INTERNATIONAL SPORT EDELWEISS JOURNAL
ISSN: 3047-4434
Journal Homepage: https://journal.neppublisher.com/
Volume: 01 Issue: 02, 2024, 23-31

The Effect of Uphill Zigzag Run Training on Increasing Agility

Deden Ilhamsyah[1,2] Elvanali Elvana[3]

[1]Sekolah Dasar Negeri Mengger 02, Dinas Pendidikan Kabupaten Bandung, West Java, Indonesia
[2]Departementof Coaching, Faculty of Sports and Health, Universitas Pendidikan Indonesia, Indonesia
[3]Magister Management, Universitas Widyatama, Bandung City, Indonesia

Received : Juli 2024
Accepted : Agustus 2024
Published : September 2024
DOI : 10.69543/wemr2d79

ABSTRACT

Background: Agility is also a problem in sports coaching; the lack of skills possessed by the players is partly due to poor agility. This indicates the lack of agility training models that can support the achievements of futsal players.

Purpose: The purpose of this study was to see the effect of zigzag run uphill and downhill training on the agility of extracurricular futsal players.

Methods: The experiment was conducted on 10 members of the futsal extracurricular in junior high schools who were given zigzag run uphill training. This study used a one-group pre-test and post-test design because it was only carried out on one group.

Results: The results of this analysis indicate that there is a significant effect of the zigzag run uphill and downhill training program on agility in extracurricular futsal students in junior high schools, with an average increase of 0.47 seconds for the zigzag run uphill training program.

Conclusion: Seeing these results, the author believes that zigzag run training with an uphill concept can be recommended as a form of training to improve agility.

KEYWORD: Zigzag Run Uphill, Futsal, Agility

CORRESPONDENCE

Author Name : Deden Ilhamsyah
Affiliation : Sekolah Dasar Negeri Mengger 02
e-mail : dedenilhamsyahzu@gmail.com

To cite this article (APA Style):

Ilhamsyah, Deden & Elvanali, Elvana. (2024). The Effect of Uphill Zigzag Run Training on Increasing Agility. *NEP Journal*. *01*(02), 23-31. https://doi.org/10.69543/wemr2d79

INTRODUCTION

Agility is a complex skill that involves rapid whole-body movements with changes in speed or direction in response to stimuli (Sheppard & Young, 2006). It is essential for success in many sports, particularly offensive sports where attackers aim to create space and defenders

seek to exert pressure (Young et al., 2022). Agility requires a combination of physical qualities such as speed, balance, strength, and coordination, as well as cognitive components such as visual scanning and anticipation (Karacabey, 2013; Sheppard & Young, 2006). Research has shown that agility performance varies across sports, with racquet sports athletes showing the fastest agility times, followed by combat sports athletes who react to visual stimuli, then ball sports players, and finally combat sports athletes who react to tactile stimuli (Zemková & Hamar, 2014). To improve agility, training should combine physical development, cognitive skills, and sport-specific scenarios, using a mixed, multicomponent approach tailored to the individual needs of the athlete (Young et al., 2022).

Agility is influenced by several factors, including somatotype, age, gender, overweight, and fatigue. Agility tends to be very specific to different movement performances and demands to make rapid changes in movement patterns. Agility occurs due to explosive power movements; the amount of power is determined by muscle strength and muscle fiber contraction, and muscle speed depends on the strength and contraction of muscle fibers (Astuti, 2019).

To improve agility, there are three types of exercises: zigzag run (back and forth running), obstacle running, and back and forth running. Because futsal emphasizes agility and leg muscle strength, zigzag run training is needed. High-intensity training affects muscle endurance, and the right training method affects muscle endurance (Apriyadi .,dkk 2014). The zig-zag run is one form of training that is very effective in improving agility. Zig-zag run is a running method using obstacles or obstacles that must be passed by running to avoid obstacles or running in a winding manner (Dabukk, 2015). Researchers prefer zig-zag run training because zig-zag run training is more effective in improving agility than shuttle run training in futsal.

One of the important components in playing futsal is agility. Without agility, you will have difficulty performing the movements requested by the coach and applying certain techniques, especially if you are talking about long-term training to reach a professional level. Good physical condition can help every player play better, but poor physical condition will affect the player's performance. One of the most important physical aspects in futsal is agility. This allows you to change direction and speed when stimulated (Mulya & Millah, 2019). Silassie & Demena (2016) research confirms that there is a correlation between speed and agility also in dribbling the ball. This study differs from previous studies in terms of the type of test used, the number of samples, and the location.

The problem of physical condition is a very important component in sports activities, based on the analysis of research data from Hermawan .,dkk, (2022), data was obtained that in the detailed physical condition profile of prospective junior high school students in special sports classes for football in Sleman Regency, Special Region of Yogyakarta, as many as 7 (6.60%) students have a physical condition profile of "very good", 20 (18.87%) students have a physical condition profile of "good", 45 (42.45%) students have a physical condition profile of "moderate", 27 (25.27%) students have a physical condition profile of "poor", and as many as 7 (6.60%) students have a physical condition of "very poor". The highest frequency is in the "moderate" category, which is 45 (42.45%), so it can be concluded that the physical condition profile of prospective junior high school students in special sports classes for football in Sleman Regency, Special Region of Yogyakarta, as a whole is in the category of "moderate."

Seeing many problems that often occur when conducting agility training programs. Training programs do not have a personalized, targeted approach, and technical problems such as equipment can affect the efficiency of agility training(Hui, Tongdecharoen, and Tasnaina 2024; Tan .,dkk 2023). Agility training programs may need to be adjusted for different age groups, as younger athletes require different training methods than older athletes (Bera & Dharmayat, 2019; Ju, 2014). Seeing the research gap from the problems that arise,

the author applies a zigzag run training program with an uphill concept to futsal athletes as a variation of agility training.

METHOD

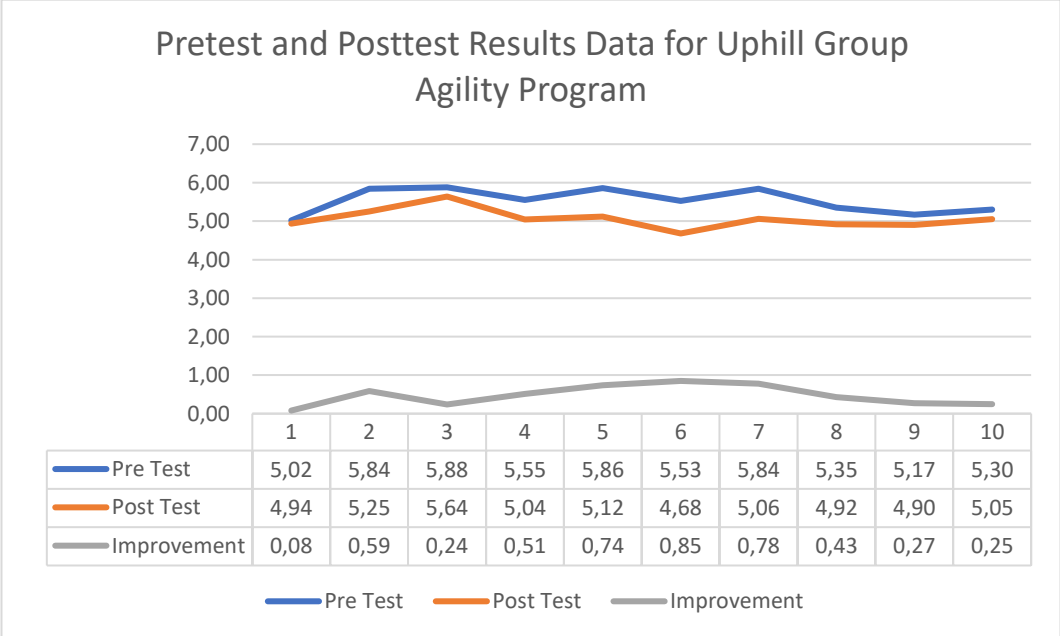
This study is an experimental study with a one-group pre-test post-test design, where the respondents are a futsal team in junior high school totaling 10 people. Because the entire population that participates in futsal extracurricular activities is only 10 people, the author takes the entire population as a sample, commonly called saturated sampling.

The research instrument used in this study is the 5-0-5 Agility Run Test (Gamble, 2012). Tes ini memiliki kesahihan (validity) 0,82. This test has a validity of 0.82. A validity test is a test that measures what is to be measured. A measurement can be said to be valid if the measuring instrument or test is really right to measure what is to be measured. Reliability 0.93. This reliability describes the degree of consistency, or consistency of the measurement results. A measuring instrument or test is said to be variable if the measuring instrument produces a picture that is truly trustworthy and can be relied on to produce actual measurement results. This test aims to measure the agility of a person/athlete. In this test, 8 cones, a stopwatch, a 20-meter field area, and a measuring tape are required.

After the players have done the initial test, in this test the players are given treatment to increase their dribbling speed, namely zig-zag run training. The researcher created a zig-zag run training program, namely providing treatment 16 times with a schedule of 3 times a week, namely Monday, Wednesday, and Friday.

RESULT

To provide an overview of the data obtained from the research results, the data is processed and analyzed. The following is the data from the pre-test and post-test agility of the zigzag run uphill group.



	1	2	3	4	5	6	7	8	9	10
Pre Test	5,02	5,84	5,88	5,55	5,86	5,53	5,84	5,35	5,17	5,30
Post Test	4,94	5,25	5,64	5,04	5,12	4,68	5,06	4,92	4,90	5,05
Improvement	0,08	0,59	0,24	0,51	0,74	0,85	0,78	0,43	0,27	0,25

Figure 1. Graph of Pretest and Posttest Results of Uphill Group Agility Program

Figure 1 is a graph of the results of the uphill group agility training, where on average there was an increase of 0.47 seconds, or 9%. With the highes.

Table 1. Agility Test Data Statistics

		Mean	N	Std. Deviation
Pair 1	PreTest_Agility_*Uphill*	5.53	10	0.32
	PostTest_Agility_*Uphill*	5.06	10	0.25

Based on Table 1, the average pre-test agility value of the research sample in the uphill program was 5.53 seconds, and the post-test was 5.06 seconds, while the standard deviation value of the pre-test agility value of the research sample in the uphill program was 0.32, and the post-test was 0.25.

Table 2. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PreTest_Agility_*Uphill*	0.234	10	0.130	0.895	10	0.195
PostTest_Agility_*Uphill*	0.207	10	0.200*	0.903	10	0.234
a. Lilliefors Significance Correction						
*. This is a lower bound of the true significance.						

The results of the normality test, as stated in Table 2, show that the Shapiro-Wilk significance value has a score of 0.195, and 0.234 has a value greater than 0.05, which means that all data is normally distributed.

Tabel 3. Paired Samples Test Uphill

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PreTest_Agility_*Uphill* - PostTest_Agility_*Uphill*	0.47	0.26	0.08	0.28	0.66	5.691	9	0.000

The results of the analysis using SPSS, as seen in table 3, show that the t-value is 5.691, where the value is greater than the t-table, which is 1.812, so the decision H1 is accepted. Likewise, the results of the P-value analysis (0.000) where it is smaller than α = 0.05, which means H1 is accepted. This means that there is a significant difference between the pre-test and post-test agility scores of the zigzag run uphill training program group. The conclusion from the results of this analysis can be said to be that there is a significant effect of the zigzag run uphill training program on agility in extracurricular futsal students at SMPN 2 Pamengpeuk, with an average increase of 0.47 seconds.

DISCUSSIONS

Based on the results of the analysis, it shows that zigzag run training with an uphill concept has a significant effect on increasing the agility of futsal players at SMPN 2 Pamengpeuk, with an average increase of 0.47 seconds. Seeing these results, the author believes that zigzag run training with an uphill concept can be recommended as a form of training to improve agility. Zigzag running training has been proven to be able to significantly increase agility and dribbling skills in various sports. Various studies have shown its effectiveness in improving the performance of futsal athletes (Hidayat et al., 2021a), football (Hafiz et al., 2023), pencak silat (Ahmad, 2018a), dan taekwondo (Malasari, 2019a). Compared with back-and-forth running exercises, zigzag running exercises have been shown to be more effective in improving dribbling skills in futsal players (Hidayat .,dkk 2021) and improving agility

in taekwondo athletes (Malasari, 2019b). The positive effects of zigzag running exercises on agility have been consistently observed across age groups and skill levels, from young soccer players (Hafiz .,dkk 2023) to more experienced martial artists (Ahmad, 2018b). These findings suggest that incorporating zigzag running exercises into a training program may benefit athletes in a variety of sports where agility and rapid changes of direction are critical to performance.

Recent studies have explored the effects of different training methods on sports performance, particularly in soccer and basketball. Sprinting training with a ball improves speed and agility in young soccer players, particularly in change-of-direction tests such as the zigzag agility test (Sal-de-Rellán .,dkk 2024). Comparing sand and grass surfaces for sprinting and jumping training, both resulted in similar improvements in vertical jump and zigzag performance for elite young soccer players (Pereira .,dkk 2023). In a comparison of high-intensity interval training (HIIT), high-intensity interval training (HIIT) was highly effective for improving agility and technical skills, while HIIT showed better results for speed-based conditioning in soccer players (Arslan et al., 2020). For high school basketball players, plyometric, strength, and change-of-direction training all resulted in similar moderate to large improvements in physical fitness, including performance in the zigzag sprint test (de Villarreal .,dkk 2021).

Uphill running has multiple purposes in improving athletic performance. It can significantly increase running speed (Mulyana & Rubiana, 2021) and increase oxygen uptake in well-trained runners (Held .,dkk 2023). Compared with horizontal high-intensity interval training, moderate uphill training significantly increases time spent above 90% VO2max, potentially leading to greater cardiovascular adaptations (Held .,dkk 2023). While both low- and high-intensity training can improve performance, high-intensity training elicits greater maximal oxygen uptake adaptations in endurance athletes (Talsnes et al., 2022). Uphill sprinting on steeper slopes has similar kinematic features to the early acceleration phase of flat sprinting, while moderate slopes induce biomechanical adaptations similar to the late acceleration phase (Okudaira .,dkk 2021). This suggests that the specific transition from uphill sprinting to sprinting depends on the gradient of the slope, allowing coaches to tailor training programs for desired outcomes in sprint mechanics and overall performance.

CONCLUSSION

Based on the results of the research and discussion above, it can be concluded that the zigzag run uphill training program has a significant effect on the agility of futsal extracurricular students in junior high schools. Seeing these results, the author believes that zigzag run training with an uphill concept can be recommended as one form of training to improve agility.

REFERENCE

Ahmad, N. (2018a). *PENGARUH LATIHAN ZIG ZAG RUN TERHADAP KELINCAHAN ATLET PENCAK SILAT TAPAK SUCI LEBONG*. https://api.semanticscholar.org/CorpusID:126131811

Ahmad, N. (2018b). *PENGARUH LATIHAN ZIG ZAG RUN TERHADAP KELINCAHAN ATLET PENCAK SILAT TAPAK SUCI LEBONG*.

Apriyadi, I., Dwi Rosella, K., St FT, S., Santoso, T. B., & Fis, S. (2014). *Pengaruh Agility Ladder Exercise Dengan Metode Lateral Run Terhadap Peningkatan Kelincahan Lari Pada Atlet Sepakbola Usia 13 Tahun DiSekolah Sepak Bola Jaten*. Universitas Muhammadiyah Surakarta.

Arslan, E., Orer, G. E., & Clemente, F. M. (2020). Running-based high-intensity interval training vs. small-sided game training programs: effects on the physical performance, psychophysiological responses and technical skills in young soccer players. *Biology of Sport*, *37*, 165–173. https://api.semanticscholar.org/CorpusID:218484030

Astuti, H. W. (2019). *PERBEDAAN PENGARUH LATIHAN ZIG-ZAG RUN DAN SHUTTLERU TERHADAP KELINCAHAN PEMAIN FUTSAL DI MERAPI FUTSAL CLUB*. Universitas' Aisyiyah Yogyakarta.

Bera, S., & Dharmayat, S. (2019). Effect of agility training exercise on motor proficiency and anthropometry in 6–10-year-old children with obesity. *Indian Journal of Physical Therapy and Research*. https://api.semanticscholar.org/CorpusID:201974997

Dabukk, A. B. (2015). Efektivitas Latihan Kelincahan Dengan Ladder Dan Zig-Zag Terhadap Kemampuan Menggiring Bola Siswa Ssb Baturetno Usia 10-12 Tahun. *Fakultas Ilmu Keolahragaan Universitas Negeri Yogyakarta*.

de Villarreal, E. S., Molina, J., de Castro-Maqueda, G., & Gutiérrez-Manzanedo, J. V. (2021). Effects of Plyometric, Strength and Change of Direction Training on High-School Basketball Player's Physical Fitness. *Journal of Human Kinetics*, *78*, 175–186. https://api.semanticscholar.org/CorpusID:233431820

Gamble, P. (2012). Training for sports speed and agility: an evidence-based approach. *Choice Reviews Online*, *49*(08), 49-4516-49–4516. https://doi.org/10.5860/choice.49-4516

Hafiz, A. H., Ramadi, & Agus Prima Aspa. (2023). the Effect of Zig Zag Run Training on the Agility of Football Players in Ssb Woner. *Journal Sport Science Indonesia*, *2*(2), 149–163. https://doi.org/10.31258/jassi.2.2.149-163

Held, S., Rappelt, L., Giesen, R., Wiedenmann, T., Deutsch, J. P., Wicker, P., & Donath, L. (2023). Increased oxygen uptake in well-trained runners during uphill high intensity running intervals: A randomized crossover testing. *Frontiers in Physiology*, *14*(February), 1–7. https://doi.org/10.3389/fphys.2023.1117314

Hermawan, H. A., Nurcahyo, F., & Yudanto, Y. (2022). Pemantauan Profil Kondisi Fisik Kecabangan Sepakbola Pada Siswa Sekolah Menengah Pertama Kelas Khusus Olahraga Di Daerah Kabupaten Sleman Yogyakarta. *Jorpres (Jurnal Olahraga Prestasi)*, *18*(3), 9–18.

Hidayat, R. T., Riswanto, A. H., & Hasanuddin, M. I. (2021a). The Effect of Shuttle Run and Zig-Zag Run Training On Dribbling Skills. *Jp.Jok (Jurnal Pendidikan Jasmani, Olahraga Dan Kesehatan)*. https://api.semanticscholar.org/CorpusID:245876235

Hidayat, R. T., Riswanto, A. H., & Hasanuddin, M. I. (2021b). The Effect of Shuttle Run and Zig-Zag Run Training On Dribbling Skills. *Jp.Jok (Jurnal Pendidikan Jasmani, Olahraga Dan Kesehatan)*.

Hui, T., Tongdecharoen, W., & Tasnaina, N. (2024). The Development of Specific Training Programs to Improve the Speed, Agility, Quickness, and Pass-Receiving Performance of Soccer Players. *International Journal of Sociologies and Anthropologies Science*

Reviews. https://api.semanticscholar.org/CorpusID:268176663

Ju, L. (2014). Agility Training of Teenage Short Track Speed Skaters. *China Winter Sports*. https://api.semanticscholar.org/CorpusID:63459540

Karacabey, K. K. K. (2013). Sport performance and agility tests Sporda performans ve çeviklik testleri. *Journal of New Results in Science*, *10*, 1693–1704. https://api.semanticscholar.org/CorpusID:142881142

Malasari, C. A. (2019a). Pengaruh Latihan Shuttle-Run dan Zig-Zag Run terhadap Kelincahan Atlet Taekwondo. *Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*. https://api.semanticscholar.org/CorpusID:213464021

Malasari, C. A. (2019b). Pengaruh Latihan Shuttle-Run dan Zig-Zag Run terhadap Kelincahan Atlet Taekwondo. *Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*.

Mulya, G., & Millah, H. (2019). Pengaruh Latihan Ladder Drill Terhadap Peningkatan Kelincahan Pemain Sepakbola. *Jurnal Segar*, *8*(1), 1–10.

Mulyana, D., & Rubiana, I. (2021). *PERBANDINGAN PENGARUH LATIHAN UPHILL DENGAN INTERVAL TRAINING TERHADAP PENINGKATAN KECEPATAN LARI*. https://api.semanticscholar.org/CorpusID:236408788

Okudaira, M., Willwacher, S., Kawama, R., Ota, K., & Tanigawa, S. (2021). Sprinting kinematics and inter-limb coordination patterns at varying slope inclinations. *Journal of Sports Sciences*, *39*, 2444–2453. https://api.semanticscholar.org/CorpusID:235905961

Pereira, L. A., Freitas, T. T., Zabaloy, S., Ferreira, R. C. A., Silva, M. L., Azevedo, P., & Loturco, I. (2023). Sprint and Jump Training on Sand vs. Grass Surfaces: Effects on the Physical Performance of Young Soccer Players. *Journal of Strength and Conditioning Research*, *37*, 1828–1833. https://api.semanticscholar.org/CorpusID:256533525

Sal-de-Rellán, A., Brahim, M. Ben, Hernaiz-Sánchez, A., Tarwneh, R., & Martín, V. (2024). Effects of resisted sprint training with ball on speed and agility performance in U-19 elite soccer players. *PLOS ONE*, *19*. https://api.semanticscholar.org/CorpusID:273049960

Sheppard, J. M., & Young, W. (2006). Agility literature review: Classifications, training and testing. *Journal of Sports Sciences*, *24*, 919–932. https://api.semanticscholar.org/CorpusID:25145679

Silassie, A. G., & Demena, T. (2016). A study of agility, coordination and speed as related to dribbling and kicking performance of Jimma, Woliso and Sebeta town male football players. *J Phys Edu Res*, *3*(1), 47–55.

Talsnes, R. K., van den Tillaar, R., & Sandbakk, Ø. (2022). Effects of Increased Load of Low- Versus High-Intensity Endurance Training on Performance and Physiological Adaptations in Endurance Athletes. *International Journal of Sports Physiology and Performance*, *17*(2), 216–225. https://doi.org/10.1123/ijspp.2021-0190

Tan, B., Tian, S., Wang, E., Xiao, L., Cao, K., Zheng, B., & Luo, L. (2023). Research on the development and testing methods of physical education and agility training equipment in universities. *Frontiers in Psychology*, *14*, 1155490. https://doi.org/10.3389/fpsyg.2023.1155490

Young, W., Dos'Santos, T., Harper, D. J., Jefferys, I., & Talpey, S. W. (2022). Agility in Invasion Sports: Position Stand of the IUSCA. *International Journal of Strength and Conditioning*. https://api.semanticscholar.org/CorpusID:247724823

Zemková, E., & Hamar, D. (2014). *Agility performance in athletes of different sport specializations*. https://api.semanticscholar.org/CorpusID:55687152

Judul Penelitian

ABSTRAK

Latar Belakang: Kelincahan juga menjadi permasalahan dalam pembinaan olahraga, kurangnya keterampilan yang dimiliki oleh para pemain salah satunya disebabkan karena kelincahan yang kurang baik hal ini mengindikasikan bahwa kurangnya model latihan agility yang dapat menunjang prestasi pemain futsal

Tujuan: Tujuan dari penelitian ini adalah untuk melihat pengaruh latihan zig zag run uphill dan downhill terhadap kelincahan pemain ekstrakulikuler futsal

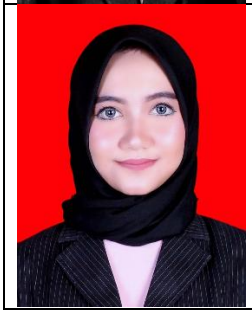
Metode: Experimen dilakukan terhadap 10 orang anggota extrakulikuler futsal di sekolah menengah pertama yang diberikan latihan zig zag run uphill, penelitian ini menggunakan one group pre-test dan post-test design karena hanya dilakukan terhadap satu kelompok.

Hasil: Hasil analisis ini menunjukan terdapat pengaruh yang signifikan program latihan zig zag run uphill dan downhill terhadap kelincahan pada siswa ektrakulikuler futsal di sekolah menengah pertama, dengan peningkatan rata-rata 0.47 detik untuk program latihan zig zag run uphill.

Kesimpulan: Melihat hasil ini penulis meyakini bahwa latihan zigzag run dengan konsep uphill dapat rekomendasikan sebagai salah satu bentuk latihan untuk meningkatkan kelincahan.

KATA KUNCI: Zigzag Run *Uphill*, Futsal, Kelincahan

AUTHOR IDENTITY

Photo	Author Name (with Title)	Affiliation
	Deden Ilhamsyah, S.Pd	Sports Coaching Department Faculty of Sport and Health Universitas Pendidikan Indonesia ORDCID ID: Scopus ID: Sinta ID: Research interests: Sports Coaching
	Elvanali Elvana, S.AB	Magister Management Universitas Widyatama ORDCID ID: Scopus ID: Sinta ID: Research interests: Sports Management