RELATIONSHIP OF MORPHOLOGICAL, PHYSIOLOGICAL AND MOTOR ABILITIES WITH PERFORMANCE OF FEMALE GYMNASTS

A THESIS
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ABSTRACT

Topic

“RELATIONSHIP OF MORPHOLOGICAL, PHYSIOLOGICAL AND MOTOR ABILITIES WITH PERFORMANCE OF FEMALE GYMNASTS.”

INTRODUCTION

Now days, sports is very popular among the masses. More and more people are not only watching it but also participating in it. Gymnastics, one of the most popular sports in modern age, is an excellent activity. It is a technical sport and the performance of the gymnast is evaluated on the basis of technique and difficulty of the skill. The exercises in gymnastics are so technically complex and often executed at such speed that the move is completed before its full impact has registered on the audience.

The shape, size and form of an individual play a significant role on the performance of a sportsman in any game. The basic structure must be present; no coach would attempt to make a champion out of any body.

The different components of motor abilities are basic to all movements which contribute successful performance of a player. A high degree of conditional abilities facilitate the
learning, practicing and mastering the technically skills in gymnastics.

The physiological factor determines the performance of the gymnast. A high degree of physical and physiological abilities are required for advanced performance in gymnastics. To meet the criteria for elite level performance, physiological demands on gymnasts are continuously increased. There is a need of cardiovascular and cardio respiratory fitness with gymnast at all level.

**HYPOTHESES:**

The study has been conducted with the following hypotheses:

1. It was hypothesised that there would be significant relationship between morphological characteristics and performance of female gymnasts.

2. It was hypothesized that there would be significant relationship of motor abilities with performance of female gymnasts.

3. It was further hypothesized that there would be significant relationship of cardiovascular fitness with performance of female gymnasts.

4. It was also hypothesized that there would be significant correlation among the three variables i.e. morphological, cardiovascular fitness and motor abilities.
5. There would be significant differences in morphological characteristics, cardiovascular fitness and motor abilities between high performance and low performance gymnasts.

**OBJECTIVES:**

Present study has been conducted with the following objectives:

1. To find out the correlation of morphological variables with competitive performance of female gymnasts.

2. To observe the correlation of cardiovascular fitness with performance of female gymnasts.

3. To examine the correlation of motor abilities (strength, flexibility and speed) with performance of female gymnasts.

4. To evaluate the correlation of morphological variables with motor abilities.

5. To find out the correlation of morphological variables with cardiovascular fitness.

6. To study the correlation of cardiovascular fitness with motor abilities.

7. To establish differences in morphological variables between high performance and low performance gymnasts.
8. To study the differences in cardiovascular fitness between high performance and low performance gymnasts.

9. To discover the differences in motor abilities between high performance and low performance gymnasts.

**Significance**

Though few studies have been conducted on Indian female gymnasts, but not a single study has been conducted on the All India Inter University level female gymnasts. This study has been chosen to fill the gap. The study will help in improving the fitness level for better performance in gymnastics. The study will also help the coaches in formulating training programme for gymnasts according to their requirements. Gymnasts will come to know their weaknesses regarding physical and physiological abilities.

**Material and Methods**

The study has been conducted on 100 female gymnasts who took part in All India Inter University Gymnastics Championship. The following parameters are taken on each female gymnast.

I. Anthropometric Measurements

II. Physiological Test

III. Motor abilities Tests
Anthropometric Measurements:

1. Weight
2. Stature
3. Sitting Height
4. Subischial Length
5. Humerus Bicondylar Diameter
6. Femur Bicondylar Diameter
7. Upper Arm Circumference
8. Upper Arm Circumference (flexed)
9. Fore arm circumference
10. Waist Circumference
11. Thigh Circumference
12. Hip Circumference
13. Calf Circumference
14. Biceps Skinfold
15. Triceps Skinfold
16. Sub-scapular Skinfold
17. Supra-iliac Skinfold
18. Calf skinfold

Body Density:
Body density has been calculated by using the equation devised by Durnin and Womersley (1974).

Percent Body Fat:
The calculated body density is converted to percent body fat by the formula devised by Siri (1961).
**Somatotype Rating:**

Heath-Carter somatotype method (1980) has been used to make the somatotype ratings.

**Physiological Test:**

Skubic and Hodgkin’s (1963) Three Minute Step test has been administered to measure cardiovascular fitness of the gymnast.

**Motor Abilities Tests:**

**A. Strength Tests**

1. Push-ups on ground (Max. Numbers)
2. Modified chin-ups (Max. Numbers)
3. Sit-ups (jack knife) (Max. Numbers)
4. Standing broad jump (cm.)

**B. Flexibility Tests**

1. Trunk flexion (cm.)
2. Trunk extension (Bridge) (cm.)
3. Flexibility of hips (Side Split) (cm.)

**Speed Test**

1. 30 metre sprint (sec.)

**Competitive Performance**

The official results of the All India Inter University Gymnastics Championship are considered as competitive performance.
STATISTICAL ANALYSIS OF THE DATA

Correlation Co-efficient (r):

Zero Order Product Moment method of correlation has been applied to compute relationship of variables with competitive performance.

Test of Significance:

The `t’ test is applied to determine the significance of differences in means of the selected variables between high performance and low performance female gymnasts.