



Original Research Article

Female Specific Problems in Indian Gymnasts

Rajkumar Sharma¹, Ashish Kumar Nigam²

¹Grade-I Gymnastic Coach, Sports Authority of India, N.S.T.C, Indore (M.P)

²Sports Officer, College of Agriculture, J.L. Nehru Krishi University, Tikamgarh (Madhya Pradesh), India.

Corresponding Author: Rajkumar Sharma

Received: 01/12/2014

Revised: 20/12/2014

Accepted: 22/12/2014

ABSTRACT

Aim was to study the female specific problems in national level female gymnasts, which signifies the prevalence of menstrual disorders and related problems in Indian elite female gymnasts. A total number of 32 female gymnasts of national level, who secured first three positions in apparatus and team event finals, were investigated in an independent group design. The selection of females was done randomly to minimize the source of error. The age of the gymnasts was 14+ years. A pre-tested semi-structured questionnaire was used for the purpose of data collection. The questionnaire was prepared taking consideration about information related to menstruation and associated problems faced by Indian female gymnasts. Each question was explained in detail to the athletes. Copies of the questionnaire were distributed to thirty two female gymnasts randomly. As soon as a group of players completed the questionnaire, it was collected from the gymnasts and verified that no questionnaire was left without being answered. The results showed a high incidence of delayed menarche. 78.13 percent females had menstrual problems and 65.63 percent of them believed that menstruation affected their performance. Menstrual problem was felt in most of the females (40.63 percent) during off-season. Anger was the commonest mood swing experienced (34.37 percent). Most of the female gymnasts suffered from increased fatigue onset of menses (62.50 percent) and during the course of menses (87.50 percent). Menorrhoea was felt the most i.e. 65.62 percent and most of the females (50.00 percent) suffered from back pain during menses. Most of the females (53.13 percent) experienced the joint pain and pulse rate increased 3-4 days before onset of menses. The results of the study revealed that no doubt, female gymnasts of today are stronger and faster than ever, but existence of some medical problems specific to them cannot be denied. These problems are delayed menarche, increased fatigue, mood swing, increased pulse rate, pre-menstruation tension, dysmenorrhoea and menorrhoea etc. The study explains the desperate need to educate the coaches and female athletes on menstrual disorders and their related physical, psychological and physiological problems in female gymnasts.

Keywords: Age at menarche, Problems due to menstruation, Menstrual disorders, National level, Gymnastics

INTRODUCTION

The female reproductive system is highly sensitive to physiological stress, and


reproductive abnormalities including delayed menarche, primary and secondary amenorrhoea and oligomenorrhoea occur in 6–

79% of women engaged in athletic activity. The prevalence of observed irregularities varies with athletic discipline and level of competition (Petterson, Fries, & Nillius, 1973; Feicht, Johnson & Martin et.al., 1978; Singh, 1981; Abraham, Beumont, Fraser, Llewellyn-Jones, 1982; Shangold, & Levine 1982; Brooks-Gunn, Warren, & Hamilton, 1987; Glass, Deuster, Kyle, et.al., 1987; Sanborn, Albrecht & Wagner, 1987).

As menarche is a powerful signifier of entry into sexual and reproductive maturity, it should be dealt with in different perspectives. Normal body maturity should be viewed, in the perspective of the maturing girls, parents, society and the governing socio-cultural norms (Taffa, et.al., 1999).

Clinical studies demonstrated that both pre- and post-menarcheal girls regard menarche as a hygienic crisis than as a maturational event. The role of parents in preparing girls for maturation is often complex and challenging. The explanations they provide to girls as they prepare their daughters for menstruation may be unsuitable and misdirected, in fact be partly inadequate to represent all the realities of menstruation, such as the emotional and cognitive changes that arrive with menarche (Elissa & Jill 1995).

Menstruation (a period) is a major stage of puberty in girls; it's one of the many physical signs that a girl is turning into a woman. And like a lot of the other changes associated with puberty, menstruation can be confusing. Some girls can't wait to start their periods, whereas others may feel afraid or anxious. Many girls don't have a complete understanding of a woman's reproductive system or what actually happens during the menstrual cycle, making the process seem even more mysterious. When girls begin to go through puberty (usually starting between the ages of 8 and 13), their bodies and minds change in many ways. The hormones in their

bodies stimulate new physical development, such as growth and breast development. About 2 to 2½ years after a girl's breasts begin to develop, she usually gets her first menstrual period. About 6 months or so before getting her first period, a girl might notice an increased amount of clear vaginal discharge. This discharge is common. There's no need for a girl to worry about discharge unless it has a strong odor or causes itchiness. The start of periods is known as menarche. Menarche doesn't happen until all the parts of a girl's reproductive system have matured and are working together (Gavin & Izenberg, 2007).

During menstruation women were considered as a threat to the economy of farming societies and needed to be secluded from social and sexual activities as to reduce the danger (Costos, Ackerman & Paradis, 2002).

Many girls use different slang terms and euphemism in an attempt to disguise the actual topic of their conversation. Another tactic girls use is the use of circumlocutions and omissions to avoid naming menstruation itself. Many women in developing countries, if asked, will state they have menstrual problems and that their general well being is thereby affected (Barbin & Barr, 1999). In several African societies menstruating women make known their unavailability for the bed in Malawi or going to bed fully clothed in Nigeria (Finlay & Jones, 2001).

Amenorrhea is cessation of menstrual periods for three or more consecutive menstrual cycles after menarche. It is seen that competitive training effects the menstrual cycle. Prevalence of amenorrhea in general population is found to be 2.5% and in athletes the range is from 3.4% - 66%. Oligomenorrhea is seen in more than 30% of athletes (Shangold & Mirkin, 1988 ; Otis, 1992).

The purpose of the present investigation was to survey the female specific problems i.e. amenorrhea, dysmenorrhea, oligomenorrhea and secondary amenorrhea, pre-menstrual tension, menarche and menstruation, and related problems in national level Indian elite female gymnasts.

MATERIALS AND METHODS

Subjects

A total number of 32 Indian elite female gymnasts of national level were included in the study. The study was accomplished at the time of Senior National Gymnastic Championship held at Allahabad in the last week of March, 2012. The selection of female was done randomly to minimize the source of error and all female gymnasts were first, second and third position holder in apparatus event and team event finals. The age of the female gymnasts was 14+.

Construction of the Questionnaire

The questionnaire was framed and constructed under the supervision of the experts of the related field, with utmost care and seriousness of the purpose, taking into consideration the maximum coverage of the area of the field concerned with relevant aspects needed for the study.

The questionnaire was prepared taking consideration about information related to menstruation and associated problems faced by female gymnasts of Chhattisgarh., like general information of menses, amenorrhoea, oligomenorrhoea, dysmenorrhoea, and others physical, physiological and psychological problems etc., so as get maximum worthwhile detailed and meaningful information from the sample.

Administration of the Questionnaire

A pre-tested semi-structured questionnaire was used, which included specific questions like, types of menstrual problems and their occurrence,

physical, physiological and psychological problems etc. Each question was explained, in detail to the athletes. Copies of the questionnaire were distributed to thirty two national level female gymnasts of Chhattisgarh to obtain the required information. As soon as a group of players completed the questionnaire, it was collected from the gymnasts and verified that no questionnaire was left without being answered.

RESULTS

To assess the female specific problems in female gymnasts, the Pre-structured data Performa was used to gather the necessary information. The frequency and mean percentage were computed on collected data related to menstruation and associated problems of female gymnasts manually by using standard calculator for meaningful presentation of the survey information. And data pertaining to this have been presented in Table 1 to 5

Table 1 provides the information related to menstruation and associated problems among school national level female gymnasts. The age of starting participation in gymnastics, had maximum frequency in 11-13 years (37.50 per cent), followed by 14-16 years (34.38 per cent) and 8-11 years (18.75 per cent). The age group of 17-19 years showed the least frequency (9.37 per cent). Most of the female gymnasts started competing at an early age of 11-13 years and 14-16 years. The highest frequency of females had their menarche at the age of 14 years (34.37 per cent) followed by 13 years (21.88 per cent), 12 years (18.75 percent), 16years (15.63 percent), 15years (06.53 percent) and 17years (03.12). Since the average age of menarche is 12-13 years, they showed a pattern of delayed menarche. Most of the female gymnasts (34.37 per cent) could not relate

their menstrual problems with off season and competition time. However, 40.63 per cent had an increase in menstrual problems during off-season and 25.00 per cent during competition. About 78.13 per cent females gymnasts had menstrual problems compared to 21.87 per cent who did not experienced any problems. A total of 34.37 percent female had no effect of menstruation on performance and 65.63 percent had either a positive or negative effect of menstruation on their performance. The performance level of 65.62 percent female gymnasts was medium followed by 31.25 percent (high), and 03.13 percent (low) female gymnasts.

Table 1: Information Related to Menstruation and Associated Problems in Indian Female Gymnasts

| S.No. | Variables | Frequency | Percentage |
|-------|---------------------------------------|-----------|------------|
| 1. | Age of Start competing in sports | 06 | 18.75 |
| | 08-10 Years | 12 | 37.50 |
| | 11-13 Years | 11 | 34.38 |
| | 14-16 Years | 04 | 09.37 |
| | !7-19 Years | | |
| 2. | Age of menarche | 06 | 18.75 |
| | 12 Years | 07 | 21.88 |
| | 13 Years | 11 | 34.37 |
| | 14 Years | 02 | 06.25 |
| | 15 Years | 05 | 15.63 |
| | 16 Years | 01 | 03.12 |
| | 17 Years | | |
| 3. | Duration of menstrual problems | 13 | 40.63 |
| | Off season | 08 | 25.00 |
| | Competition | 11 | 34.37 |
| | No relation | | |
| 4. | Problem during menses | | |
| | Yes | 25 | 78.13 |
| | NO | 07 | 21.87 |
| 5. | Effect of Menstruation on performance | 21 | 65.63 |
| | Yes | 11 | 34.37 |
| | NO | | |
| 6. | Performance level during menses | 10 | 31.25 |
| | High | 21 | 65.62 |
| | Medium | 01 | 03.13 |
| | Low | | |

Table 2 also gives the information related to menstruation and associated problems among school national level female gymnasts. A high frequency of females (53.12 per cent) could not identify an

increase in body temperature during, before or after periods.

Table 2: Information Related to Menstruation and Associated Problems in Indian Female Gymnasts

| S.No. | Variables | Frequency | Percentage |
|-------|------------------------------|-----------|------------|
| 1. | Increase in body temperature | 11 | 34.38 |
| | During | 04 | 12.50 |
| | Before | 00 | 00.00 |
| | After | 17 | 53.12 |
| | None of them | | |
| 2. | Fluid retention | | |
| | During | 07 | 21.88 |
| | Before | 03 | 09.37 |
| | After | 00 | 00.00 |
| | None of them | 22 | 68.75 |
| 3. | Mood swings experienced | | |
| | Anger | 11 | 34.37 |
| | Feel tension in mind | 07 | 21.88 |
| | Irritation | 06 | 18.75 |
| | Depression | 02 | 06.25 |
| | Loneliness | 02 | 06.25 |
| | None of them | 04 | 12.50 |
| 4. | Nature of Menstrual Cycle | | |
| | Regular | 11 | 34.37 |
| | Irregular | 21 | 65.63 |
| 5. | Nature of Menses | | |
| | Feel heavy | 03 | 09.37 |
| | Painless | 11 | 34.38 |
| | Painful | 08 | 25.00 |
| | None of them | 10 | 31.25 |

However, a total of 34.38% female gymnasts felt an increase in body temperature during the menstruation phase and 12.50 % before the onset of menstruation. The 68.75% of female gymnasts did not counter any fluid retention during periods. However, 21.88 % experienced fluid retention during the menstruation cycle and 9.37 % before onset. Mood swings experienced during menstruation were highest (34.37%) pertaining to anger followed by feeling of tension in mind (21.88%), feeling of irritation (18.75%), depression (6.25%), and loneliness (6.25%) However, 12.50 per cent of females did not experience any of the mood swings whatsoever. The regularity in menstrual cycle was found in total of 34.37 percent female gymnasts. Whereas, total of 65.63 percent female gymnasts had problem of irregularity in menstrual cycle, 31.25% of female gymnasts did not encounter any type of problem during menses. However, 34.38 %

females experienced painless menses. But 25% females and 9.37% females experienced painful menses and heavy menses respectively.

Table 3: Information Related to Menstruation and Associated Problems in Indian Female Gymnasts

| S.No. | Variables | Frequency | Percentage |
|-------|--|-----------|------------|
| 1. | Character of menstruation phase before involvement in game | 17 | 54.87 |
| | 21 days | 00 | 00.00 |
| | 24 days | 15 | 45.13 |
| | 30 days | 00 | 00.00 |
| | | | |
| 2. | Character of menstruation phase after involvement in game | 11 | 34.38 |
| | 21 days | 06 | 18.75 |
| | 24 days | 14 | 43.75 |
| | 30 days | 01 | 03.12 |
| | | | |
| 3. | Duration of Menses | | |
| | 1 | 02 | 06.25 |
| | 2 | 03 | 09.37 |
| | 3 | 05 | 15.68 |
| | 4 | 02 | 06.25 |
| | 5 | 14 | 43.75 |
| | 6 | 06 | 18.75 |
| 4. | Feeling problems before onset of menses | | |
| | Headache | 08 | 25.00 |
| | Fatigue increased | 20 | 62.50 |
| | Irritability increased | 04 | 12.50 |
| 5. | Feeling problems during onset of menses | | |
| | Headache | 00 | 00.00 |
| | Fatigue increased | 28 | 87.50 |
| | Irritability increased | 04 | 12.50 |

Table 3 provides the information related to menstruation and associated problems among school national level

female gymnasts. The 21 days regular menstrual was indicated in total of 54.87 percent female gymnasts cycle before involvement in gymnastics followed by 45.13 percent (30 days cycle) in females gymnasts. But after involvement in gymnastics, thirty days menstruation period was indicated in maximum of 43.75 percent female gymnasts followed by 34.39 percent (21days), 18.75 percent (24 days), and 03.12 percent (60 days) female gymnasts. The 5 days duration of menses was expressed by maximum of 43.75 percent female gymnasts followed by 18.75 percent (6 days), 15.68 percent (3 days), 9.37 percent (2 days), 6.25 percent (4 days), and 6.25 percent (1 day) female gymnasts. The maximum of 62.50 per cent female gymnasts suffered from increased fatigue onset of menses. However, 25.00 per cent female gymnasts felt headaches and 12.50 percent increase in irritability onset of menses. Maximum of 87.50 per cent female gymnasts suffered from increased fatigue during the course of menses. However, 12.50 percent female gymnasts suffered by an increase in irritability during menses.

Table 4: Information Related to Menstruation and Associated Problems in Indian Female Gymnasts

| S.No. | Variables | Frequency | Percentage |
|-------|---|-----------|------------|
| 1. | Dysmenorrhea (physical change in body due to menstruation) | | |
| | Headache | 07 | 21.88 |
| | Leg pain | 08 | 25.00 |
| | Back pain | 16 | 50.00 |
| | Swelling in abdomen | 01 | 03.12 |
| 2. | Oligomenorrhea (Fever after six menses in a year) | | |
| | Yes | 12 | 37.00 |
| | No | 20 | 62.50 |
| 3. | Primary amenorrhea (Menarche started after age of 17 years) | | |
| | Yes | 09 | 28.12 |
| | No | 23 | 71.88 |
| 4. | Secondary amenorrhea (Blockage of menses) | | |
| | Yes | 09 | 28.12 |
| | No | 23 | 71.88 |
| 5. | Menorrhoea (Excess bleeding during menses) | | |
| | Yes | 21 | 65.62 |
| | No | 11 | 34.38 |

Table 4 provides the information related to menstruation and associated problems among school national level female gymnasts. Physical change in body due to menstruation experienced by female gymnasts were highest (50.00%) pertaining to back pain followed by feeling of leg pain (25.00%), feeling of headache (21.88%), and swelling in abdomen (3.12%). A total of 62.50% female gymnasts did not suffer from fever after six menses in a year i.e. oligomenorrhoea whereas, 37% of total female gymnasts suffered from fever after six menses in a year. The maximum frequency of (71.88

percent) female gymnasts did not suffered from primary amenorrhea. Whereas, 28.12 percent of total female gymnasts suffered from primary amenorrhea, they showed a pattern of delayed in menses. A total of 71.88 percent female gymnasts did not suffered from the blockage of menses i.e. secondary amenorrhea whereas, 28.12% of total female gymnasts suffered from the blockage of menses. 34.38 percent female gymnasts did not suffered from menorrhoea whereas, 65.62 percent of total female gymnasts suffered from menorrhoea, they showed an irregular pattern in menses.

Table 5: Information Related to Menstruation and Associated Problems in Indian Female Gymnasts

| S.No. | Variables | Frequency | Percentage |
|-------|---|-----------|------------|
| 1. | Feeling any change in Body 3-4 days before onset of menses (Pre-menstruation tension) | | |
| | Headache | 06 | 18.75 |
| | Joint pain | 13 | 53.13 |
| | Abdominal pain | 07 | 09.37 |
| | Pimples on face | 06 | 28.13 |
| 2. | Physiological change 3-4 days before onset of menses | | |
| | Pulse rate increases maximum | 03 | 09.37 |
| | Body temperature increases | 17 | 53.13 |
| | Lowering heart rate | 03 | 09.37 |
| | B. P. unchanged | 09 | 28.13 |

Table 5 reveals that the physical change in body 3-4 days before onset of menses experienced by female gymnasts were highest (53.13%) pertaining to joint pain followed by pimples on face(28.13%), feeling of headache (18.75%), feeling of abdominal pain (9.37%). The physiological change 3-4 days before onset of menses experienced by female gymnasts were highest (53.13%) pertaining to increase in body temperature followed by B. P. unchanged (28.13%), maximum increase of pulse rate (9.37%), and lowering heart rate (9.37%).

DISCUSSION

The study indicates a wonderful result, revealed the prevailing situation around menstruation in female gymnasts. Menstruation is routine, always occurring,

but unspoken. It is associated with psychological, physical, physiological and social and educational problems, but not well addressed or given due attention.

The study has estimated age of starting competing in sports and age at menarche in the Indian elite female gymnasts. The maximum frequency at age of starting competing in sports in this study was 11-13 years. The highest frequency of females had their menarche at the age of 14 years. The average age of menarche is 12-13 years. When it was compared with average age, they showed a pattern of delayed menarche. Another researcher has also reported the same results indicated a high incidence of delayed menarche. More than fifty percentages of females had menstrual problems and less than fifty percentages of them believed that menstruation

affected their performance. Pain dysmenorrhea was also felt and anger was the commonest, mood swing experienced by more than one fourth female gymnasts (Kashyap, Koley & Sandhu, 2007). The age of menarche correlates with age of starting competing in sports. With every six months of starting early in sports, menarche gets delayed by six months to one year and is attributed to strenuous training along with a negative calorie balance, leading to a hypothalamic suppression reactions (Frisch, Gotz- Welbergen, & McArthur, Albright, Witschi, Bullen, Birnholz, Reed, & Hermann, 1981).

The study explains that most of the female gymnasts faced the problem of increment in body temperature during menses. A very small percentage of female gymnasts suffered from incidence of fluid retention. Mood swing fluctuation was observed in the gymnasts during menstruation. The anger was the dominant factor in female gymnasts. The effect of menstruation on performance was observed in the statement of maximum frequency of gymnasts, they mentioned the medium level of performance during this period. Irregularity in menstrual cycle was stated by female gymnasts due to indulged in training of gymnastics. Maximum frequency of gymnasts mentioned the minimum 21 days and maximum 30 days menstrual cycle phase. Duration of menses, most of female gymnasts was of 5 days, but the variation in duration of menses was clearly observed in the gymnasts. Problem faced before onset and during menses was characterized by increase in fatigue in most of the gymnasts, which may attributed to the loss of blood from body leads to the less supply of oxygenated blood to body tissues. The menses have no effect on the training and performance of gymnasts.

The present study reported a very high incidence of menstrual problems like dysmenorrhea,

pre-menstruation tension, oligomenorrhea, exercise induced primary and secondary amenorrhea, menorrhagia, luteal phase deficiency etc. Restricted energy availability, as promoted by fad diets, to maintain a lean appearance and improve performance, leads to initiation of menstrual disturbances (Loucks, & Heath, 1998). Amenorrhea, which involves complete follicular and luteal suppression, is the most severe of menstrual disturbances reported, less common being luteal phase defects, but, that too were reported as high as 79 percent (Desouza, & Williams, 2004).

It is well known that premenstrual symptoms are physical and psychological, but most of the women experience combination of both. However, most of the athletic women take these phenomena in their stride and fail to perceive these symptoms at all. Menstruation is a phase that affects the performance of an individual and this is attributed to associated body changes like joint laxity, fluid retention, menstrual induced leg pain, dysmenorrhea, early onset of fatigue etc. In the present study, however, it was found that menstruation improved the performance of athlete. However, some studies have reported no consistent difference among pre-menstrual, menstrual and post-menstrual phase on performance (Quadhagno, Faquin, Lim, Kummka, & Moffat 1991).

CONCLUSIONS

The maximum frequency at age of starting competing in sports in this study was 11-13 years. The highest frequency of females had their menarche at the age of 14 years. The average age of menarche is 12-13 years. Most of the frequency of female gymnasts faced the problem of increment in body temperature during menses. A very small percentage of female gymnasts suffered from incidence of fluid retention. Mood swing fluctuation was observed in the gymnasts during menstruation. The anger was the dominant factor in female gymnasts.

Medium level of performance was mentioned by female gymnasts during menstruation. Irregularity in menstrual cycle was stated by female gymnasts due to indulged in training of gymnastics. Maximum frequency of gymnasts mentioned the minimum 21 days and maximum 30 days menstrual cycle phase. Duration of menses in the most of female gymnasts was of 5 days. Problem faced before onset and during menses was characterized by increase in fatigue in most of the gymnasts, High incidence of menstrual problems like dysmenorrhea, pre-menstruation tension, oligomenorrhea, exercise induced primary and secondary amenorrhea, menorrhagia, were reported by gymnasts

REFERENCES

- Abraham, S. F., Beumont P.J.V., Fraser I.S. & Llewellyn-Jones D. (1982). Body weight, exercise and menstrual status among ballet dancers in training. *British Journal of Obstetrics and Gynecology*, 1982 ; 89 : 507–510.
- Brooks-Gunn, J., Warren, M. P., & Hamilton, L.H. (1987). The relation of eating problems and amenorrhea in ballet dancers. *Medicine & Science in Sports & Exercise*, 19, 41–44.
- Barbin, L., Barr, F. (1999). Adolescent menstrual complaints: are they important? *Journal of African Health*, 21(2), 12-13.
- Costos, D., Ackerman, R., & Paradis, L. (2002). Recollection of menarche: communication between mothers and daughters regarding menstruation. *Sex Roles Journal of Research*, 46 (1-2), 49-59. doi: 10.1023/A:1016037618567.
- Desouza, M. J., & Williams, N. I. (2004). Physiological aspects and clinical sequelae of energy deficiency and hypoestrogenism in exercising women. *Human Reproduction Update*, 10(5), 433-48.
- Elissa, K., Jill, R. (1995). Preparing girls for menstruation: Recommendations from Adolescent Girls. *Adolescence winter*, 30, 120.
- Feicht, C. B., Johnson T. S., & Martin B. J. Sparks, K. E., Wagner, W.W. (1978). Secondary amenorrhea in athletes. *Lancet*, 2, 1145–46.
- Finlay, F., & Jones, R. (2001). Letter: National guidelines are needed to provide sanitary facilities in primary schools. *British Journal of Sports Medicine* 2001 ; 323:398
- Frisch, R. E., Gotz – Welbergen, A.V., & McArthur, J.W., Albright, T., Witschi, J., Bullen, B. A. Birnholz, J., Reed, R.B. Hermann, H. (1981). Delayed menarche and amenorrhoea of college athletes in relation to onset of training. *Journal of American Medical Association* 246, 1559-63.
- Glass, A.R., Deuster, P.A., Kyle, S. B., Yahiro, J.A., Vigersky, R. A., Schoomaker, E.B. (1987). Amenorrhea in Olympic marathon runners. *Fertility and Sterility*, 48, 740–745
- Gavin, M. L. & Izenberg, G. N. (May, 2007) Female gymnasts training : puberty and periods. Retrieved from <http://kidhealth.org/parent/misc/reviewers.html>.
- Kashyap, K., Koley, S., & Sandhu, J.S.(2007). Female specific problems in inter-university level gymnasts. *Journal of Sports and Sports Science*. 30 (3), 5-13.
- Loucks, A. B., & Heath, E. M.. (1998). Dietary restriction reduces luteinizing hormones pulse frequency during waking hours and increases Lh pulse amplitude during sleep in young menstruating women. *Journal of Clinical Endocrinology and Metabolism*, 78, 910-15.
- Otis, C.L.(1992). Exercise associated amenorrhea. *Clinical Journal of Sport Medicine*, 11, 351.
- Petterson, F., Fries, H., & Nillius, S. J. (1973). Epidemiology of secondary amenorrhea: incidence and prevalence

rates. *American Journal of Obstetrics. Gynecology*, 7, 80–86.

- Quadagno, D., Faquin, L., Lim, G. N., Kummka, W., & Moffat, R (1991). The menstrual cycle : does it affect athletic performance? *Journal of Physiology and Sports Medicine*, 19, 121-24.
- Shangold, M., & Mirkin, G.(1988). Women and Exercise. Philadelphia: F.A. Davis.
- Singh, K. B. (1981). Menstrual disorders in college students. *American Journal of Obstetrics and Gynecology*, 12 (10), 299–302.
- Shangold, M. M., & Levine H. S. (1982). The effect of marathon training upon menstrual function. *American*

Journal of Obstetrics and Gynecology, 143, 862–869.

- Sanborn, C.F., Albrecht B.H., & Wagner, W.W. (1987). Athletic amenorrhea: lack of association with body fat. *Medicine & Science in Sports & Exercise*, 19, 207–212.
- Taffa, N., Himanot, R., & Desalegn, S. (1999). Do parents and young people communicate on sexual matters? The situation of Family Life Education (FLE) in a rural town in Ethiopia. *Ethiopian Journal of Health Development*, 13(3), 205-10

How to cite this article: Sharma R, Nigam AK. Female specific problems in Indian gymnasts. *Int J Health Sci Res.* 2015; 5(1):197-205.
