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Effect of SAQ Training With & Without Carbohydrate Supplementation in Elite Footballers

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ABSTRACT

Aim of the Study: The main objectives of research study were to evaluate the changes in performance (speed, agility and quickness) through SAQ training alone and combination of SAQ training with carbohydrate supplementation of 8 weeks intervention.

Methodology: The study was conducted in the vicinity of Punjab University, Lahore. Participants (n=16) were selected through the inclusion criteria which included elite footballers and the participants were divided in two groups which were group (A) and (B). Group (A) allowed following the 8 weeks exercise plan (intervention) and carbohydrate supplementation. Only the group (B) was allowed to follow the 08 weeks exercise plan (intervention). Descriptive statistics means and standard deviations were calculated. The inferential statistics, different test including paired sample t-test and independent samples t-test were applied to calculate the differences in performance of all studied groups. The data was analyzed and evaluated statistically using Version 22 of IBM SPSS software.

Findings: This study confirms that there was not a significant difference between groups (A) and (B) before Training and carbohydrate supplementation. There was a significant difference in speed, agility and quickness, pre-test of group (A) compared with post-test, followed by SAQ Training with carbohydrate supplementation. On the other hand, there was also a significant difference in speed, agility and quickness, pre-test of group B compared with post-test, followed by SAQ Training only.

Conclusion: The study concluded that there was a significant change in speed and agility but negligible change in quickness of footballers training with carbohydrate supplementation group (A) compared to training without carbohydrate supplementation group (B), after 08 week of intervention.

Keywords: SAQ Training; Carbohydrate supplementation; Speed, Agility and Quickness; Elite Football Players.

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Introduction

In today's sports world, elite football players are always looking for ways to improve performance on the field. One training technique that has received a lot of attention is Speed, Agility and Quickness (SAQ) training. SAQ training is a rigorous form of conditioning that focuses on boosting an athletes speed, agility, reaction time and overall quickness. Infect, the rehabilitation protocols of agile athletes ended with these parameters (Gill et al., 2021). It includes a range of drills and exercises that replicate the movements and requirements to football (Lennemann et al., 2013).

In the realm of contemporary sports elite football players consistently work towards improving their performance and gaining an advantage over their opponents. Among the training methods at their disposal there exists a highly sought after approach known as Speed, Agility and Quickness (SAQ) training. SAQ training is an intensive form of conditioning meticulously crafted to enhance an athletes speed, agility, reaction time and overall quickness all essential qualities for triumph, in football (Jovanovic., et al., 2011)

The main objective of SAQ training is to enhance an athlete's capacity to swiftly alter direction increase speed and react promptly to circumstances that commonly occur on the football field. Football is recognized as one of the demanding and fast paced team sports, need strength, speed and balance for athletes to possess exceptional physical abilities in order to excel in different game scenarios (Zoran Milanovic et al., 2013; Gill et al., 2024).

According to Kirkendall and Sayers (2020) exercises typically involve a combination of linear sprints, lateral movements, cutting and pivoting, multi-directional running and quick acceleration bursts. Coaches and sports scientists create structured training and core stability sessions that progressively challenge the athlete's speed, agility and quickness while closely simulating real-game scenarios (Gill et al., 2024).

One fundamental aspect of SAQ training is its adaptability to cater to specific football positions and individual player roles. Footballers' physical demands vary significantly depending on their positions, with defenders requiring quick reactions and lateral movements, midfielders needing both explosive bursts and endurance and forwards relying on rapid acceleration and precise footwork. Moreover, the benefits of SAQ training extend beyond improved physical attributes. The emphasis on dynamic movements and motor skill development contributes to enhancing an athlete's body awareness, coordination and proprioception the capability to judge the position and movement of one's body in air and on the ground. Such enhancements are essential for executing intricate football maneuvers with precision and efficiency (Robinson, 2010).

Furthermore, SAQ training fosters cognitive abilities as players must quickly process information, make split-second decisions and anticipate opponents' actions during training exercises. These cognitive skills translate directly into improved on-field performance, along with the help of supplements where players must think and react swiftly and efficiently in ever-changing game situations (Trecroci et al., 2022; Gill et al., 2022).

The incorporation of SAQ training into an elite footballer's training protocol requires careful planning and periodization. Training intensity, volume and frequency are adjusted according to the athlete's developmental stage, competition schedule and specific performance goals. As with any athletic training, the principles of progressive overload and recovery are essential to avoid overtraining and injury (Mkhize, 2018).

The focus is on creating a stimulating and challenging environment that pushes players to continually enhance their physical and cognitive abilities. To conclude, for elite football players, training in Speed, Agility and Quickness (SAQ) has become essential to their quest for perfection. Its specific emphasis on improving quickness, agility, reaction time, and general speed fits perfectly with football's dynamic style and the variety of physical demands players face during games (França et al., 2022).

Although the advantages of SAQ training are widely established, academics, coaches and athletes are now interested in learning more about how diet and supplements might optimize the efficacy of this training program (Gill et al., 2022). One important area of study is carbohydrate supplementation, which is essential for refueling muscles' glycogen reserves and enabling high-intensity activity. This research project's main goal is to examine and contrast the effects of SAQ training on elite football players' performance and physiological reactions with and without carbohydrate supplementation. The sole purpose of the study is to offer evidence-based insights into the possible advantages of consuming carbohydrates prior to SAQ training sessions and its implications for improving football players' athletic performance (Hills & Russell, 2017; Gill et al., 2022).

Football and other high-intensity sports require a lot of carbohydrates. The body's glycogen reserves are exhausted during prolonged or vigorous activity, which results in fatigue and decreased performance. Carbohydrate Supplementation in the form of sports drinks, gels, or bars can help keep glycogen levels stable, postpone exhaustion and increase total exercise capacity by doing aerobic exercise activities (Jager et al., 2017; Gill et al., 2024).

Carbohydrate Supplementation is now well recognized as an essential part of sports nutrition, especially when it comes to endurance-based activities where sustained energy expenditure is a major consideration. In the past, the focus has been on keeping muscles' glycogen levels high enough for long-duration activities like cycling or distance running. However, new research has shown that carbohydrates are also essential for maximizing performance during high-intensity, core stability exercises, intermittent activities, and polymeric which are typical of football and other sports (Guest et al., 2021). Such kind of exercises led to swear injury if it is not properly executed and chronic injury sometime led to obese by not burning calories and eating too much at rest (Gill et al., 2023).

Football has a variety of physical demands since players must sprint quickly, change directions quickly and accelerate quickly throughout a play. As the game expands, these intense bursts of activity lead to fatigue and reduced performance because the body's glycogen stores are depleting too rapidly. To perform at their best during practice and games, professional football players must maintain ideal energy levels and minimize the onset of fatigue with proper installation of stretching (Wang & Zhang, 2016; Tallet et al., 2018).

Carbohydrate Supplementation offers a substantial way to meet the unique energy requirements of game, high-intensity activities like football. Sports drinks, gels, or energy bars are easily obtainable types of carbohydrates that players can use to refuel their glycogen stores and maintain energy levels during the physically taxing parts of the game (Clyde Williams & Ian Rollo, 2015; Gill et al., 2022).

Carbohydrate Supplementation during football-related activity has advantages beyond just refueling glycogen. It has been demonstrated that the presence of carbohydrate in the circulation during activity spares the use of glycogen, postponing the onset of fatigue and saving energy for crucial game moments. This glycogen preservation is especially helpful at high-stress moments, such pivotal moments in a game or during overtime (Murray & Rosenbloom, 2018).

In order to conduct a thorough evaluation of the impacts of SAQ training both with and without carbohydrate supplementation, elite football players from Punjab University have been enlisted in the research. Participants were split into two groups at random: the first group participated in SAQ training sessions while receiving supplements for carbohydrates, and the second group received the identical SAQ training but without any supplements (Z. Milanovic et al., 2013).

Both groups' organized training protocols have been thoughtfully created to increase speed, agility and quickness. Particular drills and workouts are meant to replicate the demanding and dynamic motions that occur in football games. This kind of control over the training protocol would increase the likelihood that any performance disparities between the two groups were due to the effects of the carbohydrate supplementation rather than changes in the training stimulus (Zaharia et al., 2023).

It was anticipated that the results of this study would provide insight into the possible advantages of using carbohydrates as supplements to enhance speed, agility and quickness of professional football players. These findings may be used by coaches and athletes to create more efficient training plans that enhance performance and lower injury risk. In conclusion, research on the effects of SAQ training—both with and without carbohydrate supplementation among professional football players is an exciting field with important ramifications for the sports performance industry. Through the integration of targeted training and appropriate dietary practices, players have the opportunity to reach their maximum potential and achieve a competitive advantage in the football field (Z. Milanovic et al., 2013).

Additionally, the effects of supplementation with carbohydrates on SAQ training can benefit the larger fields of sports nutrition and research. The results of this study will guide future research and practical applications for athletes in a variety of sports disciplines by offering insightful information about the intricate interactions between dietary treatments and training adaptations (Kirkendall & Sayers, 2020). Standardized training techniques and strict subject selection criteria have also been put in place to help reduce the impact of these confounding variables. It is becoming clearer as sports nutrition develops that each athlete needs a customized strategy to maximize performance. The information acquired from this study might help customize carbohydrate supplementation plans according to the unique needs of each athlete, training protocol and schedule of matches (Verma et al., 2018).

This study may have consequences for injury prevention and player well-being in addition to its effect on sports performance. The musculoskeletal system is put under a lot of strain during SAQ training, and proper diet can speed up the healing and restoration process. By better understanding how signs of inflammation and muscle damage are affected by carbohydrate supplementation, recovery tactics can be enhanced, potentially lowering the incidence of overuse injuries among professional football players (Kloby Nielsen et al., 2020).

To sum up, examining the impact of SAQ training both with and without carbohydrate supplementation among professional football players is essential to maximizing athletic performance in one of the most demanding and well-liked sports in the world. This study has the potential to influence future training approaches, enhance athlete results, and further the fields of sports science and nutrition by examining the relationship between training and nutrition (Jovanovic., et al., 2011).

Recognizing that athletic performance is a complex process impacted by a wide range of elements is essential. An athlete's performance is greatly influenced by diet, training, recuperation, attitude and general lifestyle decisions. Therefore, to maximize the potential of elite football players and encourage greatness on the international football scene, a thorough and all-encompassing strategy to athlete development is necessary (Beck et al., 2015).

By understanding how nutrition interacts with SAQ training, we hoped to provide valuable insights that can optimize training protocols and support footballers in reaching their full potential on the field.

Study Objectives

To achieve the objectives of this study, a randomized controlled trial has conducted among elite footballers of Punjab University. Participants were divided into two groups: one undergoing SAQ training sessions with carbohydrate supplementation and the other without supplementation. Both groups have followed structured training protocols designed to improve their speed, agility and quickness.

Hypotheses

Hypotheses of this study were:

H_0 1 There is no significant difference between the pre-test of group A and pre-test of group B (speed, agility and quickness).

H_a 2 There is significant difference between the pre-test of group A and post-test of group A (speed, agility and quickness).

H_a 3 There is significant difference between the pre-test of group B and post-test of group B (speed, agility and quickness).

H_a 4 It is hypothesized that there is a significant difference between training with Supplementation group (A) and Training without Supplementation group (B).

Materials and Methods

The current research study was carried out at University of Punjab Lahore, Pakistan. Participants for this study were selected from the University of Punjab. In current experimental study, the effect of SAQ training with and without carbohydrate supplementation was evaluated among elite university football players. The participants followed an 8-week intervention/exercise routine and received carbohydrate supplements from May 5, 2023, to July 5, 2023. Throughout the trial, exercise was performed four days per week. The experiment was designed especially for elite footballers (Punjab University) on the base of inclusion criteria and convenience sampling was used for this purpose and participant size was kept 08 for each group (group A and group B). The pre and post-tests of both groups were measured before and after 8 week of intervention/exercise protocol and carbohydrate supplementation.

Data Analysis

To determine whether the data from pre intervention and post intervention test were different, the pre and post intervention data were analyzed using the appropriate descriptive statistical tools (mean and standard deviation)inferential test such (paired sample t-test and independent sample t-test in the SPSS (Statistical Product and Service Solutions) version 22 were used.

Table 1: *Description of Mean, standard deviation and pre-test score of speed, agility and quickness of group A*

Pre Intervention variables of Group A	**N**	**Mini**	**Maxi**	**$\bar{X}$**	**Std.**
Speed (sec)	08	6.14	6.70	6.34	.18
Agility (sec)	08	10.20	10.90	10.52	.25
Quickness (sec)	08	9.13	10.79	10.30	.59

$\bar{X}$ = Mean, std. = Standard deviation

Table 1 shows the mean and std. values of speed (sec), agility (sec), and quickness (sec) for 08 football players. Before intervention and supplementation the football players' status of speed, agility and quickness. The mean and standard deviation values of Group A regarding the above-mentioned variables were: Speed 6.34±.18, the value agility 10.52±.25, and similarly the value of quickness was 10.30±.59 respectively.

Table 2: *Description of Mean, standard deviation and post-test score of speed, agility and quickness of group A.*

Post-Intervention variables of Group A	**N**	**Mini**	**Maxi**	**$\bar{X}$**	**Std.**
Speed (sec)	08	5.25	5.65	5.41	.13
Agility (sec)	08	9.30	9.65	9.50	.14
Quickness(sec)	08	9.07	10.18	9.78	.38

$\bar{X}$ = Mean, std. = Standard deviation

Table 2 shows the mean and std. values of speed (sec), agility (sec), and quickness (sec) for 08 football players. After intervention, the football players' status of speed, agility and quickness. The mean and

standard deviation values of Group A regarding the above-mentioned variables were: Speed 5.41±.13, the value agility 9.50±.14, and similarly the value of quickness was 9.78±.38 respectively.

Table 3: *Description of Mean, standard deviation and pre-test score of speed, agility and quickness of group B*

Pre-Intervention variables of Group B	**N**	**Mini**	**Maxi**	**$\bar{X}$**	**Std.**
Speed (sec)	08	6.20	6.60	6.40	15
Agility (sec)	08	10.20	10.60	10.39	.12
Quickness(sec)	08	10.32	11.01	10.56	.22

$\bar{X}$ = Mean, std. = Standard deviation

Table 3 shows the mean and std. values of speed (sec), agility (sec), and quickness (sec) for 08 football players. Before intervention, the football players' status of speed, agility and quickness. The mean and standard deviation values of Group B regarding the above-mentioned variables were: Speed 6.40±.15, the value agility 10.39±.12, and similarly the value of quickness was 10.56±.22 respectively.

Table 4: *Description of Mean, standard deviation and post-test score of speed, agility and quickness of group B.*

Post-Intervention variables of Group B	**N**	**Mini**	**Maxi**	**$\bar{X}$**	**Std.**
Speed (sec)	08	5.10	5.95	5.75	.27
Agility (sec)	08	9.65	9.95	9.79	.11
Quickness(sec)	08	9.36	10.18	9.66	.29

$\bar{X}$ = Mean, std. = Standard deviation

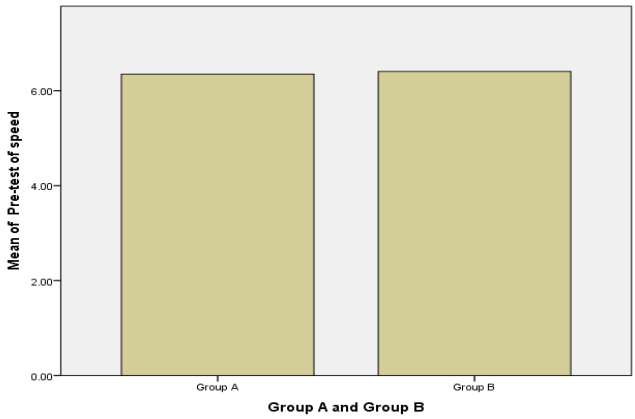
Table 4 shows the mean and std. values of speed (sec), agility (sec), and quickness (sec) for 08 football players. After intervention, the players' status of speed, agility and quickness changed. The mean and standard deviation values of Group B regarding the above-mentioned variables were: Speed 5.75±.27, the value agility 9.79±.11, and similarly the value of quickness was 9.66±.29 respectively.

Table 5: *independent sample t-test showing the difference of speed between pre-test of Group A and pre-test of Group B.*

Testing Variable	**Group**	**$\bar{x}$**	**Std.**	**N**	**Df**	**T**	**Sig.**
Speed	A	6.34	.186	8	14	-.645	.530
Speed	B	6.40	.152	8			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 1: *Bar graph showing difference of speed between pre-test of Group A and pre-test of Group B.*



The above table 5 shows the difference of speed football players of group A and B Pre-intervention. An independent sample t-test showed the speed of football players of group A and B Pre-intervention. There is no significant variance was found in speed values pre-intervention of both group, the pre- speed value of group A was (M =6.34, SD =.18) to the pre speed of group B (M =6.40, SD=.15; t (-.645) = 1.91, p =.530 > significant level = 0.05).Figure 1 also demonstrates the detailed data of speed of both groups A and B, before the intervention. On X-axis it shows the speed values of both groups and on Y-axis the mean score of speed which is same for group A and B. the graph shows there is no difference in speed of both groups. It depicts that no significant difference between the pre-test of group A speed and pre-test of group B speed.

Table 6: *independent sample t-test showing the difference of agility between pre-test of Group A and pre-test of Group B.*

Testing Variable	Group	$\bar{x}$	Std.	N	Df	T	Sig.
Agility	A	10.52	.25	8	14	-.645	0.222
Agility	B	10.39	.12	8			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 2: *Bar graph showing difference of agility between pre-test of Group A and pre-test of Group B*

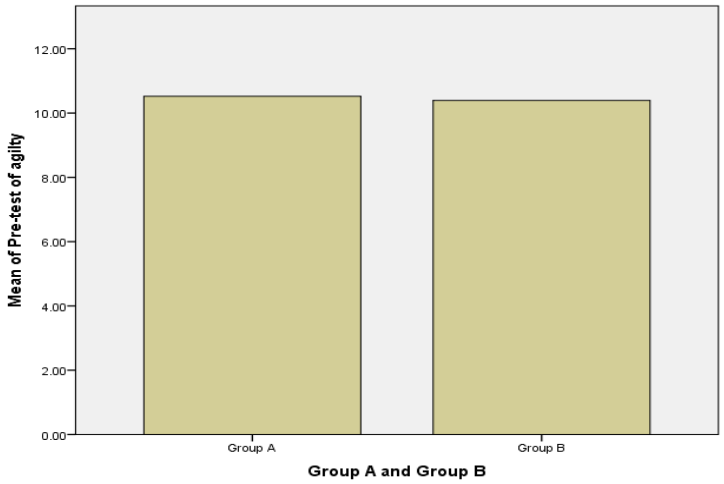


Table 6 demonstrates that there is no substantial variance was found in agility values pre-intervention of both group A and B, the pre-agility value was recorded (M =10.52, SD =.25) to pre-agility of group B (M =10.39, SD =.12; t (-.645), p =.222 > significant level = 0.05).Figure 2 also demonstrates the detailed data of agility of both groups A and B, before the intervention. On X-axis it shows the agility values of both groups and on Y-axis the mean score of agility which is same for group A and B. the graph shows there is no difference in agility of both groups. There is no significant difference between the pre-test of group A agility and pre-test of group B agility.

Table 7: *independent sample t-test showing the difference of quickness between pre-test of Group A and pre-test of Group B.*

Testing Variable	Group	$\bar{x}$	Std.	N	Df	T	Sig.
Quickness	A	10.30	0.59	8	8.99	-1.17	0.272
Quickness	B	10.56	0.22	8			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 3: *Bar graph showing difference of quickness between pre-test of Group A and pre-test of Group B*

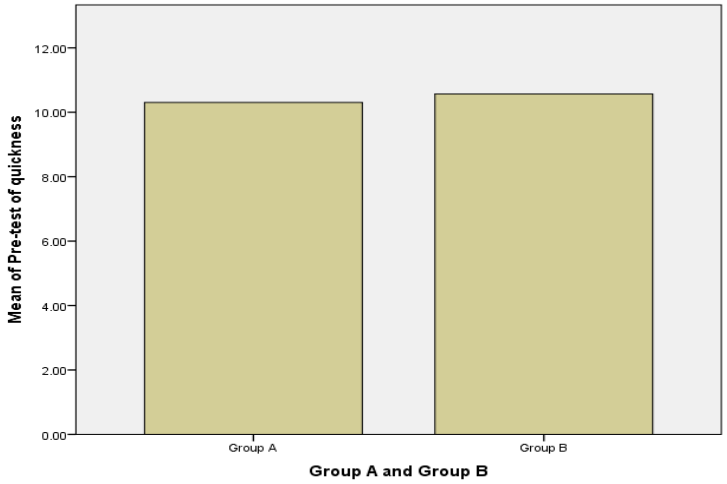


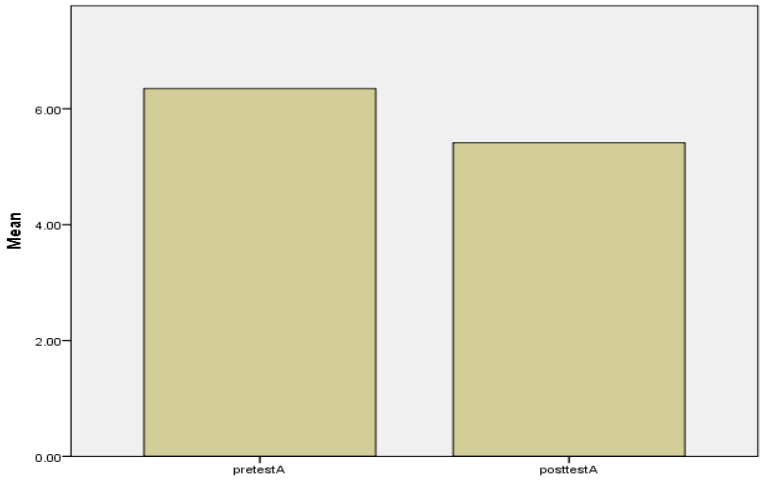
Table 7 depicts that the quickness results were also the same, there is no change was found in quickness, and the value of quickness of group A was recorded (M =10.30, SD =0.59) to pre-quickness of group B (M =10.56, SD =0.22; t (-1.17), p =.272 > significant level=0.05).It signifies that no significant difference was discovered regarding pre-test of quickness of football players of both groups A and B. Figure 3 also demonstrates the detailed data of quickness of both groups A and B, before the intervention. On X-axis it shows the quickness values of both groups and on Y-axis the mean score of quickness which is same for group A and B. the graph shows there is no difference in quickness of both groups. Graph shows no significant difference between the pre-test of group A quickness and pre-test of group B quickness.

Table 8: *Paired sample t-test showing the difference of speed between pre and post-test score of Group A.*

Name of Variable	Group	N	$\bar{x}$	Std.	Df	t	Sig.
Speed	A	8	6.34	.186	7	18.06	0.000
Speed	A	8	5.41	.130			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 4: *Bar graph showing difference of speed between pre & post-test score of group A*



The above table 8 depicts the pre and post-test comparison of football players of group A Pre-intervention and post intervention characteristics. Paired sample t-test showed the football players of group A Pre-intervention and post intervention characteristics such as speed, agility, and quickness. There is a significant variance was found in speed values pre and post intervention of group, the pre-speed value of group A was (M =6.34, SD =.18) to the post speed of group A (M =5.41, SD=.13; t (18), p =.000< significant level = 0.05). Figure 4 also demonstrates the detailed data of speed of group A, before the intervention pre-test and after intervention post-test. On X-axis it shows the speed values of group A. while on Y-axis the mean score of speed which is different. The graph shows there is a significant difference in man score of speed of group A.

Table 9: *Paired sample t-test showing the difference of agility between pre and post-test score of Group A.*

Name of Variable	Group	N	$\bar{x}$	Std.	Df	t	Sig.
Agility	A	8	10.52	.25	7	11.01	0.000
Agility	A	8	9.50	.14			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 4: *Bar graph showing difference of agility between pre and post test score of Group A*

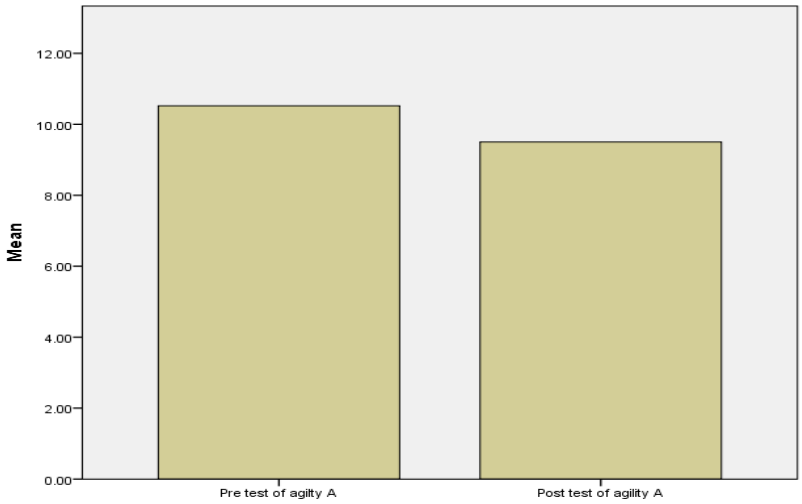


Table 9 depicts that there is significant variance was found in agility values pre and post intervention of group A, the pre-agility value was recorded (M =10.52, SD =.25) to post-agility of group A (M =9.50, SD =.14; t (11.01), p =.000 < significant level = 0.05). Figure 5 also demonstrates the detailed data of agility of group A, before the intervention pre-test and after intervention post -test. On X-axis it shows the agility values of group A. while on Y-axis the mean score of agility which is different. The graph shows there is significant difference in man score of agility of group A.

Table 10: *Paired sample t-test showing the difference of quickness between pre and post-test score of Group A.*

Name of Variable	Group	N	$\bar{x}$	Std.	Df	t	Sig.
Quickness	A	8	10.30	0.59	7	5.24	0.001
Quickness	A	8	9.78	0.38			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 5: *Bar graph showing difference of quickness between pre and post test score of Group A*

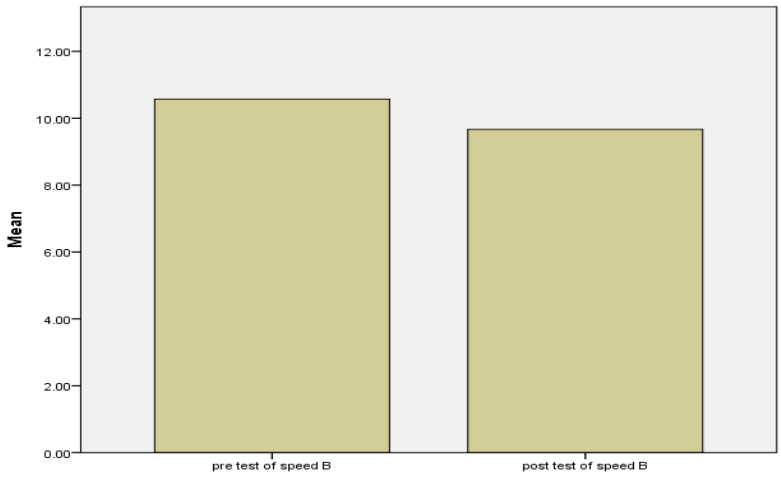
Table 10 depicts the quickness results were also the same, there is a change was found in quickness, and the value of quickness of group A was recorded (M =10.30, SD =0.59) to post-quickness of group A (M =9.78, SD =0.38; t (5.249), p =.001 < significant level=0.05) which shows that a significant difference was found regarding pre-test of speed, agility and quickness of football players of groups A before and after intervention and supplementation. Figure 6 demonstrates the detailed data of quickness of group A, before the intervention pre-test and after intervention post-test. On X-axis it shows the quickness values of group A. while on Y-axis the mean score of quickness which is different. The graph shows there is significant difference in man score of quickness of group A. There is a significant difference between pre and post-test score of Group A in respect of Speed, Agility and Quickness.

Table 11: *Paired sample t-test showing the difference of speed between pre and post-test score of Group B.*

Name of Variable	Group	N	$\bar{x}$	Std.	Df	T	Sig.
Speed	B	8	6.40	.15	7	5.19	0.001
Speed	B	8	5.75	.27			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 6: *Bar graph showing difference of speed between pre and post-test of Group B*



The above table 11 demonstrates the pre and post-test comparison of football players of group B Pre-intervention and post intervention characteristics. Paired sample t-test showed the football players of group B Pre-intervention and post intervention characteristics such as speed, agility, and quickness. There is significant variance was found in speed values pre and post intervention of group, the pre-speed value of group B was (M =6.40, SD =.15) to the post speed of group B (M =5.75, SD=.27; t (5.19), p =.001< significant level = 0.05). Figure 7 also demonstrates the detailed data of speed of group B, before the intervention pre-test and after intervention post -test. On X-axis it shows the speed values of group B. while on Y-axis the mean score of speed which is different. The graph shows there is significant difference in man score of speed of group B.

Table 12: *Paired sample t-test showing the difference of agility between pre and post-test of Group B.*

Name of Variable	Group	N	$\bar{x}$	Std.	Df	t	Sig.
Agility	B	8	10.39	.12	7	18.30	0.000
Agility	B	8	9.79	.11			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 7: *Bar graph showing difference of Agility between pre and post test score of Group B*

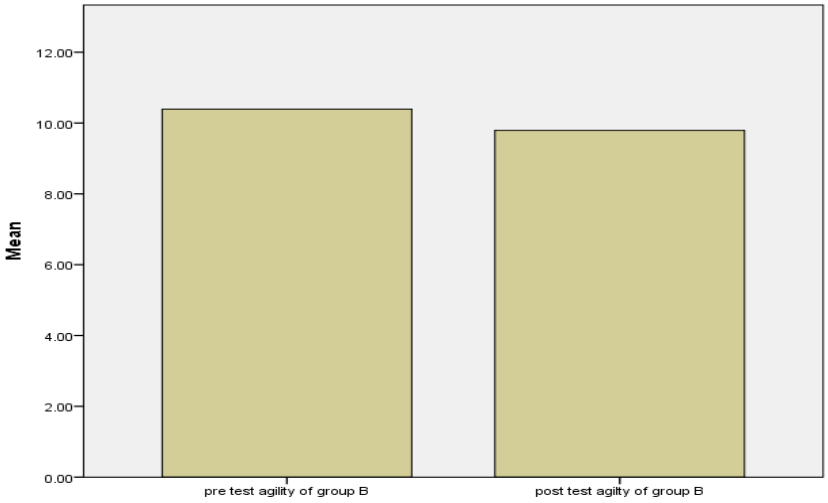


Table 12 depicts that there is significant variance was found in agility values pre and post intervention of group B, the pre-agility value was recorded (M =10.39, SD =.25) to post-agility of group B (M =9.79, SD =.11; t (18.30), p =.000 < significant level = 0.05).Figure 8 also demonstrates the detailed data of agility of group B, before the intervention pre-test and after intervention post-test. On X-axis it shows the agility values of group B. while on Y-axis the mean score of agility which is different. The graph shows there is significant difference in man score of agility of group B.

Table 13: *Paired sample t-test showing the difference of quickness between pre and post-test score of Group B.*

Name of Variable	Group	N	$\bar{x}$	Std.	Df	t	Sig.
Quickness	B	8	10.56	0.22	7	5.72	0.001
Quickness	B	8	9.66	0.29			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 8: *Bar graph showing difference of quickness between pre and post test score of Group B*

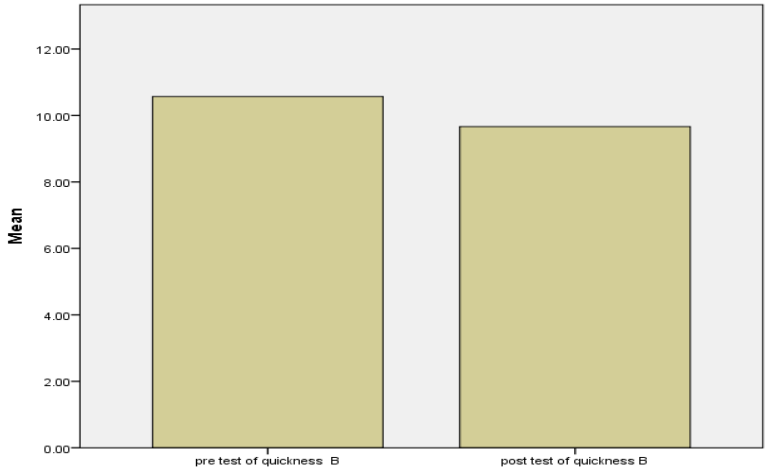


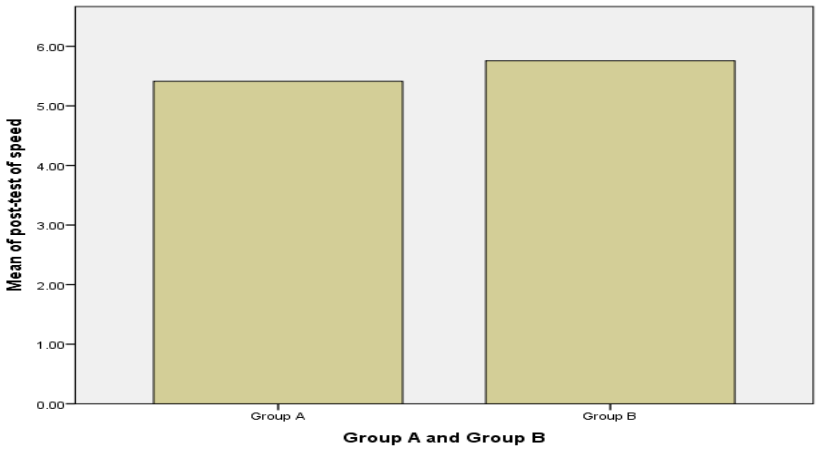
Table 13 depicts the quickness results were also the same, there is change was found in quickness, and the value of quickness of group B was recorded (M =10.56, SD =.12) to post-quickness of group B (M =9.66, SD =0.29; t (5.72), p =.001 < significant level=0.05). It indicates that a substantial difference was discovered regarding pre -test of speed, agility and quickness of football players of groups B before and after intervention and carbohydrate supplementation. Figure 9 also demonstrates the detailed data of quickness of group B, before the intervention pre-test and after intervention post-test. On X-axis it shows the quickness values of group B. while on Y-axis the mean score of quickness which is different. The graph shows there is a significant difference in the score of quickness of group B. There is a significant difference between pre and post test score of Group B in respect of Speed, Agility and Quickness.

Table 14: *Independent sample t-test showing the difference of speed between post-test of Group A and post-test of Group B.*

Name of Variable	Group	$\bar{x}$	Std.	N	Df	T	Sig.
Speed	A	5.41	.13	8	14	-3.17	0.01
Speed	B	5.75	.27	8			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 9: *Bar graph showing difference of speed between post-test of Group A and post-test of Group B*



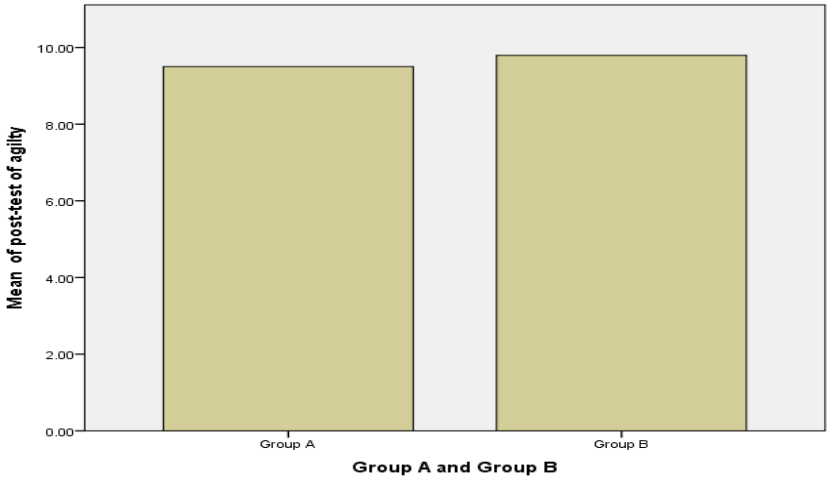
The above table 14 demonstrates the comparison of football players of group A and B Post-intervention characteristics. An independent sample t-test showed the speed football players of group A and B Post-intervention.it shows that there is significant variance was found in speed values post-intervention of both group, the post- speed value of group A was (M =5.41, SD =.13) to the post speed of group B (M =5.75, SD=.27; t (-.3.176), p =.01< significant level = 0.05).Figure 10 also demonstrates the detailed data of speed of both groups A and B, after the intervention. On X-axis it shows the speed values of both groups and on Y-axis the mean score of speed which is not same for group A and B. the graph shows there is difference in speed of both groups.

Table 15: *Independent sample t-test showing the difference of agility between post-test of Group A and post-test of Group B.*

Name of Variable	Group	$\bar{x}$	Std.	N	Df	T	Sig.
Agility	A	9.50	.14	8	14	-4.46	0.001
Agility	B	9.79	.11	8			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 10: *Bar graph showing difference of agility between post-test of Group A and post-test of Group B.*



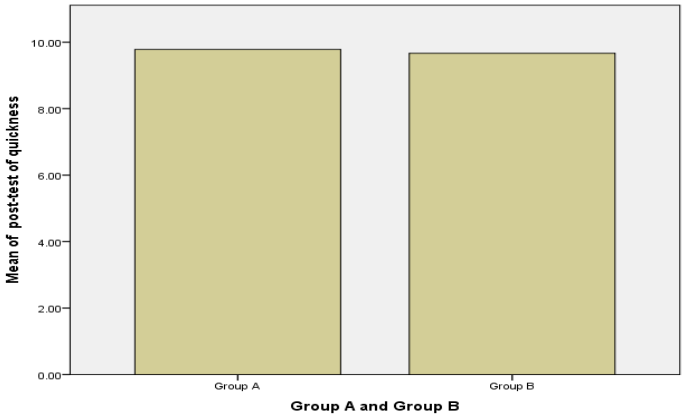
The above table 15 depicts that there is significant variance was found in agility values post-intervention of both group A and B, the post-agility value of group A was recorded (M =9.50, SD =.14) to post-agility of group B (M =9.79, SD =.11; t (-4.46), p =.001<significant level = 0.05).this shows that the change in agility occurred after intervention.Figure 11 also demonstrates the detailed data of agility of both groups A and B, after the intervention. On X-axis it shows the agility values of both groups and on Y-axis the mean score of agility which is not same for group A and B. the graph shows there is difference in agility of both groups.

Table 16: *Independent sample t-test showing the difference of Quickness between post-test of Group A and post-test of Group B.*

Name of Variable	Group	$\bar{x}$	Std.	N	Df	t	Sig.
Quickness	A	9.78	0.38	8	14	.659	0.521
Quickness	B	9.66	0.29	8			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 12: *Bar graph showing difference of Quickness between post-test of Group A and post-test of Group* B



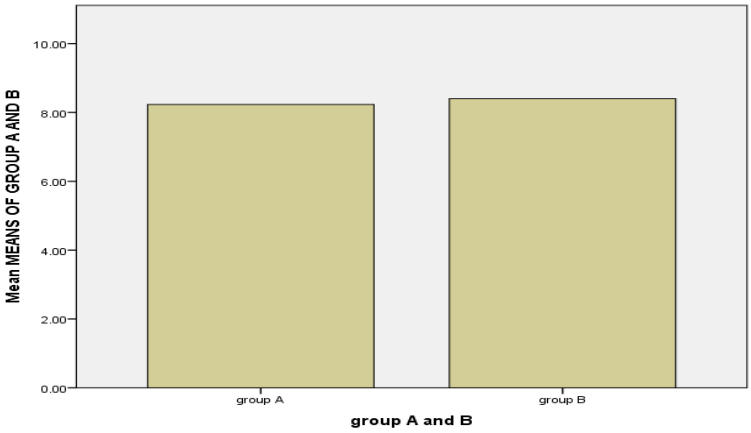
The above table 16 depicts that the quickness results were different, there is no change was found in quickness, and the value of post quickness of group A was recorded (M =9.78, SD =0.38) to post-quickness of group B (M =9.66, SD =0.29; t (.659), p =.521 > significant level = 0.05). This shows that there was no change occurred in quickness after intervention.Figure 12 also demonstrates the detailed data of quickness of both groups A and B, after the intervention. On X-axis it shows the quickness values of both groups and on Y-axis the mean score of quickness which is same for group A and B. the graph shows there is no significant difference in quickness of both groups. It implies that there is big difference was found regarding post-test of speed and agility but not for quickness of football players of both groups A and B.

Table 17: *Independent sample t-test showing the accumulative difference of speed, agility and quickness between post-test of Group A and post-test of Group B.*

Name of Variable	Group	$\bar{x}$	Std.	N	Df	t	Sig.
Speed, agility Quickness	A	8.23	2.44	8	14	-.08	.934
Speed, agility Quickness	B	8.40	2.29	8			

$\bar{X}$= Mean, std. = standard deviation, Significant level=0.05

Figure 11: *Bar graph showing the accumulative difference of speed, agility and quickness between post-test of Group A and post-test of Group B.*



The above table 18 depicts that the accumulative mean of speed, agility and quickness results were different, no change was found in speed, agility and quickness, and the values of post-speed, agility and quickness of group A was recorded (M =8.23, SD =2.44) to post-speed, agility and quickness of group B (M =8.40, SD =2.29; t (-.08), p =.93 > significant level = 0.05). This shows that there was no change occurred after intervention. Figure 13 also demonstrates the accumulative data speed, agility and quickness of both groups A and B, after the intervention. On X-axis it shows the accumulative values of speed, agility and quickness of both groups and on Y-axis the accumulative mean score of group A and B which is same. The graph shows there is no significant difference in speed, agility and quickness of both groups.

Conclusion

The purpose of this research project was to look into the "effect of SAQ training with and without carbohydrate supplementation in elite footballers ".Speed, agility and quickness are major components of footballers that play vital role in performance in terms of winning. Therefore, both SAQ training and carbohydrate supplementation is necessary for the complete development of athletes. It not only prevents athletes from injury but also increases performance especially for the beginner. It's most effective for new players. The study contributes to highlight the impact of 08-week SAQ training and carbohydrate supplementation on speed, agility and quickness of footballers with the age range of 18-25 years. The findings demonstrate that there was considerable change found in pre and post-intervention in speed, agility and quickness in both groups. If we compare post-tests of both groups then the findings demonstrate a transformation in speed and agility but quickness was not changed.

The findings demonstrate that there was no significant difference found in speed agility and quickness of footballers of both groups in pre-test score. SAQ training has significant effect on the speed, agility and quickness of football players. The findings of this research also shown that there was a significant difference in speed agility and quickness of footballers of group A and B. The current study shows that a highly significant change was found in pre and post intervention of both groups regarding speed, agility and quickness of footballers. The same study also conducted by (França et al., 2022) and concluded that SAQ training has positive impact on speed, agility and quickness of footballers. A study by (Jubjitt et al., 2017) explained that SAQ training improved the resynthesizes of glycogen and the content of glycogen.

SAQ training with carbohydrate supplementation prior to exercise not only improves performance but also prevent athletes from injury and depletion of glycogen stores during whole match. The results were resembled with (Russell et al., 2012) concluded that carbohydrate supplementation prior to match increase speed, agility and quickness of footballers and also prevent them from injury and fatigue during entire match. Moreover carbohydrate supplementation and SAQ training at the same time improved cognition of athletes hence improved reaction time. It also improved the metabolism of athletes and their sleep cycles. A study by (Sporis et al., 2011) concludes that SAQ training not only improves speed agility and quickness but it also improves muscle hypertrophy. The study of Hammami et al. (2018) also concluded that SAQ training has not only improved speed, agility and quickness of footballers it also prevented them from injury and improved their fatigue resistance. The study of Ahmadi Hekmatikar et al. (2019) showed that both SAQ training and carbohydrate supplementation increased speed agility and quickness of footballers it also improved their muscle recovery time. This study confirms that both SAQ training and carbohydrate supplementation improved speed, agility and quickness of footballers.

Limitations

The diet plan of footballers was the limitation of the study. Moreover the willingness to participant in research was also limitation.

Recommendations

On the basis of findings, the researcher recommended that;

1. Regular SAQ Training sessions may include improving the speed, agility and quickness of footballers in their training session.
2. Carbohydrate supplementation with SAQ training is helpful for Footballers to improve their performance.

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Conflict of Interest

Authors have no conflict of interest.

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