

The Difference between in a 5K race running on the Tartan Track and the Asphalt Road Track against the Injury Risk on the Men Athletic Club of Dragon and Pandawa Salatiga

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Abstract

The purpose of this study was to determine the difference between 5K long distance running on the Tartan track and the Asphalt Highway on the risk of injury to the Men's Athlete Club of Dragon Athletics and Pandawa Salatiga. This study uses a descriptive qualitative research method using an ex post facto approach in which data taken on respondents based on events that have been experienced before. The number of samples was 14 Men's Athlete of Pandawa Club and 10 Men's Athlete of Dragon Salatiga Club. The total number of samples was 34 athletes and samples were taken using purposive sampling technique. Data collection techniques using Triangulation techniques, namely questionnaire or questionnaire, interviews and documentation. The validity of the questionnaire test or questionnaire was carried out and agreed upon by experts in the field of running injuries and linguists (Expert Judgment) and the hypothesis was tested using the Chi Square test with SPSS. Observation was carried out for four weeks by taking data through questionnaires and interviews by researchers to respondents or research samples namely athletes and trainers. The results of this study indicate that the asphalt highway running track has a higher risk of injury than running on the tartan track. Asphalt highway has a hard structure on the surface, when running footstool meets a hard surface so this will cause the risk of injury to the foot such as archilles tendinitis injuries where large tendon muscles behind the ankles that connect the calf muscles to the heel bones experience irritation or inflammation. Knowing the risk of injury that occurs in certain types of trajectories can help athletes and coaches in designing training programs and minimize injury.

Keywords

5K long distance running; tartan; gravel land; risk of injury



I. Introduction

Running sports is one of the branches of athletics and is the oldest sport in the world started before the 390bc century. Formerly, this athletic sport was an adaptation of physical coaching given to the community in order to have strong strength, this was explained (Djumijar) in his book. Physical coaching provided is the basic motion of running, jumping, and throwing, this has become the number of athletics in the competition. The branch of running itself has a running number that is short distance running, middle distance running and long distance running. Short distance running or also called sprint running is 100m, 200m, and 400m, middle distance running is done at 800m, 1500m and 3000m, long distance running is done at 5000m, 10000m and 42.195m.

Running becomes a preferred choice by the community in doing sports in addition to being easy, running becomes a fun sport to do together. This sport is easy to do because it does not require complicated and many facilities and infrastructure. In running only requires shoes and a track to run. The race began to be held by various communities or the official organizers of various companies, generally they held a long distance running competition. Ningsih (2018) states Competition in a very tight working world exposes organizations to strong efficiency and competitiveness. To improve efficiency, among others required Human Resources (HR) quality. Human Resources area crucial problem in an organization to be considered for the progress of the organization or company as expected. Human Resource Development as an effort to improve the quality of the personality, knowledge, skills and abilities of employees (Irfansyah, 2020).

The most important resource in an organization is the human resources, the people who provide the energy, talents, creativity and their efforts to the organization for an organization. Of course, to get a proud achievement is not easy, it requires early, special, tiered and sustainable coaching and good management of management from the organization or school therein (Sulaiman, 2020). This is mostly done by the community or the official organizing company in an effort to build a culture of healthy living in society. Distance numbers that are often contested are long distances of 5000m or 5K and distances of 10000m or 10K.

The race which is often held by the public organizers uses the asphalt highway running track, this is because the asphalt road has a long track so that it can measure freely the running distance to be contested. Besides that, the track lane has many surface variations because the surface of the hard asphalt road surface has a path that is not always flat. The type of official track set by the IAAF (International Association of Athletics) is the tartan track as the standard used for the official running of the Athletics championship. The surface of the synthetic tartan trajectory is made of small rubber particles that are held together and firmly attached to the track surface. Tartan track has an oval field shape pattern with a length of 400 meters around the track, so if used for long distance running it is necessary to encircle the field several times.

The difference in the use of this type of trajectory is one of the factors causing injury. This was revealed in the study (Kennedy, Knowles, Dolan, & Bohne, 2005). The factors affecting runner injuries were anatomical, gender, developmental, growth, trainer errors, use of footwear, and use of surface types track or field. Different types of running track also become a problem for athletes, this is because the comfort of running every athlete is different in certain types of tracks.

Research on the influence of the running track has also been conducted by (Kuswahyudi & Pelana, 2019) namely the influence of the surface of the tartan running track with the surface of the sand running track, but this research aims to determine the effect on cardiovascular endurance. The results show that there are differences in the influence of different types of trajectories on increasing cardiovascular endurance, but it can be implied that differences in track types also affect the style of running so as to cause various factors for the risk of injury to athletes or runners.

The different types of running track use are problems that the researcher wants to investigate. How does the difference in 5K long distance running on tartan and asphalt trajectories affect the risk of injury to athletes, specifically at Dragon and Pandawa Salatiga athletes as research samples, where Dragon and Pandawa Salatiga Club are one of the clubs that have a history of being best long distance runner athlete printing The aim of this study was to determine the difference in 5K long distance running on the tartan surface trajectory and asphalt highway ground trajectory to the risk of injury to athletes.

II. Research Methods

This research was conducted for four weeks, in the middle of February to March 2020 at Dragon and Pandawa clubs in Salatiga City, Central Java. This study uses a qualitative descriptive method using the ex post facto approach, namely research that is presented in the form of a research report regarding the investigation of circumstances, conditions, situations, events or activities mentioned in investigating a study (Arikunto, 2010; 3). The study was conducted with an ex post facto approach in which the data obtained by researchers based on events that have occurred and experienced by respondents and then trace back to find out the factors that can cause these events (Sugiyono, 2010; 7). The qualitative descriptive method was used in this study to be able to answer the problem of differences in the distance of 5K long distance running on the tartan and asphalt highways to the risk of injury to athletes. Describing the truth about phenomena based on empirical data to get answers to the problems to be studied is the main objective of the study using descriptive qualitative methods (Ali, 2010; 47). This qualitative descriptive method will be used by researchers in conducting research. The population in the Dragon and Pandawa Salatiga Athletic clubs is 34 senior male athletes and 10 female senior athletes. In this study sampling using a purposive sampling technique that is done by taking the subject because of certain objectives, carried out due to several considerations of limited time, energy and funds so that sampling cannot be larger and farther (Arikunto, 2010; 183). Based on sampling techniques, researchers used all male senior athletes with a total of 34 male athletes as research samples.

2.1 Research Instruments

Triangulation techniques are used in this study, where researchers take three types of data that will be used in analyzing data. Engineering triangulation is research that uses different data collection techniques to get data from the same data source (Sugiyono, 2013; 330). Researchers used research instruments in the form of questionnaires or questionnaires, interviews and documentation. A questionnaire will be given to athletes as a research sample, then further interviews with athletes and trainers to get more accurate data. Instrument in the form of questions in the form of questionnaires and interviews compiled by researchers who then validated and approved by experts. Furthermore, looking for documentation data in the form of data about things or variables in the form of notes, transcripts, books, newspapers, magazines, and so on (Arikunto, 2010; 274). Documentation is needed to obtain evidence of validity of data that has been obtained from athletes and trainers. Documentation is needed in data retrieval to determine the athlete's history of injury, data in the form of letters from the hospital, X-ray evidence, or written or digital data such as photographs or videos.

2.2 Data Analysis

Data analysis in this study used test instruments and hypothesis testing. In this study the test instrument that will be used first is to do a validation test by an Expert Judgment according to the field in this study, namely experts in the field of athletic sports injuries and experts in the Indonesian field in order to provide a good language order so that it is easily understood by respondents when answering instruments in the form of questionnaires and interviews. The test instrument was prepared by the researcher in the form of a Questionnaire and Interview for athletes and trainers. The Hypothesis Test in this study uses the Chi Square test, this test is a non-parametric statistical calculation method where the data must be in the form of nominal and categories. Hypothesis testing regarding

associations or correlations based on certain hypotheses in each study between the frequency of observation with the frequency of expectations (Andi Supangat in Aziz, 2007; 364). This test can be used to determine the relationship and differences between variables. Chi Square test decision making using a significance value (Asymp. Sig. (2-sided)) with acceptance criteria, if the value of Asymp.Sig. Chi square in the SPSS output \leq of 0.05 (α) means that H0 is rejected and Ha is accepted, if the Asymp.Sig value. Chi square at SPSS output $>$ from 0.05 (α), it means that H0 is accepted and Ha is rejected. H0 ie there is no relationship between 5K long distance running on tartan tracks, asphalt highways, gravel land to the risk of injury to male athletes from the Dragon and Pandawa Salatiga clubs. Ha, there is a relationship between 5K long distance running on the tartan track, asphalt highway, gravel land to the risk of injury to the male athletes of the Dragon and Pandawa Salatiga clubs.

III. Discussion

3.1 Results

The analysis of the data in this study is hypothesis testing using the Chi Square test with a number of research samples as many as 34 male athletes Dragon and Pandawa Salatiga club. This study uses 2x2 tables with variable types of trajectories namely tartan tracks and asphalt highways, variable risk of injury that is mild and severe. In the questionnaire and interview data that have been done, the researcher gives two answer options to the respondent, where the respondent or athlete provides data according to the injury he experienced when running on the tartan track and the asphalt highway.

Table 1. Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Track Type *	68	100.0%	0	0.0%	68	100.0%
Injury Rate						

Based on the SPSS output above it is known that there are 68 data in which 34 samples or respondents provide two answers to the level of injury suffered on two different types of trajectories, all of which are processed into the analysis so that no data is lost then the validity level is 100%.

Table 2. Trajectory Type * Crosstabulation Injury Rate

			Injury rate		
			Minor	Major	Total
Track Type	Tartan	Count	22	12	34
		% within Track Type	64.7%	35.3%	100.0%
	Asphalt Highway	Count	10	24	34
		% within Track Type	29.4%	70.6%	100.0%
Total		Count	32	36	68
		% within Track Type	47.1%	52.9%	100.0%

The output results above can be seen in a cross tabulation table that contains information about the relationship between the types of trajectory to a running injury. There are as many as 22 athletes who suffered minor injuries on the tartan track and

suffered major injuries as many as 12 athletes or respondents on the tartan track. On the asphalt highway, there are as many as 10 athletes or respondents who suffered minor injuries and as many as 24 athletes or respondents were seriously injured.

Table 3. Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	8.500 ^a	1	.004		
Continuity Correction ^b	7.142	1	.008		
Likelihood Ratio	8.689	1	.003		
Fisher's Exact Test				.007	.004
Linear-by-Linear Association	8.375	1	.004		
N of Valid Cases	68				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 16.00.

b. Computed only for a 2x2 table

The results of Chi-Square tests using Continuity Correction, this is because this study uses a 2x2 variable table and the results of crosstabulation in table 1 show that there is no cell less than 5. Decision making based on the significance value of the output table above is known asymp value. Sig. (2-sided) in the Continuity Correction test is 0.008. So the Asymp value. Sig. (2-sided) $0.008 < 0.05$, it can be concluded that H_0 is rejected and H_a is accepted. Thus it can be interpreted that there is a relationship of the difference in the distance of 5K running on the tartan track and asphalt highway to the risk of injury to athletes from the athletic club of Dragon and Pandawa Salatiga. This also shows that there is a risk of injury to different degrees on different types of trajectories. As for the type of asphalt highway, the risk of 5K long distance running injury is heavier than 5K long distance running on tartan.

3.2 Discussion

The results of the Chi Square test data analysis using SPSS to determine the difference in 5K long distance running on the tartan track and the asphalt road trajectory to the risk of injury to the Athletics Club Dragon Athletics Dragon and Pandava Salatiga, obtained a cross tabulation table where data on the relationship between variable type of running track with the risk of injury. A total of 22 athletes have suffered minor injuries and 12 athletes have suffered severe injuries when running on the tartan track. Whereas on asphalt highway as many as 10 athletes have suffered minor injuries and as many as 24 athletes have suffered severe injuries. This shows that there are many serious injuries when running on the asphalt highway, but minor injuries actually occur when running on the tartan track.

Athletes who suffer severe injuries after running on the highway are often experiencing stress fractures where pain in the bones and leg muscles increases and microscopic cracks occur frequently in the legs. The microscopic cracks will get bigger and can cause a broken condition with serious treatment with surgery if the injured condition is forced to run. Symptoms experienced by athletes or runners are pain when touched on the injured part, and feel pain that gets worse when running and jumping using one leg. This injury is included in the level of severe injury because it requires special treatment and total rest for recovery. In addition, tearing in the muscles is also often

experienced by athletes after running on the asphalt highway. This is because the surface of the asphalt highway is hard, so when the athlete runs the footstool always collides hard with the asphalt surface. The use of shoes with soft soles is very helpful to prevent the risk of injury when running on asphalt pavement. In contrast to running on the surface of the tartan track, the foot still feels soft reflection from the surface of the tartan track made of rubber.

Minor injuries are experienced by athletes when running on tartan tracks, this is because athletes are more frequent and like running on tartan tracks. Tartan tracks are standard tracks used in official championships set by the IAAF (International Association of Athletics) with synthetic surfaces. This track is designed flat and sturdy / solid so that it can accept stamping on spikes running shoes. This also affects athletes running comfortably and reduces their risk of injury, but it does not rule out athletes being unable to get injured at all. Minor injuries that athletes often experience when running on a tartan track such as runner's knee are mild pain in the knee, where athletes feel pain when walking or climbing stairs.

Chi Square test table is known that the value of Asymp. Sig. (2-sided) 0.008, the acceptance criteria for the chi square test is if the Sig. Chi square at SPSS output \leq of 0.05 (α) there is a significant relationship and if the Sig. Chi square at SPSS output $>$ from 0.05 (α) there is no significant relationship. It can be concluded that the results of the Asimp.Sig value of 0.008 $<$ 0.05, which means there is a significant relationship to the difference in 5K long distance running at the tartan track and the asphalt highway track to the risk of injury to male athletes in the Dragon and Pandawa Salatiga athletic clubs. This is because different types of track surfaces affect the way an athlete runs but also anatomically affects the footstool when running. In the study (Kuswahyudi & Pelana, 2019) explained that the influence of the type of running track to increase cardiovascular endurance. In addition (Starbuck et al., 2016) conducted research on the effect of the use of the type of field with ground gravel on tennis players when running after the ball. This indicates that the effect on the risk of injury is very likely to occur when running using different types of trajectories.

IV. Conclusion

Based on the results of research on the relationship of differences in 5K long distance running on tartan and asphalt highway tracks against to the risk of injury to the men's athletes club of Dragon and Pandawa athletic Salatiga it can be concluded that H_0 is rejected and H_a is accepted. This means that there is a significant relationship to the difference in 5K long distance running on tartan track and the asphalt highway ground to the risk of injury to athletes from Dragon and Pandawa Salatiga athletic clubs with Asymp values. Sig. (2-sided) 0.008 $<$ 0.05. This also shows the difference in the level of risk of injury that occurs on the track. Running long distances on the asphalt highway has a risk of experiencing serious injury which is 70.6% compared to running on the tartan track with a risk of experiencing serious injury by 35.3%. While the tartan trajectory has a risk of minor injuries that are more common than running on the asphalt highway. This shows that running on the asphalt highway has a high risk of serious injury. The athlete suffered an injury after running on the asphalt highway, this is because the asphalt highway has a hard structure on the surface, when running footstool meets a hard surface so this will cause a risk of injury to the foot as in archilles tendinitis where the muscles Large tendons behind the ankles that connect the calf muscles to the heel bones become irritated or inflamed. In addition, injuries experienced by athletes tend to increase and are worse due to lack of

awareness in handling injuries. Appropriate handling of the types of injury risk that may occur in athletes can reduce the occurrence of a greater injury level. In addition, knowing the risks that may occur athletes and trainers can estimate the form of training, intensity of training, shoes, and the type of field used in running training programs and running competitions.

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