

CHAPTER - VI

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6.0.0. INTRODUCTION:

In the period of last ten years sports have gained vast popularity all over the globe. The popularity of sports is still increasing at a fast pace and this happy trend is likely to continue in the future also. In the Olympic Games the total number of participating countries, sportsmen and games has also increased steadily. Sports have become an important social and cultural activity of the modern world. The contribution of sports in the all round development of human personality recreation and relaxation of human mind and body, rehabilitation and social adjustment of the injured sick and handicapped persons and understanding a many different people, nations, religions has been widely accepted and recognized by the educationists, physical educationists and people of the world. Sports are classified into several areas e.g., performance sports, physical education, rehabilitation sports, fitness and adventure sports etc. The area of performance sports has gained much more publicity and importance than the other areas.

6.1.0 Wrestling and its importance:

Wrestling is oldest sports of the world. Man by nature and instinct is aggressive and wrestling is one of the best substitutes for its sublimation. Most of the European writers admit this idea that the origin place of the wrestling is India, whereas world renowned Greece, U.S.A., Rome, Egypt, USSR, Germany, Hungary, Turkey and China do not agree with this idea. In the past time the shape of wrestling was not such like the modern wrestling. 220 holds printed upon the walls of Beni Hasan's village of Egypt, which proves the history of wrestling. Every body is aware of this Greece old saying, "Healthy mind in a healthy body:.. Milo is known as the top wrestler of the Greece as he became five times Olympic Champion.

6.2.0 Anthropometric and Physical Fitness Component Tests:

Not only for wrestling but for all games also men and women must be physically fit. Physically unfit is not able to stand in the arena for wrestling fight as having danger of injury, fracture or dislocation. Wrestling is very tough and hard game. Physical educationists accept strength is a primary component of physical fitness while freedom from disease organics soundness and proper nutrition are essential elements for physical fitness. The positive qualities of muscular strength and circulatory are also needed. It is

these elements that the physical educator is trained to understand, interpret and use in developing physical fitness of the boys and girls, men and women.

6.3.0 Significance of the Study:

The sports scientists have found out that there are specific anthropometric measurements and physical fitness components pertaining to a particular sport. The muscular strength and grip as well as body composition has positive correlation with performance in sports. Various investigations have been undertaken in various games but the literature relating to women wrestling is very rarely available. The present study will serve as guidelines to the teachers of physical education to fix the norms of anthropometric measurements and physical fitness components of women wrestlers and to further research projects in this field will be helpful in planning out a programme of national women wrestlers on the basis of findings and conclusions. Thus, it would lead to improvement of standard in wrestling for excellence.

6.4.0 Statement of the Problem:

The present investigation has been taken up to find out scientific methods of assessment of national female wrestlers. The statement of the problem of the present investigation has been defined as under:

"ANALYSIS OF ANTHROPOMETRIC MEASUREMENTS AND PHYSICAL FITNESS COMPONENTS OF WOMEN WRESTLERS"

6.5.0 Definitions of the Terms Used:

In the present study, a few terms have been used that have got specific meaning for the present investigation. The definitions of the terms are given as under:

1. Anthropometric Measurements
2. Physical Fitness Tests.

6.6.0 Anthropometric Measurements:

The following measurements of the body were taken for comparing the body measurements of Women Wrestlers and Women Non-Wrestlers:

- (i) Total Arm Length: Subtract the value of height sty lion radial from height a acromion.
- (ii) Trunk Length: For measuring Trunk Length, the difference between height and leg length was taken.

6.7.0. Physical Fitness Tests:

For measuring physical fitness of Women Wrestlers and Women Non-Wrestlers, the following tests were used:

- (ix) Grip Dynamometer – for measuring Static Strength.

- (x) Standing Broad Jump – for measuring Dynamic Strength.
- (xi) Jumps and Reach – for measuring Power (Legs).
- (xii) Push Ups – for measuring Power (Arms).
- (xiii) Sit Ups – for measuring Power (Abdomen).
- (xiv) Toe Touch Bend and Twist – for measuring Flexibility.
- (xv) 30' Shuttle Run – for measuring Speed and Agility.
- (xvi) Harvard Step Test – for measuring Cardio-respiratory.

6.8.0 Variables Used in the Study:

1. Independent Variables:
 - iii) Weight
 - iv) Height
2. Dependent Variables:
 - xiii) Total Arm Length
 - xiv) Trunk Length
 - xv) Standing Broad Jumps
 - xvi) Push Ups
 - xvii) Jump & Reach
 - xviii) Sit Ups
 - xix) 30' Shuttle Run

- xx) Toe Touch Bend and Twist
- xxi) Grip Test Left Hand
- xxii) Grip Test Right Hand
- xxiii) Body Density
- xxiv) Harvard Test

6.9.0 OBJECTIVES:

The main aim of the present study is to act with some transparent measuring devices for purpose of attaining certain objectives, therefore, the investigator embarked upon the study in pursuit of the following objectives:

2. To find out the anthropometric measurement of national women wrestler's height, weight, percent fat, lean body weight and limb length of extremities.
2. To find out some physical fitness components which correlated for successful performance in wrestling?
3. To analyze performance of the national wrestlers in various skills during wrestling competition and to find out areas of strength and weakness of wrestlers.
4. To compare the fitness level of the national female wrestlers among themselves and with some of the top ranking international female wrestlers and non-wrestlers (participated in other games except wrestling).

5. To suggest some important measures for improvement of present performance of the national female wrestlers.

6.10.0 HYPOTHESES:

1. There is no significant difference between the means of Total Arms Length of women wrestlers and women non-wrestlers of different weight groups.
2. There is no significant difference between the means of Trunk Length of women wrestlers and women non-wrestlers of different weight groups
3. There is no significant difference between the means of Standing Broad Jump of women wrestlers and women non-wrestlers of different weight groups.
4. There is no significant difference between the means of Push Ups of women wrestlers and women non-wrestlers of different weight groups.
5. There is no significant difference between the means of Jumps and Reach of women wrestlers and women non-wrestlers of different weight groups.
6. There is no significant difference between the means of sit ups of women wrestlers and women non-wrestlers of different weight groups.

7. There is no significant difference between the means of 30` Shuttle Run of women wrestlers and women non-wrestlers of different weight groups.
8. There is no significant difference between the means of Toe Touch Bend and Reach of women wrestlers and women non-wrestlers of different weight groups.
9. There is no significant difference between the means of Grip Test Left Hand of women wrestlers and women non-wrestlers of different weight groups.
10. There is no significant difference between the means of Grip Test Right Hand of women wrestlers and women non-Wrestlers of different weight groups.
11. There is no significant difference between the means of Body Density of women wrestlers and women non-wrestlers of different weight groups.
12. There is no significant difference between the means of Harvard Step Test of women wrestlers and women non-wrestlers of different weight groups.
13. There is no significant difference between the means of Total Arms Length of women wrestlers and women non-wrestlers of different height groups.

14. There is no significant difference between the means of Trunk Length of women wrestlers and women non-wrestlers of different Height Groups.
15. There is no significant difference between the means of Standing Broad Jump of women wrestlers and women non-Wrestlers of different height groups.
16. There is no significant difference between the means of Push Ups of women wrestlers and women non-wrestlers of different height groups.
17. There is no significant difference between the means of Jumps and Reach of women wrestlers and women non-wrestlers of different height groups.
18. There is no significant difference between the means of Sit Ups of women wrestlers and women non-wrestlers of different height groups.
19. There is no significant difference between the means of 30' Shuttle Run of women wrestlers and women non-wrestlers of different height groups.
20. There is no significant difference between the means of Toe Touch Bend and Twist of women wrestlers and women non-wrestlers of different height groups.

21. There is no significant difference between the means of Grip Test Left Hand of women wrestlers and women non-wrestlers of different height groups.
22. There is no significant difference between the means of Grip Test Right Hand of women wrestlers and women non-wrestlers of different height groups.
23. There is no significant difference between the means of Body Density of women wrestlers and women non-wrestlers of different height groups.
24. There is no significant difference between the means of Harvard Step Test of women wrestlers and women non-wrestlers of different height groups.

6.11.0 DELIMITATIONS:

1. The study was confined to the selected anthropometric measurements and physical fitness components.
2. Only those women wrestlers belonging to different states who competed in the National and International Wrestling Championship were taken as subjects.
3. The present study was delimited to 100 women wrestlers from different states who participated in the National and International Competitions.

4. 100 Women Non-Wrestlers (Boxing) were also included for making it a comparative study.

6.12.0 SAMPLE:

A sample of 200 women was taken (100 National Women Wrestlers who participated in National Tournaments and 100 Women Non-wrestlers (Boxing) of similar weight and height were taken to help in assessing and comparing the difference in physical characteristics and fitness of the National Women Wrestlers. The tables show the details of the women wrestlers and women non-wrestlers weight wise and height wise:

3.13.0 TESTS USED:

For conducting this study, the following tests were used:

(I) Physical Characteristics and Anthropometric Measurements:

- (a) Height (b) Weight (c) Total Arm Length (d) Trunk Length
(e) Lean body mass

(II) Physical Fitness Tests

- (a) Static Strength (b) Dynamic Strength (c) Explosive Power (Legs) (d) Power (abdomen) (e) Flexibility (f) Cardio-respiratory Endurance (g) Speed and agility

6.14.0 Administration of the Tests:

All the above tests were administered to the National Women Wrestlers and Women Non-Wrestlers. Both groups were subject to the anthropometric and physical fitness tests. Weight and height were measured through common procedure. Weight and height were taken in kilograms and centimeters respectively.

6.15.0 Statistical Techniques Used:

Keeping in view the objectives of the study, the data so collected was statistically analyzed by using Mean, Standard Deviation and 't' Test techniques.

6.16.0 Findings and Conclusions:

The study revealed that there occurred no significant difference in the physical fitness and anthropometric measurements of women wrestlers and women non-wrestlers of different weight and height groups. The research further established that in some weights and height groups, significant difference was found in the physical fitness and anthropometric measurements of Women wrestlers and women non-wrestlers. It shows that in many cases weight and height has affected the physical fitness and anthropometric measurements of women wrestlers and women Non-

wrestlers. In the light of the interpretation of the results of the present research, the following main findings are given:

1. It is concluded that the women wrestlers with better total arm length have shown better performance as compared to women non-wrestlers in the weight groups i.e. up to 50 Kgs, 51-55 Kgs, and 56-60 Kgs whereas in the weight group of above 61 Kgs women non-wrestlers have shown better total arm length. It is further concluded that different groups of women wrestlers have different total arm length as compared to their weight range. The same is true to women non-wrestlers.
2. It is concluded that the trunk length of women wrestlers and women non-wrestlers of these weight groups i.e. up to 50 Kgs, 51-55 Kgs, 56-60 Kgs and above 61 Kgs has shown equal trunk length in all the weight groups. It is further concluded that women wrestlers and women non-wrestles do not differ in trunk length in all the weight groups.
3. It is concluded that the standing broad jump of women wrestlers and women non-wrestlers of these weight groups i.e. up to 50 Kgs, 51-55 Kgs, 56-60 Kgs and above 61 Kgs is equal in all the weight groups. The standing broad jump of

women wrestlers and women non-wrestlers has not been affected by different weight groups.

4. It is concluded that push ups scores of women wrestlers and women non-wrestlers of the weight groups i.e. up to 50 Kgs, 51-55 Kgs, and above 61 Kgs has been affected by different weights. The women wrestlers have shown better performance in push up scores as compared to women non-wrestlers in the above weight groups.
5. (i) It is concluded that the scores of jumps and reach of women wrestlers and women non-wrestlers of these weight groups i.e. up to 50 Kgs, 51-55 Kgs, and above 61 Kgs has not been affected by their weights. The women wrestlers and women non-wrestlers have shown equal performance in jumps and reach scores.

(ii) It is further concluded that jumps and reach of women wrestlers and women non-wrestlers of the weight group of 56-60 Kgs has been affected by weight. The women non-wrestlers have shown better scores in jumps and reach as compared to women wrestlers of this weight group.
6. It is concluded that the scores of sit ups of women wrestlers and women non-wrestlers of these weight groups i.e. up to 50 Kgs, 51-55 Kgs 56-60 Kgs and above 61 Kgs has been

affected by their weights. The women non-wrestlers have shown better sit up scores as compared to women wrestlers.

7. (i) It is concluded that 30' shuttle run of women wrestlers and women non-wrestlers of these weight groups i.e. 56-60 Kgs and above 61 Kgs has not been affected by their weights. The women wrestlers and women non-wrestlers have shown equal performance of these weight groups.

(ii) It is further concluded that 30' shuttle run of women wrestlers and women non-wrestlers of the weight groups i.e. up to 50 Kgs and 56-60 Kgs has been affected by weights. The women non-wrestlers have shown better performance in 30' shuttle run as compares to women wrestlers of these weight groups.

8. (i) It is concluded that toe touch bend and twist of women wrestlers and women non-wrestlers of these weight groups i.e. up to 50 Kgs, 56-60 Kgs and above 61 Kgs has not been affected by their weights. The women wrestlers and women non-wrestlers have shown equal performance in toe touch bend and twist for these weight groups.

(ii) It is further concluded that toe touch bend and twist of women wrestlers and women non-wrestlers of the weight group of 51-55 Kgs has been affected by weight. The

women wrestlers have shown better performance in toe touch bend and twist as compared to women non-wrestlers of this weight group.

9. It is concluded that the grip test left hand of women wrestlers and women non-wrestlers of the weight groups i.e. up to 50 Kgs, 51-55 Kgs, 56-60 Kgs and above 61 Kgs has been affected by their weights. The women wrestlers have shown better performance in grip test left hand as compared to women non-wrestlers of these weight groups.
10. It is concluded that grip test right hand of women wrestlers and women non-wrestlers of the weight groups i.e. up to 50 Kgs, 51-55 Kgs, 56-60 Kgs and above 61Kgs has been affected by their weights. The women wrestlers have shown better performance in grip test right hand as compared to women non-wrestles of these weight groups.
11. (i) It is concluded that Body Density of women wrestlers and women non-wrestlers of these weight group i.e. above 61 Kgs has not been affected by the weight. The women wrestlers and women non-wrestlers have shown equal performance in body density of this weight group.
(ii) It is further concluded that body Density of women wrestlers and women non-wrestlers of the weight groups i.e.

up to 50 Kgs, 51-55 Kgs and above 61 Kgs has been affected by weights. The women non-wrestles have shown better performance in body density as compared to women wrestlers of these weight groups.

12. It is concluded that Harvard test of women wrestlers and women non-wrestlers of these weight groups i.e. up to 50 Kgs, 51-55 Kgs, 56-60 Kgs and above 61 Kgs has not been affected by their weights. The women wrestlers and women non-wrestlers of these weight groups have performed equally in Harvard Test.
13. (i) It is concluded that the total arms length of women wrestlers and women non-wrestlers of the height group of 161-170 Cms has not been affected by their heights. The women wrestlers and women non-wrestles have shown equal total arms length for this height group.

(ii) It is further concluded that the total arms length of women wrestlers and women non-wrestlers of the height groups i.e. up to 150 Cms, 151-160 Cms and above 171 Cms has been affected by their height groups. It is further concluded that better the total arm length, better the performance.

14. (i) It is concluded that the trunk length of women wrestlers and women non-wrestlers of these height groups i.e. up to 150 Cms, and above 171 Cms has not been affected by their heights. The women wrestlers and women non-wrestlers of these two groups have shown equal trunk length for these height groups.

(ii) It is further concluded that the trunk length of women wrestlers and women non-wrestlers of the height groups of 151-160 and 161-170 Cms has been affected by their height groups. The women wrestlers have shown better trunk length as compared to women non-wrestlers of these groups. It is further concluded that better the trunk length, better the performance.
15. It is concluded that the standing broad jump of women wrestlers and women non-wrestlers of these height groups i.e. up to 150 Cms, 151-160 Cms, 161Cms and above 171 Cms has not been affected by their heights. The women wrestlers and women non-wrestlers have shown equal scores in standing broad jump for these height groups.
16. It is concluded that the push ups of women wrestlers and women non-wrestlers of the height groups i.e. up to 150 Cms, 151-160 Cms, 161-170 Cms and above 171 Cms has been

affected by their heights. The women wrestlers of these height groups have shown better performance in push ups as compared to women non-wrestlers of these height groups.

17. It is concluded that jumps and reach of women wrestlers and women non-wrestlers of the height groups i.e. up to 150 Cms, 151-160 Cms and above 171 Cms has been affected by their heights. The women wrestles of these height groups have shown better performance in jumps and reach as compared to women non-wrestlers of the same height groups.
18. (i) It is concluded that sit ups of women wrestlers and women non-wrestlers of the height group of above 171 Cms has not been affected by their heights. The women wrestlers and women non-wrestlers of this height group have performed equally in sit ups for this height group.
(ii) It is further concluded that sit ups of women wrestlers and women non-wrestlers of the height groups i.e. up to 150 Cms, 151-160 Cms, and 161-170 Cms has been affected by their heights. The women non-wrestlers have shown better performance in sit ups as compared to women wrestlers of these height groups.
19. (i) It is concluded that the 30' shuttle run of women wrestlers and women non-wrestlers of these height groups i.e. up to 150

Cms, 161-170 Cms and above 171 Cms has not been affected by their heights. The women wrestlers and women non-wrestlers of these height groups have performed equally.

(ii) It is further concluded that 30' shuttle run of women wrestlers and women non-wrestlers of the height group of 151-160 Cms has been affected by their heights. The women non-wrestlers of this height group have shown better performance as compared to women wrestlers of the same height group.

20. It is concluded that toe touch bend and twist of women wrestlers and women non-wrestlers of these height groups i.e. up to 150 Cms, 151-160 Cms, 161-170 Cms and above 171 Cms has not been affected by their heights. The women wrestlers and women non-wrestlers of these groups have performed equally.
21. It is concluded that grip test left hand of women wrestlers and women non-wrestlers of these height groups i.e. up to 150 Cms, 151-160 Cms, 161Cms and above 171 Cms has been affected by their heights. The women wrestlers of these height groups have shown better performance as compared women non-wrestlers of the same height groups.

22. It is concluded that grip test right hand of women wrestlers and women non-wrestlers of the height groups i.e. up to 150 Cms, 151-160 Cms, 161-170 and above 171 Cms has been effected by their heights. The women wrestlers of these groups have shown better performance as compared to women non-wrestlers of the same height groups.
23. (i) It is concluded that body density of women wrestlers and women non-wrestlers of the height group i.e. above 171 Cms has not been affected by their heights. The women wrestlers and women non-wrestlers of this group have performed equally.
- (ii) It is further concluded that body density of women wrestlers and women non-wrestlers of these height groups i.e. up to 150 Cms, 151-160 Cms and 161-170 Cms has been affected by their heights. The women non-wrestlers have shown better performance as compared to women wrestlers.
24. It is concluded that Harvard Test of women wrestlers and women non-wrestlers of these height groups i.e. up to 150 Cms, 151-160 Cms, 161-170 Cms and above 171 Cms has not been affected by their heights. The women wrestles and women non-wrestles of these height groups have performed equally.

6.17.0 Educational Complications:

The present study has dealt with relationship of anthropometric measurements and physical fitness components of women wrestlers. A comparison was made with women non-wrestlers (Boxers) to find out the relationship of the anthropometric measurements and physical fitness among the wrestlers. The study has thrown adequate light on the various areas which are given as under:

In some weight groups women wrestles have shown better performance as compared to women non-wrestlers but in some weight groups non-wrestlers have shown better performance. If proper attention is given to the women wrestlers, they can achieve better performance in those weight groups in which they are lagging behind.

In most of the height groups women wrestlers have shown better performance as compared to women non-wrestlers. Care should be to the physical fitness of the women wrestlers so that they are able to perform better.

6.18.0 Suggestions for further study:

On the basis of the results of the study obtained from the analysis of the data, the following recommendations are made:

1. A comparative study can be undertaken by taking women non-wrestlers of the other states.
2. A comparative study can be undertaken by taking other games also such as Soccer, Hockey, Kabaddi, Kho-kho etc.
3. A similar study can be undertaken between the men wrestlers and women wrestlers of the State.
4. A similar study can be undertaken between the national level men wrestlers and men non-wrestlers.
5. A similar study can be undertaken by conducting a training camp for physical fitness and anthropometric measurements.

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