Original Article

The height of the women's winners FIVB Beach Volleyball in relation to specialization and court dimensions

GEORGE GIATSIS[1], MARIA TILI[1], ELENI ZETOU[2]

[1]*Department of Physical Education and Sports Science, Aristotle University of Thessaloniki, Greece*

[2]*Department of Physical Education and Sports Science, Demokritus University of Thrace-Komotini, Greece*

ABSTRACT

Giatsis G, Tili M, Zetou E. The height of the women's winners FIVB Beach Volleyball in relation to specialization and court dimensions. *J. Hum. Sport Exerc.* Vol. 6, No. 3, pp. 497-503, 2011. The purpose of this paper is to record and compare the height of women's winners in FIVB competitions in relation to their specialization and court dimensions (9×9 m and 8×8 m). The heights of 56 winners in 217 tournaments were processed. The winners were split in three groups depending on their specialization: 21 Defenders (DE), 22 Blockers (BL) and 13 without any specialization (No Specialization - NS). The average height of winners was found to be 178.8 ± 6.1cm (min= 165 cm and max=191 cm). The one way ANOVA showed that there were significant differences ($F_{(2,53)}$= 20.198, $p<0.001$) between the DE, BL and NS players. The Post Hoc Scheffe indicated significant differences between the DE (M=173.7, SD=4.9 cm) and BL (M=182.1, SD=5.2 cm), as between DE and the NS (M=181.1, SD=3.2 cm). Also, significant difference was found ($F_{(5,60)}$ = 12.210, $p<0.001$) between the $DE_{9\times9}$, $DE_{8\times8}$, $BL_{9\times9}$, $BL_{8\times8}$, $NS_{9\times9}$ and $NS_{8\times8}$. The Post Hoc Scheffe indicated significant differences ($p<0.05$) between the $DE_{9\times9}$ (M=171.8, SD=4.7 cm) and $BL_{9\times9}$ (M=180.0, SD=2.8 cm), as ($p<0.05$) between $BL_{8\times8}$ (M=182.9, SD=5.6 cm) and $DE_{9\times9}$ (M=173.7, SD=5.1 cm. Also between $NS_{9\times9}$ (M=179.7, SD=2.3 cm) and $DE_{9\times9}$. Furthermore, the independent t-test found significant difference ($t_{(18)}$=2.717, $p<0.05$) between the 10 first blockers in victories at 8×8 m (M=182.6, SD=5.0) and 9×9 m (M=177.0, SD=4.2). Overall, when considering heights versus specializations, blockers and not specialized players were taller than defenders for both court dimensions. Moreover, the top ten blockers in 8×8 courts were taller than those in 9×9, while defenders had no statistically significant difference. Smaller court dimensions appear to have favored taller players in the FIVB top ten winning teams in Beach Volleyball due to the greatest significance of blocking. But, the importance of agility in defense favored players with such skills and was not depend on height. **Key words**: HEIGHT COMPARISON, WINNERS, STATISTICAL ANALYSIS, BLOCKERS, DEFENDERS, BEACH VOLLEY.

Corresponding author. University of Thessaloniki. Department of Physical Education and Sports Science. Kanari 15, 55132 Thessaloniki, Greece.
E-mail: george@giatsis.com
Submitted for publication July 2011.
Accepted for publication September 2011.
JOURNAL OF HUMAN SPORT & EXERCISE ISSN 1988-5202

doi:10.4100/jhse.2011.63.03

INTRODUCTION

The first official Beach Volleyball tournament for women was held in 1950 in California's Will Rogers State Beach (Couvillon, 2002), while the first tournament of the International Volleyball Federation (FIVB) was held in Almeria, Spain in 1992 (Couvillon, 2004). As a result of the worldwide success and popularity of women's Beach Volleyball, more tournaments were held for women in 2005 than for men.

FIVB made significant changes in rules in 2001. The size of the court was reduced from 9×9 meters to 8×8 meters and the scoring system was changed to rally (FIVB, 2001). The purpose of the change in the scoring system was to make the game easier to follow and more exciting for the spectators (Giatsis & Zetou, 2003). This also made Beach Volleyball more suited for television broadcasting because of the smaller variance in game duration compared to the side out scoring system. Furthermore, the reduction in the court size made the game more spectacular and increased the duration of point rallies (Giatsis, 2003; Giatsis et al., 2005) by enabling more counter attacks (Giatsis et al., 2003). It takes some time before the impact of rule changes in team sports can be assessed (Arias et al., 2011).

There have been some surveys on the impact of court dimension changes but mostly for men. The effects of court size reduction include among others an increased number of counter attacks and a longer point duration due to fewer aces (Giatsis et al., 2003), a decrease in attack and service effectiveness in the Greek Championship (Giatsis & Tzetzis, 2003) and an increase in block effectiveness in FIVB World Tour players (Ronglan & Crydeland, 2006). Additionally, Grgantov et al. (2005) compared the technical characteristics of winners and losers for both court dimensions and found that there was a reduction in service, reception and digging effectiveness but an increase in attack and block effectiveness.

Koch & Tilp (2009) worked on women's Beach Volleyball and found that the success rate at complex one was 55% and that players use shots 55% of the time when the reception was excellent and spikes 62% of the times when the reception was good. Peripheral vision enables attacking players to spot opponents' uncovered spaces while this was hindered by a set which was not sufficiently close to the net (Ahmann, 2005; Hare & Sanderson, 1997; Homberg & Papageorgiou, 1995; Kiraly & Shewman, 1999). Furthermore, in another paper by Koch & Tilp (2009) it is evident that women use a floating service 80% of the times, a bump set 83.9% of the times and shots and spikes with an equal frequency (50% each). Also, they employ a fake block or drop with a frequency of 26.9% which was much greater compared to men (11.6%).

In another survey conducted in the 2004 Summer Olympics (Laios, 2008), the frequency of leaving the net and retreating (drop) to defense was found to be 30.5% for women, i.e., much larger compared to men (10%). The author claims that this was due to softer spikes performed by women when the set was not close to the net, which enable both players to dig. Additionally, Mesquita & Teixeira (2004) report that in the FIVB World Tour, male blockers actually performed blocks 84.6% of the times, while they had the largest frequency of spikes (58%).

From the aforementioned papers, it is evident that blocking is very important when the court is small, especially in men but also in women in the majority of plays. Therefore, height can be a significant advantage for a player, especially for a Beach Volleyball blocker. Palao et al. (2008) investigated the heights of 431 female players, ranked at top positions according to FIVB from 2000 until 2006. The average player height was found to be 177-179 cm. Also, in their research they found a statistically significant difference between blockers (182 cm), defenders (173 cm) and not specialized players (179 cm). Similar results are reported by Fuchslocher et al. (2004); they worked on 21 World Tour women players, in 2003

which were ranked in the world top 30 and had an average height of 178.6 cm. In a survey on FIVB female winners, it was found that 62.5% (N=35) of the players have won more than one tournament and 23% (N=13) of the players have won 10 or more games (Tili et al., 2011).

Despite the fact that data on female Beach Volleyball player heights is available, there are no surveys on the heights of players that have won tournaments at top FIVB level or on possible differences for the two court dimensions. The purpose of this paper is to record and compare the height of women's winners in FIVB Beach Volleyball competitions in relation to their specialization and court dimensions (9×9 m and 8×8 m) from 1992 to 2010.

MATERIAL AND METHODS

Sample

The survey sample included all 217 FIVB tournaments conducted between 1992 and 2010. These include Opens, Grand Slam, and World Cup tournaments, Goodwill games and Olympic Games. The winners were split into three groups according to their specialization: Defenders (DE), Blockers (BL) and No specialization (NS). Data were retrieved from the FIVB website (http://www.fivb.org) and the Beach Volleyball Database (http://www.bvbinfo.com). Player specializations were determined based on observation, television appearances in the finals and interviews. The observer was a former professional Beach Volleyball player with an international career of more than 10 years who is currently a University Lecturer specializing on Beach Volleyball.

A player was categorized as a defender when she participated less than 20% of the times in a block. When block participation was around 50% (i.e., the player who served played defense), the player was characterized as without any specialization (no specialization). In the cases of the five female players that won more than 10 tournaments and played in both positions with different teammates, their specialization was determined by the position they played in 85% or more of the times.

The heights of the 56 winners in 217 FIVB Women's Beach Volleyball tournaments (70 in 9×9 courts and 147 in 8×8) held between 1992 and 2010 were recorded and analyzed. The winning players were split in three groups depending on their specialization: 21 Defenders (DE), 22 Blockers (BL) and 13 without any specialization (No Specialization - NS).

Statistical Analysis

One way ANOVA analysis was used and when a statistically significant difference was found, the Post-hoc Scheffe scheme was employed to estimate the differences in heights depending on specialization and court dimensions (9×9 m and 8×8 m). Statistical significance was set at $p<0.05$. Additionally, an independent t-test was conducted to locate differences in winner heights (if any) for both court dimensions as well as to analyze the heights of the top 10 blockers 8×8 and 9×9 courts. The statistical analysis was conducted using the statistical software SPSS 17.0 (2010).

RESULTS

The average height of women's winners was estimated at 178.8 ± 6.1 cm (min=165 cm and max=191 cm). The one way ANOVA indicated that there were significant differences ($F_{(2,53)}=20.198$, $p<0.001$) between the defenders, blockers and no specialization players. The Post Hoc Scheffe indicated significant differences

between the DE (M=173.7, SD=4.9 cm) and BL (M=182.1, SD=5.2 cm), as between DE and the NS (M=181.1, SD=3.2 cm).

Table 1. *The height in Total Winners, Defenders, Blockers and No specialization players from the women's FIVB tournaments*

		Height			
Specialization	N	M	SD	Minimum	Maximum
Defenders	21	173.7	4.9	165	183
Blockers	22	182.1	5.2	175	193
No Specialization	13	181.1	3.2	175	188
Total Winners	56	178.8	6.1	165	191

Note. Significant differences found ($F_{(2,53)}$=20.198, p<0.001) between the defenders, blockers and no specialization players. The Post Hoc Scheffe indicated significant differences between the DE and as between DE and the NS.

Also, a significant difference was found ($F_{(5,60)}$=12.210, p<0.001) between the $DE_{9\times9}$, $DE_{8\times8}$, $BL_{9\times9}$, $BL_{8\times8}$, $NS_{9\times9}$ and $NS_{8\times8}$. The Post Hoc Scheffe indicated significant differences (p<0.05) between the $DE_{9\times9}$ (M=171.8, SD=4.7 cm) and $BL_{9\times9}$ (M=180.0, SD=2.8 cm), (p<0.05) between $BL_{8\times8}$ (M=182.9, SD=5.6 cm) and $DE_{9\times9}$ (M=173.7, SD=5.1 cm) as between $NS_{9\times9}$ (M=179.7, SD=2.3 cm) and $DE_{9\times9}$. No statistically significant differences were found (p=0.948) between $DE_{9\times9}$ and $DE_{8\times8}$.

Table 2. *The height of women Defenders, Blockers and No specialization FIVB Beach Volleyball winners in the 9x9 m and 8x8 m.*

			Height			
Specialization	Court	N	M	SD	Minimum	Maximum
Defenders	9x9	8	171.8	4.7	165	180
Blockers	9x9	9	180.0	2.8	175	185
No Specialization	9x9	8	179.8	2.3	175	183
Defenders	8x8	17	173.6	5.1	165	183
Blockers	8x8	16	182.9	5.6	175	193
No Specialization	8x8	8	182.6	3.7	175	188

Note. Significant difference found ($F_{(5,60)}$=12.210, p<0.001) between the DE_{9x9}, DE_{8x8}, BL_{9x9}, BL_{8x8}, NS_{9x9} and NS_{8x8}. The Post Hoc Scheffe indicated significant differences between the DE_{9x9} and BL_{9x9}, between BL_{8x8} and DE_{9x9} and between NS_{9x9} and DE_{9x9}. No statistically significant differences were found (p=0.948) between $DE_{9\times9}$ and $DE_{8\times8}$.

Furthermore, the independent t-test found significant difference ($t_{(18)}$=2.717, p<0.05) between the 10 first blockers in victories at 8×8 m (M=182.6, SD=5.0) and 9×9 m (M=177.0, SD=4.2), but no difference was found (p=0.316) in the average height of winners for the two different court dimensions (9×9=177.4 cm and 8×8=178.9 cm).

Table 3. *Means and Standard Deviations of Height from the 10 first blockers of 8x8 m and 9x9 m in women's FIVB winners.*

			Height			
Specialization	Court	N	M	SD	Minimum	Maximum
Blockers	9x9	10	177	4.1	170	180
Blockers	8x8	10	183	5.1	175	191

Note. The independent t-test found significant difference ($t_{(18)}=2.717$, $p<0.05$) between the 10 first blockers in victories in 8x8 m and 9x9 m.

DISCUSSION

It is evident from the results that there was no significant difference in winners' heights for the two different court dimensions, despite the fact that the average height in 8×8 courts was greater than that in 9×9 by 1.5 cm. Smaller courts seem to have favored taller players in top ranked FIVB Beach Volleyball women's winners due to the greater significance of blocking. This is particularly important since the top 10 blockers have won more than seven tournaments (Tili et al., 2011). Another important observation is that 10 out of 12 top ranked female players in 8×8 courts have played as blockers or without specialization.

The lack of force in spikes leads to a lot of fake blocks, especially when the ball is being set far from the net (Koch & Tilp, 2009; Laios, 2008); the frequency of fake blocks was nearly one out of three, therefore agility is a prerequisite for blockers in 8×8 courts. No surveys have been conducted on fake blocks in 9×9 courts, but from surveys on reception quality which facilitates a good set, the percentages in 8×8 courts appear to be much better. This justifies the fact that there was a large number of players without specialization. An important conclusion from this survey was that unspecialized players had no difference in height from blockers. Palao et al. (2008) also stipulate to this. This holds true particularly in 9×9 courts where blockers had to cover greater distances due to worse receptions, and retreating from the net was the first option for women. Nevertheless, because of the greater importance of blocking in 8×8 courts, the top 10 female blockers who won the most tournaments were taller than the respective blockers in 9×9 courts with a significant difference.

No significant differences were found in defenders for both court dimensions. Agility is a very important factor in defense and players with such skills are favored, irrespective of height. Therefore, a player with digging skills and an effective attack either on complex one or complex can perform adequately at top FIVB competition level. The shortest winner in 8×8 courts was barely 165 cm tall.

Unspecialized players had a significant difference in heights for both court dimensions compared to defenders. This shows that taller players that were agile and could also dig used to play without specialization. This allowed them to conserve energy since the demand for energy on the sand is higher for all movements (Zamparo et al., 1992; Lejeune et al., 1998; Pinnington & Dawson, 2001; Muramatsou et al., 2005). Yet, the percentage of not specialized winners dropped from 32% in 9×9 m courts to 19% in 8×8 m courts, which goes to show that smaller dimensions promote specialization. Furthermore, the first three teams in FIVB women's career team victory leaders had a specialization with a 96 out of 217 wins in tournaments (44.2%).

CONCLUSIONS

Overall, when considering height in relation to specialization, blockers and not specialized female players were taller for both court dimensions. Moreover, the top ten blockers in 8×8 courts were taller than those in 9×9, while defenders had no significant difference. Smaller court dimensions appear to have favored taller players in the FIVB top ten winning teams in Beach Volleyball due to the greatest significance of blocking. But, the importance of agility in defense favors players with such skills and does not depend on height. Also, it seems that specialization gave an advantage to the best women teams in FIVB Beach Volleyball.

REFERENCES

1. AHMANN J. *Beach Volleyball tactics for winners*. Neuer Sportverlag; 2005. [Back to text]
2. ARIAS J, ARGUDO F, ALONSO J. Review of rule modification in sport. *Journal of Sports Science and Medicine*. 2011; 10:1-8. [Full Text] [Back to text]
3. COUVILLON A. *Sands of time. The history of Beach Volleyball. VO: 1*. Hermosa Beach: Information Guides; 2002. [Abstract] [Back to text]
4. COUVILLON A. *Sands of time. The history of Beach Volleyball. VO: 3*. Hermosa Beach: Information Guides; 2004. [Back to text]
5. FEDERATION INTERNATIONAL DE VOLLEYBALL. *Official Beach Volleyball Rules*. FIVB; 2001. [Full Text] [Back to text]
6. FUCHSLOCHER J, PRAZ M, FLACTION P, DÉRIAZ O, RUSSELL AP. Physiological characteristics of elite male and female Beach Volleyball players. 2004. [Full Text] [Back to text]
7. GIATSIS G, PAPADOPOULOU SD, DIMITROV P, LIKESAS G. Comparison of Beach Volleyball team performance after the reduction in the court dimensions. *International Journal of Volleyball Research*. 2003; (6):2-5. [Back to text]
8. GIATSIS G, TZETZIS G. Comparison of performance for winning and losing Beach Volleyball teams on different court dimensions. *International Journal of Performance Analysis in Sport.* 2003; 3(1):65-74. [Full Text] [Back to text]
9. GIATSIS G, ZETOU E, TZETZIS G. The effect of rule changes for the scoring system on the duration of the Beach Volleyball game. *J Hum Movement Stud*. 2005; 48:15-23. [Full Text] [Back to text]
10. GIATSIS G, ZETOU E. The influence of regulations changes on the fluctuation of score of Beach Volleyball games. *Inquiries in Sport and Physical Education*. 2003; 1:43-48. [Full Text] [Back to text]
11. GIATSIS G. The effect of changing the rules on score fluctuation and match duration in the FIVB women's Beach Volleyball. *International Journal of Performance Analysis in Sport.* 2003; 3(1):57-64. [Full Text] [Back to text]
12. GRGANTOV Z, KATI R, MARELI N. Effect of new rules on the correlation between situation parameters and performance in Beach Volleyball. *Coll. Antropol*. 2005; 29(2):717-722. [Full Text] [Back to text]
13. HARE D, SANDERSON D. *A guide to winning doubles Volleyball*. Corona Del Mar: Volleyball International Publications; 1997. [Back to text]
14. HOMBERG S, PAPAGEORGIOU A. *Handbook for Beach Volleyball*. Aachen: Meyer and Mayer Verlag; 1995. [Abstract] [Back to text]
15. KIRALY K, SHEWMAN B. *Beach Volleyball.* Champaign: Human Kinetics; 1999. [Abstract] [Back to text]

16. KOCH C, TILP M. Analysis of Beach Volleyball action sequences of female top athletes. *Journal of Human Sport & Exercise.* 2009; 4(3):272-283. doi:10.4100/jhse.2009.43.09 [Back to text]
17. LAIOS Y. Comparison of the basic characteristics of men's and women's Beach volley from the Athens 2004 Olympics. *International Journal of Performance Analysis in Sport.* 2008; 8(3):130-137. [Abstract] [Back to text]
18. LEJEUNE TM, WILLEMS PA, HEGLUND NC. Mechanics and Energetics of Human Locomotion on Sand. *The Journal of Experimental Biology.* 1998; 201:2071-2080. [Full Text] [Back to text]
19. MESQUITA I, TEIXEIRA J. The spike, attacks zones and the opposing block in elite male Beach Volleyball. *International Journal of Volleyball Research.* 2004; 7(1):57-62. [Full Text] [Back to text]
20. MURAMATSU S, FUKUDOME A, MIYAMA M, ARIMOTO M, KIJIMA A. Energy expenditure in maximal jumps on sand. *Journal of Physiological Anthropology*. 2005; 59-61. doi:10.2114/jpa2.25.59 [Back to text]
21. PALAO JM, GUTIÉRREZ D, FRIDERES JE. Height, weight, body mass index, and age in Beach Volleyball players in relation to level and position. *The Journal of Sports Medicine and Physical Fitness.* 2008; 48(4):466-71. [Abstract] [Back to text]
22. PINNINGTON HC, DAWSON B. Running economy of elite surf iron men and male runners, on soft dry Beach sand and grass. *Eur J Appl Physiol.* 2001; 86:62-70. doi:10.1007/s004210100472 [Back to text]
23. RONGLAN LT, GRYDELAND J. The effects of changing the rules and reducing the court dimension on the relative strengths between game actions in top international Beach Volleyball. *International Journal of Performance Analysis in Sport.* 2006; 6(1):1-12. [Abstract] [Back to text]
24. TILI M, GIATSIS G, KOYLOUMENTA I. *The FIVB women's Beach Volleyball winners*. Thessaloniki: 13en International Congress of Physical Education & Sport; 2011. [Back to text]
25. ZAMPARO P, PERINI R, ORIZIO C, SACHER M, FERRETTI G. The energy cost of walking or running on sand. *Eur J Appl Physiol.* 1992; 65:183-187. doi:10.1007/BF00705078 [Back to text]