 injuries in 2012 (Rukmana, 2021).

Several researchers have investigated the proposed risk factors for ankle sprain in athletic and military populations. Risk factors are generally classified as extrinsic and intrinsic. Extrinsic factors originate from outside the body, such as a previous history of ankle sprain or the use of substandard sports equipment, while intrinsic factors are related to individual characteristics such as age, weight, and gender. The incidence of ankle sprain in sports is fairly high, accounting for 16%–40% of all sports-related trauma cases. About 40% of all ankle injuries are due to trauma, and nearly half of all ankle sprains occur during athletic activity, particularly in basketball (41.1%), American football (9.3%), and soccer (7.9%). The incidence of injuries significantly impacts the quality of exercise (Delahunt & Remus, 2019; Dias et al., 2022; Doherty et al., 2014; Halabchi & Hassabi, 2020; Kemler et al., 2015).

The game of basketball is one of the large group ball sports consisting of two teams of five members each that compete against each other to score points by putting the ball in the opponent's basket and preventing points from being scored in their own basket (Saichudin & Munawar, 2019; Simatupang, 2016; Van den Bekerom et al., 2012; Wiharja & Nilawati, 2018). The sport of basketball is often associated with the occurrence of ankle sprains due to the nature of the game and movements that involve jumping, sudden changes of direction, and physical contact between players (Saichudin et al., 2019).

It is very important for athletes to have knowledge about injuries, including their causes, types, prevention, and initial treatment (Nurholilah, 2021; Oktavian & Roepajadi, 2021; Pakpahan, 2021; Rochmawati, 2022; Rukmana, 2021). Good knowledge about injuries will equip athletes for sports activities, enabling them to respond quickly and appropriately and to prevent sports injuries to themselves or others (Rukmana, 2021; Simatupang, 2016).

One of the treatments that can be used is the PRICE (Protection, Rest, Ice, Compression, Elevation) method. Protection involves safeguarding the injured leg to prevent the injury from worsening. The injured leg must be rested from strenuous activities. Ice refers to the application of ice to the injured area to reduce pain. Compression involves applying pressure to the injured area and its surroundings using an elastic bandage. Elevation means raising the injured leg slightly higher than the heart (Rochmawati, 2022).

Based on the research conducted, the ability to handle ankle sprain among IPSI members in Jember Regency before receiving health education about PRICE for ankle sprain was in the sufficient category. After the education, the level of handling ability increased to good (Ministry of Health, 2019). This proves that the PRICE method is effective in improving the ability to handle ankle sprain (Nurholilah, 2021).

Based on the background presented, the researcher is motivated to conduct research on the relationship between PRICE knowledge and the application of ankle sprain treatment in basketball athletes in Ternate.

This study aims to examine the relationship between knowledge of the PRICE method and its application in the treatment of ankle sprains among basketball athletes in Ternate. Specifically, it seeks to describe the frequency distribution of athletes' PRICE knowledge levels, assess the distribution of the application of ankle sprain treatment, and determine the correlation between knowledge and application of the PRICE method. The research provides multiple benefits: for researchers, it offers valuable practical experience and contributes to their understanding of research application, serving as a requirement for completing the Bachelor of Medical Education program; for educational institutions, the findings can serve as a reference for future studies and enhance students' knowledge regarding initial ankle sprain management using the PRICE method; and for the community, particularly sports athletes, the study can provide guidance and references to manage ankle sprains properly and independently, promoting safer and more effective self-care practices in athletic settings.

RESEARCH METHODS

The research method used was quantitative. The design employed observational analytics with a cross-sectional approach. A cross-sectional design is an analytical research method that determines the relationship between variables by identifying independent and dependent variables at the same time. The purpose of this study was to describe the relationship between *PRICE* knowledge and the application of ankle sprain treatment in basketball athletes in Ternate. The research was conducted in Ternate City in January 2024.

This study targeted all basketball athletes with a previous history of ankle sprains, with the accessible population limited to athletes domiciled in Ternate City who had experienced an ankle sprain prior to the research period. Inclusion criteria included athletes aged 12–35 years who were willing to participate, while exclusion criteria applied to respondents who did not complete the questionnaire. Sampling was conducted using the accidental sampling method to select participants who met these criteria.

The independent variable in this study is knowledge of the PRICE method, while the dependent variable is the application of ankle sprain management. Data were collected using questionnaires as research instruments, supported by office stationery such as pens and paper. The PRICE knowledge scale, adapted from Hardyanto's RICE questionnaire, includes 20 items with an additional 5 items for coverage, tested for reliability with Cronbach's alpha of 0.684. Responses are scored using a 0–1 Guttman scale and categorized into good knowledge (76–100%), moderate knowledge (56–75%), and poor knowledge (<56%).

The application of ankle sprain management was measured using a 10-item questionnaire from Rukmana, validated with a Cronbach's alpha of 0.919. Scores above 68% indicate good injury management, while scores below 68% are considered less adequate. Primary data were collected by distributing these questionnaires to willing basketball athletes in Ternate, ensuring that participants understood the questions and provided accurate responses.

Data processing was performed using SPSS software, with univariate analysis applied to describe the frequency distribution of research variables. Bivariate analysis using Fisher's exact test was conducted to examine the relationship between PRICE knowledge and the application of ankle sprain treatment. The results were then analyzed and discussed to test the research hypothesis and provide insights into the impact of PRICE knowledge on injury management among basketball athletes.

Table 1. Research Variables

Research Variables	Operational Definition	Skala Ukur	Category
Ankle sprain	Ankle ligament tears/stretches that athletes have experienced during research	-	-
Gender	Respondent's gender obtained when filling out the questionnaire	Nominal	Male Women
Age	The age of the respondents obtained when filling out the questionnaire.	Interval	12-16 years old 17-25 years old 26-35 years old
Knowledge of the PRICE method	The level of knowledge of the respondents about the PRICE method obtained from the questionnaire	Ordinal	Good 76-100% Enough 56-75% Less <56%
Application of *ankle sprain handling*	Respondents' handling of *ankle sprain events* obtained from the questionnaire	Ordinal	Good >68% Less <68%

This research was conducted after obtaining approval from the relevant agencies and maintaining identity confidentiality by mentioning the respondent's name with initials to be taken from the questionnaire filled out by the respondent.

RESULTS AND DISCUSSION

Based on research that has been conducted in January 2024 on the relationship between PRICE knowledge and the application of ankle sprain treatment in basketball athletes in Ternate, 60 respondents were found willing to be a sample in this study and who have met the inclusion and exclusion criteria.

A. Univariate Analysis Results

1. Characteristics of Basketball Athletes by Gender

it was found that out of 60 samples, 52 samples (86.7%) were male and there were 8 samples (13.3%) that were female.

2. Characteristics of Basketball Athletes by Age Category

The following were obtained from a total of 60 samples for the age variable, the most found in this study was 17-25 years old with a frequency of 45 samples (75.0%), followed by 12-16 years old with 12 samples (20.0%), and 26-35 years old with 3 samples (5.0%).

3. Characteristics of Basketball Athletes Based on PRICE Knowledge

The distribution of PRICE knowledge variables in this study can be seen in table 5.3 above, where out of 60 samples (100%), it is shown that as many as 33 samples (55.0%) are in the good category, as many as 26 samples (43.3%) are in the fair category and as many as 1 sample (1.7%) are in the poor category.

4. Characteristics of Basketball Athletes Based on the Handling Level *of Ankle Sprains*

The variable distribution of the application of ankle sprain treatment can be seen in table 5.4 above where there are 40 samples (66.7%) in the good category, and as many as 20 samples (33.3%) in the poor category.

B. Bivariate Analysis Results

1. The Relationship of PRICE (Protection, Rest, Ice, Compression, Elevation) Knowledge with the Application of Ankle Sprain Treatment

Table 1. The Relationship of PRICE Knowledge to the Application of Ankle Sprain Treatment

Variabel	Application of Ankle Sprain Handling				Total		p-value
	Good		Less good				
	N	%	N	%	N	%	
PRICE Knowledge							
Good							
Enough	27	81,8	6	18,2	33	55,0	0,008
Less	13	50,0	13	50,0	26	43,3	
	0	0,0	1	100	1	1,7	
Total	40		20		**60**	**100**	

60 samples (100%) of basketball athletes in Ternate City who stated PRICE knowledge in the good category and in implementing good ankle sprain handling as many as 27 samples (81.8%) and 6 samples (18.2%) were not good in the implementation of ankle strain handling. Respondents who stated that PRICE's knowledge was sufficient, all of them were good in carrying out the application of ankle sprain handling, namely as many as 13 samples (50%), while 13 samples (50%) were considered not good in carrying out the application of ankle sprain handling. Furthermore, respondents with less PRICE knowledge, all of them were not good at carrying out the application of ankle sprain handling, namely 1 sample (1.7%), then for the relationship of PRICE knowledge with the application of ankle sprain handling after the fisher's exact test was obtained, a p-value result of 0.008 (<0.05) was found.

Characteristics of Basketball Athletes by Gender

The distribution of basketball athletes by gender is most commonly found in men with a frequency of 52 samples (86.7%). It is inversely proportional to the study conducted by Cailbhe where the incidence of *ankle sprain* is more in women (13.6/1000) compared to men (6.94/1000). (Doherty *et al* ., 2014)

Based on the research above, it was found that men are more affected *by ankle sprain*. This is different from Doherty's theory which states that women are more at risk of developing ankle sprain than men. According to the researcher's analysis, this can happen due to the difference in quantity between male and female basketball athletes, where the population of male basketball athletes, especially in the Ternate area, is more than female basketball athletes. (Doherty *et al* ., 2014)

There are also several theories that state that there is no significant difference in the incidence rate of ankle sprain between male and female athletes. These findings are supported by research by Beynnon and his colleagues, who found that the incidence rate *of ankle sprain* did not differ significantly among college and high school athletes of both sexes. Recent epidemiological studies involving various sports from the National Collegiate Athletic Association (NCAA) also confirm that in comparable sports, such as baseball/softball, basketball, soccer, and tennis there is no significant difference in the incidence rate of ankle sprains between men and women (Delahunt et al , 2019) .

Characteristics of Basketball Athletes by Age Category

The distribution of basketball athletes by age category is most commonly found in vulnerable age 17-25 years with 45 samples (75.0%). Based on research conducted in Jember Regency on 83 respondents to IPSI members. The most common occurrence of ankle sprain occurred in 14-24 years of age as many as 79 samples (95.2%). (Nurholilah, 2021)

The incidence of ankle sprain increases at the age of 15-25 years. Meanwhile, at the age of 0-14 years, 24-54 years or more remain stable. This is because at this age many individuals participate in large-scale sports such as football, basketball, and other sports that require intense movement and quick action. This activity can increase the risk of ankle sprain due to physical contact and the need for agility. (Kemler et al. , 2015)

Characteristics of Basketball Athletes Based on PRICE Knowledge Level

The distribution of basketball athletes based on the level of knowledge PRICE is in the good category with 33 samples (55%). This is in line with the research conducted in Sidoarjo on 16 samples, where the level of RICE knowledge on Yanitra FC futsal players is classified as good with 8 samples (50%) (Oktavian and Roepajadi, 2021)

Knowledge of the PRICE (Protection, Rest, Ice, Compression, Elevation) method in the category of good for basketball athletes can be seen from the perspective of several health and behavioral theories. These theories include an individual's belief in the benefits of prevention and treatment, changes in behavioral stages, belief in self-worth, and motivation to adopt certain behaviors. A good understanding of PRICE can encourage athletes to take more effective

precautions. Although their effects can vary, these theories provide a basis for understanding how knowledge can influence athletes' behavior in implementing injury prevention and management measures.

Characteristics of Baket Athletes Based on the Level of Ankle Sprain Handling

The distribution of basketball athletes based on the level of ankle sprain treatment was in the good category with 40 samples (67.7%). This is different from the study conducted by Nugroho on 30 samples of PS Telaga Utama club football athletes, where the level of implementation of ankle sprain treatment is in the less category with 16 samples (53.3%) (Nugroho, 2017)

Ankle sprain is a common injury in sports, especially in athletes who are often exposed to high risks during training and matches. Proper treatment in the early stages of an injury is essential to minimize the long-term impact and speed up the recovery process. According to the sports literature, many studies have attempted to evaluate the extent to which ankle sprain treatment is applied in athletes. One of the main focuses is the use of the PRICE method as a first step. Observational studies show that although general knowledge of this method is quite high, the rate of consistent application by athletes may vary. Factors such as the level of education, athlete experience, and team culture can affect the extent to which athletes follow injury management guidelines (Bekerom *et al* ., 2012) .

The Relationship of PRICE Knowledge to the Application of Ankle Sprain Treatment

The relationship between PRICE knowledge and the application of ankle sprain treatment was obtained as evidenced by the results of Fisher's exact test obtained with a p-value of 0.008 (<0.05) which showed that H0 was rejected and H1 was accepted. It can be concluded that there is a relationship between PRICE and the application of ankle sprain treatment in basketball athletes in Ternate. Research conducted in Karawang Regency also showed a similar thing, namely there was a relationship between RICE knowledge and the application of ankle strain treatment, judging from the results of statistical tests obtained a p-value (Rukmana , 2021) of 0.000 (<0.05).

According to the researcher's analysis, it can be concluded that there is a tendency that if basketball athletes' knowledge of the PRICE method in the application of ankle sprain treatment is considered good, then the treatment of ankle sprain in basketball athletes tends to be good. This is in accordance with Natoatmodjo's theory which states that knowledge is the result of finding out after sensing or observing an event. This implies that the knowledge will be in line with a person's skills, in this case the application of ankle sprain treatment (Pakpahan, 2021) .

The weakness of this study is that the population of basketball athletes in Ternate City is not yet known for sure. Another weakness is that some variables are new variables so that the reference journals used to support this research are still relatively limited. One of the obstacles faced is limited time and accessibility. Data collection from active basketball athletes requires careful coordination with their training schedules. In addition, limited access to relevant medical facilities or records may also affect the completeness of the information collected.

CONCLUSION

This study on the relationship between PRICE knowledge and the application of ankle sprain treatment among basketball athletes in Ternate revealed that 55.0% of the 60 participants (33 athletes) had good PRICE knowledge, while 66.7% (40 athletes) demonstrated good application of ankle sprain treatment. Notably, a significant positive correlation existed between these variables, as indicated by a p-value of 0.008 (<0.05). For future research, longitudinal studies could explore the long-term effects of targeted PRICE education interventions on injury recurrence rates and athlete performance in similar high-risk sports populations.

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