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# The implementation of sport learning at school: Reality and Injury

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**ABSTRACT**

A good sport learning planning could minimize injury risk in sports learning. The study aimed at finding out the preparation process of sport learning planning and the number of injury cases. It used a cross-sectional design with a quantitative approach. It was conducted in April-October 2022 at junior high schools in the Special District of Yogyakarta. Its samples were drawn from 20,401 students and 33 physical, sports, and health education teachers using a random sampling technique that gave 400 samples (171 males and 229 females). The validity test of the student questionnaire gave r-count > r-table (0.235) and alpha Cronbach of 0.928 > 0.655, while the validity test of the teacher questionnaire gave r-count > r-table (0.344) and alpha Cronbach of 0.737 > 0.655. Results: There were 158 students (39.50%) who got cervical vertebrae injuries, 193 students (48.25%) who got shoulder injuries, 133 students (33.25%) who got elbow injuries, 182 students (45.50%) who got wrist injuries, 163 students (40.75%) who got finger injury, 198 students (49.50%) who got waist injury, 170 students (42.50%) who got pelvis injury, 202 students (50.50%) who got knee injury, 170 students (42.50%) who got ankle injury, and 165 students (41.25%) who got toe injury. Concerning sports learning planning, there were 2 teachers (6.1%) who never planned sports learning, 8 teachers (24.2%) who rarely planned it, 13 teachers (39.4%) who occasionally planned it, 9 teachers (27.3%) who often planned, and 1 teacher (3.0%) who always planned it. Conclusion: Knee injury was the most common one and teachers have not well-planned sport learning. It was necessary to conduct further study of the correlation between sports learning planning and the injury.

**Keywords:** sport learning, reality, injury

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## INTRODUCTION

Schools had a potential to be the place to promote health literacy through development of physical, sport and health educational curriculum and teachers serve as forerunners in promoting the health literacy for students. Educational curriculum was developed by focusing on students' needs, positioning teachers as health promoting agents and providing teachers with pedagogical resources to formulate key concept of health (Ahmadi *et al.,* 2020). Physical, sport and health education encouraged students to do physical activities. Some physical activities were better than no physical activity at all and more physical activities were better for optimal health outcome (Bull *et al.,* 2020). School-based physical activity was effective in improving cardiorespiratory endurance (Pozuelo-Carrascosa *et al.,* 2018) and even quality physical education class could improve students' cognition and academic performance (García-Hermoso *et al.,* 2021).

Physical activity should not be organized carelessly. The physical activity should be measurable, especially in physical, sport and health education learning. Children and adolescents of 6 to 17 years of age should do moderate to heavy physical activity for 60 minutes or more everyday (Piercy *et al.,* 2018). It was recommended that children and

adolescents did aerobic physical activity at least 60 minutes/day on average, while muscle and bone strengthening activity should be done at least 3 days/week (Okely *et al.,* 2021). Physical activity that could be measured objectively on quantity basis and subjectively on type and quality basis was necessary to estimate students' health status (Weggemans *et al.,* 2018). Participation in physical, sport and health activity had physical and psychological health benefits for students, but some activities in the physical, sport and health education had higher injury risk (Black *et al.,* 2021).

Injury had serious negative effect on students because the injury might result in physical disability, absence in sport class and higher studying cost. It was reported that there were 276 injuries and 11.7% of the injuries took place every 1,000 hours, while 42% of them were caused by excessive physical activity, 62% of them caused absence in sport class (2 days lost of time on average) and 64% of them were recurrent injuries. The majority of the injuries took place to knees, anterior leg and ankles (A.-M. van Beijsterveldt *et al.,* 2017). The results of the studies conducted in 2014 and 2016 to 4,203 students showed that there was at least an injury case during physical education class in last year (Räisänen *et al.,* 2018). It was necessary to organize sport injury screening and identification among students from the beginning. The results of studies showed that students had high risk of injury in the first year of physical, sport and health education learning (A. M. van Beijsterveldt *et al.,* 2014). It was necessary to examine injury condition as an effort to give special aid and treatment (Baidwan *et al.,* 2018 and Richardson *et al.,* 2021). Children with injuries were at higher risk of death than adults. It indicated that preventive effort and strategy were highly required (McLaughlin *et al.,* 2018)

Educational safety was not only the responsibility of physical education teachers, but also related school departments that should raise the awareness of stakeholders of educational safety in order to minimize possible accidents among students through effective educational strategy and design (Gang, 2021; Merrie *et al.,* 2016). Other opinion suggested that physical, sport and health education might be used as injury preventive effort by formulating a good physical educational program (Goossens *et al.,* 2016; Hemenway, 2019). Important parameters in physical, sport and health education learning included basic knowledge of injury, injury frequency and injury intensity (Sollerhed *et al.,* 2020). Higher frequency and intensity of physical activity increased injury risk (Räisänen *et al.,* 2016). Specific physical activity data could be used in formulating the strategy of getting a good understanding of injury risk management (Costa e Silva *et al.,* 2017), considering the difference in sex, age (Harmon *et al.,* 2018), body weight (Lee *et al.,* 2018), fitness level, activity duration (Cai *et al.,* 2018), environment, policy, and curriculum (Schofield *et al.,* 2019).

The results of the study by Ekegren *et al.* (2016) showed that there was lack of data and information of injuries in amateur, professional and elite sports. It was assumed that there was a lack of data of high injury risk environment and hence it could also be assumed that there was the same problem in physical, sport and health education area.

The study focused on portraying the distribution of the data of the injuries taking place in school environment during physical, sport and health learning. The urgency of the distribution of the data of the injuries was that it could be used as the basis formulating a guideline of injury prevention among students during physical, sport and health education learning. It aimed at finding out the preparation process of sport learning planning and the number of injury cases. In detail, it intended to answer following questions: 1) What was the profile of the injuries taking place to students on sex basis? 2) What was the profile of the injuries taking place to students on age basis? 3) What was

the profile of the injuries taking place to moving body parts of students? 4) How many grievances did students have in last year? 5) How did teachers plan and prepare physical, sport and health education learning?

## METHOD

The study used survey method with quantitative approach. Concerning its general objective, it was an analytic cross-sectional study. It was conducted at junior high schools in Yogyakarta City of the Special District of Yogyakarta in April-October 2022. The population included all of the students at the junior high schools in Yogyakarta City. There were totally 20,401 male students, consisting of 10,154 male students and 10,247 female students (The Primary Educational Data of the Directorate General of Early Childhood Education, Elementary Education and Secondary Education of the Ministry of Education, Culture, Research and Technology in the Special District of Yogyakarta). Samples were drawn using random sampling technique. The number of the samples was determined using Slovin formula $n=N/(1+Ne^2)$ at the confidence level of 95% or at the significance of 5% and the resulting number was 400 students. Data were collected using questionnaire instrument. The questionnaires were given to the students using google form, which contained 15 items with the following details: inflammation signs (5 items) and injuries (12 items).

Table 1. The Instrument Items of Inflammation Signs and Injury in Students

| No. | Factors | Indicators | Items | Sum |
|---|---|---|---|---|
| 1. | Inflammation signs | Heat, swelling, redness, pain, hard to move | 1, 2, 3, 4, 5 | 5 |
| 2. | Injuries | neck, shoulders, elbows, wrists, fingers, waist, pelvis, knees, ankles, toes | 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 | 15 |
| Total | | | | 15 |

Table 2. The Instrument Items of Teachers' Learning Planning

| No. | Factors | Indicators | Items | Sum |
|---|---|---|---|---|
| 1. | Sport learning preparation | Health examination | 1, 2, 3, 4, 5, 6 | 6 |
| | | The preparation of first aid in the case of accident | 7, 8 | 2 |
| | | Facilities and infrastructure preparation | 9, 10, 11 | 3 |
| | | Learning material preparation | 12, 13, 14 | 3 |
| 2. | Sport learning implementation | Warming up | 15 | 1 |
| | | Content | 16 | 1 |
| | | Cooling down | 17, 18, 19 | 3 |
| 3. | Sport learning evaluation | Health examination | 20, 21, 22 | 3 |
| Total | | | | 22 |

Validity and reliability tests of each item of the questionnaires for the students and the teachers were carried out separately. The results of the validity and reliability tests of the items of the questionnaire for the students were r-count > r-table (0.235) and alpha cronbach was 0.928 > 0.6, while those of the items of the questionnaire for the teachers were r-count > r-table (0.344) and alpha cronbach was 0.737 > 0.655. The results of the items of the two questionnaires were valid and reliable. Data were analyzed by 1) collecting data, 2) reducing data, 3) presenting data, and 4) drawing conclusion. The conclusion was drawn using five categories, which were: never, rarely, occasionally, often and always. And then, the percentage was calculated using percentage formula (%). The study has been approved by the Research Ethical Comission of the Institute of Research and Community Service of Yogyakarta State University with the ethical approval No. T/19.3.UN34.21/TU/2022 declaring that it was ethically appropriate in accordance to 7 (seven) WHO 2011 Standards, 1) Social Values, 2) Scientific Values, 3) Equitable Assessment and Benefits, 4) Risks, 5) Persuasion/Exploitation, 6) Confidentiality and Privacy, and 7) Informed Concent, referring to the 2016 CIOMS Guidelines. It is as indicated by the fulfillment of the indicators of each standard.

## FINDING AND DISCUSSION

### FINDING

The findings were reported to answer the questions related to the sex of the students, the age of the students, the types of the injuries that took place to the students, the number of the injuries that took place to the students and the teachers' sport learning planning and preparation. The data were collected using questionnaires that were distributed using google form.

### The Sex

There were totally 400 questionnaires distributed to 400 students (n=400) and the resulting data were summarized in Table 3, Table 4, Table 5, Table 6 and Table 7 below.

**Table 3. The Sex of the Students**

| Sex | Frequency | Percentage | Validity Percentage | Cumulative Percentage |
|---|---|---|---|---|
| Male | 171 | 42.8 | 42.8 | 42.8 |
| Female | 229 | 57.3 | 57.3 | 100.0 |
| Total | 400 | 100.0 | 100.0 | |

All the students completed the questionnaires. There were 171 male students (42.8%) and 229 female students (57.3%).

### The Age

**Table 4. The Profile of the Age of the Male Students**

| Age | Frequency | Percentage | Validity Percentage | Cumulative Percentage |
|---|---|---|---|---|
| 11 | 2 | 1.2 | 1.2 | 1.2 |
| 12 | 32 | 18.7 | 18.7 | 19.9 |
| 13 | 59 | 34.5 | 34.5 | 54.4 |
| 14 | 53 | 31.0 | 31.0 | 85.4 |
| 15 | 24 | 14.0 | 14.0 | 99.4 |
| 16 | 1 | 0.6 | 0.6 | 100.0 |
| Total | 171 | 100.0 | 100.0 | |

It was clearly observed in the table above that there totally 171 male students. There were 2 male students (1.2%) of 11 years of age, 32 male students (18.7%) of 12 years of age, 59 male students (34.5%) of 13 years of age, 53 male students (31.0%) of 14 years of age, 24 male students (14.0%) of 15 years of age, and 1 male student (0.6%) of 16 years of age. The mean age of the male students was 13 years and 4 months.

**Table 5. The Profile of the Age of the Female Students**

| Age | Frequency | Percentage | Validity Percentage | Cumulative Percentage |
|---|---|---|---|---|
| 12 | 50 | 21.8 | 21.8 | 21.8 |
| 13 | 75 | 32.8 | 32.8 | 54.6 |
| 14 | 72 | 31.4 | 31.4 | 86.0 |
| 15 | 29 | 12.7 | 12.7 | 98.7 |
| 16 | 2 | 0.9 | 0.9 | 99.6 |
| 17 | 1 | 0.4 | 0.4 | 100.0 |
| Total | 229 | 100.0 | 100.0 | |

The data summarized in the table above showed that there were 229 female students. There were 50 female students (21.8%) of 12 years of age, 75 female students (32.8%) of 13 years of age, 72 female students (31.4%) of 14 years of age, 29 female students (12.7%) of 15 years of age, 2 female students (0.9%) of 16 years of age, and 1 female student (0.4%) of 17 years of age. The mean age of the female students was 13 years and 4 months.

**The Injuries**

**Table 6. The Data of Students' Injuries**

| a. Emerging Symptoms | Never | | Ever | | Total n | Total Percentage |
|---|---|---|---|---|---|---|
| | Sum | Percentage | Sum | Percentage | | |
| Neck | 242 | 60.50% | 158 | 39.50% | 400 | 100% |
| Shoulders | 207 | 51.75% | 193 | 48.25% | 400 | 100% |
| Elbows | 267 | 66.75% | 133 | 33.25% | 400 | 100% |
| Wrists | 218 | 54.50% | 182 | 45.50% | 400 | 100% |
| Fingers | 237 | 59.25% | 163 | 40.75% | 400 | 100% |
| Waist | 202 | 50.50% | 198 | 49.50% | 400 | 100% |
| Pelvis | 230 | 57.50% | 170 | 42.50% | 400 | 100% |
| Knees | 198 | 49.50% | 202 | 50.50% | 400 | 100% |
| Ankles | 230 | 57.50% | 170 | 42.50% | 400 | 100% |
| Toes | 235 | 58.75% | 165 | 41.25% | 400 | 100% |

It was clearly observed in the table above that there were totally 400 students who participated in physical, sport and health activity at schools and 158 students (39.50%) of them had the grievance of cervical vertebrae injury, 193 students (48.25%) had the grievance of shoulder injury, 133 students (33.25%) had the grievance of elbow injury, 182 students (45.50%) had the grievance of wrist injury, 163 students (40.75%) had the grievance of finger injury, 198 students (49.50%) had the grievance o waist injury, 170 students (42.50%) had the grievance of pelvis injury, 202 students (50.50%) had the grievance of knee injury, 170 students (42.50%) had the grievance of ankle injury, and 165 students (41.25%) had the grievance of toe injury.

**Learning Planning**

**Table 7. Learning Planning**

| Category | Frequency | Percentage | Validity Percentage | Cumulative Percentage |
|---|---|---|---|---|
| Never | 2 | 6.1 | 6.1 | 6.1 |
| Rarely | 8 | 24.2 | 24.2 | 30.3 |
| Occasionally | 13 | 39.4 | 39.4 | 69.7 |
| Often | 9 | 27.3 | 27.3 | 97.0 |
| Always | 1 | 3.0 | 3.0 | 100.0 |
| Total | 33 | 100.0 | 100.0 | |

The data summarized in the Table 5 above showed that there were totally 33 teachers and there were 2 teachers (6.1%) who never planned their learning, 8 teachers (24.2%) who rarely planned their learning, 13 teachers (39.4%) who occasionally planned their learning, 9 teachers (27.3%) who often planned their learning, and 1 teacher (3.0%) who always planned his learning.

## DISCUSSION

There were 171 male students (42.8%) and 229 female students (57.3%) who have completed the questionnaires and the mean age of the male and female students of 14 years and 4 months. There were 202 students (50.50%) of them who have the grievance of knee injury.

### The Sex

Sport was part of physical, sport and health education learning. The sport included complex movement that involved various interconnected body systems. Therefore, it was necessary to pay a good attention to students' physiological aspect. Male and female had different physiology and metabolism that could be identified in sporting. Male and female had different musculoskeletal, cardiovascular, molecular and metabolism characteristics (Landen *et al.*, 2019). Female had lower cardiac output and oxygen binding capacity than male, which influenced physical performance, including sporting (Lundsgaard *et al.*, 2017; Rapp *et al.*, 2018). Female runner had lower VO2max (V. Mendonca *et al.*, 2020). Male had physiological benefits such as bigger body with bigger muscle mass, lower percentage of body fat, and bigger maximal anaerobic and aerobic energy delivery. Higher hemoglobin content caused maximal oxygen absorption of 5-10%. Female had better capacity in metabolizing fat (Sandbakk *et al.*, 2018).

The difference between male and female could be observed in their strength and endurance that were influenced among others by muscle composition. The endurance of male and female was influenced by muscle structure (Miller *et al.*, 2021). The upper and lower body of male were stronger than those of female by 157% and 60% (Monteiro *et al.*, 2016), respectively. Male had bigger type II fiber than female. The characteristic of the muscle type II included abundant mitochondria and myoglobin so that the muscle could contract quickly, but fatigue could easily happen (Trevino *et al.*, 2019; Sontag *et al.*, 2021). Fatigue level of male and female could be clearly identified from the point of view of neuromuscular system. The neuromuscular system would adapt to sporting activity and the capacity of fiber type and also muscular structure (Jenkins *et al.*, 2021).

It could be concluded that generally, male and female were physically and physiologically different. The physiological aspect influenced sporting because VO2max influenced oxygen intake while sporting. Muscle mass and type also influenced muscle endurance and strength while sporting. Male was more superior in physiological aspect

that supported optimal sporting as compared to female in sporting, including physical, sport and health learning.

**The Age**

Body maturity because of hormonal change during adolescent period caused dramatic change of body composition. Puberty ended childhood and was followed by physiological and psychological changes for sexual maturity and fertility (Abreu & Kaiser, 2016). Sex influenced puberty. Generally, female entered puberty earlier (at the age of 8-12 years) than male (at the age of 9-14 years) (Wiglesworth *et al.*, 2023). The puberty generally caused the increase in sexual hormone and growth hormone at the same time. During puberty, body height, body weight, bone and muscle mass and blood volume increase, while heart, brain, lungs, liver and kidneys enlarged (Corkins *et al.*, 2016). On the contrary, female puberty might be identified by menstruation. The muscle of the female who did sport during her menstrual period had higher lactate content than male (McNulty *et al.*, 2020).

Puberty varied among adolescents, but the puberty took place gradually and was predictable. Generally, adolescent period was divided into three: early adolescent (at the age of 10-14 years), late adolescent (at the age of 15-19 years), and young adult (at the age of 20-24 years). Adolescent was characterized by physical and sexual maturity, social independence, identity development, skills accession and abstract reasoning capacity (Das *et al.*, 2017). Individual physical and psychosocial development based on age had significant impact on sporting. Therefore, it was necessary for teachers to consider students' somatic, neurological, cognitive and psychological aspects in organizing learning (Brown *et al.*, 2017). Study results showed that overweight boys were susceptible to injury (Karuc *et al.*, 2021). In early adolescence, students had the potential of being overweight that could result in the lack of quality movement. The lack of the quality movement and low flexibility were the most common causal factors of injury. Routine practice by improving movement pattern and flexibility could prevent injury (Koźlenia & Domaradzki, 2021).

It was concluded that adolescents would experience physical and psychosocial development. At this stage, the adolescents had the opportunity to maximize their potential through sporting. However, it was necessary to pay a good attention to basic principles in doing sport in order to avoid injury.

**The Injury**

Injury could be recognized from some inflammation symptoms in certain body parts. The inflammation was one of the basic protecting reactions of organisms that could be physically observed (Kuprash & Nedospasov, 2016). Inflammatory classical signs included redness (*rubor*), pain (*dolor*), heat (*calor*), sweeling (*tumor*), and functional loss (*function laesa*) (Corr, 2021). The clinical signs could be explained by biochemical and cellular process activated by inflammatory response. The *rubor* and the *calor* resulted from local vasolidation.

*Rubor* dan *kalor* adalah hasil dari *vasodilatasi* lokal. *Tumor, dolor* dan the *functio laesa* took place because of extravasations of blood plasma and white blood cells and inflammation mediator (Zigterman & Dubois, 2022). Shoulder, lower back, knee, elbow and wrist joints were the most frequent anatomical locations of injury that affected muscle and tendon, and sprain was the most common injury (Keogh & Winwood, 2017). Diagnosis could be made using physical examination, roentgen, USG, magnetic resonance imaging (MRI) and other clinical procedures. The injury could be alleviated

using stretching, treatment, physical therapy and surgery (Chen *et al.,* 2020).

Sport subject had positive impact on students' physical fitness, while injury had negative impact on the physical fitness of the students (Rexen *et al.,* 2016). One of the characteristics of physical education learning at schools was that the physical education learning might result in students' injury. The most common causal factor of the injury included insufficient preparation and non-standard technical measure (Wang & Huang, 2020). Sport injury was serious problem among students who participated in sport learning. There was 1.90 injury in 1,000 hours, which taking place during the participation of sport learning (Gutiérrez-Castañón *et al.,* 2018). Of 848 registered sport injuries, 319 injuries (172 males and 147 females) taking place during sporting activity under teachers' supervision (0.30 injury/student). Sprain and bruise, especially those taking place in ankles and knees, were the most frequent injuries. There were 27.3% of the reported injuries taking place to the students who actively participated in physical education session and the effects of the injuries lasted for more than 3 days (Martínez-de-Quel-Pérez *et al.,* 2019). The majority of the sport injuries taking place to the students at schools were minor sprains of lower and upper legs (Fragoso & Teles, 2016). The injuries could influence students' attitude toward sport and physical education learning (Goossens *et al.,* 2019).

**Learning Planning**

The data summarized in Table 7 showed that there were totally 33 teachers and 2 of them (6.1%) never planned their learning, 8 of them (24.2%) rarely planned their learning, 13 of them (39.4%) occasionally planned their learning, 9 of them (27.3%) often planned their learning, and 1 of them (3.0%) always planned his learning.

Physical, sport and health education learning represented an effort to maintain students' health by doing physical activities at schools (Nyberg & Larsson, 2014). The physical, sport and health education learning in Indonesia was organized once a week in addition to extracurricular program. The physical activity was organized at least 60 minutes/day by considering the intensity to prevent diseases and to promote children and adolescents' health (Poitras *et al.,* 2016). Physical, sport and health education learning was useful for cognitive and meta-cognitive developments in adolescence (Álvarez-Bueno *et al.,* 2017). Sport had positive impact on cognitive and emotional functions (Bidzan-Bluma & Lipowska, 2018). Physical, sport and health education learning was useful for physical, cognitive, affective and social conditions (Casey & Goodyear, 2015). Physical activity was useful in decreasing the risk of excessive body weight gain among children and adults, the risk of diseases and fall injuries among elder people and in improving mental health and physical function (Powell *et al.,* 2018). School-based physical activity was part of the prevention or treatment program of obesity in children with obesity (Martin *et al.,* 2018).

Learning quality might be improved by planning learning process and implementing the learning plan in learning process. The objectives of the learning planning were to systematize and to direct learning process. Sport learning principles aimed at creating safe learning environment (Quarmby *et al.,* 2022). Five themes were identified to be useful for adolescents who participated in physical and sport education learning, which were social interaction, pleasure, challenge, and basic movement competence (Beni *et al.,* 2017). The theme of basic movement skill related to basic skills and discussed how to develop related skills in wider context of health promotion and recommended the use of different pedagogical approaches in teaching the basic movement skills. It was concluded that the development of the basic movement skills was

the focus of physical, sport and health education (Barnett *et al.*, 2016).

Teachers played an important role as forerunners in facilitating students in learning process and in developing their potential. The success in meeting learning objective was determined by teachers' ability to plan their learning process *(Heikinaro-Johansson et al., 2018), to implement, and to evaluate the learning process* (Leirhaug & MacPhail, 2015). The sport learning should be implemented by paying a good attention to learning design, learning implementation guideline and evaluation. The development of learning program consisted of three main aspects, which were learning program design, learning implementation guideline and learning evaluation (Narmaditya, 2022). The learning evaluation might be organized by taking students' feed back into account (Ghazali *et al.*, 2020; Bayu *et al.*, 2022). The evaluation played an important role to find out students' motifs to participate in physical, sport and health education learning. The motifs were important to participate in different physical activities, including activity types, age and sex of adults. A good understanding of the motifs was very important in developing intervention to increase the involvement level in learning process (Molanorouzi *et al.*, 2015).

The results of the study of football players showed that injury incident during football match and practice could be decreased using dynamic warming up and intensifying strength, balance and mobility exercises (Pérez-Gómez *et al.*, 2022). Other studies recommended muscle preparation before sporting to reduce injury risk of lower extremities. However, the problem was that the programs were not sustainable. It was therefore necessary to focus on the implementation of the programs in order to improve the knowledge and the behavior related to injury prevention practices (Emery *et al.*, 2015). Other studies described that players and staff members of a professional football team played a very important role in evidence-based injury prevention training program. However, the perception among the members of the team of what training, who are responsible for the training and when the training should be organized varied. Positive impact of the injury prevention training program in professional football team required detailed understanding of particular implementation context of each team (O'Brien & Finch, 2017).

The injury prevention context should be prepared in each activity, especially in high injury risk activity, including physical, sport and health education learning. It was also necessary to raise awareness of the importance of improving the knowledge of teachers related to injuries (Singh *et al.*, 2015). It could be concluded that the characteristics of physical, sport and health education put the emphasis on physical aspects that could improve physical fitness, but it had also injury risk. Therefore, it was necessary to make a good learning plan to minimize the injury risk. Also, it was necessary to standardize the perception of educators of the injury to make a good injury prevention plan. Therefore, the evaluation of the physical, sport and health education learning was very important.

## CONCLUSION

Physical, sport and health education learning had unique characteristics. The physical, sport and health education learning put the emphasis on physical aspects to optimize students' cognitive, affective, and psychomotor aspects. Physical, sport and health education teachers faced special challenge in meeting their learning objectives. In addition to deliver learning instruction, they should also make special preparation to anticipate sport injuries that might take place to their students. Though there were many influencing factors of injury, the preparation, and the strategy in organizing the physical, sport and health education learning were very important to minimize the injury risk. The

preparation and the strategy could be formulated by considering students' characteristics such as sex, age, and the types of the physical activities and the understanding and the knowledge of the students of the injury. The results of the study showed that the most common injury took place to knee joints and there was a lack of teachers' preparation in organizing the learning process. It was necessary to conduct further study of the causal factors of injuries during physical, sport and health education learning. Additionally, it was also necessary to conduct further study of the strategic steps in preventing injuries of lower extremities during physical, sport and health education learning.

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