Age of menarche in Indian female basketball and volleyball players at different competitive levels

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Data for the age of menarche have been collected on 98 female volleyball players and 75 basketball players. The players belonged to four different levels of competition: international, national, intervarsity and district. Menarche is significantly delayed in players as compared with the controls. There is a continuous trend of increase in the age of menarche with the increasing levels of competition; menarche is more delayed in players playing at a higher level than those at the lower levels of competition.

Keywords: Menarche, physical activity, levels of participation, basketball, volleyball

Introduction

Strenuous physical training for female athletes in top-class competition has raised questions with regard to its effect on their physiological functions. Important considerations centre on the influence of the varying degrees of intensity of training on the age of menarche. Strenuous physical activity is known to delay menarche in sportswomen¹⁻⁴. Sidhu and Grewal⁴ further reported that menarche is significantly delayed in those players who started participating in games before the onset of puberty as compared with those who started playing after the onset of puberty⁴.

The present study has been undertaken to investigate whether the level of participation has any effect on the age of menarche.

Materials and methods

Data on the age of menarche have been collected on 75 female basketball players and 98 female volleyball players. Eighty one subjects formed the control group. Most players and controls belonged to the Punjab state. The players were classified according to their level of participation as either international, national, intervarsity or district level. International level is the highest level of participation and the district level is the lowest level of participation in the present series. International players are those who represented India in an international competition and such players are available only in volleyball in this study.

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Table 1. Mean age of menarche in controls and players of basketball and volleyball at different levels of competition

	N	Mean	SD	t test with control
Control	81	14.39	1.39	—
<i>Basketball</i>				
National	24	15.53	1.29	3.58*
Intervarsity	19	15.23	1.20	2.43*
District	32	15.18	1.66	2.57*
All levels combined	75	15.31	1.43	4.07*
<i>Volleyball</i>				
International	14	14.82	1.54	1.05
National	47	15.26	1.60	3.22*
Intervarsity	15	15.18	1.11	2.07*
District	22	14.96	1.58	1.66
All levels combined	98	15.12	1.51	3.34*

*Statistically significant at 5 per cent level

The age of menarche was obtained by the recall method. According to Damon *et al.*⁵ recalled age at menarche is accurate enough for anthropological and epidemiologic purposes involving group comparisons⁵. However, additional care was taken in the study and only those girls were included in the study who could easily recall their exact age of menarche.

Results and discussion

Table 1 gives the mean age of menarche in the players and controls. Menarche is significantly delayed in the players of basketball and volleyball as compared with the controls. However, the delay is slightly more in the basketball players than the volleyball players.

The players in each game were divided into two groups; group A includes those players who started participating in games before the onset of puberty, and group B includes those who started participating in games after the onset of puberty. It can be observed from Table 2 that menarche is significantly delayed in the players of group A as compared with the players of group B. When the players of groups A and B in both the games are compared with the control group, it is interesting to observe that a significant delay in the age of menarche is observed only in the players of group A, whereas the players of group B do not differ statistically from the controls (Table 3).

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Table 2. Mean age of menarche in basketball and volleyball players who started playing either before the onset of menarche (Group A) or after menarche (Group B)

Game	Group A			Group B			T test between A & B
	N	Mean	±SD	N	Mean	±SD	
Basketball	30	15.90	1.29	28	14.67	1.34	3.54*
Volleyball	55	15.66	1.53	22	14.10	1.27	4.23*

*Statistically significant at 5 per cent level

It suggests that the strenuous physical activity in which the players were involved before puberty may have delayed menarche. Similar results were reported by Orosz *et al.*⁶, Sidhu and Grewal⁴, Frisch *et al.*⁷ and Malina⁸. It also suggests that intensive training may delay the menarche.

It was interesting to sub-divide the data into A and B groups at each level of participation in both the sporting categories (Table 4). However, the number of subjects in some low categories has rendered the statistical tests inapplicable. Table 4 shows that menarche is more delayed in the players of group A than the group B players at each level of participation in both the games. The maximum delay is observed in the national players of basketball, followed by the national players of volleyball. In other words, the maximum delay in the age of menarche is observed in the players of national level i.e. the higher level of participation.

It is important to mention here that the players of the group A of international level in volleyball show a minimum delay in the age of menarche, even though they belong to the highest level of competition. The reason attributed to this could be that out of the 14 players of international level in volleyball, eight were from Bengal, one from Tamil Nadu, one from Rajasthan, one from Kerala, two from Delhi and one from Punjab. Debnath *et al.* studied the menstrual patterns of female players from nine different states and reported that menarche starts earlier in Bengal and Tripura states, followed by Maharashtra, Goa and Bihar and that it appears later in Rajasthan, Karnataka and Assam⁹. Since in the international volleyball team, the majority of the players are from Bengal state, this could explain the early menarche in these players.

It is thus concluded that menarche is more delayed in players at higher levels of competition. Malina *et al.* reported an association between delayed menarche and more advanced competitive levels in several sports except swimming². He also suggested that lateness in maturity may be related to success in some sports. Espenschade also reported that the girls classified as the better performers were more commonly later maturing girls¹⁰.

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Table 3. T test applied to age of menarche, between the controls and groups A and B of basketball and volleyball

Game		t test with control
Basketball	Group A	5.13*
	Group B	0.93
Volleyball	Group A	4.98*
	Group B	0.89

*Statistically significant at 5 per cent level

Table 4. Age of menarche in groups A and B of basketball and volleyball players at different competitive levels

	Group A (Those players who started playing before the onset of menarche)			Group B (Those players who started playing after the onset of menarche)		
	N	Mean	SD	N	Mean	SD
Basketball						
National	8	16.33	1.10	13	14.93	1.25
Intervarsity	7	15.37	1.60	6	14.53	0.90
District	16	15.73	1.39	9	14.52	1.63
Volleyball						
International	12	14.96	1.57	2	14.00	—
National	24	16.17	1.33	15	13.91	1.35
Intervarsity	6	15.93	1.19	2	14.50	—
District	14	15.23	1.65	4	14.23	1.35

*Statistically significant at 5 per cent level

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