

**A COMPARATIVE STUDY OF ANTHROPOMETRICAL,  
PHYSICAL FITNESS AND NEUROPSYCHOLOGICAL  
PARAMETERS OF BUDDHIST TRAINEE MONKS  
AMONG THREE DIFFERENT COUNTRIES**

**SYNOPSIS OF Ph.D. THESIS**

*Submitted to Jadavpur University*

*in partial fulfillment of the requirements for the award of degree of*

**DOCTOR OF PHILOSOPHY  
IN PHYSICAL EDUCATION  
FACULTY OF ARTS**

*By*

**Pravesh Chhetri**

**Department of Physical Education**

**Jadavpur University**

**Kolkata – 700 032**

**2021**

## **INTRODUCTION**

Buddhist education system occupies a significant place in the history of education in ancient India for training men in morality and mental culture leading to wisdom and salvation. The Buddha's teaching contains three major aspects: discipline, meditation and wisdom (Altekar, 1965). The aim of Buddhist education was all round development of child's personality including his physical, mental, moral and intellectual development and also to make a free man, a wise, intelligent, moral, non-violent & secular man.

There is number of monasteries imparting such education across the world in a systematic manner. The monastic schools are residential in nature. Buddhist Monks above six years of age are coming to the monasteries from various parts of the country to being educated in these monasteries. Like Vedic system, in Buddhist education system too, the relation of the teacher and the students (guru and the disciples) are very close, affectionate, cordial, pure and very good. The curriculum are mainly religious which include what are termed vinaya, sutta or suttanta and abhidhamma together with suttas and sutta vibhanga which are taught orally. The study are equally centred material studies and religious leading to nirvana. Languages like English, Tibetan and local language also taught. Similarly practical and manual skill development subjects were given importance in classes. Methods of teaching are recitation, discussion, debates, question-answer session and lecture. Tours were undertaken sometimes for propagation and expansion of education as well as Buddhism. The Bhikshus as students were assigned to different classes according to their progress in studies. As a student in formal institutions like schools these monks also need to be physically fit. They also follow some measures in routine to stay physically capable of taught. It is quite interesting to delve into the anthropometric, physical fitness and neuropsychological parameters of trainee Buddhist monks which is indispensable for the master and the taught alike.

## **REVIEW OF LITERATURE**

Literature review is crucial to any scientific investigation. It provides a basis for theoretical framework and an insight into the methods and procedures involve in the research process. It gives an idea about the work done in the particular field and helps to increase the researchers' breath of knowledge of the particular subject in hand. It also provides significant methods for the basic interpretation and findings. Therefore the

review of literature is vital for the researcher to identify already available literature and to understand the knowledge in the area of study.

A large amount of literature on anthropometrical, physical fitness and neuropsychological parameters among various groups are available in the form of physical education and sports journal articles, reviews, in edited volumes and in completed research works reported in the sports literature are scanned. For the present study the researcher reviewed 87 literature related to anthropometrical, physical fitness and neuropsychological parameters of various group of people to be acquainted with the gamut of literatures related with the present topic.

The review of literature the researcher has done has given a lot of insight into the present study. They ranged from anthropometrics, physical fitness and neuropsychological parameters of various group of people. The literature related with Buddhist Trainee Monks are very few and mostly on physical health. However these literatures neither study the anthropometrical, physical fitness and neuropsychological parameters of Buddhist Trainee Monks nor that particularly of any countries under study.

Till now, there is no such comprehensive study carried out as the researcher have intended to. Therefore, this study is taken up to assess the comparative study of anthropometrical, physical fitness and neuropsychological parameters of Buddhist Trainee Monks of India, Nepal and Bhutan.

## **STATEMENT OF THE PROBLEM**

The purpose of the present study was to compare the Anthropometrical, Physical Fitness and Neuropsychological parameters of Buddhist Trainee Monks among three different countries.

## **OBJECTIVES OF THE STUDY**

The study was conducted with following objectives:

1. To find out whether the Buddhist Trainee Monks of three countries viz. India, Bhutan and Nepal differed in the selected anthropometric parameters.
2. To find out whether the Buddhist Trainee Monks of three countries viz. India, Bhutan and Nepal differed in the selected physical fitness parameters.
3. To find out whether the Buddhist Trainee Monks of three countries viz. India, Bhutan and Nepal differed in the selected neuropsychological parameters.

## **HYPOTHESES**

The following hypotheses were formulated to conduct the present study:

1. There would be no significant difference of anthropometrical parameters among Buddhist Trainee Monks of three different countries viz. India, Bhutan and Nepal.
2. There would be no significant difference of physical fitness parameters among Buddhist Trainee Monks of three different countries viz. India, Bhutan and Nepal.
3. There would be no significant difference of neuropsychological parameters among Buddhist Trainee Monks of three different countries viz. India, Bhutan and Nepal.

## **DELIMITATIONS**

1. The present study was delimited to 120 Buddhist trainee monks from three different countries –India, Bhutan and Nepal covering 40 monks from each country.
2. The study was surrounded to three anthropometrical parameters; a. General Body Measurements, b. Skeletal Diameters, c. Circumferences
3. Again the study was delimited to four physical fitness parameters; a. Flexibility, b. Explosive strength, c. Balance, d. Reaction time
4. Further the study was bordered to five neuropsychological parameters; a. Long Term Memory, b. Short Term Memory, c. Tactile Sense, d. Hand Eye Co-ordination, e. Visual Motor Co-ordination.

## **LIMITATIONS**

Personal habits of the subjects and their state of mind as well as emotional stress and other factors, which may have effect the result of this study and which could not be controlled was considered the limitations of the study. Certain factors like diet, daily routine, habits, facilities, training systems, geographical conditions etc. that might have had effect on the result of the study were also tested as the limitation of the subjects.

## **METHODOLOGY**

Research method provides guidelines and channelizes the available information of the given subject in a structured manner. The methodology employed for the present study was Design of the study, Selection of subjects, Selection of variables, Criterion

measures, Collection of Data, Procedure for administering the test, Reliability of Data, Statistical procedure and Level of Significance adopted.

For the purpose of this study 120 Buddhist trainees monks as subjects are randomly selected of which 40 (forty) from India, 40 (forty) from Nepal, and 40 (forty) from Bhutan. The age level of subjects ranged from 11 to 13 years. The researcher personally visited the monastery to collect data and get a chance to talk with the monks and closely observe the resources and facilities. The data has been collected from the monasteries of three different countries on different consecutive days during 2018. Data sheet for each subject has been prepared and completed during the personal visit with necessary equipment in the monasteries premises.

There are 14 Anthropometric, 4 Physical fitness and 5 Neuropsychological variables considered for this study. The variables test and criterion measures considered are mentioned below in table -1, 2 & 3;

**Table: 1. Selected Anthropometrical Variables, Tests and Criterion Measures**

| Sl. No | Anthropometrical Variables             | Test/ Instruments                    | Unit of Measurement |
|--------|----------------------------------------|--------------------------------------|---------------------|
| 1      | Standing Height                        | Stadiometer                          | Centimeter          |
| 2      | Weight                                 | Electronic Standard Weighing Machine | Kilograms           |
| 3      | Sitting Height                         | Stadiometer                          | Centimeter          |
| 4      | Biacromial diameter (shoulder width)   | Flexible steel tape                  | Centimeter          |
| 5      | Bicristal diameter (abdominal width)   | Flexible steel tape                  | Centimeter          |
| 6      | Bitrochantric diameter (Hip width)     | Flexible steel tape                  | Centimeter          |
| 7      | Humerus Bicondylar width (Elbow width) | Sliding calipers                     | Centimeter          |
| 8      | Wrist diameter                         | Flexible steel tape                  | Centimeter          |
| 9      | Femur Bicondylar Diameter (Knee width) | Sliding calipers                     | Centimeter          |
| 10     | Chest circumference                    | Non stretchable steel tape           | Centimeter          |
| 11     | Upper-arm circumference                | Flexible steel tape                  | Centimeter          |
| 12     | Fore-arm circumference                 | Flexible steel tape                  | Centimeter          |
| 13     | Thigh circumference                    | Flexible steel tape                  | Centimeter          |
| 14     | Calf circumference                     | Flexible steel tape                  | Centimeter          |

**Table: 2 Selected Physical Fitness Variables, Tests and Criterion Measures**

| Sl. No. | Physical Fitness Variables | Test                | Instruments        | Unit of Measurement |
|---------|----------------------------|---------------------|--------------------|---------------------|
| 1       | Flexibility                | Sit and reach test  | Modified Yardstick | Centimeter          |
| 2       | Explosive strength         | Standing broad jump | Tape and chalk     | Centimeter          |
| 3       | Balance                    | Stork stand test    | Stop watch (timer) | Seconds             |
| 4       | Reaction Time              | Hand grip test      | Ruler and timer    | Seconds             |

**Table: 3 Selected Neuropsychological Variables, Tests and Criterion Measures**

| Sr. No | Neuropsychological Variables         | Test/Instruments       |
|--------|--------------------------------------|------------------------|
| 1      | Long Term Memory.                    | Long Term Memory Test  |
| 2      | Short Term Memory                    | Short Term Memory Test |
| 3      | Tactile Sense                        | Aesthesiometer         |
| 4      | Hand Eye Co-ordination               | Mirror drawing         |
| 5      | Visual Motor Co-ordination variables | Finger Dexterity Test  |

**RELIABILITY OF DATA**

The reliability of data was ensured by establishing the Tester's competency, Subject reliability and Instrument reliability.

**STATISTICAL PROCEDURE**

For the descriptive statistics the Mean and Standard deviation are used and for comparing the anthropometric, physical fitness and neuropsychological parameters of Buddhist trainee monks among three different countries India, Bhutan and Nepal, in addition to the simple statistical application, One-way Analysis of Variance (ANOVA) with Least Significant Difference (LSD) post hoc test was employed in cases where F ratio were significant and the level of significance was fixed at 0.05.

**FINDINGS OF THE STUDY**

The purpose of this study is to compare the Anthropometrical, Motor Fitness and Neuropsychological parameters of Buddhist Trainees Monks among the three different countries viz. India, Nepal and Bhutan. From the analysis of data, it was evident that in twelve anthropometric parameters considered in this study the calculated F-Value is less

than the tabulated F-Value at 0.05 level of significance and also the calculated 'p' value was greater than 0.05. So it is found that there was no significant difference in anthropometric parameters like Height (cm.), Weight (kg), Sitting Height (cm.), Wrist Width (cm.), Elbow Width (cm.), Shoulder Width (cm.), Abdominal Width (cm.), Hip Width (cm.), Knee Width (cm.), Fore Arm Circumference (cm.), Chest Circumference (cm.), and Thigh Girth (cm.), of Indian, Nepal and Bhutan Buddhist Trainee Monks.

Talking about the physical fitness parameters the calculated F-Value were less than the tabulated F-Value at 0.05, level of significance and also the calculated 'p' value was greater than 0.05 was found in Balance, Flexibility and Reaction Time. This shows that there was no significant difference in motor fitness parameters like Balance (sec.), Flexibility (cm.) and Reaction Time (sec.) among Indian, Nepal and Bhutan Buddhist Trainee Monks.

Regarding Neuropsychological parameter the calculated F-Value were less than the tabulated F-Value at 0.05 level of significance and also the calculated 'p' value was greater than 0.05 was found in neuropsychological parameters like Short Term Memory, Tactile Sensitivity, Hand Eye Coordination (error), Visual Motor Coordination (time) and Visual Motor Coordination (touch). This shows that there was no significant difference in such neuropsychological parameters among Indian, Nepal and Bhutan Buddhist Trainee Monks.

On the other hand it was evident from the analysis of data that in two anthropometric parameters taken into studies, Calf Circumference (cm.) and Upper Arm Circumference (cm.), the calculated F-Value is greater than the tabulated F-Value at 0.05 level of significance and also the calculated 'p' value was less than 0.05, meaning that there was significant difference in only two anthropometric parameters among Indian, Nepal and Bhutan Buddhist Trainee Monks. Since F-value was found greater and 'p' value was less the inter group comparison have been conducted in these anthropometric parameters. The Analysis of Variance (ANOVA) and Inter Group Comparison show that Upper Arm Circumference (cm.) of Indian and Nepal Buddhist Trainee Monks was better than the Upper Arm Circumference (cm.) of Bhutan Buddhist Trainee Monks, as the mean Upper Arm Circumference (cm.) of Bhutan Buddhist Trainee Monks differ significantly than Indian and Nepal Buddhist Trainee Monks. But there was no significant difference evident between Indian and Nepal Buddhist Trainee Monks. Similarly the Calf Circumference (cm.) of Indian Buddhist Trainee Monks was better

than the Calf Circumference of Bhutan Buddhist Trainee Monks, as the mean Calf Circumference of Indian Buddhist Trainee Monks differs significantly than Bhutan Buddhist Trainee Monks. But there was no significant difference found between Bhutan and Nepal Buddhist Trainee Monks and Indian and Nepal Buddhist Trainee Monks.

Similarly in other one physical fitness parameters taken into study, in Explosive Strength (mt.) the calculated F-Value is greater than the tabulated F-Value at 0.05 level of significance and also the calculated 'p' value was less than 0.05, so that there was significant difference in this motor fitness parameters among Indian, Nepal and Bhutan Buddhist Trainee Monks. Since F-value was found greater and 'p' value was less the inter group comparison have been conducted in this motor fitness parameters. The Analysis of Variance (ANOVA) and Inter Group Comparison show that the Explosive Strength (mt.) of Indian Buddhist Trainee Monks was better than the Explosive Strength (mt.) of Bhutan Buddhist Trainee Monks, as the mean Explosive Strength (mt.) of Indian Buddhist Trainee Monks differ significantly than Bhutan Buddhist Trainee Monks. But there was no significant difference observed between India & Nepal and Bhutan & Nepal Buddhist Trainee Monks.

Likewise in two neuropsychological parameters covered under the study such as Long Term Memory and Hand Eye Coordination (time) the calculated F-Value is greater than the tabulated F-Value at 0.05 level of significance and also the calculated 'p' value was less than 0.05. So, that there was significant difference in these two neuropsychological parameters among Indian, Nepal and Bhutan Buddhist Trainee Monks. Since F-value was found greater and 'p' value was less the inter group comparison have been conducted. The Analysis of Variance (ANOVA) and Inter Group Comparison show that the Long Term Memory of Bhutan Buddhist Trainee Monks was superior to the Long Term Memory of Indian Buddhist Trainee Monks, as the mean Long Term Memory of Bhutan Buddhist Trainee Monks differs significantly than Indian Buddhist Trainee Monks. But there was no significant difference found between Bhutan & Nepal Buddhist Trainee Monks and Indian & Nepal Buddhist Trainee Monks. Similarly, Bhutan Buddhist Trainee Monks was superior in Hand Eye Coordination (time) than Indian Buddhist Trainee Monks, as the mean Hand Eye Coordination (time) of Bhutan Buddhist Trainee Monks differs significantly than Indian Buddhist Trainee Monks. But there was no significant difference noticed between Indian & Nepal Buddhist Trainee Monks and Nepal & Bhutan Buddhist Trainee Monks.



## TESTING OF HYPOTHESES

It was hypothesized that there would be no significant difference on anthropometrical, physical fitness and neuropsychological parameters of Buddhist trainees monks among three different countries viz. India, Nepal and Bhutan.

The results of the study revealed that no significant difference was observed among Buddhist Trainee Monks of India, Bhutan and Nepal concerning standing height, body weight, sitting height, wrist diameter, elbow width, shoulder width, abdominal width, hip width, knee width, forearm circumference, chest circumference and thigh circumference. So the hypothesis formulated earlier is accepted. However significant difference was observed among Buddhist Trainee Monks of India, Bhutan and Nepal regarding upper arm circumference and calf circumference. So the hypothesis formulated earlier is rejected.

Similarly regarding physical fitness variables the study revealed that no significant difference was observed in balance, flexibility and reaction time among Buddhist Trainees Monks of India, Bhutan and Nepal. So the hypothesis formulated earlier is accepted. But significant difference was observed in explosive strength, thus the hypothesis formulated earlier is rejected.

Likewise concerning neuropsychological variables no significant difference was observed among Buddhist Trainees Monks of India, Nepal and Bhutan relating to short term memory, tactile sense, visual motor coordination (time & touch) and hand eye coordination (error). So the hypothesis formulated earlier is accepted. On the other hand significant difference was observed in long term memory and hand eye coordination (time) thereby the hypothesis formulated earlier is rejected.

## SCHEME OF THE WORK

The present work has been divided into the following chapters;

**Chapter 1** of the present study is an introductory deal with the introduction of Buddhist education system, profile of monasteries under study, need of the study, statement of the problem, objectives, hypotheses, delimitations, limitations, definitions of terms and significance of the present study to clarify the research work.

**Chapter 2** of the present study depicts the review of the selective studies related to the different aspects of anthropometrical, physical fitness, neuropsychological parameters and Buddhist monks which are useful to the present research problem.

**Chapter 3** of this study provides an insight to the methodology employed for the present study. The methodology followed was design of the study, selection of subjects, selection of variables, criterion measures, and collection of data, procedure for administering the test, reliability of data, statistical procedure and level of significance adopted.

**Chapter 4** of this study depicts the analysis of data, discussion of findings and testing of hypotheses.

**Chapter 5** reflects a concluding view of the whole gamut of the study with summary, conclusions and also offers some recommendation based on the findings of the present study.

At the end the bibliography and appendices were provided. The bibliography was prepared according to American Psychological Association (APA) referencing style, 6<sup>th</sup> Ed.

**Supervisor**

  
Dr. Gopal Chandra Saha  
Professor  
Department of Physical Education  
Jadavpur University  
Kolkata - 700 032

**Researcher**

**Dated:** 16/09/2021

**Dated:**