CHAPTER- V
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY
The purpose of the study was to compare the anthropometric characteristics, body composition and physical fitness between cricketers and non cricketers.

OBJECTIVES OF THE STUDY
1. To find out the significant difference of anthropometric characteristics between cricketers and non cricketers.
2. To find out the significant difference of body composition between cricketers and non cricketers.
3. To find out the significant difference of physical fitness between cricketers and non cricketers.
4. To find out the significant difference of anthropometric characteristics among cricketers of district, state and national level.
5. To find out the significant difference of body composition among cricketers of district, state and national level.
6. To find out the significant difference of physical fitness among cricketers of district, state and national level.

HYPOTHESES
1. There may not be significant difference of anthropometric characteristics between cricketers and non cricketers.
2. There may not be significant difference of body composition between cricketers and non cricketers.
3. There may not be significant difference of physical fitness between cricketers and non cricketers.
4. There may not be significant difference of anthropometric characteristics among cricketers of district, state and national level.
5. There may not be significant difference of body composition among cricketers of district, state and national level.
6. There may not be significant difference of physical fitness among cricketers of district, state and national level.
SELECTION OF VARIABLES

A feasibility analysis as to which of the variables could be taken up for the investigation, keeping in view the availability of equipment, acceptability to the subjects and the legitimate time that could be devoted for tests and to keep the entire study unitary and integrated was made in consultation with experts. With the above criteria’s in mind, the following anthropometric characteristics, body composition and physical fitness parameters were selected.

I. Anthropometric Characteristics:
   i. Standing height
   ii. Body weight
   iii. Leg length
   iv. Upper leg length
   v. Lower leg length
   vi. Arm length
   vii. Upper arm length
   viii. Lower arm length
   ix. Hip width (bitrochantric diameter)
   x. Shoulder width (biacromial diameter)
   xi. Chest width
   xii. Calf girth
   xiii. Thigh girth
   xiv. Chest girth
   xv. Upper arm girth
   xvi. Lower arm girth

II. Body Composition

III. Physical Fitness Parameters:
   i. Speed
   ii. Strength
   iii. Agility
   iv. Flexibility

SELECTION OF TESTS

As per the available literature, the following standardized tests were used to collect relevant data for the purpose of the study.
### Anthropometric Characteristics:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Test Items</th>
<th>Unit of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing Height</td>
<td>Stadiometer</td>
<td>in centimeters</td>
</tr>
<tr>
<td>Weight</td>
<td>Weighing machine</td>
<td>in kilogram</td>
</tr>
<tr>
<td>Leg Length</td>
<td>Flexible steel tape</td>
<td>in centimeters</td>
</tr>
<tr>
<td>Upper Leg Length</td>
<td>Flexible steel tape</td>
<td>in centimeters</td>
</tr>
<tr>
<td>Lower Leg Length</td>
<td>Flexible steel tape</td>
<td>in centimeters</td>
</tr>
<tr>
<td>Arm Length</td>
<td>Flexible steel tape</td>
<td>in centimeters</td>
</tr>
<tr>
<td>Upper Arm Length</td>
<td>Flexible steel tape</td>
<td>in centimeters</td>
</tr>
<tr>
<td>Lower Arm Length</td>
<td>Flexible steel tape</td>
<td>in centimeters</td>
</tr>
<tr>
<td>Hip Width</td>
<td>Sliding calipers</td>
<td>in centimetres</td>
</tr>
<tr>
<td>Shoulder Width</td>
<td>Sliding calipers</td>
<td>in centimetres</td>
</tr>
<tr>
<td>Chest Width</td>
<td>Sliding calipers</td>
<td>in centimetres</td>
</tr>
<tr>
<td>Calf Girth</td>
<td>Flexible steel tapes</td>
<td>in centimetres</td>
</tr>
<tr>
<td>Thigh Girth</td>
<td>Flexible steel tapes</td>
<td>in centimetres</td>
</tr>
<tr>
<td>Chest Girth</td>
<td>Flexible steel tapes</td>
<td>in centimetres</td>
</tr>
<tr>
<td>Upper Arm Girth</td>
<td>Flexible steel tapes</td>
<td>in centimetres</td>
</tr>
<tr>
<td>Body Composition</td>
<td>Skin fold calipers</td>
<td>in millimetres</td>
</tr>
</tbody>
</table>

### Body Composition:

<table>
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<th>Test Items</th>
<th>Unit of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body composition</td>
<td>Skin fold calliper</td>
<td>in nearest millimeter</td>
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</tbody>
</table>

### Physical Fitness Parameters:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Test Items</th>
<th>Unit of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>50 yards run</td>
<td>in 1/10(^{th}) of sec</td>
</tr>
<tr>
<td>Strength</td>
<td>Pull-ups</td>
<td>number</td>
</tr>
<tr>
<td>Agility</td>
<td>Shuttle run</td>
<td>in 1/10(^{th}) of a sec</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Sit and Reach test</td>
<td>in centimeters</td>
</tr>
</tbody>
</table>

Unpaired t-test was used in data analyses. In all the analyses, the 5% critical level (p≤0.05) was considered to indicate statistical significance. The data was further subjected to one way analysis of variance (ANOVA).
CONCLUSIONS

1. The mean of standing height of cricketer and non-cricketer was 174.5939 and 172.8667 respectively, whereas the standard deviation (SD) of standing height of cricketer and non-cricketer was 4.8312 and 5.8305 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (2.930*). The data does suggest that the differences between cricketer and non-cricketer in regard to standing height are significant.

2. The mean of weigh of cricketer and non-cricketer was 71.6545 and 70.2848 respectively, whereas the standard deviation (SD) of weigh of cricketer and non-cricketer was 3.2622 and 5.2100 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (2.862*). The data does suggest that the differences between cricketer and non-cricketer in regard to weigh are significant.

3. The mean of weigh of cricketer and non-cricketer was 71.6545 and 70.2848 respectively, whereas the standard deviation (SD) of weigh of cricketer and non-cricketer was 3.2622 and 5.2100 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (2.862*). The data does suggest that the differences between cricketer and non-cricketer in regard to weigh are significant.

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6. The mean of arm length of cricketer and non-cricketer was 82.1303 and 80.7485 respectively, whereas the standard deviation (SD) of arm length of cricketer and non-
cricketer was 2.3800 and 3.4085 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (4.270*). The data does suggest that the differences between cricketer and non-cricketer in regard to arm length are significant.

7. The mean of upper arm length of cricketer and non-cricketer was 36.1273 and 35.8212 respectively, whereas the standard deviation (SD) of upper arm length of cricketer and non-cricketer was 1.4500 and 1.8487 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (1.673*). The data does suggest that the differences between cricketer and non-cricketer in regard to upper arm length are significant.

8. The mean of lower arm length of cricketer and non-cricketer was 46.1364 and 45.0061 respectively, whereas the standard deviation (SD) of lower arm length of cricketer and non-cricketer was 2.4503 and 1.7617 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (4.811*). The data does suggest that the differences between cricketer and non-cricketer in regard to lower arm length are significant.

9. The mean of hip width of cricketer and non-cricketer was 31.0788 and 30.9909 respectively, whereas the standard deviation (SD) of hip width of cricketer and non-cricketer was 2.4841 and 2.1381 respectively. The critical value of t at 95% probability level is much greater (1.645) than the observed value of t (0.344*). The data does suggest that the differences between cricketer and non-cricketer in regard to hip width are insignificant.

10. The mean of hip width of cricketer and non-cricketer was 31.0788 and 30.9909 respectively, whereas the standard deviation (SD) of hip width of cricketer and non-cricketer was 2.4841 and 2.1381 respectively. The critical value of t at 95% probability level is much greater (1.645) than the observed value of t (0.344*). The data does suggest that the differences between cricketer and non-cricketer in regard to hip width are insignificant.

11. The mean of chest width of cricketer and non-cricketer was 31.1242 and 30.1636 respectively, whereas the standard deviation (SD) of chest width of cricketer and non-cricketer was 1.7236 and 1.8080 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (4.940*). The data does suggest that the differences between cricketer and non-cricketer in regard to chest width are significant.
12. The mean of calf girth of cricketer and non-cricketer was 38.6388 and 32.5279 respectively, whereas the standard deviation (SD) of calf girth of cricketer and non-cricketer was 1.9483 and 1.8703 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (29.065*). The data does suggest that the differences between cricketer and non-cricketer in regard to calf girth are significant.

13. The mean of thigh girth of cricketer and non-cricketer was 55.5612 and 51.4139 respectively, whereas the standard deviation (SD) of thigh girth of cricketer and non-cricketer was 2.1977 and 2.8909 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (14.670*). The data does suggest that the differences between cricketer and non-cricketer in regard to thigh girth are significant.

14. The mean of thigh girth of cricketer and non-cricketer was 55.5612 and 51.4139 respectively, whereas the standard deviation (SD) of thigh girth of cricketer and non-cricketer was 2.1977 and 2.8909 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (14.670*). The data does suggest that the differences between cricketer and non-cricketer in regard to thigh girth are significant.

15. The mean of thigh girth of cricketer and non-cricketer was 55.5612 and 51.4139 respectively, whereas the standard deviation (SD) of thigh girth of cricketer and non-cricketer was 2.1977 and 2.8909 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (14.670*). The data does suggest that the differences between cricketer and non-cricketer in regard to thigh girth are significant.

16. The mean of thigh girth of cricketer and non-cricketer was 55.5612 and 51.4139 respectively, whereas the standard deviation (SD) of thigh girth of cricketer and non-cricketer was 2.1977 and 2.8909 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (14.670*). The data does suggest that the differences between cricketer and non-cricketer in regard to thigh girth are significant.

17. There is no significant difference in standing height among district, state and national level cricketers, since f value observed .029is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of
three performance level- district, state and national level cricketers are not different in standing height. This also implies in this parameters they are of equal level.

18. There is no significant difference in body weight among district, state and national level cricketers, since f value observed 1.079 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in body weight. This also implies in this parameters they are of equal level.

19. There is no significant difference in leg length among district, state and national level cricketers, since f value observed .264 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in leg length. This also implies in this parameters they are of equal level.

20. There is no significant difference in upper leg length among district, state and national level cricketers, since f value observed .118 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in upper leg length. This also implies in this parameters they are of equal level.

21. There is no significant difference in lower leg length among district, state and national level cricketers, since f value observed .229 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in lower leg length. This also implies in this parameters they are of equal level.

22. There is no significant difference in arm length among district, state and national level cricketers, since f value observed .024 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in arm length. This also implies in this parameters they are of equal level.

23. There is no significant difference in upper arm length among district, state and national level cricketers, since f value observed .427 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in upper arm length. This also implies in this parameters they are of equal level.

24. There is significant difference in upper arm length among district, state and national level cricketers, since f value observed 5.050 is much greater than the tabulated value
3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are different in upper arm length. As f value was found significant post hoc mean comparison was used to exactly find the difference as well as level of difference between the groups.

25. The mean values of all the three groups i.e. district, state and national level cricketer with the help of Scheffe post hoc test then it is showed that district level cricket players had performed better lower arm length than their counterparts; state and national level cricketers.

26. There is no significant difference in hip width among district, state and national level cricketers, since f value observed .091 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in hip width. This also implies in this parameters they are of equal level.

27. There is no significant difference in shoulder width among district, state and national level cricketers, since f value observed .552 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in shoulder width. This also implies in this parameters they are of equal level.

28. There is no significant difference in chest width among district, state and national level cricketers, since f value observed .298 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in chest width. This also implies in this parameters they are of equal level.

29. There is no significant difference in calf girth among district, state and national level cricketers, since f value observed .459 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in calf girth. This also implies in this parameters they are of equal level.

30. There is no significant difference in thigh girth among district, state and national level cricketers, since f value observed .088 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in thigh girth. This also implies in this parameters they are of equal level.
31. There is no significant difference in chest girth among district, state and national level cricketers, since f value observed .057 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in chest girth. This also implies in this parameters they are of equal level.

32. There is no significant difference in upper arm girth among district, state and national level cricketers, since f value observed .145 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in upper arm girth. This also implies in this parameters they are of equal level.

33. There is no significant difference in lower arm girth among district, state and national level cricketers, since f value observed .202 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in lower arm girth. This also implies in this parameters they are of equal level.

34. The mean of body composition of cricketer and non-cricketer was 28.4667 and 22.6715 respectively, whereas the standard deviation (SD) of body composition of cricketer and non-cricketer was 2.7730 and 2.4290 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (20.193*). The data does suggest that the differences between cricketer and non-cricketer in regard to body composition are significant.

35. There is no significant difference in body composition among district, state and national level cricketers, since f value observed .003 is much lesser than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are not different in body composition. This also implies in this parameters they are of equal level.

36. The mean of speed of cricketer and non-cricketer was 8.7758 and 9.7818 respectively, whereas the standard deviation (SD) of speed of cricketer and non-cricketer was 1.0727 and 1.5104 respectively. The critical value of t at 95% probability level is much lower (1.645) than the observed value of t (6.976*). The data does suggest that the differences between cricketer and non-cricketer in regard to speed are significant.

37. The mean of strength of cricketer and non-cricketer was 55.4606 and 49.1636 respectively, whereas the standard deviation (SD) of strength of cricketer and non-cricketer was 6.9812 and 11.3472 respectively. The critical value of t at 95%
probability level is much lower (1.645) than the observed value of t (6.071*). The
data does suggest that the differences between cricketer and non-cricketer in regard to
strength are significant.

38. The mean of agility of cricketer and non-cricketer was 10.0706 and 10.0492
respectively, whereas the standard deviation (SD) of agility of cricketer and non-
cricketer was 1.0953 and 0.6814 respectively. The critical value of t at 95%
probability level is much greater (1.645) than the observed value of t (0.214*). The
data does suggest that the differences between cricketer and non-cricketer in regard to
agility are insignificant.

39. The mean of flexibility of cricketer and non-cricketer was 22.1030 and 21.6909
respectively, whereas the standard deviation (SD) of flexibility of cricketer and non-
cricketer was 2.9992 and 3.2715 respectively. The critical value of t at 95%
probability level is much greater (1.645) than the observed value of t (1.193). The
data does suggest that the differences between cricketer and non-cricketer in regard to
flexibility are insignificant.

40. There is significant difference in speed among district, state and national level
cricketers, since f value observed 5.364 is much greater than the tabulated value 3.04
at 0.05 level of significance. Above finding clearly indicates that cricketer of three
performance level- district, state and national level cricketers are different in speed.
As f value was found significant post hoc mean comparison was used to exactly find
the difference as well as level of difference between the groups.

41. The mean values of all the three groups i.e. district, state and national level cricketer
with the help of Scheffe post hoc test then it is showed that state level cricket players
had performed better speed than their counterparts; district and national level cricketers.

42. The mean values of all the three groups i.e. district, state and national level cricketer
with the help of Scheffe post hoc test then it is showed that state level cricket players
had performed better strength than their counterparts; district and national level cricketers.

43. The mean values of all the three groups i.e. district, state and national level cricketer
with the help of Scheffe post hoc test then it is showed that national level cricket
players had performed better agility than their counterparts; district and state level cricketers.
44. The mean values of all the three groups i.e. district, state and national level cricketer with the help of Scheffe post hoc test then it is showed that state level cricket players had performed better flexibility than their counterparts; district and national level cricketers.

45. There is significant difference in strength among district, state and national level cricketers, since f value observed 5.218 is much greater than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are different in strength. As f value was found significant post hoc mean comparison was used to exactly find the difference as well as level of difference between the groups.

46. There is significant difference in agility among district, state and national level cricketers, since f value observed 4.4516 is much greater than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are different in agility. As f value was found significant post hoc mean comparison was used to exactly find the difference as well as level of difference between the groups.

47. There is significant difference in flexibility among district, state and national level cricketers, since f value observed 4.148 is much greater than the tabulated value 3.04 at 0.05 level of significance. Above finding clearly indicates that cricketer of three performance level- district, state and national level cricketers are different in flexibility. As f value was found significant post hoc mean comparison was used to exactly find the difference as well as level of difference between the groups.

ReCOMMENDATIONS

In the light of the conclusions drawn the following recommendations are made:

1. Physical education teachers and coaches may utilize the findings of the present study by preparing or modifying the existing training schedules for cricket players at different levels.

2. A similar study may be undertaken with female cricket players as subjects.

3. The present study may be repeated in other games and sports where the criterion used for performance is the combined effect of different players of a cricket (Team games).

4. It is suggested that a longitudinal study with the subjects employed in this research work may be carried out in order to find the effect of changes in contributing independent variables and their effect on cricketer and non cricketer.
5. It is recommended that the present study may be repeated by selecting subjects belonging to lower age groups.
6. A similar study may be undertaken with other variables namely, psychological, biochemical and sociological in addition to the variables chosen in the present study.