

Contribution core stability and strength to the performance athlete Slalom Number Water Ski in terms of gender Characteristics

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Abstract.

The purpose of this study is to find out the contribution of core stability and strength to the performance athletes slalom number Water Ski in Jakarta in terms of gender characteristics. This research is a survey study using correlational design, while this study was conducted in lake Sunter Jakarta with a sample number of 15 male athletes slalom number water ski. This research instrument uses core stability and strength tests and measurements. For core stability use the ability to fight prisoners' lumbar-pelvic-hip muscles and to strength using tests sit up and Pushups for 60 seconds. The data analysis in this study uses descriptive analysis and inferential analysis. Descriptive analysis aims to obtain average values, standard deviations, minimum values, and maximum values, while for inferential analysis using simple regression and multiple regression at a significant level $\alpha=0.05$ overall data analysis using SPSS version 23. The results of this study show that: (1) there is a contribution of core stability to the performance of male athletes; (2) there is a core stability contribution to the performance of male athletes, and (3) there is a simultaneous contribution of core stability strength to the performance of male athletes slalom number Water Ski in the Jakarta. However, this study only involved a few physical components, for further research to consider the social environment, psychology athletes, and those associated with improving the performance of athletes athlete reviewed from gender.

Keywords: core stability, strength, performance, water ski.

1. INTRODUCTION

The Outbreak of Covid-19 disease causes all activities to have limitations from economic activity to sports activities [1],[2]. One of the sports activities is in water skiing sport. This does not make the author remain productive in improving the performance of water skiers, especially in slalom numbers through a review of core stability and strength as well as the gender characteristics of athletes.

To be able to improve an athlete's achievement is not easy but special tips are needed, such as presenting a fun exercise program especially in a physical exercise program [3]. Thus stimulating athletes to excel and motivate athlete training besides that also when an athlete to achieve peak achievements then a coach must pay attention

to motor skills and motor abilities namely agility, strength, endurance, main balance) and related to motor abilities [4],[5],[6]. Because every athlete has a diverse level of physical quality. In addition, in delivering the program the trainer should start from easy to difficult[7], [8]. Process training program process is well received by its athletes.

The achievements of the *water skiing slalom* number are not only determined by the good lighting and breeding but at the elite level to be able to compete with other countries requires a technological approach as well as paying attention to the physical condition of athletes to achieve achievements in the sport of water skiing number *slalom*. The water skiing *slalom* number is a measurable sport, every supporting component of the achievement and achievement of the results of the exercise can be measured and predicted precisely at the time of the match.

The dominant physical condition in water ski sports is core stability and endurance. Core stability is the ability of a person to maintain balance both when plank and maintain balance[11]–[14]. While endurance is the ability of a person to perform physical activity subsequently does not experience significant fatigue[15]–[19]. Thus it is suspected that the dominant physical condition of one of the core stability and strength contributes to the performance athlete slalom number Water Ski.

Based on the phenomenon in the form of facts, researchers conducted a study through scientific studies to analyze the contribution of core stability and strength to the performance athlete slalom number Water Ski in Jakarta in terms of gender characteristics.

II. METHODS

The survey method used in this study uses a correlational design. The population and samples are athletes slalom number Water Ski in Jakarta with a sample number of 15 males. Data collection techniques using several techniques, namely 1) Observations made by researchers in this research are conducted with collaborative observation techniques, namely observations assisted by peers. This observation is done formally when athletes do exercises. Observations are made to monitor the process of water skiing slalom numbers, and 2) The awarding of tests is intended to measure how far the athlete's ability is about core stability and strength. For core stability ability to fight prisoners *lumbar-pelvic-hip* muscles by using *Core Strength Stability test*, and the score obtained in the form of a score with units 1, 2, 3, 4, and 5. A water ski athlete in the *slalom* number must have good core *stability* ability *slalom* activities, to cross the *slalom* balls well, and to strength using sit_up tests and push-ups for 60 seconds. (2) the length of the rope, and (3) the speed of the boat (*speed boat*), Before analyzing the data is equalized first the unit using T-Score.

Quantitative data analysis techniques starting from descriptive statistical analysis are used to describe the contribution of core stability and strength to the performance athlete slalom number Water Ski in Jakarta in terms of gender

characteristics based on test results and measurements. To determine the category of core stability score, strength, performance can be seen from the mean, max, min, range, and standard deviation. Furthermore, inferential analysis is a statistical technique used to analyze sample data and the results are applied to the population that is intended to test the research hypothesis, before hypothesis testing is first conducted a prerequisite test of data using with *Kolmogrove Smirnov Normality Test* and subsequently conducted a simple regression analysis and multiple regression at a real level $\alpha = 0.05$, overall data analysis using statistical package for social science (SPSS) version 20.0

III. RESULT AND DISCUSSION

RESULT

This research resulted in findings on the contribution of core stability (X_1) and strength (X_2) to the performance athletes slalom number Water Ski in Jakarta in terms of gender characteristics (Y). The results of descriptive analysis of data can be seen in the following histograms:

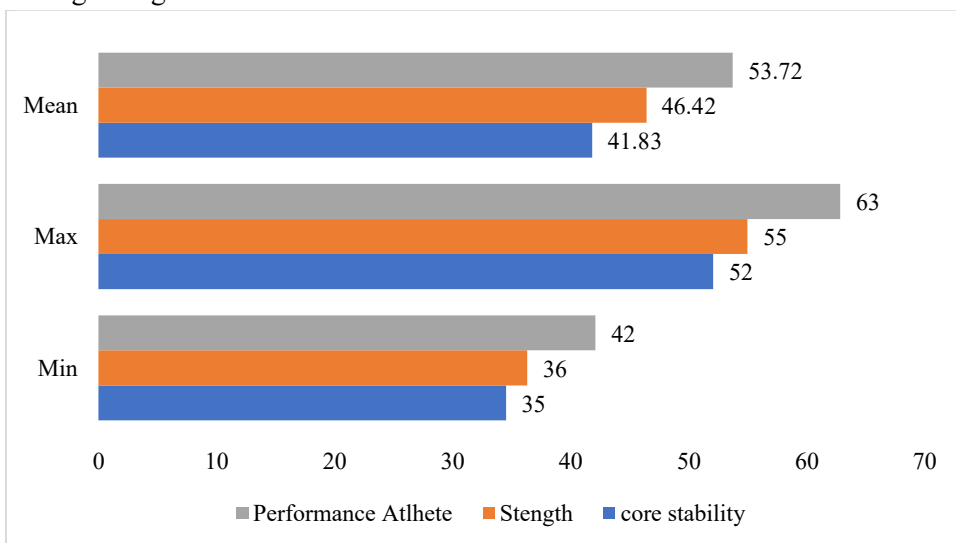


Fig. 1. Histogram descriptive data core stability (X_1), strength (X_2), and performance athletes (Y)

Based on the descriptive analysis results in figure 1 can be described the average value of core stability (X_1) of 41.83; strength (X_2) 46.42; and performance athletes (Y) of 53.72, then the maximum value of core stability (X_1) of 52; strength (X_2) 55; and performance athletes (Y) of 63, then the maximum value of core stability value (X_1) is 35; strength (X_2) 36; and performance athletes (Y) of 42. After the results of the descriptive analysis are outlined, continued to test the normality of the data as a prerequisite for the test of research hypothesis, as for the results of normality of research data can be seen in the following histogram:

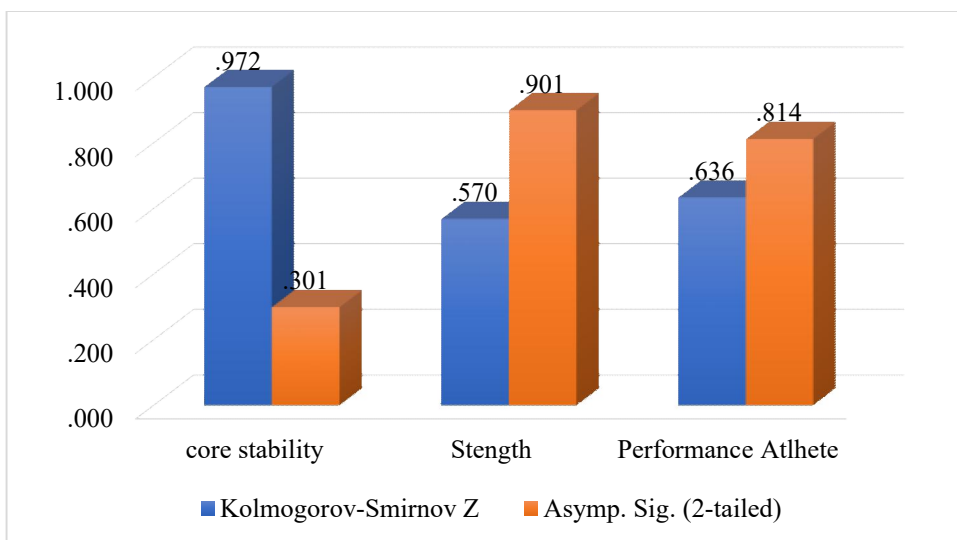


Fig. 2. Histogram test normality data core stability (X_1), strength (X_2), and performance athletes (Y)

Based on the results of the normality test data in figure 2 about the value of *Kolmogorov-Smirnov Z* (KS-Z) in the entire data group turned out to be greater than the value of $\alpha = 0.05$. Thus it can be concluded that the sample of this study comes from a normally distributed population. After the test conditions are met then the hypothesis test is conducted as for the results of the hypothesis test to determine the significance of the contribution of core stability and strength to the performance athletes slalom number Water Ski in Jakarta in term of gender characteristics can be seen in the following table:

1. Contribution of core stability to performance athletes slalom number Water Ski

Table 1. Correlation coefficient and determination of Y over X_1

R	R Square	Adjusted R Square
.467 ^a	.218	.158

Coefficient correlation (R) in table 1 obtained a value of 0.467 has been consulted with from the guidelines of interpretation of correlation coefficients of Sugiyono in the medium category [20]. To clarify the results of the meaningful interpretation of correlation coefficients can be seen in Table 2 as follows;

Table 2 Guidelines for providing an interpretation of correlation coefficients

Coefficient interval	Relationship level
0,00 – 0,199	Very Low
0,20 – 0,399	Low
0,40 – 0,599	Are
0,60 – 0,799	Strong
0,80 – 1,000	Very Strong

Furthermore from the results of analysts *R Square* (coefficient of determination) obtained the value of amounting to 0,218 which means 21.8% from

total variation of performance athletes slalom number Water Ski (Y) caused by the contribution of multiple regression variable core stability (X_1). This means that 21.8% of core stability data (X_1) contributes directly to the performance athletes slalom number Water Ski (Y) and the rest by 78.2% or $(100\% - 21.8\% = 78.2\%)$ caused by several factors such as environmental influence, athlete's health condition, mental state, and associated with performance athletes slalom number Water Ski.

b. Strength contribution to top service skills (Y)

Table 3. Correlation coefficient and determination of Y over X_2

R	R Square	Adjusted R Square
.661 ^a	.437	.394

Coefficient correlation (R) in table 3 obtained a value of 0.661 has been consulted with from the guidelines of interpretation of correlation coefficient of Sugiyono in strong category [21]. To clarify the results of the meaningful interpretation of the correlation coefficient can be seen in table 2. Furthermore from the results of analysts *R Square* (coefficient of determination) obtained the value of amounting to 0.437 which means 43.7% from the total variation of performance athletes slalom number Water Ski (Y) caused by the contribution of multiple regression variable strength (X_2). This means that 43.7% of data strength (X_2) contributes directly to the performance athletes slalom number Water Ski (Y) and the rest by 56.3% or $(100\% - 43.7\% = 56.3\%)$ caused by other factors such as environmental influences, interests, condition athlete health, mental state, and related to performance athletes slalom number Water Ski.

c. Contribution of core stability (X_1) and strength (X_2) simultaneously to performance athletes slalom number Water Ski (Y)

Table 4. Correlation coefficient and determination of Y over $X_{1,2}$

R	R Square	Adjusted R Square
.672 ^a	.452	.360

Coefficient correlation (R) in table 4 obtained a value of 0.672 has been consulted with from the guidelines of interpretation of correlation coefficients of Sugiyono in strong category [20]. To clarify the results of the meaningful interpretation of the correlation coefficient can be seen in table 2. Furthermore from the results of analysts *R Square* (coefficient of determination) obtained the value of amounting to 0.452 which means 45.2% from the total variation of performance athletes slalom number Water Ski (Y) caused by the contribution of multiple regression variable strength and strength ($X_{1,2}$). This means that 45.2% of core stability and strength data ($X_{1,2}$) contributes directly to the performance athletes slalom number Water Ski (Y) and the rest by 54.8% or $(100\% - 45.2\% = 54.8\%)$ caused by other factors such as environmental influence, interests, athlete health conditions, mental state, and related performance athletes slalom number Water Ski.

Based on these results, it can be concluded that the coefficient of termination (R) between core stability (X_1) and strength (X_2) simultaneously against performance athletes slalom number Water Ski (Y) has a contribution or H_0 rejected and received H_1 . Thus it can be concluded that there is a contribution of core stability and strength to the performance athletes slalom number Water Ski. This means that the coefficient can be generalized or can apply to the overall population of athletes where the sample was taken.

Discussion

This research was conducted to analyze the contribution of core stability and strength to perform in male athletes slalom number Water Ski. In this study, it can be concluded that there is a contribution of core stability and strength simultaneously to the top service skills in the male slalom number Water Ski. For core stability test ability to fight prisoners *lumbar-pelvic-hip* muscles using *Core Strength Stability test*, and the scores obtained in the form of scores with units 1, 2, 3, 4, and 5. A water ski athlete in the *slalom* number must have good core *stability* ability in *slalom* activities, to cross the *slalom* balls well, and to strength using *sit_up* tests and push-ups for 60 seconds. (2) length of rope, and (3) speed boat (*speed boat*).

Based on the findings of this study, can be consulted previous research among others Fahrezzy results in his research describing the physical fitness profile of water skiers number slalom [10], Dzimbova and Kirkova his research suggests The research shows that training and competitions in alpine skiing disciplines allow the development of the anaerobic capacity of athletes, which are extremely important for better performance during a race [22], Bottollier et.al the results of his research found Energetic training goals should focus on the improvement of both aerobic, glycolytic, and phosphagen systems for alpine ski racers who perform SL and GS. Giant slalom specialists might benefit from emphasizing the improvement of the aerobic system, without neglecting other systems.

Then the results of Junget *al's* research outlined about The mechanics and cause of injuries were different by the level of experiences where different training approaches may be required to minimize the injuries. Additionally, the strength and conditioning program that is systematically designed for core strength is needed to eliminate chronic trunk pain in collegiate water-skiing athletes. While the results of the study Bray-Miners et.al. elaborated Statistical analysis suggested that there was a difference in the average peak roll achieved between the skis, but was unable to suggest a difference between skis in the other performance parameters. In contrast, however, statistical analysis indicated that there was a difference in the performance achieved between the skiers, which is supported by their slalom course success rates. The identified performance parameters were effective at differentiating skier ability levels with the subject with the highest success rate among the top three highest-

scoring for 10 of 11 parameters and the subject with the lowest success rate was among the bottom 2 in all 11 parameters.

Thus it is clear that in the research conducted by some researchers no one has researched the contribution of core stability and strength to the performance of athletes slalom number Water Ski in Jakarta in terms of gender characteristics. Strength and power when combined in training to improve the performance of athletes slalom number Water Ski consisting of core stability and strength of arm and shoulder muscles as well as strength of abdominal muscles and core stability also plays an important role in supporting performance of athletes slalom number Water Ski it is because the dominant physical component is the dominant body part in supporting performance of athletes slalom number Water Ski. The presence of arms and shoulders of both proportions and abilities should be utilized in the correct techniques to support the mastery of paralyzed techniques, especially athletes doing exercises and during matches concerning gender characteristics.

IV. CONCLUSION

Based on the findings of this study it can be assumed that to improve the performance of athletes slalom number Water Ski in Jakarta in terms of gender characteristics the need to consider physical conditions one of which is core stability and strength. The results of this study also contributed to adding to about the latest science related to the sport of water skiing, especially in the number of slalom. Considering that this study only involves samples of men and in slalom numbers, the need for prudence in determining variables associated with improving performance of athletes. However, for further research, different variables are needed to be related to the advancement of water skiing, especially in improving the performance of water ski athletes.

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REFERENCES

- [1] G. Jariono, N. Nursubekti, P. Indarto, S. Hendarto, H. Nugroho, and F. Fachrezy, "Analysis of physical condition using Kinovea software on taekwondo athletes Dojang Mahameru Surakarta," *Transform. A. Service. Masy.*, 2020, doi: 10.20414/transformasi.v16i2.2635.
- [2] G. Jariono and N. Subekti, "Sports Motivation Survey And Physical Activity Athletes Of Sport Education Teacher Training And Education Faculty FKIP Muhammadiyah University Surakarta," *Kinesthetic J. Ilm. Educators. Jasm.*, 2020, doi:

<http://ijstm.inarah.co.id>

- 10.33369/jk.v4i2.12449.
- [3] H. Nugroho, S. Y. Gontara, P. D. Angga, G. Jariono, and I. L. Maghribi, "Kinesthetic : Scientific Journal of Physical Education QUALITY OF PHYSICAL CONDITION OF YOUTH PENCAK SILAT ATHLETES REVIEWED FROM SPEED , POWER ,," vol. 5, no. 1, pp. 154–162, 2021.
- [4] F. Fachrezzy, G. Jariono, U. Maslikah, and H. Nugroho, "Functional Exercise Model for Weight Loss in Sports Science Faculty Athletes," pp. 159–165, 2020.
- [5] G. Jariono, F. Fachrezzy, and H. Nugroho, "Application of Jigsaw Type Cooperative Learning Model to Improving the Physical Exercise Athletes Volleyball at Junior High School 1 Sajoanging," vol. 2, no. 5, 2020.
- [6] G. Jariono, H. Nugroho, and I. Hermawan, "The Effect of Circuit Learning on Improving The Physical Fitness of Elementary School Athletes," pp. 59–68.
- [7] I. Hermawan, U. Maslikah, M. Masyhur, and G. Jariono, "TRAINING THE PHYSICAL CONDITION OF TRAINERS OF DEPOK, WEST JAVA IN THE FACE OF PORPROV 2022 PREPARATION," vol. 2020, pp. 371–380, 2022.
- [8] S. I. Sports, F. I. Sports, and U. N. Jakarta, "Training and Preparation of Physical Training on Members of the Army Strategic Command (KOSTRAD)," vol. 1, no. 1, pp. 27–34, 2021, doi: 10.25008/altifani.v1i1.115.
- [9] F. Fachrezzy, U. Maslikah, E. Safadilla, R. Reginald, and S. Hendarto, "Physical Fitness Of The Poomsae Taekwondo Athletes In Terms Of Agility, Balance And Endurance," *Kinesthetic J. Ilm. Educators. Jasm.*, vol. 5, no. 1, pp. 111–119, 2021, doi: 10.33369/jk.v5i1.14364.
- [10] F. Fachrezzy, I. Hermawan, U. Maslikah, H. Nugroho, and E. Sudarmanto, "Profile Physical Fitness Athlete of Slalom Number Water Ski," *Int. J. Educ. Res. Soc. Sci.*, vol. 2, no. 1, pp. 34–40, 2021, doi: 10.51601/ijersc.v2i1.29.
- [11] P. Dan *et al.*, "The Effect of Static Core Stability Exercises (Plank and Side Plank) and Dynamic Core Stability (Side Lying Hip Abduction and Oblique Crunch) on Balance," *J. Phys. Educ. Heal. Sport*, vol. 3, no. 2, pp. 96–103, 2016, doi: 10.15294/jpehs.v3i2.6550.
- [12] A. Aytar, N. O. Pekiavas, N. Ergun, and M. Karatas, "Is there a relationship between core stability, balance and strength in amputee soccer players? A pilot study," *Prosthet. Orthot. Int.*, 2012, doi: 10.1177/0309364612445836.
- [13] I. G. Pratama, "Effect Of Circuit Training Core Stability Dynamic On Balance And Strength Of Abdominal Muscles In SSB PSBK Junior," *Briliant J. Ris. and Conceptual*, 2019, doi: 10.28926/briliant.v4i1.261.
- [14] N. W. R. Firdauz and M. Setijono, Hari., . "The Effect of Core Stability Dynamic and Medicine Ball Training to Enhancement Leg Muscle Strength, Abdominal Muscle Strength, and Balance," *J. Sport Sci. Educ.*, vol. 2, pp. 65–70, 2017.
- [15] T. Stöggl and B. Sperlich, "Polarized training has greater impact on key endurance variables than threshold, high intensity, or high volume training," *Front. Physiol.*, 2014, doi: 10.3389/fphys.2014.00033.
- [16] P. Aagaard and J. L. Andersen, "Effects of strength training on endurance capacity in top-level endurance athletes," *Scandinavian Journal of Medicine and Science in Sports*.2010, doi: 10.1111/j.1600-0838.2010.01197.x.
- [17] N. Mach and D. Fuster-Botella, "Endurance exercise and gut microbiota: A review,"

- Journal of Sport and Health Science*. 2017, doi: 10.1016/j.jshs.2016.05.001.
- [18] J. S. Volek, T. Noakes, and S. D. Phinney, "Rethinking fat as a fuel for endurance exercise," *Eur. J. Sport Sci.*, 2015, doi: 10.1080/17461391.2014.959564.
- [19] S. N. Ismanda, A. Purba, and H. Herman, "Effectiveness of Special Preparatory Stage Exercises for Endurance Junior Male Athletes in Taekwondo Sports," *J. Terap. Sports Science*, 2017, doi: 10.17509/jtikor.v2i2.8071.
- [20] Sugiyono, *Method of Research Education Approach Causative, Qualitative, R&D*. 2017.
- [21] Sugiyono, "Quantitative Research Method, Qualitative and R&D. Bandung: PT Alfabet.," *Sugiyono. (2017). Quantitative, Qualitative and R&D Research Method: PT Alfabet*. 2017.
- [22] T. Dzimbova and M. Kirkova, "Impact of training and competitions in alpine skiing on the anaerobic capacity of adolescent athletes," *J. Phys. Educ. Sport*, vol. 20, no. 5, pp. 2628–2636, 2020, doi: 10.7752/jpes.2020.05358.
- [23] V. Bottollier, N. Coulmy, L. Le Quellec, and J. Prioux, "Energy Demands in Well-Trained Alpine Ski Racers During Different Duration of Slalom and Giant Slalom Runs," *J. strength Cond. Res.*, vol. 34, no. 8, pp. 2156–2164, 2020, doi: 10.1519/JSC.0000000000003311.
- [24] H.C. Jung *et al.*, "Water ski injuries and chronic pain in collegiate athletes," *Int. J. Environ. Res. Public Health*, vol. 18, no. 8, pp. 1–13, 2021, doi: 10.3390/ijerph18083939.
- [25] J. Bray-Miners, R. J. Runciman, G. Monteith, and N. Groendyk, "Biomechanics of slalom water skiing," *Proc. Inst. Mech. Eng. Part P J. Sport. Eng. Technol.*, vol. 229, no. 1, pp. 47–57, 2015, doi: 10.1177/1754337114547555.