

Short Communication

# Female Athlete Triad: Tip of Iceberg

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**1. Abstract**

Female Athletic Syndrome is a triad of medical condition that is frequently seen in physically active young women characterized by disordered eating, amenorrhea and osteoporosis. It can be summed up as low energy availability, menstrual dysfunction and low bone density. In India where female nutrition is inappropriate, inadequate and often unhealthy, with their health in dire straits and they being engaged in physical activities that demand high energy requirement, their sub optimal energy intake make them susceptible to the triad of female athlete. The article recognizes the relevance of this condition in Indian perspective and discusses the causes and treatment modalities available.

**2. Keywords:** Female athlete syndrome disordered eating; Amenorrhea; Osteoporosis

**3. Introduction**

The past century has witnessed increased participation of woman in sports and activities that require increased physical activity and stamina [1]. It was initially defined at triad consensus conference in 1992 and gradually received recognition around globe due to debilitating consequences [2]. It is a triad of medical condition that is frequently seen in physically active young women characterized by disordered eating, amenorrhea and osteoporosis [3]. It can be summed up as low energy availability, menstrual dysfunction and low bone density [4]. There are studies in literature [5-9], which have pointed towards increased incidence of this triad. This triad is largely attributed to energy imbalance rather deficient in energy against increased requirements, it occurs in woman engaged in sports activities [10].

**4. Indian Perspective**

The average life of Indian women requires working in strenuous conditions. In rural India, women collect firewood, fetch drinking water, search fodder to feed cattle work hard to raise crops and look after children. Another subset of young rural women is striving hard to gain entry in athletics and make a mark in sports. Women in urban India have a life no less stressful as compared to rural counterpart - they work in offices for long hours and shoulder numerous responsibilities of household work. A common factor in all these is poor inclination to look after them – be it nutrition, pursuing healthy lifestyle or giving time for them. They all are work tirelessly to pursue their daily chores. (Table 1) enumerates various factors that govern health concern of woman in India and disorders associated with poor nutrition (Table2).

**Table 1:** Factor that determine the health concerns of the women

Poverty	Unsafe Abortions
Illiteracy	Early Marriage
Social & Cultural Issues	Malnutrition
Reproductive years	Inadequate health services
Gender Discrimination	Less employment opportunities
Low levels of education	Early Marriage & Child bearing
Sexual Abuse	Domestic Violence

**Table 2:** Disorders associated with malnutrition in women

Iron and Iodine deficiency related disorders	Diabetes Mellitus
Cardiovascular Disease Anemia Osteoporosis Mental depression and Suicide commitment	Osteoarthritis Malabsorption Syndrome Impaired menstrual cycle Malignancy

Nonetheless in developed nations the triad is seen in sports women but in country like India where female nutrition in rural areas is in appropriate with their health in dire straits and they being engaged in physical activities that demand high energy requirement, their sub optimal energy intake make them susceptible to the triad of female athlete.

The Obstetrician- gynecology expert can frequently encounter this problem in patients at their routine visit or as a part of evaluation for amenorrhea [11]. The long-term risk includes osteoporosis with poor bone mineral health and ultimately diminished athletic performance. The key etiology lies between energy availability, bone health and menstrual function. The low energy availability could be attributed to deliberate low intake of food as a part of training or coach or family pressure or as self-image reservation or may be due to under-line eating disorder like anorexia nervosa, bulimia and binge eating. These are part of mental disorder and any athlete physically active women developing such symptoms should take a psychiatrist reference. Amenorrhea in female athletic triad may be primary or secondary type. In primary type there is no uterine bleeding either by age of 14 years without secondary sexual characteristics or by age of 16 years with secondary sexual characteristics. Secondary amenorrhea is defined as 3month absence of menstrual bleeding in women with primary regular menses or a 12-month absence with previous oligomenorrhea. The prevalence of secondary amenorrhea is high in female athletics has higher 65% in long marathon runners [12] compared to 2-5 percent in general population [13]. The amenorrhea causes decrease in systemic estrogen level causing negative effect on bone density full. Estrogen is the principle hormone in females that helps to maintain balance between bone formation and absorption. Osteoporosis in later life is not always due to bone loss during adulthood but it can be attributed to failure to obtain optimal bone mineral density during childhood and adolescence. The American College of sports medicine and International Society for Technical Densitometry have different criteria for bone mineral density BMD screening and Z score is recommended parameter full. Z-score compares BMD for age with sex matched controls with 30-year-old woman and thus not useful for adolescent population. Z score less than -1.0 in

an athlete requires further work up. Z score between -1.0 to -1.9 falls in low BMD category [13-15]. The term Osteoporosis is reserved for those with score less than 2 in adolescence and young adults.

Once the nutritional needs are fulfilled by BMD stabilized and improve after nutritional needs are restored but not always.

All three components need not be present to diagnose the disease. (Table 3) enumerates the various sign and symptoms that should be a part of screening and should be a part of preparticipation screening protocol:

As a gynecologist look for signs of hyperestrogenemia like delayed puberty, breast atrophy and atrophic vaginitis in patients suspected of female athletic syndrome. The laboratory investigations needed include complete blood count, electronics, glucose testing, urine analysis, pregnancy test, FSH, Prolactin, Estradiol and for sexually active patient's evaluation for sexually transmitted infections. The core stone of management is appropriate balanced energy intake. Once the energy expenditure is appropriately adjusted there is a restoration of normal menses and it marks the correction of energy balance. The non-pharmacological interventions involve psychiatrist or psychologist, dietitian, family physician or obstetrician and gynecologist. A daily intake of 1000 to 1300 milligram of calcium and 600 units of vitamin D is recommended [16]. Communication with patient, her parents, coach in order to educate and monitor the patient for a liquid nutrition so that the patient has proper weight gain. A weight gain of 0.23 kilogram 0.45 kilogram per week until desired goal weight is attained is reasonable [17]. During this time exercise should not be totally eliminated rather reduced by 20% only and close monitoring for next 3 months is desirable. The role of pharmacology therapy in female athlete triad remains controversial as none of the agents are approved and none have shown full Restoration of BMD. Anxiety and depression can be dealt with antidepressants.

**Table 3:** Relevant history

History about eating or weight gain or loss	Diet pill use
Menstrual history and pattern Exercise regime Current & past medication Eating habits Diet history History of eating disorder	Substance abuse Depression Sexual history Age of secondary sexual characteristics Age of menarche Substance abuse
Physical examination includes	
Weight Height Growth chart Hair loss	Constipation Ankle edema Orthostatic hypotension Constipation

Oral contraceptive pills prevent greater reduction of bone loss. 20-35 micrograms of ethinyl estradiol may help in maintaining BMD [10]. OCP may induce regular menses and make a false alarm of energy in balance collection. It is pointed out that its Restoration of menses by improving energy balance is cardinal sign of recovery not the OCP in use amenorrhea. Those with failed estrogen therapy may be given transdermal estradiol with cyclic progesterone [18]. Bi-phosphates are not recommended for osteoporosis in postmenopausal women. The choice of contraceptive in sexually active female cause difficulty as most of the choice is mask spontaneous menses but if reliable birth control measures are required implant and progesterone intra-uterine device should be offered. The copper intrauterine device contraception without masking resumption of spontaneous menses is best suited in such cases.

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