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ORIGINAL ARTICLE

Talent Identification Predicting in Athletics: A Case Study in Indonesia

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ABSTRACT

Background. The importance of predicting talents in children is so that hidden sports talents have opportunities to be developed. **Objectives.** This study aims to predict the talent level of children 12-15 years old in athletics. **Methods.** The research used the ex-post facto descriptive method. The population is 507 children, consisting of 283 boys and 224 girls in two cities, Salatiga City and Lombok City. Samples were selected by random cluster sampling. The instrument uses ten kinds of predictive tests, including height, weight, the span of the arm, length of leg, sit & reach, standing broad jump, 40 m sprint, 10-second step frequency, shaken, and 800 m run. Data collection techniques using talent prediction tests. Data analysis using Criterion-Referenced Standards. **Results.** The results showed that there were 17 children (2%) in the very talented category, 30 children (9%) talented, 91 children (16.5%) moderately gifted, and 349 children (72.5%) under-talented. Predict test results from Salatiga showed that there were four talented in sprint and jump, two talented in jump, and one expert in throw numbers. The distribution of talent shown from Lombok is five proficient in sprint and jump, three capable in a sprint, and two talented in throw numbers. Talent identification prediction tests are proven to predict the potential talent of children in athletics. The cities of Salatiga and Lombok are the centers of athletic seedlings that are used as benchmarks for achievement. **Conclusion.** This test can predict the level of athletic talent in children aged 12-15 years old.

KEYWORDS: ***Athletics, Coaching, Talent Identification, Biomotor, Predicting.***

INTRODUCTION

Indonesia has the potential to compete in sports achievements at the international level. The benchmark for the accomplishment of Indonesian athletes can be seen from the results of multi-event sports parties such as the SEA Games, Asian Games, and Olympics (1). Indonesia has a tradition of winning in sports such as athletics, badminton, and weightlifting (2). Talking about Indonesia's best achievements in sprinting, can't be separated from the name Lalu Moh. Zohri from Lombok is a junior world champion with the best time of 10.03 seconds at the 2019 Osaka Gand Prix. Zohri is one of the successful products of the athletic talent identification model in Indonesia

Talent identification means selecting the best people for the sport, which has become a significant

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process (3). The measurement criteria for determining each sport were physical, physiological, motor, and biological examinations. The talent identification program is an integral part of the elite athlete selection process (4). Identifying talent in sports is still considered a positive phenomenon as long as it is carried out with the right measuring tools (5). Talent is an essential skill related to motor performance and combines one's abilities, attitudes, and body shape (6). Identifying the best talent is a significant concern of sports scientists and sports coaches (7). Optimizing sports talent means the potential for potential athletes (8).

The use of sports science about the giftedness of athletes is used as a guide in predicting the potential of athletes. The government's contribution is needed to prepare winning strategies, and training facilities, increase competition opportunities and maximize sports science approaches to achieve the best results (9). Because national sports have a considerable influence in strengthening the existence of a nation (10). The talent identification program is one of the sports science-based approaches to optimizing the potential of athletes in the future.

There are three stages of athletic sports achievement development, the first stage of multilateral development, the second stage of talent identification, and the third stage of talent scouting. The process of talent identification and providing appropriate advice to improve athletic field outcomes in international competitions (11). In Nordic countries, the title and selecting of athletic talent have been developed by predicting the talent potential of children. This sports talent identification and selection program continues to grow today and will become the source of the best national team members in the future (12). Talent identification and development systems are usually used to turn young athletes into future sports stars (12). Talent identification efforts can start in schools, sports clubs, schools, and sports centers. Effective identification and development of talent will provide opportunities for talented young athletes in the sports that are of interest to perform optimally according to the golden age of each sport so that, in the end, it will further enhance national sports achievements (13).

Lagging in Indonesia's sporting achievements with other Asian countries is a big problem. This acceleration of the lag has prompted the need for structuring a sports coaching system, including a method for identifying talented athletes. Talent identification programs in developed countries have been implemented with the support of adequate resources, namely the government, the community, and expertise, through a scientific approach (14). With advances in measurement and evaluation, a measurement system has been found that can be used to predict future performance (15).

As an illustration, nearly 80% of medal winners result from a careful talent identification process (16). The drawing strengthens the experts' belief that the coaching carried out has been on the right track. Therefore, the talent identification process should be an ongoing task to get further benefits. It is necessary to develop bio motor criteria to identify talent that is expected to be able to find potential athletes (17). Competent athletes have a specific biological profile, high bio motor abilities, and solid physiological properties.

This talent identification test was conducted in two big cities, Salatiga and Lombok. The two cities are centers of producing Indonesia's athletes in athletics (18). Geographically, the city of Salatiga is located in the highlands with the characteristics of a thin level of oxygen availability. The city of Lombok is an area with the features of most coastal regions. From the geographical aspect, the two cities have suitable characteristics for developing potential athlete seeds (19).

The test component for predicting athletic talent should be specific according to relevant references from sports experts (20). The test developer prepares the test components by considering the test items obtained based on the characteristics of the number of athletic sports. The selected test should be easy to perform and accurately measure anthropometric indicators and athletes' physical abilities. Anthropometric measurement indicators required by each number are 1) height test, 2) weight test, 3) arm span test, and 4) leg length test. The physical component measurement indicators consist of 5) sit & reach test, 6) standing broad jump test, 7) 40 m sprint test, 8) 10-second step frequency test, 9) spoken test (Medicine Ball 3 kg for women and 4 kg for men), and 10) the 800m test.

Figures 1 and 2 show the stages of athlete development. The athlete development stage begins at the multilateral development stage, the talent scouting stage, the talent identification stage, the talent development stage, and the high-performance stage (21).

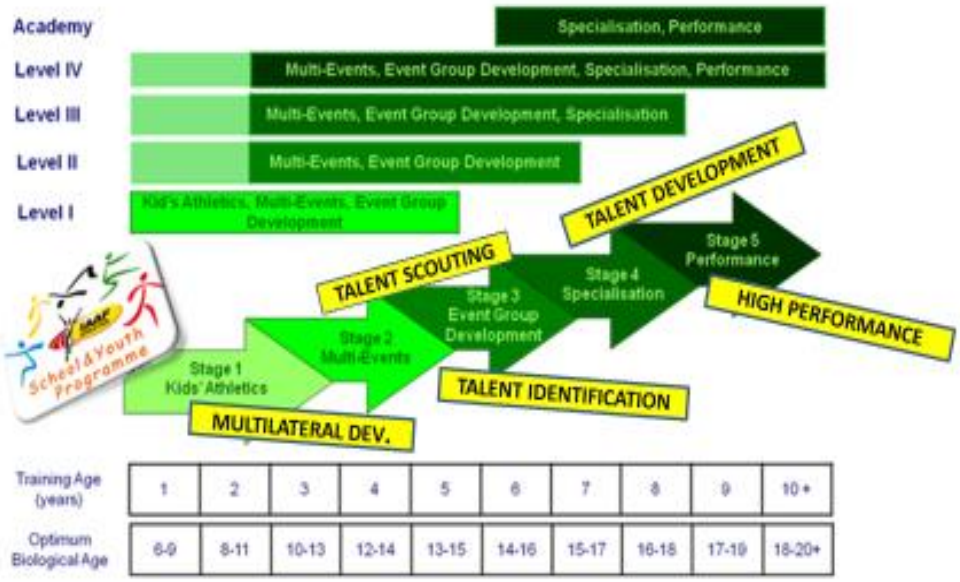

Figure 1. Stage of Athlete Development

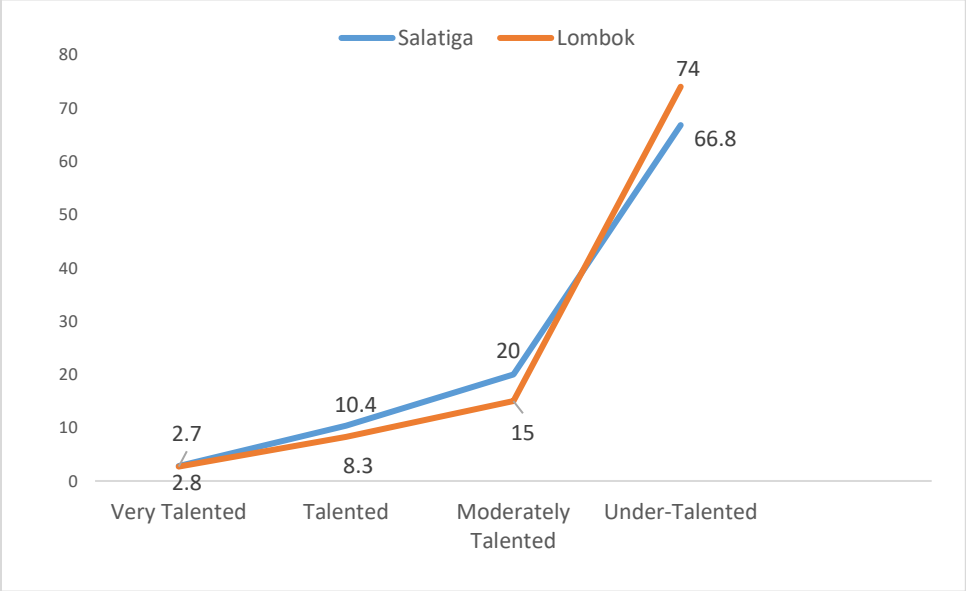

Figure 2. Distribution of Talent Identification Results

MATERIALS AND METHODS

This research uses the ex-post fact descriptive method in the form of tests and measurements. The ex-post facto process is a type of research that does not directly control the variables.

Participants. The study population was children aged 12-15 years from Salatiga City and Lombok City, with 507 children consisting of 283 boys and 224 girls. The reason for choosing the research location is because these two cities are suppliers of Indonesia's elite athletes. In addition, there are also many athletic clubs with a large number of teenage athletes. The sample was selected by random cluster sampling based on the number of existing athletic clubs. The test was carried out for 20 days, involving 18 testers. The prediction test is divided into two parts: the anthropometric test carried out in the room, and the bio motor measurement carried out in the stadium.

Measurement. The athletes' talent prediction is measured by tests and measurements, namely anthropometric tests and bio-motor measurements. The result of the trainer's perception assessment recommends compiling 10 test materials and measuring talent identification predictions. These ten test items are considered to represent the

athletes' talent identification predictions of the numbers in athletics.

The numbers include sprints, medium-distance runs, throws, jumps, and body mass index (BMI) predictions. There are five kinds of Anthropometric tests, namely: height, weight, span of the arm, length of leg, and sit & reach, and there are five kinds of Bio motor tests: standing broad jump, sprint 40 m, step frequency 10 seconds, shaken test (Medicine Ball 4 kg for male and 3 kilograms of female), run 800 m. Table 1 below shows the name of the trial, the place of the test, the instrument, and the number of officers:

Table 1. Place, Tools, And Number Of Tests

No	Test Name	Place	Tools	Officers
1	Height	Walk in the room	Microtoise	1
2	Weight	Indoor	Weight Scales	1
3	Span of Arm	Indoor	Roll Meter	1
4	Length of Leg	Indoor	Roll Meter	1
5	Sit & Reach	Indoor	Sit & Reach	2
6	Sprint 40 meters	Running Track	Stopwatch	3
7	Shocken	Stadium Grass	Medicine ball	2
8	Standing Broad Jump	Long Jump Place	Roll meter	2
9	Step Frequency	Stadium Grass	Stopwatch	2
10	Run 800 meters	Running Track	Stopwatch	3
Amount				18

Data collection. The data was collected using a talent prediction test instrument prepared by researchers who have been tested in several regions. The research instrument for predicting children's talent consisted of 10 items of athletic talent identification tests as shown in Table 2. The research instruments were validated by athletic coaching experts and test & measurement experts. All test kits have also been validated and their reliability values were also found with the Product Moment Correlation technique with deviations, namely the flexibility test (0.748), the 400 m running test (0.843), the shoken test (0.934), the standing broad jump test (0.987), the step frequency test (0.861), and 800m running test (0.827).

Data analysis. The data analysis technique used the Absolute Criteria or Criterion-Referenced Standard technique from the results of the talent prediction test performed. The results of data analysis are used as the basis for predicting talent. The data analysis steps that will be carried out are data reduction, making data display in tabular form, creating cross-site analysis, presenting findings, and concluding in general tendencies of talent, namely very talented, talented, moderately talented, and under-talented.

Table 2. The Data of Tests for Talent Identification of 12-15 Years Old

No	Test Name	Type of Test
1	Height	Anthropometry
2	Weight	Anthropometry
3	Span of Arm	Anthropometry
4	Length of Leg	Anthropometry
5	Sit & Reach	Bio motor
6	Sprint 40 meters	Bio motor
7	Shocken	Bio motor
8	Standing Broad Jump	Bio motor
9	Step Frequency	Bio motor
10	Run 800 meters	Bio motor

RESULTS

Trainers' Perceptions of Talent Identification Prediction Test. Before carrying out the talent test, the researcher took the trainer's perceived value to determine the trainer's perception of the implementation of talent identification. The results of the trainer's perception are very high; that is, there are 30 out of 35 trainers (85%) state the importance of predicting children's talent identification tests. This shows that the coach's enthusiasm is high enough for the need for athletic talent test instruments. The 35 trainers have a national-level coach license and have athletes 12-15 years old along with a regular training program.

Result of Talent Identification Prediction Test. The results of 10 test materials in the city of Salatiga show the potential numbers in athletics. The results of talent identification prediction tests for 250 children or athletes 12-15 years old are as follows: there are seven children (2.8%) with the very talented, 26 children (10.4%) talented, 50 children (20%) moderately gifted, and 167 children (66.8%) under-talented.

The results of 10 talent test materials in the city of Lombok show the potential numbers in athletics. The results of talent identification prediction tests for 257 children or athletes 12-15 years old were as follows: there were ten children (2.7%) with the very talented, 24 children (8.3%) talented, 41 children (15%) moderately talented, and 182 children (74%) under-talented. The

following are the results of athletic talent prediction tests in general and specific effects in the City of Salatiga and the City of Lombok:

Based on the prediction test results in Table 3, the city of Salatiga has a very talented category that is 2.8%: 2.7% greater than the city of Lombok. Likewise, the apt type is more significant than 10.4%: 8.3%. This shows that the children of the town of Salatiga are more talented than the children from the city of Lombok. This is in line with a large number of athletic clubs in Salatiga, which are more and more active than in the city of Lombok.

Table 3. Athletics Talent Identification Prediction Test Results

Category	Salatiga		Lombok	
	N	%	N	%
Very Talented	7	2.8	10	2.7
Talented	26	10.4	24	8.3
Moderately Talented	50	20	41	15
Under-Talented	167	66.8	182	74
Total	250	100	257	100

In the very talented category, it is known that 7 out of 250 children from the city of Salatiga have a very gifted sort, and 10 out of 257 children from the city of Lombok are very talented. In the expert category, it is known that 26 out of 250 children from Salatiga have the gifted category and 24 out of 257 children from the city of Lombok have the talented category. In the moderately talented category, it is known that 50 out of 250 children from the city of Salatiga have a moderately talented category and 41 out of 257 children from the city of Lombok are moderately talented. In the under-talented category, it is known that 167 out of 250 children from the city of Salatiga have the category of under-talented and 182 out of 257 children from the city of Lombok have the category of under-talented.

We specifically want to recapitulate the scores of the very talented seven children from the city of Salatiga and ten from the town of Lombok, along with the specialized numbers found from the results of this test, as in Table 4.

Table 4. Recapitulation of The Very Talented Participants

No. Participant	Gender	Total Score	Percentage	Talent on Show
Very Talented Participants of Salatiga				
1	Male	26	86	Sprint, Jump
2	Male	26	86	Sprint, Jump
3	Female	25	83	Sprint, Jump
4	Male	25	83	Sprint, Jump
5	Male	25	83	Jump
6	Female	24	80	Jump
7	Female	24	80	Throw
Very Talented Participants of Lombok				
1	Male	26	86	Sprint, Jump
2	Male	26	86	Sprint, Jump
3	Male	25	83	Sprint, Jump
4	Male	25	83	Sprint, Jump
5	Female	25	83	Sprint, Jump
6	Male	25	80	Jump
7	Male	24	80	Jump
8	Male	24	80	Jump
9	Male	24	80	Throw
10	Male	24	80	Throw

The prediction test results above also show that of the seven very talented children in Salatiga, four are boys and three girls, and out of the ten very gifted children in Lombok, 9 are boys and one girl. The distribution of talents shown by the children from Salatiga was four talents in the sprint and jump, two people in the jump, and one person in the throw. The distribution of talents shown by children from Lombok is five talents in the sprint and jump, three people in the jump, and two people in the throw.

DISCUSSION

Trainers' Perceptions of Talent Identification Prediction Test. The results of the perceived need for athletic talent prediction tests were taken based on the coach's perception. Trainers' perceptions are in the very high

category. There are 30 out of 35 trainers (85%) state the importance of talent prediction tests. This shows the coach's high enthusiasm for the need for athletic talent tests to support sports performance. The trainer's perception is used in this study because it emphasizes the importance of predicting athletic aptitude tests in children. The emphasis on the purpose of identifying sports talent in this formulation lies in the effort to predict the athlete's chances based on the athlete's talent (4).

A talent identification program must be implemented to create opportunities through existing sports, especially those that support priority sports branches (22). With these efforts, children and adolescents who have hidden sports talents will have the opportunity to be developed so that they can achieve the highest achievement (6). The talent prediction program is an integral part of the selection process for athletes. While many sports organizations use talent prediction programs, there is not one clear set of variables that consistently predicts future success. There is an exaggerated representation of studies that examined the physical profiles of athletes (60%); focused on the male sample (65%); challenged athletes between 10 and 20 years old (60%); and were published between 2010 and 2015 (65%) (4). So another diversity is needed in the involvement in the talent prediction process.

Athletics is a sport with many competitions. The number of medals provided is the largest among other sports (23). This condition can be seen as a good opportunity for the parent sport to obtain as many awards as possible (16, 24). For this reason, the prediction test for talent in this athletic sport is a formula for selecting potential athletes who are expected to be able to get as many medals as possible in specific specialization numbers such as sprint, middle distance running, throw, or jump (25, 26).

However, several other factors influence children's achievement. Talent criteria for achievement follow the leading standards in identifying talent, including health, bio motor quality, heredity, and supported by sports facilities, climate, and the availability of experts (27). A talent identification and development program from an early age must be implemented to create opportunities through existing sports, especially those that support priority sports branches. With these efforts, children and adolescents who have hidden sports talents will have the chance to be developed so that they can achieve the highest achievement. Talent identification and development efforts can be started in schools, sports clubs, sports schools, and sports centers (28). Effective identification of talent will provide opportunities for talented young athletes in the sports that are of interest to perform optimally according to the golden age in each sport, thus ultimately increasing national sports achievements (28, 29).

Physics is the foundation of sports achievement because technique, tactics, and mentality will be appropriately developed if you have good physical qualities (30-32). An athlete will develop his skills from basic to more advanced techniques if he has a good physique (33). The primary basis for selecting athletes is the initial physical condition possessed by prospective athletes. Physical play a significant role in the training process good physicality, technique, tactics, and mentality can improve along with the training process. If the physician does not support the athlete's appearance, the athlete cannot display technical abilities (34). Maximum mental and tactics, therefore, especially physical talent scouting, need to be carried out because the initial start of coaching is the availability of quality athlete seeds (35). Without qualified athletes, it will be difficult to get optimal performance.

There are several essential components of bio motors in athletics, including flexibility, speed, power, agility, reaction, and endurance. The members of bio motor power, stamina, coordination, flexibility, and balance combine several bio motor components (6). These bio motor components are indispensable in carrying out athletic physical tests (25). However, it is necessary to set a stronger theoretical basis for talent management by presenting a conceptual framework of talent. The definition, operationalization, and measurement of talent and its relationship to performance are well clarified (36).

According to Nurrudin (37), the process of coaching and scouting talents is used to prepare long-term athletes. The description above shows the importance of sports coaching from an early age. This means that a country has the opportunity to increase the athletes' performance optimally if it can carry out a gradual, tiered, and sustainable process of fostering and seeding. Experience shows that only talented athletes who want to

train well can achieve peak performance. Top achievement is the result of all the efforts of the coaching program within a certain period, which is a combination of a systematic, tiered, continuous, repeated, and increasing training process.

Result of Talent Identification Prediction Test. The prediction test results for talent from two cities, Salatiga and Lombok, with 10 test materials and measurements have been known. This predictive test shows which children are talented in athletics. This is in line with the principles of sports talent identification: (a) a complete analysis of his physical and mental health, (b) the use of specific instruments from the sport concerned, (c) selection based on anthropometric characteristics, characteristics physical and psychological characteristics, (d) evaluation based on comprehensive data (38). Selected tests are indicators of the supporting factors for the achievement of athletic achievement. Selected tests are easy to perform and accurate enough to measure anthropometric and motor indicators according to numbers in athletics (39, 40).

These results can be analyzed as follows: flexibility training with the sit & reach test helps see the breadth and narrowness of the joint space. This flexibility training helps develop speed, agility, and flexibility, prevent injury in the muscle area, and determine the flexibility profile in different sports (41). The speed number measured by the 40 m sprint test is a very dominant factor in the sprint number: to run as fast as possible to reach a certain distance in the shortest possible time. At the 100 m sprint number, biomechanically, the athlete will experience the following phases: the reaction phase, the acceleration phase, the maximum speed phase, and the deceleration phase (5, 42). Another factor that determines the sprint is the Biometric factor because, in a sprint, running speed is primarily determined by the frequency of the stride and the length of the stride. Running short distances is very good for building cardiovascular capacity, physical strength, and endurance (43). Running short distances can also help reduce visceral fat.

The step frequency test measures the step frequency. The speed factor also influences the frequency of steps (17). The number of steps per second on a sprint is called step frequency. The frequency of stops at a certain speed during running can reduce the variable lower limb loading (44). Step frequency is determined by the level of coordination and technique, while step length is primarily determined by body size and biomotor constituents. Therefore, in looking for sprint athletes and biomotor ability, biometric quality is also essential.

In the jump and throw number groups, these numbers relate to the biomechanical aspect, which has the same thing, namely the existence of parabolic motion, which determines high achievement (36). In the number of throws, objects thrown by the thrower, such as bullets, discs, javelins, and hammerheads, will experience parabolic movements (43). The test form used is to throw the ball back over the top of the head. This test is often referred to as the shoken test. The other predictor variable of talent is throwing the ball backward or speaking (44). The shoken test aims to train arm muscles and coordination of leg, arm, and body movements (26). This shoken test uses a 4 kg Medicine ball for men and 3 kg for women.

Meanwhile, the jump numbers that experience parabolic movement are the athlete's body, both horizontal and vertical jump numbers (24). Those that determine the high performance of the symbolic activity are Initial velocity (take-off and detachment of objects) / Vo, Angle of the division of things, take-off / <o, Height of detail of objects, and take-off / ho. The long jump variable is also helpful in monitoring muscle fitness because of its practicality, scalability, and predictive usefulness (45). The test used is the standing broad jump test. As for determining the endurance of running or running medium and long distances, the 800 m running test is used. Long-distance running trains the body to use fat as an alternative energy source besides carbohydrates. Strength training is needed for long-distance runners (46). The prediction tests mentioned above represent numbers in athletics, such as sprint numbers, long distance runs, throws, and jumps.

Many references state that to achieve sports optimally, it needs to be supported by many factors, including the main factor being talent (2, 7, 9, 24). From a sports perspective, there are two assumptions used in assessing talent in sports, namely: in a specific population. There will be at most 15% of individuals who have sports talent. The rest is less talented; all members or individuals in a population have talent; it is just that not all individuals have sufficiently accurate information about their potential for certain sports

(4, 19, 35). This is in line with the research results, which state that athletes who successfully win international championships usually have better performance as teenagers compared to other athletes who also reach international levels as seniors (31, 47). Although there are differences of opinion about the age of achievement as a teenager, it does not guarantee achievement as an adult in sprint numbers. Annual performance improvement is needed and provides the most appropriate approach to identifying athletes who are more likely to succeed as elite athletes in adulthood (38).

The study of the development of sports technology impacts the performance of the sports coaching system, especially for predictions in terms of physical and physiological abilities that can be prepared from the start for potential athlete candidates (29). Physical skills and physiological functions can be predicted according to the science of motor development and motor learning and physiology (33, 34). From the supporting scientific studies, it is possible to prepare potential athletes as early as possible effectively and efficiently (35). Indeed, some tests require special equipment so that a sufficiently complex preparation is needed to carry out the measurement. Anyone can carry out tests and sizes with the requirements by following the test implementation procedure.

In achievement sports management, the coaching process is carried out through long-term coaching, starting with selecting potential young athletes and a systematic, planned, and sustainable coaching process (48). The training program is designed in stages, combining athletes' ability, training load, food, and rest, and is based on sports science and technology. In children 12-15 years old, the movement skills that should be possessed are basic movement skills. (27, 29) This age should start applying the concept of talent development to activity materials in schools or clubs so that children can perform various sports skills with more complex movements(47). The research results show that children and adults will be active and even reach peak performance in sports if sports coaching is adjusted to the stages of growth and development.

Referring to the Long Term Athletes Development model (24, 48), there are seven primary stages in the pattern of sports coaching, namely: a) Stage 1: Active Start (0-6 Years), b) Stage 2: Fundamentals (female 6-8, boys 6-9) c) Stage 3: Learn to practice (girls 8-11, boys 9-12) d) Stage 4: Exercises to practice (girls 11-15, boys 12-16) e) Stage 5: Training to compete (girls 15-21, boys 16-23) f) Stage 6: Training to become champions (girls 18+, boys 19+) g) Stage 7: Active lifestyle sports. The seven stages of grouping based on growth and development characteristics can be used for sports practitioners to create a program, both educational sports, and sports achievements effectively and efficiently (12, 16). Apart from the types of material provided, the children's sports potential is also influenced by the sports facilities owned by schools or other educational institutions (28, 29).

With the identification of sports talent in children correctly, at the next stage of development, the child can be directed according to the sport that is his talent (12). Based on the research data, it can be concluded that children 12-15 years old in the City of Salatiga have a higher athletic talent potential than in Lombok. However, it is known that there are more under-talented than very-talented children. However, it does not reduce the possibility that it is good enough for athletic development in Salatiga City and Lombok City. Sports achievements of this kind will be achieved by developing prerequisite aspects in childhood and youth (33). Athletes can reach the pinnacle of achievement if they start training for a sport that has been guided by their talents from the start and is supported by good general sports performance capacity.

CONCLUSION

Based on the data analysis process, it can be concluded that the talent identification prediction test for children 12-15 years old for athletics can be done by anthropometric tests and biomotor measurements. This predictive test shows that there is a potential for talent in children in athletics from two cities in Indonesia that can be developed towards superior achievement. The town of Lombok has a more significant potential for talent than Salatiga. This is in line with the excellent development marked by the many athletic clubs in Lombok. However, there is also a need for further research related to other factors such as physiology, psychology, sociology, and culture.

APPLICABLE REMARKS

- It is suggested that Indonesia should use a sports science approach through a prediction

test of athletic talent. According to the results of this study, the athlete's talent prediction test is very helpful in getting information about potential athletes.

- The athletic talent identification program is emphasized only at 12-15 years. According to the study results, this age is a safe range from implementing the talent prediction test. Meanwhile, after 15 years, it is included in the category of talent development.
- Anthropometric measurements and biomotor tests in predicting talent are highly recommended. Test items can also be added with others to complete.
- Based on the results, this athletics talent prediction test can be applied to all regions of Indonesia with the characteristics of children in the age range of 12-15 years. Despite the selection of locations in two cities that are centers of excellent athletes.
- The test item compiled by the researcher is made with easy steps so that it can be used by regional trainers and sports teachers and does not require costly equipment.
- The city of Lombok has a higher number of talented athletes due to an intense training culture factor marked by a large number of athletic clubs. This confirms that the culture of practice influences the results of the aptitude prediction test.
- Considering the results, it is also recommended to look at other factors such as physiological, psychological, sociological, and cultural to see the prize optimally.

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AUTHORS' CONTRIBUTION

Study concept and design: Ermawan Susanto. *Acquisition of data:* Ermawan Susanto. *Analysis and interpretation of data:* All Authors. *Drafting of the manuscript:* Mujriah Bayok. *Critical revision of the manuscript for important intellectual content:* Rabwan Satriawan. *Statistical analysis:* Rifqi Festiawan. *Administrative, technical, and material support:* Dennis Dwi Kurniawan. *Study supervision:* Firmansyah Putra.

CONFLICT OF INTEREST

The authors declare no conflict of interest regarding the publication of this study.

REFERENCES

1. Schleichardt A, Badura M, Lehmann F, Ueberschar O. Comparison of force-velocity profiles of the leg-extensors for elite athletes in the throwing events relating to gender, age and event. *Sports Biomech*. 2021;**20**(6):720-736. **doi:** 10.1080/14763141.2019.1598479 **pmid:** 31132026
2. Tyskbo D. Competing institutional logics in talent management: talent identification at the HQ and a subsidiary. *Int J Human Resource Manage*. 2021;**32**(10):2150-2184. **doi:** 10.1080/09585192.2019.1579248
3. Millar P, Clutterbuck R, Doherty A. Understanding the adoption of long-term athlete development in one community sport club. *Manag Sport Leisure*. 2020;**25**(4):259-274. **doi:** 10.1080/23750472.2020.1713197
4. Ropret R. Long-term athlete development: From theoretical and practical model to cognitive problem. *Fizicka Kultura*. 2019;**73**(2):190-205. **doi:** 10.5937/fizkul1902190R
5. Blagrove RC, Howe LP, Cushion EJ, Spence A, Howatson G, Pedlar CR, et al. Effects of Strength Training on Postpubertal Adolescent Distance Runners. *Med Sci Sports Exerc*. 2018;**50**(6):1224-1232. **doi:** 10.1249/MSS.0000000000001543 **pmid:** 29315164
6. Boccia G, Cardinale M, Brustio PR. World-Class Sprinters' Careers: Early Success Does Not Guarantee Success at Adult Age. *Int J Sports Physiol Perform*. 2021;**16**(3):367-374. **doi:** 10.1123/ijspp.2020-0090 **pmid:** 33296871
7. Byounggoo K. Sports Talent Identification and Selection in Korea. *IJASS Int J Appl Sport Sci*. 2014;**26**(2):99-111. **doi:** 10.24985/ijass.2014.26.2.99

8. Read PJ, Oliver JL, Lloyd RS. Seven Pillars of Prevention: Effective Strategies for Strength and Conditioning Coaches to Reduce Injury Risk and Improve Performance in Young Athletes. *Strength Condition J*. 2020;**42**(6):120-128. **doi:** 10.1519/ssc.0000000000000588
9. Boostani M, Boostani M, Rezaei A. Talent identification in sport. *J Combat Sport Martial Art*. 2012;**2**(2):137-141. **doi:** 10.5604/20815735.1047147
10. Hagyard J, Brimmell J, Edwards EJ, Vaughan RS. Inhibitory Control Across Athletic Expertise and Its Relationship With Sport Performance. *J Sport Exerc Psychol*. 2021;**43**(1):14-27. **doi:** 10.1123/jsep.2020-0043 **pmid:** 33383568
11. Glang A, Koester MC, Beaver SV, Clay JE, McLaughlin KA. Online training in sports concussion for youth sports coaches. *Int J Sports Sci Coach*. 2010;**5**(1):1-12. **doi:** 10.1260/1747-9541.5.1.1 **pmid:** 20640175
12. Bergsgard NA, Borodulin K, Fahlen J, Høyer-Kruse J, Iversen EB. National structures for building and managing sport facilities: a comparative analysis of the Nordic countries. *Sport Soc*. 2019;**22**(4):525-539. **doi:** 10.1080/17430437.2017.1389023
13. Collins D, MacNamara Á, Cruickshank A. Research and Practice in Talent Identification and Development Some Thoughts on the State of Play. *J Appl Sport Psychol*. 2019;**31**(3):340-351. **doi:** 10.1080/10413200.2018.1475430
14. Black MI, Allen SJ, Forrester SE, Folland JP. The Anthropometry of Economical Running. *Med Sci Sports Exerc*. 2020;**52**(3):762-770. **doi:** 10.1249/MSS.0000000000002158 **pmid:** 31524830
15. Aryanto B, Hariono A, Pahalawidi C. Construct Validity For Talent Identification Test Athletic With Aiken's V. *Atlantis Press*. 2019. **doi:** 10.2991/yishpess-cois-18.2018.167
16. Herzog W. Considerations for Predicting Individual Muscle Forces in Athletic Movements. *Int J Sport Biomechan*. 2016;**3**(2):128-141. **doi:** 10.1123/ijsb.3.2.128
17. Hobara H, Sato T, Sakaguchi M, Sato T, Nakazawa K. Step frequency and lower extremity loading during running. *Int J Sports Med*. 2012;**33**(4):310-313. **doi:** 10.1055/s-0031-1291232 **pmid:** 22383130
18. Soori M, Mohaghegh S, Hajian M, Yekta AA. Sexual activity before competition and athletic performance: A systematic review. *Annal Appl Sport Sci*. 2017;**5**(3):5-12. **doi:** 10.29252/acadpub.aassjournal.5.3.5
19. Bjørndal CT, Ronglan LT. Engaging with uncertainty in athlete development-orchestrating talent development through incremental leadership. *Sport Educat Soc*. 2021;**26**(1):104-116. **doi:** 10.1080/13573322.2019.1695198
20. De Wilde A, Seifried C. Sport history and sport management in the United States: Opportunities and challenges. *J Sport History*. 2018;**45**(1):66-86. **doi:** 10.5406/jsporthistory.45.1.0066
21. Connolly BGJ, Grayson LA. From Play to Practice: Athlete Development for Coaches. Strategies. Taylor and Francis Ltd.2021.
22. Till K, Baker J. Challenges and [Possible] Solutions to Optimizing Talent Identification and Development in Sport. *Front Psychol*. 2020;**11**:664. **doi:** 10.3389/fpsyg.2020.00664 **pmid:** 32351427
23. Higginbotham GD. Can I belong in school and sports?: The intersectional value of athletic identity in high school and across the college transition. *Cultur Divers Ethnic Minor Psychol*. 2021;**27**(4):613-629. **doi:** 10.1037/cdp0000478 **pmid:** 34351179
24. Toohey K, MacMahon C, Weissensteiner J, Thomson A, Auld C, Beaton A, et al. Using transdisciplinary research to examine talent identification and development in sport. *Sport Soc*. 2018;**21**(2):356-375. **doi:** 10.1080/17430437.2017.1310199
25. Karp JR. Strength training for distance running: A scientific perspective. *Strength Condition J*. 2010;**32**(3):83-86. **doi:** 10.1519/SSC.0b013e3181df195b
26. Werkhausen A, Cronin NJ, Albracht K, Bojsen-Moller J, Seynnes OR. Distinct muscle-tendon interaction during running at different speeds and in different loading conditions. *J Appl Physiol (1985)*. 2019;**127**(1):246-253. **doi:** 10.1152/japplphysiol.00710.2018 **pmid:** 31070955
27. Malchrowicz J, Malchrowicz-Mośko E, Fadigas A. Age-related motives in mass running events participation. *Olimpian J Olympic Stud*. 2018;**2**(1):257-273. **doi:** 10.30937/2526-6314.v2n1.id42
28. Nijs S, Gallardo-Gallardo E, Dries N, Sels L. A multidisciplinary review into the definition, operationalization, and measurement of talent. *J World Business*. 2014;**49**(2):180-191. **doi:** 10.1016/j.jwb.2013.11.002

29. Rahtawu A, Kristiyanto A, Purnama SK. The Influence of Parenting Style and Gender Perspective in Youth Sport Talent. *Int J Multicult Multirel Understand*. 2019;**5**(6):151. **doi:** 10.18415/ijmmu.v5i6.537
30. Smith AS. Youth Athletic Development: Including the Science of Periodization into Practice. *Strategies*. 2021;**34**(3):16-22. **doi:** 10.1080/08924562.2021.1896917
31. Yamamoto R, Akizuki K, Kanai Y, Nakano W, Kobayashi Y, Ohashi Y. Differences in skill level influence the effects of visual feedback on motor learning. *J Phys Ther Sci*. 2019;**31**(11):939-945. **doi:** 10.1589/jpts.31.939 **pmid:** 31871382
32. Irmansyah S, Lumintuarso SS. Physical Literacy in the Culture of Physical Education in Elementary Schools: Indonesian Perspectives. *Int J Human Move Sport Sci*. 2021;**9**(5):955-963. **doi:** 10.13189/saj.2021.090514
33. Vaeyens R, Lenoir M, Williams AM, Philippaerts RM. Talent identification and development programmes in sport : current models and future directions. *Sports Med*. 2008;**38**(9):703-714. **doi:** 10.2165/00007256-200838090-00001 **pmid:** 18712939
34. Vaeyens R, Gullich A, Warr CR, Philippaerts R. Talent identification and promotion programmes of Olympic athletes. *J Sports Sci*. 2009;**27**(13):1367-1380. **doi:** 10.1080/02640410903110974 **pmid:** 19787538
35. Roberts AH, Greenwood D, Stanley M, Humberstone C, Iredale F, Raynor A. Understanding the "gut instinct" of expert coaches during talent identification. *J Sports Sci*. 2021;**39**(4):359-367. **doi:** 10.1080/02640414.2020.1823083 **pmid:** 32962508
36. Pinoniemi BK, Tomkinson GR, Walch TJ, Roemmich JN, Fitzgerald JS. Temporal Trends in the Standing Broad Jump Performance of United States Children and Adolescents. *Res Q Exerc Sport*. 2021;**92**(1):71-81. **doi:** 10.1080/02701367.2019.1710446 **pmid:** 32053474
37. Noon MR, Eyre ELJ, Ellis M, Myers TD, Morris RO, Mundy PD, et al. The Influence of Recruitment Age and Anthropometric and Physical Characteristics on the Development Pathway of English Academy Football Players. *Int J Sports Physiol Perform*. 2021;**16**(2):199-207. **doi:** 10.1123/ijspp.2019-0534 **pmid:** 32994386
38. Saraya AE, Sugiyanto S, Doewes M. Anthropometric Factors and Physical Condition Dominant Determinants Batting Skills in Softball. *Int J Multicult Multirel Understand*. 2018;**5**(4):213. **doi:** 10.18415/ijmmu.v5i4.264
39. Ribeiro J, Davids K, Silva P, Coutinho P, Barreira D, Garganta J. Talent Development in Sport Requires Athlete Enrichment: Contemporary Insights from a Nonlinear Pedagogy and the Athletic Skills Model. *Sports Med*. 2021;**51**(6):1115-1122. **doi:** 10.1007/s40279-021-01437-6 **pmid:** 33675517
40. Saadatifard E, Javadipour M, Honari H, Saffari M, Zareian H. The context of recreational sports for women in Iran. *Annal Appl Sport Sci*. 2019;**7**(1):83-95. **doi:** 10.29252/aassjournal.7.1.83
41. Kalar AM, Hemmatinezhad M, Ramezaninezhad R. Designing a framework of stakeholders' participation in school sport decisions. *Annal Appl Sport Sci*. 2019;**7**(2):13-20. **doi:** 10.29252/aassjournal.7.2.13
42. Etxegarai U, Insunza A, Larruskain J, Santos-Concejero J, Gil SM, Portillo E, et al. Prediction of performance by heart rate-derived parameters in recreational runners. *J Sports Sci*. 2018;**36**(18):2129-2137. **doi:** 10.1080/02640414.2018.1442185 **pmid:** 29474140
43. Stellingwerff T, Morton JP, Burke LM. A Framework for Periodized Nutrition for Athletics. *Int J Sport Nutr Exerc Metab*. 2019;**29**(2):141-151. **doi:** 10.1123/ijsnem.2018-0305 **pmid:** 30632439
44. Furlong LM, Egginton NL. Kinetic Asymmetry during Running at Preferred and Nonpreferred Speeds. *Med Sci Sports Exerc*. 2018;**50**(6):1241-1248. **doi:** 10.1249/MSS.0000000000001560 **pmid:** 29360663
45. Tjelta LI, Tjensvoll O. All-Time Best Norwegian Track and Field Athletes: to What Extent Did They Achieve Outstanding Results at the Ages of 15 and 18 Years? *Int J Environ Res Public Health*. 2020;**17**(19). **doi:** 10.3390/ijerph17197142 **pmid:** 33003570
46. Trotier F. Indonesia's Position in Asia: Increasing Soft Power and Connectivity through the 2018 Asian Games. *TRaNS Trans Region Nation Stud Southeast Asia*. 2021;**9**(1):81-97. **doi:** 10.1017/trn.2020.12
47. Taylor RD, Collins D, Carson HJ. Sibling interaction as a facilitator for talent development in sport. *Int J Sport Sci Coach*. 2017;**12**(2):219-230. **doi:** 10.1177/1747954117694926
48. Tranckle P, Cushion CJ. Rethinking giftedness and talent in sport. *Quest*. 2006;**58**(2):265-282. **doi:** 10.1080/00336297.2006.10491883