Knowledge level of sports injury first aid using PRICE method among student-athletes in Indonesia: A case study

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ABSTRACT

Background: Sports injuries are a risk often experienced by athletes, including special sports class students, so knowledge about proper injury management is needed, one of which is the PRICE method (Protection, Rest, Ice, Compression, Elevation).

Objectives: This study aimed to assess the level of knowledge about first aid in sports injuries using the PRICE method among student-athletes.

Methods: This study used a descriptive quantitative method with a survey technique. The research sample comprised 18 students selected through purposive sampling, using an instrument in the form of a questionnaire containing 48 items related to the PRICE method.

Results: The results showed 33.3% of students had a high level of knowledge, 38.4% were moderate, 22.3% were low, and 5.5% were very low.

Conclusions: The level of student knowledge of the PRICE method is mainly in the moderate to high category, but there are still some students with low understanding, especially in the Compression aspect, so further education is needed to improve the effectiveness of injury management. The compression component had the lowest understanding, indicating a need for further education and training.

Keywords: PRICE method, sports injuries, student athletes.

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INTRODUCTION

Sports among Indonesian people have increased significantly along with the increasing number of people who realize the importance of maintaining a healthy body through physical activity. According to Khairuddin (2017), exercise is necessary for human life because if someone exercises regularly, it will positively influence their physical development. Apart from being beneficial for growth in human physical development, it also influences spiritual development. This influence can provide work efficiency for the body's tools, so blood circulation, breathing, and digestion become regular. In general, physical activity is divided into 3: daily physical activity, physical exercise, and sports activities (Hadi, 2020). According to Nisa & Jannah (2021), it is necessary to hone and improve technical, physical, and mental abilities. With the coaching program, the availability of facilities and infrastructure, government and community support, the availability of human resources, the acceptance system for athletes, coaches, and assistant coaches, and financing the implementation of the coaching program (Triyasari et al., 2016).

Sports injury is a damage that occurs to the structure and function of the body due to force or physical or chemical stress during exercise; injuries can occur to anyone, anytime, and anywhere (Siregar & Nugroho, 2022). Injury in sports is one of the risks often faced by athletes and participants in physical activities. Sports injuries that are not treated properly can cause pain that can reduce an athlete's performance (Okta & Hartono, 2020). Although sports provide many health benefits, it cannot be denied that the risk of injury always exists. Injuries in sports can occur due to various factors, such as excessive exercise intensity, lack of warm-up before exercise, muscle imbalance, improper technique, and unsafe environmental conditions. According to Baan et al. (2022), athletes, coaches, and sports activists need to know the best actions and treatments to overcome injuries in sports.

Injury prevention in sport is essential to maintain the fitness and health of athletes and participants in physical activities. Prevention is equivalent to efforts to contain, reduce, or stop the impact and consequences of risks that will occur (Nasri & Leni, 2021). This includes warming up sufficiently before exercise, using appropriate protective equipment, following proper exercise techniques, paying attention to physical condition and fitness, and getting adequate rest for recovery. First aid when an injury occurs is essential for athletes to know because selecting good and correct injury management can accelerate injury recovery so that athletes can carry out activities as before (Siregar & Nugroho, 2022). Proper handling of injuries can also help speed up the recovery process and prevent further complications. By paying attention to these aspects, the risk of injury in sports can be minimized so that athletes and participants in physical activities can continue to enjoy the benefits of sports without worrying about injury.

Sports injuries are a common problem experienced by student-athletes, especially during intense physical activity such as in sports school programs. Proper initial management is essential to prevent the injury from worsening and accelerate recovery. One of the most recognized methods of acute injury management is the PRICE method (Protection, Rest, Ice, Compression, Elevation), which has been widely recommended in medical and sports literature (Bleakley et al., 2012). The P.R.I.C.E method is an injury management method with emergency management that aims to prevent further injury and reduce pain (Baan et al., 2022). This method is the standard approach to treat common muscle and joint injuries on the soccer

field. PRICE is a commonly recommended first aid procedure for muscle, joint, or ligament injuries. However, not much is known about high school athletes' specific knowledge of the PRICE method, especially in structured sports school programs in Indonesia. Student-athletes' understanding of the method is important, as they are often the first to respond to injuries during practice or matches. According to Bleakley et al. (2012), the PRICE approach has long been used as a standard of first aid. However, its effectiveness depends on an individual's technical understanding of each component. This study aimed to assess student-athletes' knowledge of the PRICE method, which could inform the design of a more effective sports injury education program in a sports school setting.

Several high schools offer special sports classes, making them an option for those who want to develop their interest and talent in soccer. Although not many schools offer special sports classes in Malang Regency, State Senior High School 1 Turen is one of them. The school has a Special Talent program specifically designed for students with a sports talent. This program requires students to have high intelligence to excel in academic and non-academic fields. Sports injuries are unavoidable risks in physical activity and sports, especially for students in special sports classes. Several factors cause injury, including errors in training methods, structural abnormalities, muscle weakness, and joint support (Puspitasari, 2019). Therefore, proper first treatment of sports injuries is essential to reduce the negative impact and speed up recovery (Hoffman & Fogard, 2011).

The PRICE method aims to reduce swelling, control pain, and prevent more fatal injuries. However, the success of the PRICE method is highly dependent on an individual's knowledge and skills in handling first aid. In this context, the students of the special sports class at State Senior High School 1 Turen, Malang Regency, Indonesia, a good understanding of the PRICE method is crucial given the high intensity of their training and competition. Based on the background described above, the author is interested in researching the level of knowledge of the PRICE method among students of special sports classes at State Senior High School 1 Turen, Malang Regency, Indonesia.

METHODS

Study Design and Participants

This research uses a non-experimental quantitative approach with a survey method. This approach helps describe or analyze social, educational, or health phenomena. With the proper research design, surveys can produce accurate and relevant data to support evidence-based decision making.

The population is an object/subject with specific qualities and characteristics that the researcher determines to study and then draw conclusions (Sugiyono, 2017). The population of this study were students of the State Senior High School 1 Turen grades 10, 11, and 12 who participated in the special talent program with a total of 123 students, who participated in football 44 students, Pencak Silat 12 students, male Volleyball 28 students, female Volleyball 20 students, Karate six students, swimming five students, Badminton five students athletics three students. The sampling technique in this study was purposive sampling. Purposive sampling is a technique with specific considerations (Sugiyono, 2017). The implementation time was in September 2024. This research was conducted at the State Senior High School 1

Turen at Street of Mayjen Panjaitan No.65, Turen District, Malang Regency, East Java Provinve, 65175, Indonesia.

The samples taken in this study fit the criteria. The inclusion criteria are as follows:

a) Students in grades 10 and 11 of the special talent program (special sports class students) of State Senior High School 1 Turen who participate in football.
b) Physically and mentally healthy, not in a sick condition.
c) Willing to participate in this study.

Based on these criteria, a sample of 18 students was obtained (17 students and one female student).

Ethical approval statement

Ethical clearance of the study was sought from the Universitas Negeri Malang, Indonesia with the Number: 45.121.3/UN32.14/PB/2024.

Research Instruments

The instrument used in this study is a questionnaire developed based on a previous study by Robin (2016). It has gone through a content validation process (expert judgment) by two expert lecturers in the field of sports injury management from the Faculty of Sport and Health Sciences, namely Dr. Fatkurrahman Arjuna, M.Or, and Dr. Tri Ani Hastuti, M.Pd.

This instrument consists of 48 closed-question items arranged on a 4-point Likert scale, namely: strongly disagree (1), disagree (2), agree (3), and strongly agree (4). Each item measured the respondent's knowledge of aspects of the PRICE method (Protection, Rest, Ice, Compression, Elevation).

Before being used in the main study, this instrument was tested on a small group (preliminary trial) with characteristics similar to the main sample's. Based on the reliability test results using Cronbach's Alpha, a value of $\alpha = 0.86$ was obtained, indicating that the instrument has a high level of reliability and can be used for data collection in this study.

Data Analysis

Data collected through questionnaires were analyzed quantitatively using percentage-based descriptive analysis techniques. This analysis aims to determine the distribution of students' knowledge levels of each component of the PRICE method. The response results were summed and converted into a total score, then classified into specific categories (very high, high, sufficient, low, and very low) based on a predetermined range of values.

Data processing is done by calculating the frequency and percentage of each category, which is then used to interpret how large the proportion of students who know each level is. This technique was chosen because it can provide a clear and measurable picture of the respondents' knowledge level. The analysis was conducted using Microsoft Excel, and data validation was done through double-checking so that the results are accurate and can be scientifically accounted for.

RESULTS

Respondents in this study were students of State Senior High School 1 Turen, Malang Regency. The survey consisted of 48 items about the PRICE method used for injury management. Data collection activities were carried out on September 21, 2024 with 18 respondents. The results of this study are presented through a description of the variables in the frequency distribution table that has been taken

population and samples. In the form of standard deviation, minimum value, maximum value, mode, mean, and median. The following are the detailed results of descriptive analysis and data management in this study.

a. Protection

A descriptive analysis of the protection method is obtained through a survey with 10 statements. The results show that the data obtained is tightly distributed around the average value, which means that respondents give relatively consistent responses to the statements submitted. Table 1 is a data presentation in the form of a frequency distribution table and categorization of the data.

Table 1. Categorization of the Score of the Protection Method Point Survey Results

No	Score Interval	N	Percentage	Category
1.	X ≥ 8,955	1	5,5 %	Very High
2.	7,985≤ X < 8,995	1	5,5 %	High
3.	7,015 ≤ X < 7,985	9	50 %	Moderate
4.	6,045 ≤ X < 7,015	5	27,8 %	Low
5.	X < 6,045	2	11,2 %	Very Low

Based on Table 1, it is known that the majority of respondents' knowledge is in the moderate category (50%). This category reflects that most participants felt the protection methods applied were quite effective. Meanwhile, the low and very low categories accounted for 27.8% and 11.2% of the respondents, respectively, indicating a group with a low understanding of the protection methods. Only 5.5% of respondents scored very high (≥ 8.955), indicating that few had a very high level of understanding. The function of Protection is to protect the injured area and prevent further damage.

b. Rest

The rest of the method was obtained through a survey with 10 descriptive analysis statements. The data in Table 2 shows considerable variation in respondents' responses, but most values are still distributed around the mean. This reflects that many respondents have a favorable view of the implemented rest method.

Table 2. Categorization of the Score of the Rest Method Point Survey Results

No	Score Interval	N	Percentage	Category
1.	X ≥ 10,65	6	33,40 %	Very High
2.	9,35≤ X < 10,65	7	38,90 %	High
3.	8,12 ≤ X < 9,35	2	11,10 %	Moderate
4.	6,75 ≤ X < 8,12	1	5,50%	Low
5.	X < 6,75	2	11,10 %	Very Low

Based on Table 2, it is known that a total of 7 athletes (38.90%) are classified in the high category. The data analysis shows that more than half of the respondents had a good positive response to the effectiveness of the rest. In contrast, the moderate, low, and very low categories accounted for a much smaller percentage. The function of rest is to rest the injured body part to prevent additional stress and allow the natural healing process.

c. Ice

A descriptive analysis of the Ice method was obtained through a survey with nine statements. The data in Table 3 shows that respondents give consistent and not too varied responses to the statements asked. This reflects that most respondents have similar views on the effectiveness of cooling methods.

Table 3. Categorization of the Score of the Ice Method Point Survey Results

No	Score Interval	N	Percentage	Category
1.	X ≥ 8,4	0	0%	Very High
2.	7,6 ≤ X < 8,4	8	44,40 %	High
3.	6,8 ≤ X < 7,6	5	27,80 %	Moderate
4.	6,0 ≤ X < 6,8	2	11,20 %	Low
5.	X < 6	3	16,60 %	Very Low

Based on Table 3, it is known that the categorization of the survey score shows that most respondents (44.40%) have a good understanding of the ice method. The function of the Ice method is to apply ice to reduce swelling and pain by constricting blood vessels in the injured area.

d. Compress

A descriptive analysis of the compression method was obtained through a survey with 10 statements. Table 4 shows that most respondents gave high but not extreme ratings.

Table 4. Categorization of the Score of the Compress Method Point Survey Results

No	Score Interval	N	Percentage	Category
1.	X ≥ 10,84	3	16,7 %	Very High
2.	7,6 ≤ X < 8,4	5	27,8%	High
3.	6,8 ≤ X < 7,6	3	16,7 %	Moderate
4.	6,0 ≤ X < 6,8	1	5,5 %	Low
5.	X < 6	6	33,3 %	Very Low

Based on Table 4, the majority of respondents gave an upbeat assessment. The high category includes 27.8% of respondents, while the very high and moderate categories include 16.7%. This shows that almost half of the respondents understand the effectiveness of the compress method used. The function of Compression is to apply pressure to the injured area to reduce swelling and support stability.

e. Elevation

Descriptive analysis of the elevation method was obtained through a survey with 9 statements.

Table 5. Categorization of the Score of the Elevation Method Point Survey Results

No	Score Interval	N	Percentage	Category
1.	X ≥ 7,88	2	11, 1 %	Very High
2.	7,18 ≤ X < 7,88	7	38,9 %	High
3.	6,48 ≤ X < 7,18	2	11,1 %	Moderate
4.	5,78 ≤ X < 6,48	5	27,8	Low
5.	X < 6	2	11,1 %	Very Low

Based on Table 5, the majority of respondents gave an upbeat assessment. The high category accounted for 38.9% of respondents, while the high and moderate categories accounted for 11.1%. This indicates that almost 50% of the respondents got good results on the knowledge of the elevation method. Elevation's function is to raise the injured area above the level of the heart to reduce blood flow to the area, thereby reducing swelling.

Based on the data obtained in this study, the level of knowledge of PRICE among students at State Senior High School 1 Turen shows significant results.

Based on Table 6, most students in the special sports class at State Senior High School 1 Turen had a moderate to high level of understanding of the PRICE method, which amounted to 71.7% (38.4% moderate and 33.3% high). However, around 27.8% of students were classified as low to very low in their knowledge (22.3% low and 5.5% very low). This shows that although most students have a sufficient basic

understanding, some students do not have sufficient knowledge, especially in certain technical aspects of the PRICE method.

Table 6. Score Categorization of PRICE Method Survey Results

No	Score Interval	N	Percentage	Category
1.	X ≥ 45,465	0	0 %	Very High
2.	40,855 ≤ X < 45,465	6	33,3 %	High
3.	36,245 ≤ X < 40,855	7	38,4 %	Moderate
4.	31,635 ≤ X < 36,245	4	22,3 %	Low
5.	X < 31,635	1	5,5 %	Very Low

DISCUSSION

This study revealed that students of special sports classes at State Senior High School 1 Turen's knowledge of the first treatment of injuries with the PRICE method varied. Most students have a moderate to high understanding of the Rest and Ice components, but the understanding of Compression is still low. This can be seen from the survey results, which showed that only 27.8% of respondents were in the high category for the Compression method, while 33.3% were in the very low category. In contrast, the Rest method showed better results, with 38.9% of respondents in the high category and 33.4% in the very high category. This finding indicates that students are more familiar with the concept of rest and the use of ice compared to the compression technique.

The low understanding of Compression may be due to the lack of formal training on injury first aid in schools. The study by Baan et al. (2022) showed that athletes who had never received specialized training tended to have limited knowledge of injury management techniques. In addition, similar studies in other sports, such as volleyball and basketball, have also reported consistent results, where athletes often lack understanding of technical components such as Compression and elevation (Candra et al., 2021; Rofik & Kafrawi, 2022). This confirms the importance of integrating first aid materials in sports training programs.

A comprehensive understanding of the PRICE method is essential for students who are also athletes. Proper handling of injuries speeds up recovery and prevents further complications, such as swelling or tissue damage (Sudijandoko, 2006). In addition, this knowledge can increase athletes' confidence in dealing with injuries during training or competition. A study by Okta & Hartono (2020) mentioned that athletes with a good understanding of PRICE tend to have more stable performance because they can manage injuries independently.

Educational interventions such as workshops, routine training, or integration of PRICE material in the physical education curriculum are needed to improve students' understanding of injury first aid. Research by Nasri & Leni (2021) shows that practice-based educational programs significantly improve athletes' knowledge and skills in handling injuries. In addition, collaboration with medical personnel or physiotherapists can provide more in-depth and applicable training.

The implications of these findings are important to examine in the context of educational policy. The results support the need to integrate a PRICE method-based first aid curriculum in sports school programs, so that students not only understand the theory. However, they can also apply the techniques independently (Finch, 2006). Regular training programs involving medical personnel, coaches, and physiotherapists can enrich students' experience in dealing with injuries quickly and appropriately (Mears & Jago, 2016; Van Mechelen, Hlobil, & Kemper, 1992).

The contribution of this research to the field of sport education is to provide a factual picture of the student-athlete knowledge gap and offer an empirical basis for curriculum designers or coaches to develop more targeted educational strategies. In the context of young athletes' health, improving first aid literacy is crucial to creating a safe training environment that supports long-term performance.

Limitations of the study

The limitations of this study lie in the relatively small sample size (18 respondents) and the limited scope of one school. For future research, expanding the sample and covering various sports is recommended to get a more comprehensive picture. In addition, experimental research with PRICE training intervention can be conducted to measure the effectiveness of education in improving students' knowledge and practical skills.

CONCLUSIONS

The study concluded that overall knowledge of the PRICE method among student-athletes at State Senior High School 1 Turen ranged from moderate to high, with significant deficiencies in understanding compression techniques. Further education and integrating first aid content in sports training programs are essential to improve athletes' preparedness and injury management capabilities.

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DATA AVAILABILITY

The data that support the findings of this study are available on request from the corresponding author, HNAR. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

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CONFLICT OF INTEREST

The author officially certifies that there are no conflicts of interest with any party with respect to this research.

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