Profile of VO₂ max Student Athletes in West Java before Facing Multievent POPNAS in 2017

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Abstract—The purpose of this study was to determine the profile of VO₂ Max level in West Java student athletes. The research method used is descriptive quantitative with a survey approach. Data retrieval in this study using Test cooper 2.4 km. The subjects of this study were West Java student athletes in 10 sports totaling 317 athletes (170 male athletes and 147 female athletes). Data analysis techniques use percentages. Based on the results of the study obtained the profile of VO₂ Max level athletes of male students in West Java in the very good category of 9.41%, in the good category at 34.71%, in the category of enough 35.29%, in the category of less at 14.71%, and in the category of very less at 5.88%, while the VO₂ Max level profile of West Java female student athletes in the very good category was 8.84%, in the good category at 19.73%, in the enough category at 43.54%, in the less category at 18.37%, and in the very less category at 9.52%. It can be concluded that the VO₂ Max profile for all male and female students of West Java is enough.

Keywords—VO₂ Max; student athletes; popnas

I. INTRODUCTION

In every sporting event, whether it's single event or multi event, an athlete must have excellent physical, technical, tactic and mental abilities so that what is the goal and achievement can be achieved maximally.

Good physical conditions will affect the functions and systems of the body's organisms, among others in the form of; 1) there will be an increase in the ability of the circulatory system and work of the heart, 2) there will be an increase in strength, flexibility, stamina and other physical components, 3) there will be a better movement economy during training, 4) there will be a faster recovery in body organs after exercise, 5) there will be a rapid response from our body's organisms if such response is needed at any time [1,2], in a more specific context in sports activities, the physical condition of a person will greatly influence even determine the movement of his appearance [2].

One component of physical ability, the component of endurance is a component of physical condition that is needed by an athlete, of several basic biomotor components, endurance can be developed first, because without resistance is difficult to hold repetition of other types of training. In line with this opinion that an athlete is required to achieve achievement, must

have the ability to do exercises or matches with high intensity until complete without experiencing significant fatigue [2].

In the world of sports the term VO₂ max is very familiar, many experts say that achievement in sports can be determined by the level of VO₂ max, Physical capacity of athletes is an important element of success in sports achievements. It involves a huge number of different capacities, with aerobic capacity being its major component [3]. The higher the VO₂max, the longer the ability of the muscles to do work means that the muscles do not get tired quickly, otherwise the lower the VO₂max, the faster the ability of the muscles to do work, so that the muscles get tired. Thus it can be said that the high and low levels of a person's VO₂ max can affect maximum achievement [4].

Pekan Olahraga Pelajar Nasional (POPNAS) is a multi-sport event between national students in Indonesia, and is a place to achieve achievement of student athletes throughout Indonesia, in the implementation of POPNAS XIV in 2017, sports were competed in 21 sports.

To achieve good achievement on the POPNAS multi event, a student athlete is required to have good physical condition because in reality the match is only a short time between 3-6 match days, so to be able to achieve maximum performance.

West Java Province is the most advanced province in terms of sports coaching, seen from several single events and multi event has always been the best province in terms of achievement, at the 2016 PON XIX multi event implementation West Java became the overall champion at the senior or elite multi event, as well Achievement of student athletes in the POPNAS XIII multi event in 2015 West Java Province became the overall champion of the multi event.

Facing the multi event level of POPNAS XIV students In 2017, West Java province again participated in the event by sending 336 athletes spread across 21 sports, with the best provinces in terms of achievement in the previous student multi event level in 2015, researchers interested in knowing with notes research entitled Profile Of Vo₂max Student Athletes In West Java Before Facing Multi event POPNAS in 2017 so that knowing the profile of VO₂max West Java student athletes can provide useful information for coaches, athletes and other policy makers.

II. METHOD

The method used to collect data is a survey method with test and measurement techniques. This type of research used in this study is non-experimental research through descriptive quantitative approach, the instrument used is using a 2.4 Km cooper test.

The subjects of this study were 317 athletes from West Java with age of 15-17 years old (170 male athletes and 147 female athletes) from 10 sports are; 1) Weightlifting, 2) Athletics, 3) Badminton, 4) Karate, 5) Archery, 6) Pencak Silat, 7) Swimming, 8) Sepak Takraw, 9) Taekwondo, 10) Tarung Derajat.

In this study data obtained in the form of numerical data or quantitative data. Simplification of data in this study was processed descriptively through percentages.

III. RESULTS AND DISCUSSION

The sequences of calculation results will be adjusted to the procedures written in the section above. The results of data processing will be presented in detail as follows:

This research was carried out in West Java, which was addressed in the West Java Arcamanik Athletics field in West Java province, data collection was carried out on July 13, 2017. The subjects in this study were West Java student athletes facing POPNAS multi event in 2017 as many as 10 sports totaling 317 athletes male and female students aged 15-17 years. The study used 2.4 Km cooper test.

Based on the results of research obtained from ten branches of male student athletes, 2 sports have an average profile of excellent VO2 max, 4 sports have an average profile of good VO2 max and 4 sports have an average profile of enough VO2 max, while female athletes 1 sport has an average profile of excellent VO2 max, 2 sports have an average profile of good VO2 max and 7 sports have an average profile of VO2 max is enough.

For data analysis used in this study is to use descriptive percentages by using the results of the VO2 max profile determination criteria for male and female student athletes as contained in Table 1.

TABLE I. VO2 MAX MALE AND FEMALE PROFILE CRITERIA

No	Male	Female	Score	Category
1	≥ 55.86	≥ 47.99	10	Very Good
2	49.15 – 55.85	42.39 – 47.98	8	Good
3	42.15 – 55.85	36.79 – 42.38	5	Enough
4	35.74 – 42.44	31.19 – 36.78	4	Less
5	35.73	≤ 31.18	2	Very Less

TABLE II. AVERAGE SPORTS PROFILE OF VO2 MAX

No	Sports	Gender	Average Vo2max	Criteria	Inf
1	Weightlifting	Male	34.75	Very Good	
		Female	30.00	Good	
2	Athletics	Male	50.40	Enough	
		Female	43.74	Enough	
3	Karate	Male	46.09	Good	
		Female	37.51	Enough	
4	Archery	Male	39.64	Good	
		Female	32.21	Enough	
5	Pencak Silat	Male	47.42	Enough	
		Female	37.35	Enough	
6	Swimming	Male	48.93	Good	
		Female	42.13	Good	
7	Sepak Takraw	Male	42.68	Enough	
		Female	34.55	Enough	
8	Taekwondo	Male	50.20	Good	
		Female	40.82	Enough	
9	Tarung Derajat	Male	46.77	Enough	
		Female	38.14	Enough	
10	Badminton	Male	54.25	Very Good	
		Female	42.19	Very Good	

Based on the results of the study it is known that VO2 max for all male student athletes can be seen in Table 3.

TABLE III. RECAPITULATION OF VO2 MAX RESULTS OF MALE STUDENT ATHLETES

No	Category	Amount	Percentage
1	Very Good	10	5.88 %
2	Good	25	14.71 %
3	Enough	60	35.29 %
4	Less	59	34.71 %
5	Very Less	16	9.41 %
	Amount	170	100 %

Fig. 1. VO2 max results of male student athletes.

Based on Table 3 and figure 1 VO2 max data was obtained from 170 male student athletes, there were 10 (5.88%) male student athletes in the very poor category, 25 (14.71%) male student athletes in the less category, 60 (35.29%) male student athletes included in the category of enough, 59 (34.71%) male student athletes were in the good category, 16 (9.41%) male student athletes were in the very good category, from the results of VO2 max the male student athlete will be explained in each sport.

While the results of the study note that VO2 max for all female student athletes can be seen in Table 4.

TABLE IV. RECAPITULATION OF VO2 MAX RESULTS OF FEMALE STUDENTS

No	Category	Amount	Percentage
1	Very Good	14	9.52 %
2	Good	27	18.37 %
3	Enough	64	43.54 %
4	Less	29	19.73 %
5	Very Less	13	8.84 %
	Amount	147	100 %

Fig. 2. VO2 max results of female student athletes.

Based on Table 4 and figure 2, VO2 max data obtained from 147 female students there were 14 (9.52%) female student athletes in the very poor category, 27 (18.37%) female student athletes in the less category, 64 (43.54%) female student athletes included in the category enough, 29 (19.73%) female student athletes were in the good category, 13 (8.84%) female student athletes were in the very good category from the results of the female student athlete's VO2 max will be elaborated on each sports branch VO2 max profile profiling male student athletes and female student athletes as contained in Table 5 and Table 6.

TABLE V. VO2 MAX PROFILE CRITERIA FOR MALE STUDENT ATHLETES

No	Sports	MALE				
		SK	K	C	B	SB
1	Weightlifting	≤ 32.17	32.18 – 32.93	32.94 – 33.69	33.70 – 34.44	≥ 34.45
2	Athletics	≤ 41.52	41.53 – 46.78	46.79 – 52.04	52.03 – 57.30	≥ 57.31
3	Badminton	≤ 51.87	51.88 – 52.48	52.49 – 53.10	53.11 – 53.71	≥ 53.72
4	Karate	≤ 37.03	37.04 – 41.46	41.47 – 45.90	45.91 – 50.33	≥ 50.34
5	Archery	≤ 32.55	32.56 – 36.07	36.08 – 39.59	39.60 – 43.11	≥ 43.12
6	Pencak Silat	≤ 40.57	40.58 – 43.93	43.94 – 47.28	47.29 – 50.64	≥ 50.65
7	Swimming	≤ 40.20	40.21 – 43.92	43.93 – 47.65	47.66 – 51.38	≥ 51.39
8	Sepak Takraw	≤ 38.18	38.19 – 41.20	41.21 – 44.22	44.23 – 47.24	≥ 47.25
9	Taekwondo	≤ 42.62	42.63 – 45.93	45.94 – 49.23	49.24 – 52.54	≥ 52.55
10	Tarung Derajat	≤ 44.55	44.56 – 46.17	46.18 – 47.80	47.81 – 49.43	≥ 49.44
SK : Very Less		C : Enough		SB : Very Good		
K : Less		B : Good				

TABLE VI. PROFILE CRITERIA FOR VO2 MAX FEMALE SPORTS ATHLETES

No	Sports	FEMALE				
		SK	K	C	B	SB
1	Weightlifting	≤ 28.00	28.01 – 28.85	28.86 – 29.70	29.71 – 30.56	≥ 30.57
2	Athletics	≤ 35.25	35.26 – 39.83	39.84 – 44.41	44.42 – 48.99	≥ 49.00
3	Badminton	≤ 40.55	40.56 – 40.98	40.99 – 41.41	41.42 – 41.84	≥ 41.85
4	Karate	≤ 35.33	35.34 – 36.50	36.51 – 37.67	37.68 – 38.84	≥ 38.85
5	Archery	≤ 28.86	28.87 – 32.14	32.15 – 35.42	35.43 – 38.70	≥ 38.71
6	Pencak Silat	≤ 32.16	32.17 – 35.30	35.31 – 38.45	38.46 – 41.60	≥ 41.61
7	Swimming	≤ 38.22	38.23 – 39.99	40.00 – 41.76	41.77 – 43.53	≥ 43.54
8	Sepak Takraw	≤ 32.27	32.28 – 33.54	33.55 – 34.81	34.82 – 36.08	≥ 36.09
9	Taekwondo	≤ 34.42	34.43 – 38.03	38.04 – 41.64	41.65 – 45.26	≥ 45.27
10	Tarung Derajat	≤ 36.24	36.25 – 37.91	37.92 – 39.58	39.59 – 41.25	≥ 41.26
SK : Very Less		C : Enough		SB : Very Good		
K : Less		B : Good				

IV. CONCLUSION

Based on the results of data processing, calculations, and analysis, it can be concluded that VO₂max profiles of West Java male student athletes aged 15-17 years are in the "Enough" category and the VO₂max profile of West Java female student athletes aged 15-17 years is in the category "Enough".

REFERENCES

- [1] Harsono, Coaching dan Aspek-Aspek Psikologis dalam Coaching. Jakarta: C.V. Tambak Kusuma, 1988.
- [2] Kardjono, Modul Mata Kuliah Pembinaan Kondisi Fisik. Bandung: FPOK UPI, 2008,
- [3] G. Rancovic, V. Mutavdzic, D. Taskic, A. Preljevic, M. Kocic and G.N. Rancovic, "Aerobic capacity as an indicator in different kinds of sports," Bosnian J Of Basic Medical Sciences, vol. 10, no. 1, pp. 44–48, 2010.
- [4] W. F. Ganong, Buku Ajar fisiologi kedokteran. Jakarta: EGC, 2001.