



Original Article

A Training Program Using Assistive Tools to Develop Specific Physical Abilities and the Performance Level of (Uchi-Komi – Nage-Komi) of Judokas

Prof. Dr. Abdel Halim Mohamed Abdel Halim Moaz¹, Assoc. Prof. Dr. Mohamed Bily Ibrahim Bily², PhD Candidate. Mohamed Abdel Fattah Fathallah Qouta³

^{1,2,3} Department of Theories and Applications of Combative and Aquatic Sports, Faculty of Sports Science, University of Sadat City, Egypt

E-mail address: mohamed.qota@phed.usc.edu.eg

Doi : 10.21608/jat.2025.364355.1050

Abstract

The study aims to develop specific physical abilities and assess their impact on the skill performance level of Uchi-Komi and Nage-Komi in judokas under 16 years old. The authors employed the experimental method using a pre-post test design for two groups (experimental and control), as this design is appropriate for the research objectives and hypotheses. The sample was purposively selected from judokas at El-Gomhoria Sports Club in the Menoufia region, registered with the Egyptian Judo, Sumo, and Aikido Federation for the 2023-2024 season, totaling 24 players. The results demonstrated a significant improvement in physical fitness tests and skill performance levels for Uchi-Komi and Nage-Komi among judokas. The experimental group exhibited superior results compared to the control group. Post-test comparisons between the two groups revealed statistically significant differences in skill performance and physical abilities, favoring the experimental group. The computed t-value exceeded the critical t-value at a 0.05 significance level, confirming the effectiveness of the training program

Keywords: *Physical abilities, Uchi-Komi, Nage-Komi*

Introduction

Judo is a sport characterized by dynamic and variable playing conditions, requiring athletes to react quickly and effectively to unpredictable situations to achieve victory. Regardless of a player's technical proficiency and tactical awareness, they cannot perform optimally on the mat without comprehensive physical preparation.

According to Shadad (1996), judo is one of the most widely practiced sports worldwide, with numerous leading judo nations continuously working to develop their athletes based on scientific training principles. Judo is an extremely demanding sport, requiring significant physical and mental effort to meet its performance demands (Shadad, 2005, P 237).



Hegazy (2006) emphasized that each sport requires specific physical fitness components, which vary in nature and importance depending on the sport. Several studies have identified the key physical attributes essential for judokas, which significantly impact their skill performance levels (Hegazy, 2006, P.230,231).

Abdel Fattah (1997) noted that muscular endurance and strength endurance are fundamental components of athletic performance in sports that demand prolonged high-effort execution, such as swimming, rowing, water polo, boxing, wrestling, cycling, fencing, basketball, football, and track events (Abdel Fattah, 1997, P.63).

The muscular endurance is a primary physical component in various sports requiring sustained performance, including boxing, wrestling, and judo (Shadad, 1996, P.239).

The sport-specific physical training, characterized by precise temporal and spatial movement patterns, is crucial for athletes. These exercises focus on developing fundamental skills relevant to the specialized sport. Coaches must thoroughly understand the nature and necessity of these training methods to enhance an athlete's specialized physical abilities and performance levels (Mahmoud, 2008, P.200).

The authors assert that successful judo performance depends significantly on physical capabilities, particularly endurance. Endurance training has become indispensable due to the implementation of the Golden Score Rule, which may require a player to compete in multiple matches within a single day.

Abdel Fattah (2024) conducted a study titled "The Effect of S.A.Q Training on Specific Physical Abilities and the Level of Some Composite Skills in Young Judo Players." The research aimed to explore the effect of S.A.Q training on specific physical abilities and some composite skills (Renzoku Waza) in young Judo athletes. The researcher employed the experimental method and selected a sample of 14 players from the National Talent and Olympic Champion Project using a purposive sampling technique. The results showed a significant positive impact of S.A.Q training on the level of specific physical abilities and composite skills in Judo.

Based on the authors' practical experience in judo and their observations of existing training programs, several technical challenges affecting match performance were the weak skill execution among players, the reliance on traditional training methods by coaches, with limited use of assistive tools and modern training approaches and finally the inadequate physical and technical conditioning, which negatively affect match performance, particularly in extended matches and Golden Score scenarios, reducing a player's ability to secure victory.

Accordingly, this study tests the effect of a training program using assistive tools to develop specific physical abilities and the performance level of (uchi-komi – nage-komi) Jodoka.



The authors incorporated a variety of assistive training tools like Cones, Hurdles, Swedish benches, Medicine balls, Barbells, Digital markers.

The training program focused on innovative physical and technical exercises designed to enhance the physical abilities essential for judo. These improvements directly contribute to enhancing skill execution in Uchi-Komi and Nage-Komi, enabling players to maintain optimal performance efficiency and increase their chances of winning matches.

Study Hypotheses

1. There are statistically significant differences in the control group between pre- and post-measurements in skill performance and specific physical abilities among judokas in favor of the post-measurement.
2. There are statistically significant differences between the experimental and control groups in post-measurements of skill performance and specific physical abilities among judokas in favor of the post-measurement of the experimental group.

Materials and Method

The author employed the experimental method due to its suitability for the research objectives and hypotheses. The study used a pre-test and post-test design for two groups: an experimental group trained according to the proposed program and a control group trained using traditional methods.

Participants

The study population consists of judokas under 16 years old in the Menoufia region, registered with the Egyptian Judo, Sumo, and Aikido Federation for the 2023/2024 season. A purposive sample of 24 players was selected from Al-Gomhoria Sports Club's judokas under 16 years old.

Homogeneity of the participant Groups

The authors verified the normality of the data distribution for the main participant groups and the pilot study group (non-distinctive). The sample consisted of 24 judokas under 16 years old, measured in growth variables (age, height, weight), and Training experience, as shown in Table (1).

Table 1. Normal Distribution of the participant groups in Growth variables (n = 16)

Variable	Unit	Mean	Median	SD	Skewness	
Growth variables	Age	years	15.84	16.00	0.44	-1.53
	Height	Cm	163.52	160.00	11.35	0.95
	Weight	Kg	62.42	61.00	9.70	0.46
Training experience	years	3.17	3.00	1.48	0.29	



Table (1) indicates that the skewness coefficients for the main participant groups measurements in growth variables (age, height, weight) and Training experience ranged between (± 3), confirming the normality of the data distribution.

Normality of the participant Groups

The authors verified the normality of the pre-measurement data distribution for the control and experimental groups of judokas under 16 years old (total number of participants: 16 players) in the research variables, as shown in Table 2.

Table 2. Normality Distribution of Pre-Measurement Data for the Control and Experimental Groups in Research Variables (n = 24)

Variable	Unit	Mean	Median	SD	Skewness
Push-ups	Rep	8.70	9.01	0.44	1.87-
Sit –ups	Rep	22.81	23.01	1.04	0.46-
Standing broad jump	Cm	165.66	166.28	3.07	0.60-
Bridge	Cm	60.87	60.16	2.67	0.80
150m Sprint	Sec	7.36	7.43	0.46	0.43-
800m Run	Min	3.31	3.28	0.12	0.66
Static equilibrium	Min	1.48	1.48	0.15	0.08
(Agility Barb)	Sec	7.86	8.01	0.60	0.60-

Table (2) confirms that the skewness coefficients of the pre-measurements for the control and experimental groups in the research variables ranged between (± 3), ensuring the normality of the data distribution.

Equivalence between the Groups of participants

The authors determined the equivalence of the pre-measurements between the control and experimental groups in the test variables. See Table (3).

Table 3. Statistical Significance of Differences Between Pre-Measurements for the Control and Experimental Groups in Test Variables (n1=n2 = 8)

Physical variables Tests	Unit	Control group		Experimental group		T-Value
		Mean	±SD	Mean	±SD	
Push-ups	Rep	8.39	0.53	8.26	0.47	0.49
Sit –ups	Rep	22.15	0.85	22.77	1.18	1.17
Standing broad jump	Cm	161.9	8.45	160.65	9.06	0.29
Bridge	Cm	54.05	1.12	53.77	0.90	0.50
150m Sprint	Sec	7.57	0.27	7.60	0.20	0.50
800m Run	Min	3.4	0.15	3.45	0.18	0.65
Static equilibrium	Min	1.43	0.15	1.44	0.11	0.25
Agility Barb	Sec	7.28	0.74	7.05	0.79	0.66



Table (3) shows no statistically significant differences at a 0.05 significance level between the pre-measurements of the control and experimental groups in the test variables, confirming the equivalence of both groups.

The authors reviewed previous literature and consulted experts to select the most appropriate skill tests for Uchi-komi and Nage-komi.

Table 4. Normal distribution test of the participant groups in the skill performance level (Uchi- komi) evaluation form (n=24)

Variable	Unit	Mean	Median	SD	Skewness
Ouchi gari (15 sec)	Rep	10.20	10.48	0.90	0.65-
Ouchi gari (30 sec)	Rep	20.60	21.00	0.70	0.80-
Ouchi gari (45 sec)	Rep	30.49	30.48	0.71	0.17
Ouchi gari (60 sec)	Rep	43.29	44.00	0.83	2.30-
Ippon seoi nage (15 sec)	Rep	12.20	12.00	0.65	0.95
Ippon seoi nage (30 sec)	Rep	22.70	22.00	1.05	2.10
Ippon seoi nage (45 sec)	Rep	33.41	33.00	1.01	1.23
Ippon seoi nage (60 sec)	Rep	47.30	47.49	0.76	0.49-

Table 5. Significance of differences in the skill performance level (uchi-komi) evaluation form between the experimental and control groups using Mann–Whitney test (n1=n2=8)

Tests	Group	Mean	SD	Mean rank	Total rank	Z-score
Ouchi gari (15 sec)	Control	10.20	0.86	7.623	60	0.794
	Experimental	10.60	0.90	9.370	74	
Ouchi gari (30 sec)	Control	21.00	0.50	8.930	70	0.440
	Experimental	20.85	0.62	8.062	63	
Ouchi gari (45 sec)	Control	30.70	0.70	8.936	70	0.402
	Experimental	30.60	0.76	8.061	62	
Ouchi gari (60 sec)	Control	43.48	0.74	8.934	70	0.411
	Experimental	43.30	0.73	8.060	62	
Ippon seoi nage (15 sec)	Control	12.35	0.50	9.000	70	0.520
	Experimental	12.22	0.46	8.000	62	
Ippon seoi nage (30 sec)	Control	23.20	1.35	9.248	72	0.675
	Experimental	22.70	0.85	7.747	60	
Ippon seoi nage (45 sec)	Control	33.60	1.27	8.620	65	0.111
	Experimental	33.47	1.05	8.373	65	
Ippon seoi nage (60 sec)	Control	47.61	0.50	9.186	73	0.656
	Experimental	47.35	0.72	7.810	62	



All evaluated aspects of skill performance level this is confirmed by the skewness coefficient values, which range between (230-:2.70). These values indicate that the participant groups are normally distributed.

The results indicate that there are no statistically significant differences between the experimental and control groups in the skill performance level (uchi –komi), as shown by the Mann-whitney z-scores (0.795 :0.113) . The values suggest a balanced performance distribution performance distribution, indicating similar developmental levels between both groups in the evaluated skills.

Table 6. Normal distribution test of the participant in the skill performance level (Nagy- komi) evaluation form (n=24)

Variable	Unit	Mean	Median	SD	Skewness
Ouchi gari (15 sec)	Rep	7.17	7.00	0.76	0.66
Ouchi gari (30 sec)	Rep	10.25	10.00	0.68	1.11
Ouchi gari (45 sec)	Rep	19.25	19.00	1.22	0.61
Ouchi gari (60 sec)	Rep	24.29	24.00	1.12	0.78
Ippon seoi nage (15 sec)	Rep	8.17	8.00	0.64	0.78
Ippon seoi nage (30 sec)	Rep	14.17	14.00	0.76	0.66
Ippon seoi nage (45 sec)	Rep	21.42	21.00	0.72	1.74
Ippon seoi nage (60 sec)	Rep	28.42	28.00	1.06	1.18

All evaluated aspects of skill performance level this is confirmed by the skewness coefficient values, which range between (1.74 :0.78). These values indicate that the participants are normally distributed.

Homogeneity in the Skill Performance Level of (Nage-Komi)

The researcher verified the normality of the data distribution for the primary experimental group and the pilot study group, consisting of 24 judokas under 16 years old. Table (7) illustrates the findings.

The results indicate that there are no statistically significant differences between the experimental and control groups in the skill performance level (nagy –komi), as shown by the Mann–Whitney z-scores (0.707 :0.109). The values suggest a balanced performance distribution performance distribution, indicating similar developmental levels between both groups in the evaluated skills.

**Table 7. Significance of differences in the skill performance level (uchi-komi) evaluation form between the experimental and control groups using the Mann–Whitney test (n1=n2=8)**

Tests	Group	Mean	SD	Mean rank	Total rank	Z-score
Ouchi gari (15 sec)	Control	7.38	0.74	8.938	72	0.403
	Experimental	7.25	0.71	8.063	65	
Ouchi gari (30 sec)	Control	10.50	0.53	9.250	74	0.707
	Experimental	10.25	0.71	7.750	62	
Ouchi gari (45 sec)	Control	19.50	1.51	8.625	69	0.109
	Experimental	19.38	1.30	8.375	67	
Ouchi gari (60 sec)	Control	24.50	1.41	8.750	70	0.217
	Experimental	24.38	1.06	8.250	66	
Ippon seoi nage (15 sec)	Control	8.38	0.52	9.000	72	0.522
	Experimental	8.25	0.46	8.000	64	
Ippon seoi nage (30 sec)	Control	14.38	0.74	8.938	72	0.403
	Experimental	14.25	0.71	8.063	65	
Ippon seoi nage (45 sec)	Control	21.63	0.52	9.188	74	0.648
	Experimental	21.50	0.76	7.813	63	
Ippon seoi nage (60 sec)	Control	28.63	0.74	8.938	72	0.388
	Experimental	28.50	1.31	8.063	65	

Skill Tests

The authors conducted a comprehensive review of available references and studies in the field of judo to identify the tests used to assess the skill performance level of judokas. After selecting the appropriate tests, they were presented to a group of experts to choose the most suitable ones for the nature of the study.

Pilot Studies

The pilot study was conducted from Sunday, August 3, 2024, to Tuesday, August 5, 2024. The results of the first pilot study confirmed the following:

- The scientific validity and reliability of the tests used in the study.
- The suitability of the equipment and tools used in the research.
- Potential errors that may arise during the test procedures to prevent them in the main study.
- The trial of some training program units.

Validity of the tests

In order to test the validity of the tests, the authors calculated the differences between a distinguish group and the other non-distinguish measurements of the physical variables tests of total (8) wrestlers into two groups (the pilot groups).



Table (8) shows that there are statistical significance differences between the distinguish and non-distinguish group in the studied physical variables in favor of the distinguish group, which gives a direct indication of the validity of these tests.

Table 8. Validity coefficients of the physical tests (n1=n2=8)

Test	Mean (Distinguished Group)	SD (Distinguished Group)	Mean (Non-Distinguished Group)	SD (Non-Distinguished Group)	T-Value	Eta Squared (η^2)	Square Root (η)
Push-ups (Rep)	12.05	0.78	8.55	0.58	10.05	0.878	0.937
Sit-ups (Rep)	32.40	2.25	22.29	1.07	11.05	0.897	0.947
Standing Broad Jump (Cm)	206.57	12.10	162.55	9.29	7.68	0.808	0.899
Bridge (Cm)	62.05	3.88	54.18	1.18	5.20	0.659	0.812
50m Sprint (Sec)	6.48	0.35	7.58	0.40	6.48	0.750	0.866
800m Run (Min)	2.68	0.20	3.41	0.18	9.49	0.865	0.930
Static Equilibrium (Min)	2.45	0.18	1.40	0.15	16.59	0.952	0.976
Agility (Agility Barb) (Sec)	10.55	1.25	7.55	0.57	6.08	0.725	0.852

The Eta Squared (η^2) values indicate that all tests have a significant effect size, suggesting clear differences between the distinguished and non-distinguished groups. The high values confirm the internal validity of the tests, reflecting their accuracy in distinguishing between groups. The highest Eta Squared value was in the Static Equilibrium test (0.952), demonstrating its strong discriminatory power, whereas the lowest was in the Bridge test (0.659), which is still within the acceptable range. Overall, the results affirm the reliability of these tests in assessing physical abilities

Reliability of physical tests

To ensure the reliability of the physical tests used in the research, the Test-Retest method was applied, the tests were administered to a sample of (8) players under the age of 16 from the non-elite grope, the same tests were repeated one week later under identical conditions, and the results were statistically analyzed to calculate reliability coefficients.

The validity coefficient of the form for evaluating skill performance level (uchi- komi) was calculated to determine the construct to determine the construct validity by applying it to the pilot study group. The sample was divided into distinguished and non-distinguished groups.



Table 9. Validity coefficients of the physical tests (n=8)

Tests	Test		Re-Test		R-value*
	Mean	±SD	Mean	±SD	
Push-ups (Rep)	8.55	0.58	8.66	0.56	0.79
Sit-ups (Rep)	22.29	1.06	22.55	0.95	0.78
Standing Broad Jump (Cm)	162.55	9.29	163.16	5.95	0.86
Bridge (Cm)	54.15	1.18	54.29	1.19	0.98
50m Sprint (Sec)	7.59	0.39	7.51	0.39	0.96
800m Run (Min)	3.40	0.15	3.38	0.17	0.97
Static Equilibrium (Min)	1.40	0.16	1.46	0.15	0.85
Agility (Agility Barb) (Sec)	7.57	0.55	7.65	0.56	0.79

Table 10. Significance of differences using Mann-Whitney test between the distinguished and non- distinguished groups in skill performance level (uchi-komi) (n1=n2=8)

Test	Group	Mean	SD	Rank Mean	Rank Sum	Z-Value *	Eta Squared (η^2)	Square Root (η)
Ouchi gari (15 sec)	Non-Distinguished	10.00	1.05	4.5	35	3.430	0.882	0.939
	Distinguished	14.48	0.51	12.5	100			
Ouchi gari (30 sec)	Non-Distinguished	20.47	1.05	4.5	35	3.480	0.886	0.941
	Distinguished	26.20	0.86	12.5	100			
Ouchi gari (45 sec)	Non-Distinguished	30.20	0.70	4.5	35	3.452	0.884	0.940
	Distinguished	36.11	0.63	12.5	100			
Ouchi gari (60 sec)	Non-Distinguished	43.11	1.10	4.5	35	3.426	0.881	0.938
	Distinguished	52.60	0.72	12.5	100			
Ippon seoi nage (15 sec)	Non-Distinguished	12.00	0.92	4.5	35	3.450	0.885	0.941
	Distinguished	17.24	1.02	12.5	100			
Ippon seoi nage (30 sec)	Non-Distinguished	22.24	0.71	4.5	35	3.610	0.896	0.946
	Distinguished	29.00	0.52	12.5	100			
Ippon seoi nage (45 sec)	Non-Distinguished	33.12	0.63	4.5	35	3.442	0.883	0.940
	Distinguished	40.12	1.12	12.5	100			
Ippon seoi nage (60 sec)	Non-Distinguished	47.12	0.97	4.5	35	3.422	0.880	0.938
	Distinguished	55.12	1.12	12.5	100			



The Eta Squared (η^2) values in this table confirm the presence of significant differences between the distinguished and non-distinguished groups across all tests. The high values support the internal validity of the measurements, indicating their reliability in assessing physical performance. The highest Eta Squared value was found in the Ippon Seoi Nage (30 sec) test (0.896), demonstrating its strong ability to differentiate between groups, while the lowest was in the Ippon Seoi Nage (60 sec) test (0.880), which remains within the acceptable range. These results validate the effectiveness of these tests in distinguishing athletic capabilities.

The validity coefficient of the form for evaluating skill performance level (uchi-komi) was calculated to determine the construct to determine the construct validity by applying it to the pilot study group. The participants were divided into distinguished and non-distinguished groups.

Table 11. Significance of differences using Mann-Whitney test between the distinguished and non-distinguished groups in skill performance level (uchi-komi) (n1=n2=8)

Tests	Group	Mean	SD	Mean rank	Total rank	Z-score
Ouchi gari (15 sec)	Non-distinguished	10.00	1.05	4.5	35	3.430
	Distinguished	14.48	0.51	12.5	100	
Ouchi gari (30 sec)	Non-distinguished	20.47	1.05	4.5	35	3.480
	Distinguished	26.20	0.86	12.5	100	
Ouchi gari (45 sec)	Non-distinguished	30.20	0.70	4.5	35	3.452
	Distinguished	36.11	0.63	12.5	100	
Ouchi gari (60 sec)	Non-distinguished	43.11	1.10	4.5	35	3.426
	Distinguished	52.60	0.72	12.5	100	
Ippon seoi nage (15 sec)	Non-distinguished	12.00	0.92	4.5	35	3.450
	Distinguished	17.24	1.02	12.5	100	
Ippon seoi nage (30 sec)	Non-distinguished	22.24	0.71	4.5	35	3.610
	Distinguished	29.00	0.52	12.5	100	
Ippon seoi nage (45 sec)	Non-distinguished	33.12	0.63	4.5	35	3.442
	Distinguished	40.12	1.12	12.5	100	
Ippon seoi nage (60 sec)	Non-distinguished	47.12	0.97	4.5	35	3.422
	Distinguished	55.12	1.12	12.5	100	

* The tabulated R-value at (df = 6) at 0.05 (one-tailed) = 0.622.

From Table (12), the reliability coefficients for the test-retest procedure ranged between (0.75 to 0.95), which are statistically significant at the 0.05 level, confirming the reliability of these physical tests.



Table 12. Correlation coefficient between the initial and re-test application of the skill performance (uchi komi) (n=8)

Variable	Unit	Test		Re-test		Difference between the two means	R-value
		Mean	±SD	Mean	±SD		
Ouchi gari (15 sec)	Rep	10.00	1.05	10.10	0.98	0.12	*0.94
Ouchi gari (30 sec)	Rep	20.48	1.05	20.22	1.38	0.24	*0.96
Ouchi gari (45 sec)	Rep	30.22	0.69	30.22	1.03	0.00	*0.88
Ouchi gari (60 sec)	Rep	43.10	1.10	42.86	1.35	0.24	*0.85
Ippon seoi nage (15 sec)	Rep	12.00	0.91	12.11	0.63	0.12	*0.96
Ippon seoi nage (30 sec)	Rep	22.24	0.70	22.12	0.82	0.12	*0.91
Ippon seoi nage (45 sec)	Rep	33.12	0.62	33.00	0.52	0.12	*0.83
Ippon seoi nage (60 sec)	Rep	47.12	0.97	47.12	0.63	0.00	*0.87

Table 13. Significance of differences using maan-whitny test between the distinguished and non-distinguished groups in skill performance level evaluation form (nage-komi) (n1=n2=8)

Test	Group	Mean	SD	Rank Mean	Rank Sum	Z-Value *	Eta Squared (η^2)	Square Root (η)
Ouchi Gari (15 sec) (Rep)	Non-Distinguished	6.88	0.83	4.5	36	3.406	0.880	0.938
	Distinguished	11.13	0.83	12.5	100			
Ouchi Gari (30 sec) (Rep)	Non-Distinguished	10.00	0.76	4.5	36	3.414	0.881	0.939
	Distinguished	14.00	0.93	12.5	100			
Ouchi Gari (45 sec) (Rep)	Non-Distinguished	18.88	0.83	4.5	36	3.406	0.880	0.938
	Distinguished	24.00	0.93	12.5	100			
Ouchi Gari (60 sec) (Rep)	Non-Distinguished	24.00	0.93	4.5	36	3.406	0.880	0.938
	Distinguished	32.13	0.83	12.5	100			
Ippon Seoi Nage (15sec) (Rep)	Non-Distinguished	7.88	0.83	4.5	36	3.406	0.880	0.938
	Distinguished	12.00	0.93	12.5	100			
Ippon Seoi Nage (30 sec) (Rep)	Non-Distinguished	13.88	0.83	4.5	36	3.398	0.879	0.937
	Distinguished	19.25	1.04	12.5	100			
Ippon Seoi Nage (45 sec) (Rep)	Non-Distinguished	21.13	0.83	4.5	36	3.406	0.880	0.938
	Distinguished	26.00	0.93	12.5	100			
Ippon Seoi Nage (60 sec) (Rep)	Non-Distinguished	28.13	1.13	4.5	36	3.398	0.879	0.937
	Distinguished	36.13	0.83	12.5	100			



The Eta Squared (η^2) values in this table confirm the presence of significant differences between the distinguished and non-distinguished groups across all tests. The high values support the internal validity of the measurements, indicating their reliability in assessing physical performance. The highest Eta Squared value was found in the Ouchi Gari (30 sec) test (0.881), demonstrating its strong ability to differentiate between groups, while the lowest was in the Ippon Seoi Nage (30 sec) test (0.879), which remains within the acceptable range, These results validate the effectiveness of these tests in distinguishing athletic capabilities.

Table 14. The significance of differences using the Mann-Whitney test between distinguished and non-distinguished groups in the skill performance (uchi komi) (n=8)

Variable	Unit	Test		Re-Test		Difference between the two means	R-value
		Mean	±SD	Mean	±SD		
Ouchi gari (15 sec)	Rep	6.88	0.83	6.75	0.71	0.13	*0.91
Ouchi gari (30 sec)	Rep	10.00	0.76	9.88	0.83	0.13	*0.91
Ouchi gari (45 sec)	Rep	18.88	0.83	18.63	0.74	0.25	*0.83
Ouchi gari (60 sec)	Rep	24.00	0.93	23.88	0.83	0.13	*0.92
Ippon seoi nage (15 sec)	Rep	7.88	0.83	7.75	0.71	0.13	*0.91
Ippon seoi nage (30 sec)	Rep	13.88	0.83	13.75	1.04	0.13	*0.95
Ippon seoi nage (45 sec)	Rep	21.13	0.83	21.00	0.93	0.13	*0.92
Ippon seoi nage (60 sec)	Rep	28.13	1.13	28.00	0.93	0.13	*0.96

These results confirm the reliability of the applied physical tests, supporting their validity for use in the main study.

Main Study

1. Pre-measurements

The participants were tested as pre-measurements from Wednesday, August 6, 2024, to Saturday, August 9, 2024, where:

- Physical Measurements were on August 6, 2024
- Skill Measurements through conditional competitive matches were on August 7, 2024

2. Main Program

The training program was designed based on reviewing previous studies on judo training programs and expert consultations with judo coaches and sports training specialists.

The program aims to develop specific physical abilities and enhance the skill performance of (Uchi-komi and Nage-komi) of judokas under 16years.

Average intensity of the training was 87.52% of maximal effort. Training methods was the Interval training (low-intensity & high-intensity).



Training Program duration was 12 weeks (3 months), each training Session was 90 minutes, the participants trained 3 sessions per week (Saturday, Monday, Wednesday)

The proposed training program was implemented at the beginning of the specific preparation period and before the competitions of the training season. The randori exercises were applied in the skill part to the experimental group for three months, with three training units per week on training days (Saturday, Monday, and Wednesday) from August 11, 2024, to November 10, 2024.

3. Post measurements

Post-measurements were conducted for both the experimental and control of , the same tests and the same conditions as the pre-measurements were done, from Monday, November 11, 2024, to Thursday, November 14, 2024. The tests were distributed over the four days (Monday, Tuesday, Wednesday, and Thursday).

- Physical Measurements were on November 11, 2024
- Skill Measurements through conditional competitive matches were on November 13 and 14, 2024

Tools and devices

- Expert opinion surveys (validated by 10 experts).
- Standardized skill and physical ability tests (validated for accuracy and reliability).
- Equipment Used
- Rasta meter for height measurement.
- Electronic medical scale for weight measurement.
- Judo mat for skill performance tests.
- Stopwatch for timing speed and endurance tests.
- Skill Performance Tests

Statistical Analysis

According to the study objectives and hypotheses, the authors used the statistical program (SPSS) to process the data and employed the following statistical methods:

- * Mean - Skewness coefficient
- * Standard deviation - Mann-Whitney test
- * Median - Wilcoxon test
- * Improvement rate using percentage %.

Results and Discussion

Based on the research objectives and hypotheses, the authors presented and discussed the results. Tables (15, 16, and 17) illustrate the differences between the pre- and post-measurements for the control group in physical tests and skill performance evaluation (Uchi komi – Nage Komi) for the studied skills. The results indicate an improvement in favor of the post-measurement.



Table 15. The significance of differences and improvement rates between the means of pre-and post-measurements for the participants in the physical tests (n=8)

Tests	Pre-measurement		Post-measurement		T-value	Improvement rate%
	Mean	±SD	Mean	±SD		
Push-ups (Rep)	8.38	0.54	10.65	0.94	* 5.68	% 26.89
Sit-ups (Rep)	22.12	0.85	26.40	0.76	* 10.08	% 19.25
Standing Broad Jump (Cm)	161.90	8.45	183.77	7.46	* 5.17	% 13.53
Bridge (Cm)	54.02	1.09	52.77	0.91	* 2.40	% 2.33
50m Sprint (Sec)	7.54	0.25	6.96	0.24	* 4.87	% 7.75
800m Run (Min)	3.40	0.15	3.03	0.13	* 5.78	% 10.76
Static Equilibrium (Min)	1.42	0.14	1.67	0.15	* 3.89	% 17.88
Agility (Agility Barb) (Sec)	7.27	0.73	8.02	0.55	* 2.26	% 10.36

Table 16. The significance of differences and improvement rates between the means of pre-and post-measurements for the experimental group in physical tests rated to technical performance (uchi komi) (n=8)

Variable	Pre-measurement		Post-measurement		Mean ranks		Sum of ranks		Z-value	Improvement rate%
	Mea/	±SD	Mea/	±SD	-	+	-	+		
Ouchi Gari (15 sec) (Rep)	10.25	0.89	11.25	0.89	0.00	4.00	0.00	28.00	*2.530	%9.76
Ouchi gari (30 sec) (Rep)	21.00	0.53	23.00	0.53	0.00	4.50	0.00	36.00	*2.558	%9.52
Ouchi Gari (30 sec) (Rep)	30.75	0.71	32.50	0.76	0.00	4.50	0.00	36.00	*2.565	%5.69
Ouchi gari (60 sec) (Rep)	43.50	0.76	45.25	1.04	0.00	3.50	0.00	21.00	*2.226	%4.02
Ouchi Gari (45 sec) (Rep)	12.38	0.52	14.00	0.93	0.00	4.50	0.00	36.00	*2.565	%13.13
Ippon seoi nage (30 sec) (Rep)	23.25	1.39	25.63	1.06	0.00	4.50	0.00	36.00	*2.536	%10.22
Ouchi Gari (60 sec) (Rep)	33.63	1.30	35.50	0.76	0.00	4.00	0.00	28.00	*2.392	%5.58
Ippon seoi nage (60 sec) (Rep)	47.63	0.52	50.25	0.89	0.00	4.50	0.00	36.00	*2.539	%5.51

**Table 17. The significance of differences and improvement rates between the means of pre-and post-measurements for the experimental group in physical tests rated to technical performance (Nagy- komi) (n=8)**

Variable	Pre-measurement		Post-measurement		Mean ranks		Sum of ranks		Z-value	Improvement rate %
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		
Ouchi Gari (15 sec) (Rep)	7.38	0.74	8.50	0.53	0.00	3.50	0.00	21.00	*2.251	15.25
Ouchi gari (30 sec) (Rep)	10.50	0.53	11.75	0.46	0.00	4.50	0.00	36.00	*2.640	11.90
Ouchi Gari (30 sec) (Rep)	19.50	1.51	21.38	0.74	1.00	4.00	1.00	20.00	*2.003	9.62
Ouchi gari (60 sec) (Rep)	24.50	1.41	26.50	0.93	0.00	4.00	0.00	28.00	*2.388	8.16
Ouchi Gari (45 sec) (Rep)	8.38	0.52	9.88	0.35	0.00	4.50	0.00	36.00	*2.585	17.91
Ippon seoi nage (30 sec) (Rep)	14.38	0.74	16.50	0.76	0.00	4.50	0.00	36.00	*2.539	14.78
Ouchi Gari (60 sec) (Rep)	21.63	0.52	24.25	0.71	0.00	4.50	0.00	36.00	*2.588	12.14
Ippon seoi nage (60 sec) (Rep)	28.63	0.74	31.63	0.52	0.00	4.50	0.00	36.00	*2.636	10.48

Authors attribute the progress of the control group in the post-measurement for all studied variables (physical and skill-related) to the traditional training program. This program included common training methods used by most coaches but did not exploit training in a detailed manner using uchi komi and Nage Komi training methods and specific physical exercises as applied to the experimental group.

According to Mohamed Shaddad et al. (2007), a judo player must take advantage of the opponent's attack by using their momentum and disrupting their balance to counterattack and win matches. Ahmed Abu Al-Fadl Hegazy (2006) emphasizes that specific physical abilities play a crucial role in all phases of technical skills in judo, including balance, initiating the movement, and the final execution (throwing). Thus, the degree of improvement in post-test results determines the level of progress.

Therefore, the researcher confirms that the first research hypothesis has been achieved, which states: "*There are statistically significant differences in the control group between the pre- and post-measurements in skill performance and specific physical abilities for of judokas, favoring the post-measurement.*"



Tables (18, 19, and 20) illustrate the differences between the experimental and control groups, as well as the differences between the pre- and post-measurements for the control group in physical tests and skill performance evaluation ((uchi komi) – Nage Komi) for the studied skills. The results indicate an improvement in favor of the post-measurement for the experimental group.

Table 18. The significance of differences and improvement rates between the means of pre-and post-measurements for the participants in selected physical tests (n=8)

Tests	Pre-measurement		Post-measurement		T-value	Improvement rate%
	Mean	±SD	Mean	±SD		
Push-ups (Rep)	8.38	0.54	10.65	0.94	* 5.68	26.89
Sit-ups (Rep)	22.12	0.85	26.40	0.76	* 10.08	19.25
Standing Broad Jump (Cm)	161.90	8.45	183.77	7.46	* 5.17	13.53
Bridge (Cm)	54.02	1.09	52.77	0.91	* 2.40	2.33
50m Sprint (Sec)	7.54	0.25	6.96	0.24	* 4.87	7.75
800m Run (Min)	3.40	0.15	3.03	0.13	* 5.78	10.76
Static Equilibrium (Min)	1.42	0.14	1.67	0.15	* 3.89	17.88
Agility (Agility Barb) (Sec)	7.27	0.73	8.02	0.55	* 2.26	10.36

Table 19. The significance of differences and improvement rates between the means of pre-and post-measurements for the experimental group in physical tests rated to the technical performance (uchi komi) (n=8)

Variable	Pre-measurement		Post-measurement		Mean ranks		Sum of ranks		Z-value *	Improvement rate%
	Mean	±SD	Mean	±SD	-	+	-	+		
Ouchi Gari (15 sec) (Rep)	10.25	0.89	11.25	0.89	0.00	4.00	0.00	28	2.530	%9.76
Ouchi gari in (30 sec) (Rep)	21.00	0.53	23.00	0.53	0.00	4.50	0.00	36	2.558	%9.52
Ouchi Gari (30 sec) (Rep)	30.75	0.71	32.50	0.76	0.00	4.50	0.00	36	2.565	%5.69
Ouchi gari in (60 sec) (Rep)	43.50	0.76	45.25	1.04	0.00	3.50	0.00	21	2.226	%4.02
Ouchi Gari (45 sec) (Rep)	12.38	0.52	14.00	0.93	0.00	4.50	0.00	36	2.565	%13.13
Ippon seoi nage (30 sec) (Rep)	23.25	1.39	25.63	1.06	0.00	4.50	0.00	36	2.536	%10.22
Ouchi Gari (60 sec) (Rep)	33.63	1.30	35.50	0.76	0.00	4.00	0.00	28	2.392	%5.58
Ippon seoi nage (60 sec) (Rep)	47.63	0.52	50.25	0.89	0.00	4.50	0.00	36	2.539	%5.51



Table 20. The significance of differences and improvement rates between the means of pre-and post-measurements for the experimental group in physical tests rated to the technical performance (Nagy- komi) (n=8)

Variable	Pre-measurement		Post-measurement		Mean ranks		Sum of ranks		Z-value	Improvement rate%
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		
Ouchi Gari (15 sec) (Rep)	7.38	0.74	8.50	0.53	0.00	3.50	0.00	21.00	2.251	15.25
Ouchi gari in (30 sec) (Rep)	10.50	0.53	11.75	0.46	0.00	4.50	0.00	36.00	2.640	11.90
Ouchi Gari (30 sec) (Rep)	19.50	1.51	21.38	0.74	1.00	4.00	1.00	20.00	2.003	9.62
Ouchi gari in (60 sec) (Rep)	24.50	1.41	26.50	0.93	0.00	4.00	0.00	28.00	2.388	8.16
Ouchi Gari (45 sec) (Rep)	8.38	0.52	9.88	0.35	0.00	4.50	0.00	36.00	2.585	17.91
Ippon sei nage (30 sec) (Rep)	14.38	0.74	16.50	0.76	0.00	4.50	0.00	36.00	2.539	14.78
Ouchi Gari (60 sec) (Rep)	21.63	0.52	24.25	0.71	0.00	4.50	0.00	36.00	2.588	12.14
Ippon sei nage (60 sec) (Rep)	28.63	0.74	31.63	0.52	0.00	4.50	0.00	36.00	2.636	10.48

The Comparison between the two groups revealed significant statistical differences in favor of the experimental group. This confirms that incorporating auxiliary training tools significantly enhances physical attributes and skill performance of judokas.

Authors attribute this improvement to the effectiveness of the training program, which instilled confidence in the players through the learning of various skills. This aligns with the findings of **Mohamed Hamed Shaddad (1996)**, who emphasized that a training program incorporating a variety of offensive and skill-based drills positively impacts learning, mastering, and integrating judo skills. This highlights the importance of motor integration as an indicator of increased skill performance among players.

This conclusion is consistent with the findings of **Hassan Sayed Moawad (2007)**, who noted that skill-based training fosters a sense of competition, which is essential for young athletes at this stage. The observed improvement can be attributed to the use of both physical and skill-based training, which enhances judo performance. Kazumi (1997) also indicated that rapid changes during matches necessitate both physical and technical preparation to execute techniques effectively in judo. Similarly, Westcott (1995) pointed out that physical abilities play a crucial role in improving technical performance, as they are an integral part of an athlete's preparation, influencing competition outcomes.



Based on these results, the researcher concludes that the second research hypothesis has been achieved, which states: *"There are statistically significant differences between the experimental and control groups in the post-measurements of skill performance and specific physical abilities for of judokas, favoring the post-measurement of the experimental group."*

Conclusion

Based on the previous research results, within the limits of the participant Groups, tools used, devices, and statistical analyses, the researcher arrived at the following conclusions:

1. Physical Abilities:

- Inclined Push-Ups Improvement Rate: 21.20%
- Sit-Ups (Squat Position) Improvement Rate: 17.08%
- Standing Broad Jump Improvement Rate: 10.02%
- Bridge (Kobri) Improvement Rate: 4.05%
- 50m Sprint Improvement Rate: 6.42%
- 800m Run Improvement Rate: 13.30%
- Static Balance Improvement Rate: 14.04%
- Agility Improvement Rate: 9.40%

2. (Uchi komi) Performance:

- Ouchi-Gari (15 sec) Improvement Rate: 16.49%
- Ouchi-Gari (30 sec) Improvement Rate: 10.05%
- Ouchi-Gari (45 sec) Improvement Rate: 5.90%
- Ouchi-Gari (1 min) Improvement Rate: 4.43%
- Ippon Seoi-Nage (15 sec) Improvement Rate: 14.41%
- Ippon Seoi-Nage (30 sec) Improvement Rate: 7.94%
- Ippon Seoi-Nage (45 sec) Improvement Rate: 5.28%
- Ippon Seoi-Nage (1 min) Improvement Rate: 4.01%

3. Nage Komi Performance:

- Ouchi-Gari (15 sec) Improvement Rate: 16.18%
- Ouchi-Gari (30 sec) Improvement Rate: 14.89%
- Ouchi-Gari (45 sec) Improvement Rate: 9.36%
- Ouchi-Gari (1 min) Improvement Rate: 8.96%
- Ippon Seoi-Nage (15 sec) Improvement Rate: 18.99%
- Ippon Seoi-Nage (30 sec) Improvement Rate: 15.91%
- Ippon Seoi-Nage (45 sec) Improvement Rate: 7.22%
- Ippon Seoi-Nage (1 min) Improvement Rate: 6.72%

Recommendations

1. Implement the proposed training program on the same age group in different regions.



2. Guide coaches to use the skill performance evaluation form for training methods (uchi komi) – Nage Komi) before designing training programs.
3. Utilize the experimental group's training program to enhance the physical and skill performance of of judokas at different age stages.

References

- Abdel Fattah, A.** (1997). *Principles of sports training: Physiological foundations*. Dar Al-Fikr Al-Arabi.
- Abdel Halim, M. A.** (2013). *Modern methods for teaching judo*. Dar Al-Wafa for Printing and Publishing.
- Abdel Maqsood, S.** (1997). *Theories of sports training – Strength training and physiology*. The Book Publishing Center.
- Abdel Nabi, D. A.** (2024). The effect of S.A.Q training on specific physical abilities and the level of some complex skills in young judo players. *Scientific Journal of Physical Education, Tanta University*.
- Ali, M.** (2015). *Physical abilities and their importance in sports*. Dar Al-Fikr Al-Arabi.
- Allawi, M. H., & Abdel Fattah, A.** (1984). *Physiology of sports training*. Dar Al-Fikr Al-Arabi.
- Hegazy, A. A. F.** (2006). *Theoretical and practical foundations of judo*. Dar Al-Maaref.
- Shadad, M. H.** (1996). *Physical, skill, and psychological variables contributing to the performance level of judo players* [Unpublished doctoral dissertation]. Faculty of Physical Education, Helwan University.