CHAPTER VI
SUMMARY, CONCLUSION AND RECOMMENDATION
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Summary

The physical fitness status of National population varies between nations due to such influences as age, sex, heredity, ethnic, cultural and economic patterns and the physical environment. Leaders in physical education around the world have shown increased concern in recent years about the level of physical fitness of their national populations. This concern is reflected by the development and administration of fitness tests in many different countries.

Physical activity and the capacity to work are the fundamental determinants of human survival. Many physiologists and physical educators have tried to investigate the factors which influence the level of physical capacity and the anthropometric characteristics of mankind. Scientists and physiologists have been of the view, that anthropometric measurements and physical components of an athlete have a lot to do with his performance.

The measurement and evaluation of the physical fitness status of youth in different countries provided information with which one can make an indirect comparison between the levels of effectiveness of physical education programme with
regard to achieving physical education objectives.

But, none had undertaken a study to determine the status of physical fitness of the children of Nepal, nor had comparison been made between Nepalese children and other populations. The problem of physical fitness status of National children was found always neglected.

So, the present study "construction of Physical Fitness Test Batteries and their relationship with the anthropometric characteristics" was undertaken with a view to constructing the test batteries of physical fitness and developing the norms for secondary school students, and finding out the relationship with the anthropometric characteristics.

The review of literature on construction of physical fitness test batteries indicated that a number of researchers had attempted to construct the test batteries, to develop the norms for test batteries, and to find out the relationship with the anthropometric measure. But almost all the investigations were based on the data of European, American and Australian children and not of the children of Nepal. Besides, the available developed norms of test batteries were agewise and not gradewise. Similarly, not a single study was found on the comparison of physical fitness status of children with the
variation of altitude. Present study has been the original attempt of its kind for the construction of test batteries, development of physical fitness norms, and comparison of the physical fitness of National children in Nepal.

The data for the present investigation had been collected from 49 districts covering three geographical regions of Nepal. The study was conducted on 3420 students, including 1500 from Tarai, 1500 from Hill and 420 from the Himalaya region from the eighth, ninth and tenth grade students (1140 from each grade) of Nepal. The data were collected in relation with the following variables:

(A) Physical Fitness variables:
   i) Muscular strength,
   ii) Muscular endurance,
   iii) Cardiac-respiratory endurance, and
   iv) Speed.

(B) Anthropometric Measures:
   i) Age,
   ii) Height,
   iii) Weight,
   iv) Arm length,
   v) Upper arm Length,
   vi) Forearm length,
vii) Arm girth,
viii) Hand length,
ix) Leg length,
x) Upper leg length,
xi) Foreleg length,
xi) Thigh girth,
xi) Calf girth,
xi) Neck girth,
xv) Chest girth.

The following tests were used for the measurement of the fitness components:

- a) Push-ups (muscular strength),
- b) Sit-ups (Muscular endurance),
- c) Harvard Step test (Cardio-respiratory endurance), and
- d) 50-yds dash (speed).

The data thus collected for physical fitness and anthropometric measure were recorded, tabulated and analysed quantitatively and qualitatively. The data pertaining to physical fitness components were analysed by one way analysis of variance for each variable separately to find out the regional and gradewise differences. Scheffe's test of post-hoc significance
was used to assess the significant differences between the paired means of different groups. The ‘F’ ratio obtained by one way analysis of variance was tested for significance at .05 level of confidence.

To establish and compare the physical fitness standard of the secondary school students of Nepal percentile norms were developed regionwise and on the basis of regional samples, National percentile norms for selected physical fitness components were developed.

To find out the relationship between the selected physical fitness components and anthropometric measure gradewise intercorrelation matrix was developed by product moment coefficient of correlation and tested for significance at .05 level of confidence.

The findings derived from the statistical analysis of the data are listed below in order of study:

(A) Comparison of Fitness Status of the students of different regions (Namely: Tarai, Hill and Himalaya) in selected physical fitness components:

1) Gradewise regional differences:

a) Grade eighth:

i) The students of Tarai were found to be
significantly faster in comparison to the students of Hill and Himalaya.

ii) In muscular strength test the students of Hill were significantly stronger, whereas the students of Himalaya excelled significantly in muscular endurance and cardio-respiratory endurance the remaining two groups.

iii) No significant difference was shown in between Tarai and Hill students on muscular strength.

b) Grade ninth:

i) The students of Tarai were found to be significantly stronger in muscular strength and faster in speed than the students of Hill and Himalaya.

ii) In muscular endurance and cardio-respiratory endurance the students of Himalaya were found significantly superior in comparison to Hill and Tarai students.

iii) No significant differences were found in between the students of Tarai and Hill in muscular strength, students of Tarai and Himalaya in muscular endurance, students of Hill and Himalaya in cardio-respiratory endurance.

c) Grade tenth:

i) The students of Tarai were found to be
significantly stronger, having more muscular endurance and faster in comparison to the students of Hill and Himalaya.

ii) In cardio-respiratory endurance the students of Hill were found to be significantly superior to the students of Himalaya and Tarai.

iii) No significant differences were found in between the students of Tarai and Hill in muscular strength, students of Hill and Himalaya in muscular endurance and cardio-respiratory endurance.

2) Inter-grade national differences:

The students of tenth grade were found to be significantly stronger in muscular strength, superior in muscular endurance and cardio-respiratory endurance, and faster in speed in comparison to ninth and eighth grade students.

(B) Determination of the norms on selected Test:

a) Grade eighth:

i) In developed percentile norms the students of Tarai were found superior in speed, whereas the students of Hill were at the high percentile level in muscular strength.

ii) The students of Himalaya were found superior in the developed percentile norms in muscular endurance and
cardio-respiratory endurance test.

b) **Grade ninth**:

   i) The students of Tarai had achieved significantly higher scores in developed percentile in muscular strength and speed test.

   ii) In muscular endurance and cardio-respiratory endurance the developed percentile norm scores were higher for the Himalaya groups.

c) **Grade tenth**:

   i) The students of Tarai were found to be significantly superior in the developed percentile norms of muscular strength, muscular endurance and speed performance.

   ii) In cardio-respiratory endurance the developed percentile norms and standards were found superior in the Hill group.

(C) **Relationship between the physical fitness performance and selected anthropometric measure of secondary school students**:

   a) **Grade eighth**:

   i) Muscular strength and muscular endurance
were not found significantly correlated with anthropometric measurement.

ii) Cardio-respiratory endurance was significantly correlated with age, weight, leg length, thigh girth, calf girth, chest girth and neck girth, whereas speed was significantly correlated with forearm length, arm girth, abdominal girth and arm span.

iii) Muscular endurance was significantly correlated with muscular strength and cardio-respiratory endurance.

b) Grade ninth:

i) Muscular strength was not correlated significantly with anthropometric measure, but it was significantly correlated with muscular endurance and speed.

ii) Muscular endurance was found to be significantly correlated with leg length and forearm length, whereas cardio-respiratory endurance was significantly correlated with age, thigh girth and calf girth.

iii) Speed was found to be significantly correlated with forearm length, arm girth and abdominal girth.
c) Grade tenth:

i) Body segment measures were significantly correlated with each other, but age was not found significantly correlated with upper arm length, hand length, leg length, upper leg length, foreleg length, thigh girth, calf girth, chest girth, abdominal girth, muscular strength, muscular endurance and cardio-respiratory endurance.

ii) Anthropometric measure was not significantly correlated with muscular strength, muscular endurance, cardio-respiratory endurance and speed performance.

iii) Muscular endurance was significantly correlated with muscular strength and speed.

Conclusions

On the basis of the findings the following conclusions may be drawn:

i) The results of the study clearly indicated that there were significant differences in each selected physical fitness component (muscular strength, muscular endurance, cardio-respiratory endurance and speed) of all three grade students of Tarai, Hill and Himalaya regions.

ii) The developed norms of physical fitness test
batteries were diversified regionwise and the developed national norms of selected physical fitness test were found to be very poor than the European norms of physical fitness tests.

iii) The relationship between the anthropometric measurement and physical fitness components was found to be non-significant, and those variables which were found significantly correlated had low correlation value.

**Recommendation**

In the light of the findings of the present study, the following recommendations are made :-

i) All over the world test batteries of physical fitness are commonly used for the final grading of the students on the basis of established norms to make the evaluation procedure of physical education more objective. So, it is recommended to the Government of Nepal to adopt the proposed physical fitness test batteries and developed norms for effective examination system and evaluation.

ii) The comparison of physical fitness status of the students of various regions could be made by using the proposed test batteries.
iii) Evaluative procedures can be adopted on the basis of developed norms.

iv) The proposed test batteries and norms can be helpful for the screening of students and players.

v) The proposed test batteries and norms can be used in place of borrowed European physical fitness tests and norms.

vi) The proposed norms can be used to find out the present physical fitness status of the students of Nepal and to undertake the measures for improving the physical fitness. Further these batteries could also be used for monitory the development of physical fitness of the student population of Nepal.

vii) The test batteries can be helpful for the student to understand and estimate his own potentialities.

viii) It may be helpful for the planners of the country to understand the physical fitness status of the students of Nepal, and also to compare them with the children of other countries.

ix) It can be helpful for conducting training programme based on the evaluation of physical fitness status of the students.
Areas for further Research

The following areas are suggested for further research:

i) Similar studies may be carried out with other parameters (e.g. motor fitness, General motor fitness etc.) not used in this study.

ii) Similar study may be carried out on the female subjects.

iii) A study on factors affecting the physical fitness performance of the students of different regions.

iv) Relationship between physiological variables and performance may be undertaken.

v) Environmental effects upon various performance criteria may be studied.

vi) A study on individual differences among various physiological parameters may be conducted.

vii) Effects of training on various physical fitness components may be studied.