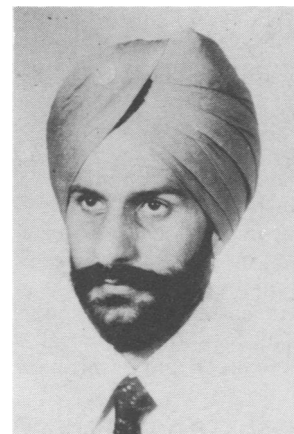




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AGE OF MENARCHE IN VARIOUS CATEGORIES OF INDIAN SPORTSWOMEN

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ABSTRACT

Data on the age of menarche has been collected on 264 Indian sportswomen, and 108 girls forming the control group, all hailing from the Punjab, Haryana, Chandigarh and Delhi. Outstanding athletes and players of hockey, basketball and volleyball were included. The combined mean age at menarche for sportswomen is 15.21 years and for the control sample is 14.05 years. The differences in the two series are statistically significant. The mean age at menarche in hockey, basketball, volleyball and athletes is found to be 15.15, 15.40, 15.05 and 15.27 years respectively. The differences in these groups, however, are not found to be statistically significant.

The further sub-divisions of the athletes into sprinters, distance runners, jumpers, throwers and shotputters did not show any intragroup differences in the age at menarche.

There is an indication from our results that strenuous activity is responsible for the delayed maturation in the sportswomen.

INTRODUCTION

An important stage in the physical development of girls is the first menstruation appearing after the adolescent growth spurt: menarche. The age of menarche is an important index of human development and of physiological age. It varies from population to population and is influenced by various factors like geographical residence and climate, race, socio-economic factors, genetic influences and control of certain serious diseases of childhood, immigration and others (Damon, Damon et al, 1969, Huber, 1973, Kowalska, Valsik et al, 1963, Corrain, 1956, Tanner, 1962, Wich, 1965, Eiben and Bodzsar, 1970, Valsik and Stukovsky, 1964, Farkas, 1962. Age at menarche may be delayed under poor socio-economic and health influences and accelerated by residence in an urban community and by blindness (Zacharias, Wurtman et al, 1970, 1964, Bai and Vijayalakshmi, 1973, Eileen and Tye, 1970, Burrell Healy et al, 1961, Foll, 1961, Wilson and Sutherland, 1950, 1953). These have reported that climate plays no part, race but little, however, socio-economic circumstances and nutrition are most important.

Malina, Harper et al (1973), studied the effect of active participation in sport on the age of menarche, and

reported that menarche appears significantly later in athletes than in non-athletes.

The present investigation has been undertaken with a view to finding whether the Indian sportswomen differ in the age at menarche from those girls who normally do not participate in games and sports. Inter and Intra sport differences in the age at menarche have also been studied. An attempt has been made to study the differences in the age of menarche of those girls who started participating in physical events before puberty than those who started playing after puberty.

MATERIALS AND METHODS

Data on the age of menarche were collected on 264 Indian sportswomen specialising in three games, hockey, volleyball, basketball, as well as in various other athletic events; during 1978-79. Most of these girls were residents of Punjab, Haryana, Chandigarh and Delhi. They had come to attend training camps at the Netaji Subhas National Institute of Sports and at the Punjabi University, both at Patiala. All the athletes and players were of the University, State, National and International level.

For the control group, a representative sample of 108 girls was studied from the Government College for Women and Punjabi University, Patiala.

The age of menarche was obtained by the recall method. Since all the subjects were educated and young, the accuracy of the method can't be doubted. According to Damon and Bejema (1974) recalled age at menarche is accurate enough for anthropological and epidemiologic purposes involving group comparisons. However, additional care was taken in this study and while 380 sports-women were questioned, only the 264 who were unequivocal in their recall of date were included in the group reported in this paper.

RESULTS AND DISCUSSION

Table I enlists the mean age at menarche along with S.D. and S.E.M. in the girls specialising in hockey, volleyball, basketball, athletics and in the control sample. It is observed from the table that the mean menarchal age in the combined sample of sportswomen is 15.19 years, whereas in those girls who do not take any active part in games and sports, the menarche occurs at 14.05 years. Thus menarche is delayed by about one year in the sportswomen. The maximum delay (1.34 years) has occurred in basketball and the minimum in volleyball (1.00 years) players. For hockey and athletics, the age of menarche is 15.15 and 15.27 years respectively. The values of 't' between various categories of sportswomen and control indicate that menarchal age is significantly delayed in all the sportive categories as compared to the control sample. Malina et al (1973) also reported that mean menarchal age is significantly late in athletes than in the non-athletes.

While studying the differences in the intersport groups (Table II) it is found that no significant difference exists between various intersport categories. The value of 't' is maximum (1.209) between volleyball and basketball, the minimum (0.380) being in hockey and volleyball.

TABLE II

'T' test among various combinations of sport categories

	Hockey	Basketball	Volleyball
Hockey	—	—	—
Basketball	0.954	—	—
Volleyball	0.380	1.209	—
Athletics	0.468	0.456	0.767

The category of athletes represent sprinters, long distance runners, jumpers, discus and javelin throwers, and shotputters. For a detailed study they were further divided into respective groups. Mean age of menarche, S.D. and S.E.M. for these groups is given in Table III. It is observed that the mean menarchal age is minimum (14.93 years) in the sprinters and maximum (15.99 years) in jumpers. The differences between various athletic groups are non-significant except for sprinters and throwers of discus and javelin.

TABLE III

Mean age at menarche, its S.D. and S.E.M. in various athletic events

Athletic Event	N	Mean Age (Years)	S.D.	S.E.M.
Sprinters	24	14.93	1.526	0.311
Long Distance Runners	11	15.06	0.890	0.268
Jumpers	14	15.99	2.200	0.587
Discus and Javelin Throwers	9	15.75	0.810	0.270
Shotputters	10	14.95	2.287	0.723

After having observed that the menarchal age is significantly delayed in the active group of girls, our attention was focussed to investigate further, whether the

TABLE I

Mean, S.E.M. and S.D. of age of menarche in control and various sport categories.

Game/Event	N	Age range (Years)	Mean Age (Years)	S.D.	S.E.M.	'T' test with control
Hockey	80	11.33-17.75	15.15	1.404	0.156	5.401*
Athletics	68	11.25-19.33	15.27	1.674	0.203	5.041*
Volleyball	72	11.00-19.67	15.05	1.597	0.188	4.386*
Basketball	44	11.70-18.00	15.39	1.432	0.215	5.334*
Combined	264	—	15.19	1.504	0.092	7.124*
Control Sample	108	—	14.05	1.425	0.137	—

strenuous activity related to sport is responsible for this delay, or some other factor such as the more late maturing girls taking up sport, etc., that may be responsible for this phenomenon. To answer this question the data of menarchal age in various sports categories, were further divided into three groups, Group A consisting of those girls who started taking part in sports before the occurrence of puberty, Group B in whom menarche had already occurred before they took up sport and Group C in whom participation in sport and menarche occurred simultaneously. These data have been given in Table V. In hockey, basketball and jumpers, more than 60% of girls started taking part in these games before the occurrence of menarche. However, the sprinters and shotputters have 40% or less who started participating before menarche.

Table VI gives the various statistical constants of menarchal age of Group A and B girls. It is clearly evident from the table that in all the games and sports

TABLE IV
'T' test among various athletic events

	Sprinters	Long Distance Runners	Jumpers	Discus & Javelin Throwers
Sprinters	—	—	—	—
Long Distance Runners	0.319	—	—	—
Jumpers	1.588	1.435	—	—
Discus and Javelin Throwers	2.014*	1.828	0.371	—
Shotputters	0.026	0.142	1.121	1.045

studied, the mean menarchal age in Group A is significantly more than in Group B. The maximum difference in menarchal age between the two groups is 1.62 years in

TABLE V

Total number and percentage of players in various sport categories and in various Groups

Group A: Those players who took up sports before puberty

Group B: Those players who took up sports after puberty

Group C: Those players in whom both the events occurred simultaneously

Game/Event	Group A		Group B		Group C		Total No.
	No.	%	No.	%	No.	%	
Hockey	51	64	26	32	3	4	80
Volleyball	42	58	29	40	1	2	72
Basketball	30	68	14	32	0	0	44
Athletics (Combined)	30	44	24	35	14	21	68
Athletic Events Sprinters	8	33	14	58	2	9	24
Long Distance Runners	5	45	6	55	0	0	11
Jumpers	11	79	1	7	2	14	14
Discus and Javelin Throwers	4	44	2	22	3	34	9
Shotputters	4	40	4	40	2	20	10
Combined	155	59	96	36	13	5	264
Control Sample	—	—	—	—	—	—	108

TABLE VI

Mean, S.E.M. and S.D. of age of menarche (years) of two groups of sportswomen — one who started playing before menarche (Group A) and the other who started playing after menarche (Group B)

Game/Event	Mean	Group A		Group B			Mean A-B	'T' Values in Groups A and B
		S.E.M.	S.D.	Mean	S.E.M.	S.D.		
Hockey	15.57	0.177	1.269	14.56	0.256	1.310	1.01	3.241*
Athletics	15.75	0.237	1.300	14.49	0.301	1.474	1.26	3.308*
Volleyball	15.71	0.224	1.455	14.09	0.215	1.160	1.62	5.255*
Basketball	15.85	0.234	1.284	14.45	0.363	1.361	1.40	3.226*
Combined	15.69	0.104	1.289	14.38	0.136	1.312	1.31	7.863*

volleyball, followed by basketball, 1.40 years and the minimum is in hockey, 1.01 years.

Table VII gives the value of t between the control sample and Group A and B. As anticipated significant differences exist only between Group A and control

TABLE VII

'T' test between control sample and Groups A and B of various sport categories

Game/Event		Control	Sample
Hockey	Group A	6.868*	
	Group B	0.619	
Volleyball	Group A	6.384*	
	Group B	0.142	
Basketball	Group A	6.662*	
	Group B	1.038	
Athletics	Group A	6.246*	
	Group B	1.326	

whereas Group B and control has not given any significant differences.

Combining the information from Tables IV, V and VI, it is amply clear that about 60% of girls in all the sport categories started taking part in games before the occurrence of menarche. 36% of the girls had already experienced menarche before they started any active participation in games. This category i.e. Group B has not given any significant deviation from the control sample. However, Group A has shown significant differences not only with control but also with Group B. It thus seems most probable that menarche is delayed under the influence of strenuous physical activity. Some indication to this effect is also available from the nature of the game or athletic event, as is in the case of basketball.

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