Early Detection of the Risk of Injury in Fairrunning Club in Padang City Using Functional Movement Screening Method (FMS)

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Abstract. The increased risk of injury in running athletes is related to inadequate flexibility, muscle imbalance, and lack of neuromuscular coordination in athletes. One method of checking the ability of athletes who see from the functional motion approach is the Functional Movement Screening (FMS) method. The purpose of the study was to see the level of risk of injury in athletes of the padang city running community using the Functional Movement Screening (FMS) method. The study used quantitative descriptive methods with a cross-sectional approach. Research was conducted on Fairrunning Club athletes in the city of Padang as many as 16 people taken with purposive sampling techniques with the total number of club members as many as 20 people. FMS consists of 7 movements, namely: (1) Deep Squat, (2) Hurdle Step, (3) Inline Lunges, (4) Shoulder Mobility, (5) Active Straight Leg Raise, (6) Trunk Stability Push-up and (7) Rotary Stability. Assessment of the risk of injury in FMS with a category of high, medium, low. If the value of ≤ 14 means a high risk of cedar, if the value of 15–18 is at risk of moderate injury, and if the value of 19–21 means a low risk of injury. Based on the results of the study showed that the risk of injury to athletes running Fairrunning Club Kota Padang with the number of points ≤ 14 as many as 5 people (relative frequency 31%) in the High category, 15–18 as many as 10 people (relative frequency 63%) in the medium category, 19–21 as many as 1 person (relative frequency 6%) in the low category, the average value of functional movement screening (FMS) examination conducted by fairrunning club athletes padang city is 16 included in the medium classification. The risk of cedara in fairrunning club athletes in Padang city is at a moderate level.

Keywords: Risk of Injury · Functional Movement Screening (FMS)

1 Introduction

Running consists of structured movements that require skill. Improving running skills requires proper exercises and techniques so that running movements are more efficient and avoid injury. The increased risk of injury in running athletes is related to techniques and posture when running (Wardati & Kusuma, 2020). (Hotta et al., 2015) mentioned in

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his research that there is some risk of injury to athletes, such as inadequate flexibility, muscle weakness and imbalance, and lack of neuromuscular coordination. According to (Zein & Sudarko, 2019) One of the risk factors for injury is the imbalance of muscle strength in athletes.

Any damage that occurs to the structure or function of the body due to a compulsion or physical or chemical pressure is called an injury (Iskandar et al., 2021). There are two types of sports injuries consisting of acute injuries, chronic injuries. According to (Novita & Tohidin, 2020) severe injuries that occur suddenly, such as ligament tears, muscles, tendons or sprains, or even broken are called acute injuries. While chronic injury is damage to the structure or function of the body caused by a slightly excessive force, which lasts repeatedly over a long period of time.

The increased risk of injury in running athletes is related to inadequate flexibility, muscle imbalance, and lack of neuromuscular coordination in athletes. But knowing the lack of ability in these athletes can minimize the risk of injury. The method that can be used to find out the shortcomings is to use the Functional Movement Screening (FMS) method, which by using this tool the examination will more quickly know the ability of athletes to perform basic sports movements and know the mobility, stability, and strength possessed by athletes.

According to (Zein & Sudarko, 2019) Functional Movement Screening (FMS) is a method for assessing a person's functional movement ability. FMS is a basic functional motion evaluation tool by looking at the pattern and quality of motion per individual. This examination is dynamic by observing the body's locomotor system both in maintaining the torso, mobility of motion and processing musculoskeletal power. This functional motion check is built from a propiosepsi system developed to assess performance by fundamental movement, which requires a balance between stability and mobility as it moves through proximal sequences to distals (Cook et al., 2006, Warren et al., 2015). FMS is intended to measure fundamental movements and independent of the 7 basic motion patterns of HipHinge, Squat, Lunge, Gait, Push, Pull, Rotation.

FMS examination provides information to an athlete that relates to weaknesses or imbalances in functional motion patterns, asymmetries and limitations of movement between right and left, and can be a predictor of the risk of injury that may occur (Cook et al., 2006). If there is an imbalance and compensation of motion that is not in accordance with normal patterns, it can be said that there are problems of biomechanics and kinetic chains that have the potential to occur in micro or macro injuries (Bardenett et al., 2015; Tee et al., 2016).

The best time to use FMS is when the season is stopped or the preparation period (Letafatkar et al., 2014). It is not recommended to do it when the match season is either preseason or season games are underway because it can lower the flight hours of athletes to compete due to injury (K.B. Kiesel et al., 2014). FMS is very well used as a benchmark for the creation of functional repair programs and injury prevention. Making preventive efforts in the form of body correction exercises such as flexibility, core stability, and motor control can be used as preventive interventions (Frost et al. 2012, Tee et al., 2016). These efforts can improve the value of FMS by characterizing increased symmetry of functional motion and a decreased risk of injury. These efforts can improve the value of FMS by characterizing increased symmetry of functional motion and decreased risk

of injury (K. Kiesel et al., 2011). For athletes undergoing an injury recovery program, FMS can also be included in the benchmark of athlete preparation for returning to sports activities (Cook et al., 2014; Garrison et al., 2015).

2 Methods

This type of research uses quantitative descriptive methods because it intends to look at the level of risk of injury that can occur in athletes running with a cross-sectional approach. The study subjects were Fairunning Club athletes from Padang city who performed routine exercises with the number of samples used as many as 16 people taken with purposive sampling techniques from the total number of athletes was 20 people. The criteria for subjects in this study were (1) Athletes who were not injured (2) Who were willing to engage in this study (3) Athletes who exercised regularly.

Research instruments use the Functional Movement Screening (FMS) method. FMS examination is performed to identify any muscle weakness and type muscle balance through the movements performed (Zein & Sudarko, 2019). FMS consists of 7 movements, namely: (1) Deep Squat, (2) Hurdle Step, (3) Inline Lunges, (4) Shoulder Mobility, (5) Active Straight Leg Raise, (6) Trunk Stability Push-up and (7) Rotary Stability. Details of FMS movements in accordance with the guidance of (Cook et al., 2014).

The assessment given to the movements made with the values of "0" to "3" with the following criteria (Cook et al., 2006): Value 3 that can complete the movement well, Value 2 that completes the movement with compensation, Value 1 is given if it cannot complete the movement, Value 0 is given if the recording of pain while moving. This injury risk assessment is found if the value of > 14 is low risk of injury and the value of ≤ 14 means a high risk of injury (Chorba et al., 2010, Letafatkar et al., 2014, Shojaedin et al., 2014). However, the assessment of the risk of injury in FMS can be described by categorizing high, medium, low. If the value of ≤ 14 means a high risk of cedar, if the value of 15–18 is at risk of moderate injury, and if the value of 19–21 means a low risk of injury. Data analysis is processed using quantitative descriptive statistical formulas.

3 Result

Functional Movement Screening (FMS) results obtained from the research that has been done are as shown in Table 1.

In the Table 1 shows the imperfectness of Fairrunning Club Kota Pandang athletes in performing functional movement screening (FMS) movements. The most difficult movements were Shoulder Mobility (average score of $1.62 \pm 1{,}053$), Rotary Stability (1.81 ± 0.527), and Trunk Stability pushup (1.88 ± 1.053). Based on the analysis of data on the results of functional movement screening (FMS) examination of fairunning club athletes in Padang City, shows that the lack of scapula and pelvic stability ability, shoulder mobility, back, pelvis, knees, scapulothoracici stability and mobility, lack of ability of torso muscles (cores) that affect balance, lack of muscle strength of the upper limbs. Athletes can be seen from the imperfect athletes in performing Shoulder Mobility movements, and motor control is seen from the imperfect athletes in performing trunk stability pushup, Rotary Stability (Table 2).

Table 1. Results of Functional Movement Screening (FMS) Examination of Fairrunning Club Athletes in Padang City

No	Fms Movement	Fms Value (N = 16)			
		Minimum Value	Maximum Value	Average	Standard Deviation
1	Deep Squat	2	3	2,69	0,464
2	Hurdle Step	2	3	2,62	0,484
3	Inline Lunge	2	3	2,56	0,496
4	Shoulder Mobility	0	3	1,62	1,053
5	Active Straight -Leg Raise	0	3	2,56	0,788
6	Trunk Stability Pushup	0	3	1,88	1,053
7	Rotary Stability	0	2	1,81	0,527

Table 2. Distribusi Frekuensi Hasil Pemeriksaan *Functional Movement Screening* (FMS) Atlet Komunitas Lari di Kota Padang

No	Number of Points	Injury Risk Category	Frequency	
			Absolute (Fa)	Relatif (%)
1	≤14	High Risk	5	31%
2	15–18	Medium Risk	10	63%
3	19–21	Low Risk	1	6%
Jumlah			16	100%

Based on the table of frequency distribution results show that the risk of injury to athletes of the Lari Kota Padang community with the number of points ≤ 14 as many as 5 people (relative frequency 31%) in the High category, 15–18 as many as 10 people (relative frequency 63%) in the medium category, 19–21 as many as 1 person (relative frequency 6%) in the low category. The average score obtained from the analysis of data on functional movement screening (FMS) examinations conducted by athletes of the Padang City running community was 16. If the number is interpreted into the table of the indicator of assessing the level of injury risk on a scale of three then the number is included in the medium classification. The conclusion is that the level of risk of injury to athletes of The Padang City Running Community is at a moderate level with an average ability of 16. In response to the results of existing research, the coach of fairrunning club athletes in Padang City can make these results as a benchmark for making exercise programs, in order to minimize the risk of injury to athletes.

Based on research that has been done on athletes of the Padang City running community. The risk of injury that can be experienced by athletes of the Padang City running

community is in the Medium category. This means that the stability, mobility, and motor control abilities possessed by athletes of the Padang City running community are still not good. Which in the application of FMS assesses deep movement through three aspects of body intrinsic, namely mobility, stability, and motoric control (Warren et al., 2015). So this looks imperfect athletes in performing functional movement screening (FMS), one of the most difficult movements to do is Shoulder Mobility, Trunk Stability Pushup, and Rotary Stability.

Athletes' imperfections in performing shoulder mobility, trunk stability pushup, and rotary stability. It can be seen that the ability of fairrunning club athletes' limbs is quite good, but in other supporting parts in running such as shoulders, backs, and core stability is still lacking. Whereas in supporting parts such as arm swings and posture greatly affect the appearance of athletes in running. As stated by (Massuaming, 2018) in his research that in running if accompanied by a good swing of both arms, the balance in running will be maintained and the swing of the arm can also stabilize the body when running, so that an athlete can run well if supported by a good balance.

From the results of the study also seen an imbalance of muscle work between the ability of the upper and lower limbs which can be seen from the good ability of athletes when doing deep squats, hurdle steps, inline lunge, active straight leg raise, this leads to an increased risk of injury. According to (Zein & Sudarko, 2019) Muscle strength imbalance owned by athletes or called muscle imbalance is one of the risk factors for injury. This muscle work imbalance results in decreased muscle and cardiovascular endurance ability.

The imbalance of muscle work when running will affect the level of risk of injury that can be experienced by athletes. Therefore, minimizing the risk of injury must be done by improving the exercise program so that muscle work balance is achieved. An exercise program is a draft of exercise activities that have been prepared as guidelines in practicing for a certain period of time and a certain purpose (Irawadi: 2011). The results of the examination that has been carried out can be used as a guideline in making an exercise program. The results of this examination can be used as a benchmark for improving the Fairruning Club athlete training program to achieve muscle work balance. In order to minimize the occurrence of injuries and increased performance of an athlete.

In the results of the study, there were 5 fairrunning club athletes in Padang city who were at high risk of injury. So that the 5 athletes need to improve the exercise program by paying more attention to exercises that can improve the ability of mobility, stability and motor control of athletes. As in the study (Syafrianto et al., 2021) mentioned that by providing Proprioceptive exercises and Strengthening exercises can improve functional stability ability in the ankle. As well as exercises that can achieve the right balance of muscle work, especially exercises that focus on the ability of the shoulder, back, and core stability of athletes who are still lacking. The same goes for 10 Fairrunning Club athletes who are at risk of injury. So that these efforts can improve the value of FMS by characterizing increased symmetry of functional motion and decreased risk of injury (K. Kiesel et al., 2011).

4 Conclusion

Based on the results of the data analysis, it can be concluded that the risk of cedara in Fairrunning Club Athletes in Padang City is at a moderate level with an average ability gain of 16. With as many as 5 people in the high category, 10 people in the medium category, 1 person in the low category. The results of the study also showed an imbalance in muscle work between the ability of upper and lower limbs, this leads to an increased risk of injury to athletes. The results of the Functional Movement Screening (FMS) examination can be used as a benchmark for making exercise programs or improving the training program of Fairrunning Club Athletes in Padang City to achieve muscle work balance.

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