INTRODUCTION

Skill in any game is pre-requisite to exhibit top performance of a player. Simultaneously, it becomes highly impossible for any player to achieve such level of performance without having a concrete base on fitness. Thus, both the fitness and skills are complimentary to each other to become a successful player.

Basketball is a fastest ball game in the world. Over the years this versatile game has become popular worldwide. In this game, full speed is seldom achieved by a player so that the player must have ability to stop and change direction quickly to get success. This suggests that a compromise must be reached between the use of out-right speed and the use of controlled speed so that he can drop quickly and change direction on demand. Basketball player is most effective when he can start quickly and move with “controlled speed” to a given spot on the floor. Therefore, Basketball is more often a game of nimble and quick bursts of speed from side to side and fluent forward and backward movements on playing surface.

Moreover, shooting is an important skill required in Basketball. The shooting skill, like other skills of Basketball, requires a more powerful concentration. In an International Basketball competition, almost all teams are of similar physical caliber, but the team which complies of good shooters always wins.

The experiments on Yoga in relation to neuro-psycho-physiological aspects also revealed that Yoga contributes to take care of one’s attention, motivation, anxiety, concentration, neuromuscular efficiency, balance,
coordination etc. (Bera et al., 1990; Gore, 1987; Kulkarni & Bhogal, 1991; Sahsi, 1988; Vinod et al., 1991) that require for better shooting performance in Basketball. The usefulness of yoga in area of Basketball has not been verified till-date.

Malick (2000) proved the utility of Yoga stretching and relaxation for improving rifle shooting performance among the personnels of Indian Defense. Review of research literature indicates that sports scientists have evolved various scientific methods of training and strategies to improve better performance in different sports including Basketball (Coughlin, 1984; Giorgis, 1986; Houston, 1989; Kavussanu, 1992; Smith, 1987). Various relaxation techniques are also recently being applied among athletes in competitive sports to improve overall performance ability. It was, therefore, thought desirable to include yoga in the training programme so as to enhance fitness and skills of Basketball players.

**Need of the Study**

Basketball is a game where shooting performance is a predominately deciding factor. If an athlete concentrates properly, he/ she gets success while performing shooting in Basketball.

Here the question arises - how an athlete can improve the power of concentration? Although regular practice of conventional training helps to improve Basketball shooting performance, we thought since yoga brings homeostasis in mento-emotional and physical aspects, it may be of immense help to improve this ability. Moreover, yoga works at the conscious level for awakening awareness (Bhole, 1989) which, in turn, claims to improve concentration. The step-wise process in Yoga, viz., *yama, niyama, asana, pranayama, dharana, dhyana* and *samadhi*, develops awareness as well as concentration to the fullest extent to achieve success. The
principles of these practices, in fact, work on the psycho-physio-neurological level that brings the equilibrium state and provides a state of balance or homeostasis. Once a Basketball player reaches this state of homeostasis, he can concentrate perfectly on his task of shooting performance and becomes successful. This emphasizes the need of this study.

**Statement of the Problem**

The importance of developing good conditioning programs based on the specific physiological demands of each sport is considered a key factor to success (Gillam, 1985; Taylor, 2003; 2004). Basketball is becoming increasingly popular in many countries and is played worldwide by more than 450 million people. At the professional level, numerous tests and training programs are being used to monitor the cardiovascular (Mcllnnes et al., 1995) and athletic (Lange and Bury 2001) performances of players. The results of these evaluations are used to adjust training techniques in an attempt to prevent traumatic and overuse injuries. Zakas et al., (1995) showed that compared with players in lower divisions, professional basketball players did not produce higher quadriceps or hamstrings peak torque values relative to body weight. Theocharopoulos and Tsitskaris (2000) and Rahnama et al., (2005) suggested that the specific training is necessary to reach the professional level in basketball players.

Further, basketball requires tremendous endurance, speed, agility, and power (Siegler et al., 2003). Therefore, it seems clear that the there is need to develop a programme which will minimize the injuries and achieve performance skills in basketball. Consequently, game performance can be influenced by different training approaches and that no literature is
available to report these training modalities. Thus, the purpose of this study was to identify the effect of six weeks yoga training on fitness components and basic skills of school children from 12 to 14 years.

**Problem and its Relevance**

The rise in professionalism in sport over the last two decades has had a ripple down effect to virtually every level of sport. No longer does it seem enough to have natural talent and to play sport simply for enjoyment. What is now required on top of talent is the development of this talent by the many and various means available in the contemporary sporting world, and by fine-tuning these natural abilities so that the full potential of the sportsperson can be achieved. At the higher levels of professional sport this can involve a support team of coaches, managers, trainers, health, fitness and diet consultants and sport psychologists, but the person most responsible for coordinating, or at some levels, assuming, many of these responsibilities, is the coach.

The nature of coaching has changed radically in this period, and continues to change at a rapid pace. The use of technology, science, medicine and psychology in training programs has become standard procedure and reveals a willingness by coaches to draw on a broad spectrum of tools to give their team or athlete the winning edge. Increasingly yoga is becoming one of these tools.

Yoga which encompasses several techniques including physical postures, breathing techniques (Pranayama) and meditation has become very popular for its applications in health starting from better physical fitness (Telles et al., 1994) to a better quality of life. Yoga has been used effectively for stress reduction that has resulted in biochemical and
physiological changes. Several studies have highlighted the psychological benefits of integrated yoga practices such as anxiety, neurosis, and depressive illness. The clinical potential of yoga as a self-control technique for improving and stabilizing affective states was studied by Harvey. In a three armed study, Harvey compared yogic breathing exercises with two control groups (a course on the philosophy of meditation and a course in psychology) and demonstrated that yogic breathing exercises showed an improvement in mood and vigor as well as decreased tension, fatigue, and depression relative to subjects in control groups. The mood benefits of Hatha yoga and swimming compared in college students showed that yoga was as effective as swimming in decreasing anxiety, confusion, tension and depression, and that the acute decreases after yoga were significantly greater than after swimming for men who were personally selected to participate (Berger and Owen 1992).

Yoga’s influence on the physical and mental preparation of athletes for performance is growing as coaches and athletes begin to recognize the value of yoga techniques and apply them to sport. The relationship between sport and yoga is now developing and flourishing. Many athletes are now using yoga to supplement their regular exercises and improve their performance. Yoga can help with many things from helping back, improving balance, increasing flexibility, and strengthening core. In fact, most athletes probably think that their regular training is enough. After all, many athletes put a lot into their training and workouts. It’s hard to believe that something like yoga can make a difference. However, the reality is that yoga has many benefits no matter what kind of physical activity you engage in. Professionals in basketball, tennis, football, baseball, and hockey use yoga to stay fit and prevent injuries.
Further, basketball players have very tight muscles because of all the jumping and landing involved in their sport, and this leads to injury. Their balance – surprisingly – and their proprioception or the ability to sense clearly what is happening in the muscles are quite poor as well, but yoga can help significantly in these areas. Therefore, the researcher has undertaken this study entitled “Effect of selected yogic exercises on fitness components and basic basketball skills of school children from 12 to 14 years”.

Objectives of the Study

The objectives of the study were as follows:

1) To prepare a “Training schedules” of yogic exercises on the basis of the principles of Yoga with a view to improve overall fitness and skills of school level Basketball players.

2) To see the effect of the said training intervention in improving fitness and skills of basketball players.

Hypotheses

On the basis of literature available so far it was hypothesized that:

HO1: Yoga practices would not help to improve the selected fitness components of basketball players.

HO2: Yoga practices would not help to improve the selected skills of basketball players.

HO3: Yoga practices may not help to maintain the selected fitness components and skills of basketball players.
Delimitation of the Study

Due to the dearth of time and financial restriction, the investigator has delimited this study as follows:

1. This study has been delimited to the school level male basketball players, age ranged from 12-14 years.
2. This study has been delimited to selected fitness and skill variables associated to basketball.

Limitations of the Study

While conducting the experiment, the present investigator has recorded some drawbacks as limitations of the study as follows:

- Due to paucity of time and busy schedule in school, the investigator had to restrict the Yoga training session for only 45 minutes daily.
- Total duration of training for this study was limited for 6 weeks only. Due to paucity of time the researcher could not extend the experimental period.
- The subjects of all the experimental as well as control groups were totally ignorant and had no significant background about the exposure of yoga asanas and Pranayamas. Although the investigator has taken proper care for teaching the same, however, such a situation may have adverse effect on their cognitive aspect of learning.

Significance of the Study

- The study may bring an outstanding result showing improvement in the performance in Basketball, which is a challenging sport.
Basketball players at national and international level may be benefited through this study.

The newly designed yoga program may be included additionally in training programme of Indian Basketball players participating in national and international events.

The study will keep encouraging the physical educators, coaches and athletes not only to understand the mechanism of the influence of yoga on fitness and skills but also to find out its effectiveness during detraining period or off season of players.

**Operational Definitions of Important Terms Used**

**Yoga practices**

Yoga is an Indian philosophy, which has been proved as a scientific discipline for enriching state of self realization in bringing psycho-physical homeostasis. However, yoga practice is a system of systematic practice of different kinds of posture (Asanas), breathing (Pranayams) and meditation (Dhyana) which primarily aims at providing health and physical fitness at psycho-physiological level.

**Physical Fitness**

1. Fitness is a state, which characterizes the degree to which a person is able to function without undue fatigue. It is the capacity to work that depends upon the physical, mental, emotional, social and spiritual components of fitness all of which are related to each other.

2. Physical fitness is the ability to carry out daily tasks with vigour and alertness without for undue fatigue and meet with the ample
energy to engage in leisure time pursuit and to meet the above physical stress encountered in emergency situation.

3. Physical fitness is defined as the ability to perform muscular work satisfactorily under specified conditions and may be assessed.

4. Physical fitness is an intrinsically individualized under expressing individuals biodynamic potentials, comprising functional and metabolic components. It brings in functional integration of parts of body at the highest levels of work efficiency, energy economy and endurance.

Skills
An ability and capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carryout complex activities or job functions involving ideas is known as skills.

Basketball
Basketball is a team sport in which two teams of five players try to score points by throwing or "shooting" a ball through the top of a basketball hoop while following a set of rules. Basketball is one of the world's most popular and widely viewed sports.

BRIEF REVIEW OF LITERATURE
The researcher has gone through various databases to locate literature related to this study. The relevant studies found from various sources, which the researcher has come across, are cited below.

Montgomery, Pyne and Minahan (2010) characterized the physical and physiological responses during different basketball practice drills and games. Methods: Male basketball players (n=11; 19.1+/−2.1 y, 1.91+/−0.09
m, 87.9+/−15.1 kg; mean+/−SD) completed offensive and defensive practice drills, half court 5on5 scrimmage play, and competitive games. Heart rate, VO2, and triaxial accelerometer data (physical demand) were normalized for individual participation time. Data were log-transformed and differences between drills and games standardized for interpretation of magnitudes and reported with the effect size (ES) statistic. Results: There was no substantial difference in the physical or physiological variables between offensive and defensive drills; physical load (9.5%; 90% confidence limits+/−45); mean heart rate (-2.4%;+/−4.2); peak heart rate (-0.9%;+/−3.4); and VO2 (-5.7%;+/−9.1). Physical load was moderately greater in game play compared with a 5on5 scrimmage (85.2%;+/−40.5); with a higher mean heart rate (12.4%;+/−5.4). The oxygen demand for live play was substantially larger than 5on5 (30.6%;+/−15.6). Conclusions: Defensive and offensive drills during basketball practice have similar physiological responses and physical demand. Live play is substantially more demanding than a 5on5 scrimmage in both physical and physiological attributes. Accelerometers and predicted oxygen cost from heart rate monitoring systems are useful for differentiating the practice and competition demands of basketball.

In this study, by McInnes et al., (1995) the intensities of activity and movement patterns during men's basketball were investigated by videoing the movements and monitoring the heart rate and blood lactate responses of eight elite players during competition. The results are expressed according to 'live time', which is actual playing time, and 'total time', which includes live time as well as all stoppages in play. The mean (+/- S.D.) frequency of all activities was 997 +/- 183, with a change in movement category every 2.0 s. A mean total of 105 +/- 52 high-intensity runs (mean duration 1.7 s) was recorded for each game, resulting in one high-intensity
run every 21 s during live time. Sixty percent of live time was spent engaged in low-intensity activity, while 15% was spent in high-intensity activity. The mean heart rate (HR) during live time was 169 +/- 9 beats min-1 (89 +/- 2% peak HR attained during laboratory testing); 75% of live time was spent with a HR response of greater than 85% peak HR. The mean blood lactate concentration was 6.8 +/- 2.8 mM, indicating the involvement of glycolysis in the energy demands of basketball. It is concluded that the physiological requirements of men's basketball are high, placing considerable demands on the cardiovascular and metabolic capacities of players.

Drinkwater et al., (2008) presented reference values of fitness and body size in basketball players, and identifies practical methods of interpreting changes within players and differences between players beyond the null-hypothesis. The volume of literature on fitness testing in court sports such as basketball is considerably less than for field sports or individual sports such as running and cycling. Team sport performance is dependent upon a diverse range of qualities including size, fitness, sport-specific skills, team tactics, and psychological attributes. The game of basketball has evolved to have a high priority on body size and physical fitness by coaches and players. A player's size has a large influence on the position in the team, while the high-intensity, intermittent nature of the physical demands requires players to have a high level of fitness. Basketball coaches and sport scientists often use a battery of sport-specific physical tests to evaluate body size and composition, and aerobic fitness and power. This testing may be used to track changes within athletes over time to evaluate the effectiveness of training programmes or screen players for selection. Sports science research is establishing typical (or 'reference')
values for both within-athlete changes and between-athlete differences. Newer statistical approaches such as magnitude-based inferences have emerged that are providing more meaningful interpretation of fitness testing results in the field for coaches and athletes. Careful selection and implementation of tests, and more pertinent interpretation of data, will enhance the value of fitness testing in high-level basketball programmes.

Apostolidis et al., (2004) conducted a study to describe the physiological and technical characteristics of elite young basketball players, and to examine the relationship between certain field and laboratory tests among these players. Methods: Thirteen male players of the junior's Basketball National team (age: 18.5 +/- 0.5 years, mass: 95.5 +/- 8.8 kg, height: 199.5 +/- 6.2 cm, body fat: 11.4 +/- 1.9%, means +/- SD) performed a run to exhaustion on the treadmill, the Wingate test and 2 types of vertical jump. On a separate day, the field tests (control dribble, defensive movement, speed dribble, speed running, shuttle run and dribble shuttle run) were conducted. Results: Maximal oxygen uptake (VO2max) and ventilatory threshold were 51.7 +/- 4.8 ml/kg/min and 77.6 +/- 7.0% VO2max, respectively. Maximum power output was 10.7 +/- 1.3 Watts/kg and mean power (Pmean) 8.0 +/- 0.7 Watts/kg. Counter-movement and squat jump height were 40.1 +/- 3.7 and 39.8 +/- 4.0 cm, respectively. Performance in control dribble (13.70 +/- 0.96 s), speed dribble (4.24 +/- 0.75 s), high intensity shuttle run (27.90 +/- 1.04 s) and dribble shuttle run (29.50 +/- 1.22 s) was correlated with Pmean (r=-0.58, r=-0.62, r=-0.56 and r=-0.73, respectively, p<0.05). Percent body fat was negatively correlated with all the above field tests (r=0.63, r=0.57, r=0.66, r=0.65, respectively, p<0.05). Conclusion: These players presented a moderate VO2max and anaerobic power. The significant correlation between Pmean and certain
field tests indicates that these tests could be used for the assessment of anaerobic capacity of young basketball players.

The purpose of this study conducted by Wang, Liu and Moffit (2009) was to describe skills and offensive tactics frequently used in pick-up basketball games. 65 participants were recruited from public basketball courts. An observational instrument was developed to analyze the performances of pick-up games. Participants' performances were videotaped and coded. Results indicated that the passing skills most frequently observed in the games were chest pass, overhead pass, and bounce pass. For dribbling, crossover dribble and change-of-pace dribble were frequently observed. Jump shot, set shot, and layup were also frequently used. The offensive tactics frequently used included drive, cut, and set screen. The study may be beneficial for helping young people prepare to play pick-up basketball games.

Joshi et al., (1992) examined the effect of short term pranayam practice on breathing rate and ventilatory functions of lungs. Thirty three normal male and forty two normal female subjects of average age of 18.5 years underwent six weeks course in ‘Pranayam’ and their ventilatory lung functions were studied before and after their practice. They had improved ventilatory functions in the form of lowered respiratory rate (RR) and increases in the forced vital capacity (FVC) forced expiratory volume at the end of 1st second (FEV %) maximum voluntary ventilation (MVV) peak expiratory flow rate (PEFR lit/sec) and prolongation of breath holding time.

Desai (1978) examined the effect of asanas on skill development in Basketball. 120 Students oh Higher secondary Education complex, science stream, Rajratna P.T Patel science college, Vallabh Vidyanagar were
selected as subjects. After giving AAHPER Basketball skill tests for boys, the initial test scores were recorded. They were ranked in order of the merit of the composite scores computed by adding the percentiles scores of each student in the various test items. They were divided into two equated groups of 20 each, assigning even numbers in the merit list to one group (Group- A – Asanas) and odd numbers to the other group (Group – B – Controlled) Group A has Basketball skills for an hour each day for a period of 6 weeks. They were also instructed to practice a prescribed series of asanas for half an hour after their lesson in Basketball skills. Group B was taught Basketball skills on the same day as for group A except for practice of asanas after Basketball skills practiced. AAHPER Basketball skill test for boys was administered at the beginning of the experimental period after 2 weeks, 4 weeks and 6 weeks for the commencement of the project. The rate and amount of learning of each group after two weeks, 6 weeks were tested for significance by calculating ‘t’ ratio between the group mean difference of the initial and final scores, so also the group A and B were tested for these three time duration. It was seen that practicing asanas with proper techniques after skill practice improves the efficiency of learning shooting skill and dribbling in Basketball where as passing skills are not influence. It advanced the learning by about two weeks in all the basic skills, except in speed pass and jump and reach.

Kurland (1984) studied the influence of Hath Yoga on flexibility of the hip joint in older and younger women. Two groups of women (aged 17 – 23, 40 – 58) followed an 18hr program of Hath Yoga. The range of motion of the hip, lower back musculature and hamstring muscle group was measured at the beginning, midpoint and end of the yoga program. The Thomas Test (TT) the Wells Dillon sit and reach test (WDSRT) and the
straight leg raise (SLR) measured range of motion. No subjects had prior exposure to Hath yoga. All subjects in both groups improved hip flexibility. In all three measurement periods older women achieved lower levels of flexibility than younger. However M values for both groups showed that by the end of the program the older group scored at the levels similar to those of the younger at the beginning. This indicates that the effects of age on reduced flexibility can be modified with yoga. Statistical analysis showed age and individuals differences were important influences on flexibility.

The reports and reviews presented above have given many ideas and strategies that help for improving performance in basketball. Also there are some articles which show preventive measures for injuries that are common in this game. Related studies on yoga also revealed that many of the components of shooting abilities and skills that are required for better performance in basketball can be improved through yoga practices. However, no controlled experiment directly available to record the efficacy of yoga on basketball skills and fitness among school level basketball players and hence this study seems to be justified.

**METHODOLOGY**

**Sample**

Sixty (n = 60) male Basket Ball players aged between 12 to 14 years were selected randomly from Shishuvan School, Matunga, Mumbai, for this study. The investigator made sure that the entire subjects were ready to go through the experimental requirements of this research project. The
Inclusion and Exclusion Criteria

The criteria for inclusion and exclusion of the subject were as follows:

- The Basketball players who practice regularly and having a certain level of knowledge in competitive basketball game, were included in the experiment.
- The subjects who are expected to remain present till the experimental trials are finished were incorporated in this study.
- The players suffering from known serious health problem, as ruled out by the physician, were excluded.
- The subjects who agreed to restrict themselves into yogic diet during the tenure of the experiment were included.
- Final selection of the subjects was done as per the suggestion of the basketball coach.

Experimental Design

The experimental design followed in this study was a parallel group design considering an experimental group and a control group. Making the use of the Fisher’s table random numbers, the entire sixty subjects were divided randomly into two groups viz. Group A (Experimental) and Group B (Control). The design of the experiment was planned in five phases.
• Phase – I: Pretest
• Phase – II: Training (Yoga practices),
• Phase – III: Post Test
• Phase-IV: Follow up test

**Pre Test (Phase –I)**

As the purpose of this study was to measure the fitness and skills of basketball players, standard tests were administered for this purpose. The fitness components were speed, agility and flexibility, whereas the basketball skills were shooting, passing and dribble test respectively. To assess these variables standard test were applied to record the pre test data for both the experimental and control group.

**Treatment Stimuli (Phase – II)**

After the pre testing was over, all the subject of experimental group underwent a one and half month (6 weeks) training of yoga practices along with their as usual regular exercise and Basketball practice daily for forty five minutes except Sundays and holidays.

The total 60 subjects were divided into two groups: Group A - Experimental and Group B – Control. Both the groups participated in their regular training schedule. Additionally, the subjects of Group A underwent special training programme of yoga practice. The subjects of Group B i.e. Control group were engaged in training as per their schedule but not allowed to participate in yoga programme.

The controlled subjects, altogether did not receive the above mentioned yoga training, were kept busy with some recreational activities for forty five minutes daily in the evening except Sunday and holidays during the total period of experiment.
Post Test (Phase III)

When the treatment or training period of 6 weeks was over the post test on fitness and basketball skill was assessed for both the group. A completely randomized group design (Rothstein, 1985) for two groups of equal numbers was adopted for this study. The scores in each criterion measure were taken before and after the experimental period of 6 weeks.

Follow up (F.U.)/Detraining

Finally, when the post test on fitness and basketball skill was assessed for both the group, there was a detraining period for 6 weeks, where no training was imparted on behalf of the investigator. However, the subjects of the experimental group were directed to practice the yoga exercises on their own. After 6 weeks of detraining period is over, all the variables were finally tested on the subjects of both the groups.

A completely randomized group design (Rothstein, 1985) for two groups of equal numbers was adopted for this study. The scores in each criterion measure were taken before and after the experimental period of 6 weeks and after the follow up (F.U.) or detraining period of another 6 weeks. Thus, the total duration of the project was 3 months.

Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Tools/Method Used</th>
<th>Criterion Measures (nearest to)</th>
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<tr>
<td>Fitness components</td>
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<table>
<thead>
<tr>
<th>Speed</th>
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<tbody>
<tr>
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<tr>
<td>Flexibility</td>
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Basketball skills

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</thead>
<tbody>
<tr>
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<td>Push pass test</td>
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</tr>
<tr>
<td>Dribbling</td>
<td>Johnson dribble test</td>
<td>0.01 sec</td>
</tr>
</tbody>
</table>

Statistical Analysis

Descriptive statistics have been applied to process the data prior to employing inferential statistics. Since six variables were repeatedly measures for an equal span of interval, repeated measures ANOVA followed by Newman Kuels Post Hoc test have been applied.