A Study of Menstruation in Young Chinese Female Athletes

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In order to investigate the problem of menstrual dysfunction among young female athletes in the Chinese population,152 female athletes participating in the 1988 Taiwan Area Athletic Meet (TAAM) were surveyed via questionnaire. Among the athletes who were younger than 18 years, those who were premenarche-trained had delayed menarche (13.7 ± 1.1 years), which was statistically significant, when compared with the postmenarche-trained group (13.0 ± 1.4 years)and the college students in general population(12.8 ± 1.0 years) (p<0.05 and p<0.0001,respectively).

For the problem of irregular menstrual pattern,athletes who were trained after menarche were studied. It was found that the percentage of athletes with regular menstrual cycle declined from 78% to 32% after training, those with irregular menstrual pattern retained the same irregularity.

In this survey,68 athletes experienced worse performance during menstrual cycle,29 of whom had tried to avoid menstrual period during the important athletic competitions.Those who visited a gynecologist or general practitioner had a greater success rate in adjusting menstrual cycle,whereas those with the help of a Chinese herbalist or by themselves had a greater chance of failure.

Key words: menstrual dysfunction, female athlete, chinese female athlete.

INTRODUCTION

There has been a significant increase in the number of women participating in competitive or endurance sports during the last 20 years in Chinese society. The age of participating in training seems to be gradually becoming earlier. The effect of this early enrollment of the female athletes in increased physical activites has been reported to have a higher incidence of oligomenorrhea and amenorrhea,and later age of menarche in comparison with the general population[1-2].Surveys of the Chinese population are rarely published. In this study, we preliminarily investigated several factors in the menstrual history of the young female athletes, in order to compare them with those in Western society.

MATERIALS AND METHOD

Nine-hundred and forty one female athletes participating in the 1988 Taiwan Area Athletic Meet (TAAM) were investigated, via questionnaire, about their menstrual history.

The questionnaire covered 1)the personal data such as age (including age when training began), body weight(before and after training), body height, marital status, stress, eating behavior; 2)the training information such as items enrolled, training intensity: 3) the menstrual history such as

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menstrual frequency, age at menarche, experience of contraceptive pill, experience of adjusting menstrual period, performance during menstrual period and regularity of menstrual period. The menstrual irregularity was defined in this study as variation of menstrual cycle greater than one week.

The athletes were grouped into two major categories according to the time they started training, with respect to their menarches. Those who trained before menarche were grouped as Group A and those after as B. Since it is known that the comparison of sexual development,for example, age at menarche in this study, should be limited to groups maturing at approximately the same time and living under similar conditions[3],the athletes who were younger than 18 years were identified. There were 68 athletes in group A and 20 athletes in group B who were younger than 18 years [Fig. 2]. Thus,for the mean menarcheal age of the athletes,athletes who were younger than 18 years were included. Group B was further subdivided into 2 subgroups according to the regularity of the menstrual cycle. Those who had irregular menstrual cycle after training were grouped in B-R1,whereas the others who maintain regular menstrual cycle despite training were in group B-R2.

The ponderal index $(PI = BH/3\sqrt{BW})$ was used as the index for maturity and growth status for each individual. The value of PI is inversely proportional to the body size.

The Chi-square and unpaired t-test were used for statistical comparison.The calculated level of significance was $p < 0.05$.
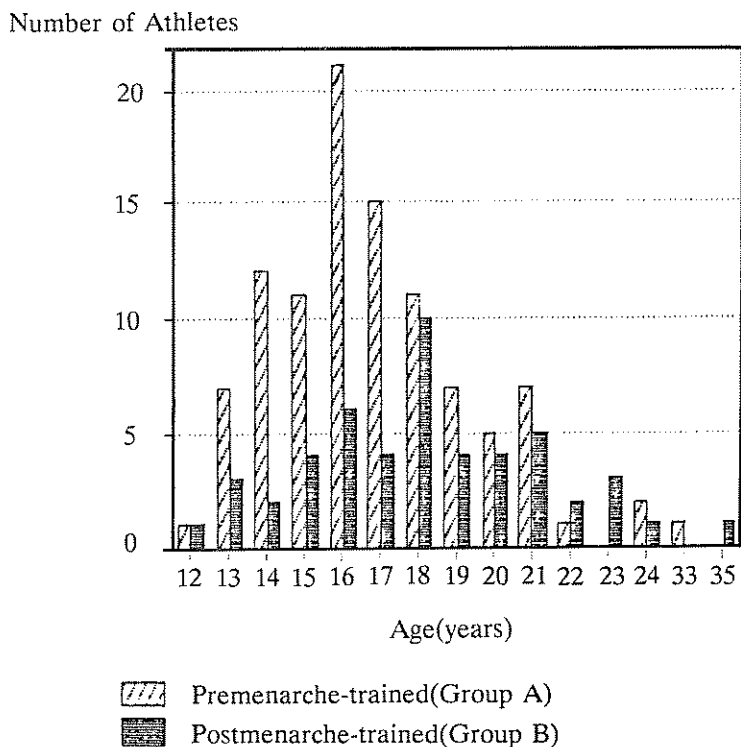
Number of Athletes

Age(years)

Premenarche-trained(Group A)
Postmenarche-trained(Group B)

Fig 2. Age Distribution of the Athletes

RESULTS

One-hundred and fifty-two questionnaires were returned(16.15%). They were representatives of the 14 districts of Taiwan.Items enrolled and number of athletes covered in the study were track (72) ,swimming(49),soccer(18) ,basket ball(1),volley ball(1),tennis(1),wrestling(3), fencing(2)and lacrosse(5) [Fig. 1]. The number of athletes included in group A were 102 and in group B 50.Their ages ranged from 12 to 35 (mean 17.37 ±

3.3).The mean menarcheal age of groups A and B were 13.7 ± 1.1 (n=68) and 13.0 ± 1.4 (n=20) years (p<0.05). respectively.The mean menarcheal ages of the general population younger than 18 years old in Taipei and Hwa-Lian city were 12.8 ± 1.0 (n=1770) and 13.0 ± 1.0 (n=1457)[4]. Athletes in group A had a significantly later menarche than college females in the general population both in Taipei and in Hwa-Lian city(p<0.0001) [Table 1].
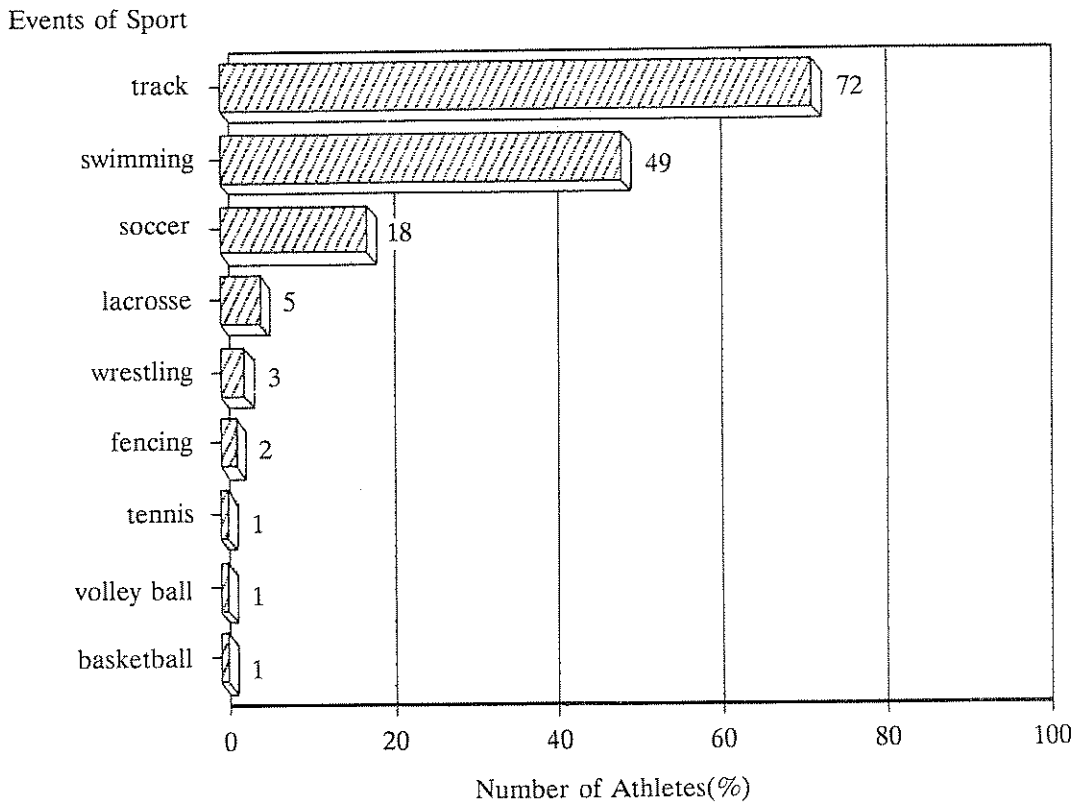
Events of Sport

Fig 1. Distribution of Athletes in Different Events

There were no statistically significant differences for the body weight, body height and ponderal index between groups A and B[Table 2].

Before training,78% of the athletes had regular menstrual patterns. After training,only 32% of them retained the regularity in group B-R2.Those with irregular menses before training, all had the same irregularity after training(22%).These data are shown in Fig.3 and Table 3.They are statistically significant[p<0.0001].

Sixty-eight athletes(44.7%) had the problem of worse performance during menstrual period. Twenty-nine of them tried to avoid menstruating during important athletic competitions. Those who visited gynecologists or general practitioners had a greater success rate in adjusting menstrual cycle, whereas those with the help of Chinese herbalist or by themselves had a greater chance of failure.

There were no athletes with primary or secondary amenorrhea found in this study.

Table 1　Age at Menarche for Athletes Younger than 18 years and College Students in Taipei and Hwa-Lian

	NO.	P.I	Menarche(years)	P value + + *:@	*:#
* Group A	68	43.78±1.38	**13.7±1.1	<0.0001	<0.0001
Group B	20	43.90±1.45	##13.0±1.3	NS	NS
@ Taipei	1770	/	12.8±1.0		
# Hwa-Lian	1457	/	13.0±1.0		

+ + :t-test　　　　##:** $p < 0.05$
P.I. :Ponderal Index

Table 2　Personal Data of 152 Athletes in this Study

	Group A (n = 102)	Group B (n = 50)	P-value @
Age(years)	16.9±3.0	18.3±3.8	<0.05
Body height (cm)	162.02±5.63	162.14±5.48	NS
Body weight (kg)	51.75±6.67	53.06±6.67	NS
Ponderal index	43.60±1.34	43.26±1.56	NS
**Ponderal index	43.78±1.38	43.90±1.45	NS

@: t-test
Ponderal index:$P.I. = BH/3 \sqrt{BW}$
**:P.I. of athletes younger than 18 years.

Before Training
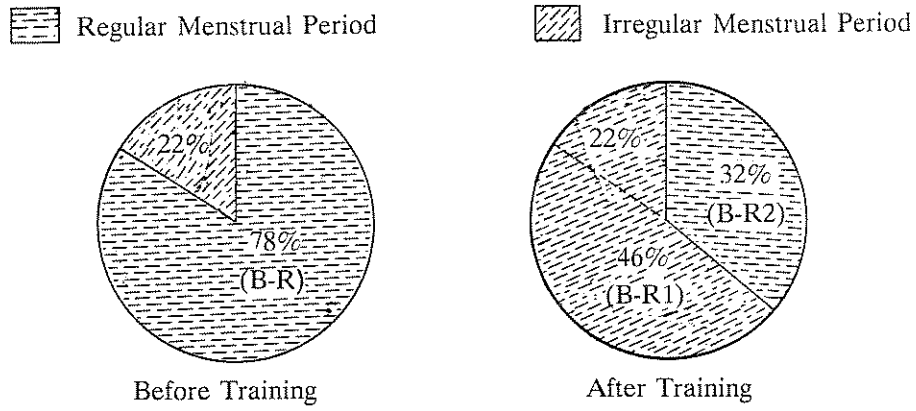
After Training

Fig 3 Menstrual Regularity Before and After Training of Athletes in Group B

Results of Performance

Number of Athletes(%)
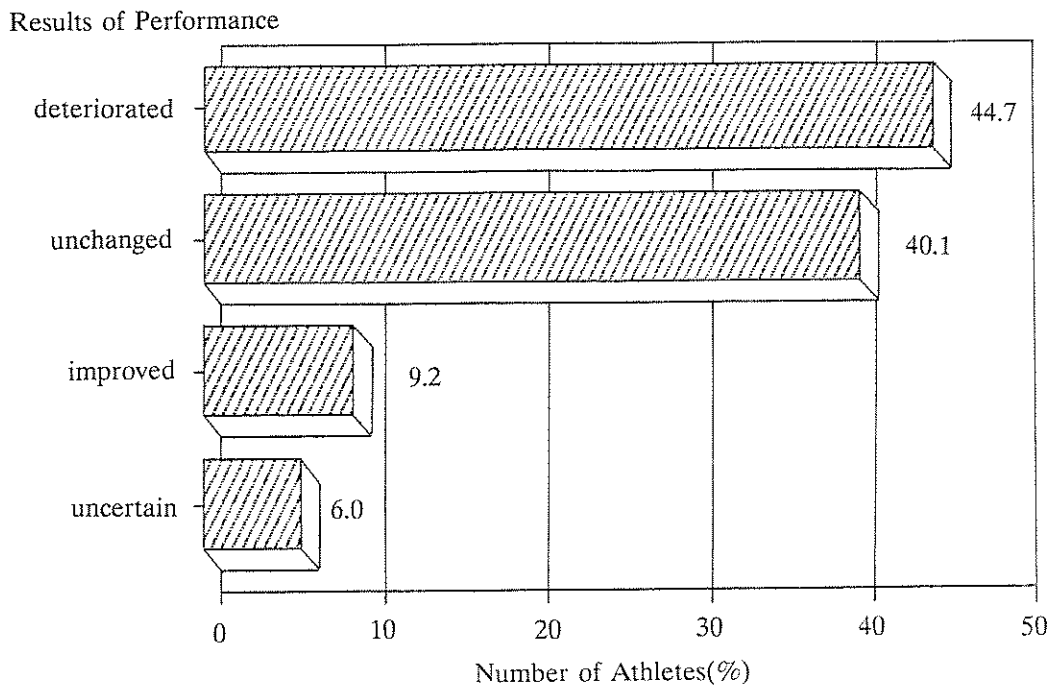
Fig 4. Performance during Menstrual Period

Table 3 Menstrual Regularity of Athletes in Group B
Before and After Training

	Menstrual cycle					
	Regular		Irregular		Total	
	Number	%	Number	%	Number	%
Before training	39	78	11	22	50	100
After training	16	32	34	68	50	100

Chi-square: p < 0.0001

Table 4. Means and Results of Adjusting Menstrual Cycle

Results Means	Success	Uncertainty	Failure	Total
Gynecologist	3	1	1	5
General practitioner	4	5	0	9
Chinese herbalist	0	3	1	4
Self-managed	0	10	1	11
Total	7	19	3	29

Chi = square : p < 0.05

DISCUSSION

Many factors may vary simultaneously during athletic training.The intensities of the work load,frequency and/or duration of exertion,body weight and/or composition,diet,and emotional stress may all contribute to the development of menstrual disorder. Thus,the pathogenesis of ex-ercise- associated abnormalities in menstrual func-tion is till now incompletely understood and rec-ognized as multifactorial.

Firsch investigated the age of menarche and menstrual periodicity of 21 college swimmers and 17 runners in relation to the age of initiating train-ing in 1981. For all the premenarche-trained ath-letes,menarche was delayed 0.4 year for each year of training before menarche. Of the premenarche-trained athletes, 61% had experiened irregular menstrual period and 22% were amenorrheic[5]. In this study,the premenarche-trained group(n = 68)

had the mean menarche age of 13.7 ± 1.1 years, which was delayed significantly by comparison with the college students in the general population [Table 1]. The same finding was noted by Malina[2] and Warren[6] as well.

Shangold investigated 1,841 women who were marathon runners and came to the conclusion that the best preditor of a woman's menstrual pattern during training was her pretraining menstrual pat-tern[7].The result was the same in this study. Eleven athletes who experienced irregular men-strual pattern before training remained irregular. Schwartz studied 139 long-distance runners in 1981 and found there was a higher incidence in the de-velopment of amenorrhea in those who had prior irregular menstrual cycles,than in the other run-ners and non-runners[8].But no case was found in this study,possibly the strenuousness of the training was not the same in our young athletes.

The majority of the population in Chinese society habitually relies on the traditional and unscientific modes of treatments,even in adjusting menstrual cycle,resulting in uncertain effects. This is very important in the management of sport injuries. Further medical education and consultation should be given to our athletes in this society.

In conclusion, from this preliminary survey, it is evident that the problem of menstrual dysfunction can be observed similarly among young female athletes in Chinese population as in the Western society. In order to investigate the relative important roles of extrinsic factors such as intensity of training, or intrinsic factors such as hormonal changes in the problem of the exercise-associated menstrual dysfunction, further studies should be made in the future.

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中國年輕女運動選手月經問題之分析探討

張春琴　黃美涓

在運動風氣日漸盛行的社會裡，女生參加激烈運動甚至競賽已相當普遍。本篇調查目的在於探討激烈運動對年輕女性是否會造成月經異常。

本篇調查對象爲152位參加民國 77年度台灣區運會部份運動項目的女選手。參賽項目及人數分別爲：田徑 （72位）、游泳（49位）、足球（18位）、曲棍球（5位）、摔角（3位）、劍道 （2位）及排、網、籃球三項各1位，共9項運動項目。平均年齡爲 17.37 ± 3.3 歲 （12～35歲）。平均身高爲 162.09 ± 5.56公分 （149～176公分）。平均體重爲 52.18 ± 6.68公斤 （39～75公斤）。

爲探討激烈運動是否會延遲初經的年齡，把月經初潮以前就開始接受訓練者，稱爲 A組（102位）。在已有月經後才接受訓練者，稱爲 B組（50位）。已知初經年齡平均每隔10年即降低 2至 3個月，所以在探討運動員初經年齡時，僅針對小於18歲的女運動員作統計，並與台北市、花蓮市的中學女生作比較。小於18歲的女運動員中， A組有68位，初經年齡爲13.7 ± 1.1歲；B 組有20位，初經年齡爲 13.0 ± 1.4

歲。兩者在統計學上呈顯著相關（P<0.05）。若與同年齡層的台北市及花蓮市中學女生比較，則 A組運動員初經年齡的延遲在統計學上呈更大的意義（ P<0.0001）（台北市中學生初經年齡爲 12.8 ± 1.0歲；花蓮市中學生初經年齡爲13.0 ± 1.0歲）。

在 B組中，受訓練前就已有不規則經期的11位選手，在接受訓練後仍有不規則經期。月經期間對比賽成績的影響方面有68位（44.74%）選手自認成績會變差。其中有29位（19.08%）曾因而有過調經的經驗，使在有重要比賽時不會遇到經期。其中有 5位是求助於婦產科專科醫師而得到 60%的成功率。9位找非婦產科醫師而得到 44.44%成功率。此外另有 10位（34.48%）自己想辦法及 4位找中醫師調經者，皆不能確保成功。這29位選手所參加的項目計有游泳、田徑、足球及劍道。

由於中國人一向比較保守，本研究問卷調查回收率僅佔當時女選手（9項運動項目）的16. 15%。要獲得更深入的瞭解及分析則仍有待進一步的研究。