Introduction

Many factors influence an individual's behavior. Healthy lifestyle including healthy diet, regular exercise, stress management, and regular check-ups may help to reduce or eliminate the risk of diseases.

The human body is designed to be exercised. Sedentary lifestyle is associated with increased risk of disease and reduced functional capacity. Health benefits can be obtained through moderate level of regular physical activity for all ages.

Physiological factors play a dominant role in addition to the psychological preparation for the physical fitness. Regular exercise can slow deterioration in those who have already started to develop cognitive problems. Knowledge about health related physical activities will lead to a better healthy lifestyle among society.

According to Daryl Sidentop (1994) physical movement is the basic language of the early childhood years. Moving about and physically exploring their immediate surroundings are the main ways young children learn about their world. Providing opportunities for physical movements and later for motor play have long been recognized as fundamentally important for fostering a child’s physical social and mental development.

Many children and young people know that activity is good for them but they do not do enough activity to gain health benefits. One need to be motivated to be active and to be helped to feel good about participating in physical activities. The ways in which health related information and experiences are delivered to young people is critical.
Pupils should enjoy their involvement in physical activity. They should be presented with opportunities to make progress, succeed and to feel confident about being active.

Hall Higdon and Len Snowden (2002)“after the age of 30, muscle fibers decline at 3 to 5 percent each decade. This can add up to a muscle power decrease of about 30 per cent by the age of 60.” fitness programme will help to regain some of the lost muscle strength as well as to improve cardio-vascular and respiratory efficiency.

Fitness trends have become very popular because of our society’s general concern with fitness and health as the modern cyber age has several health related problems which have focused the attention on social development too.

**Need and significance of the study**

According to Bernard Shaw education should aim at the evolution of a better humanity, through the transmission of not only physical traits but also the cultural ones. Mahatma Gandhi defines education as “by education I mean an all round drawing out of the best in child and man-body, mind and spirit.” John Locke says that the attainment of a sound mind in a sound body is the end of education. Development and maintenance of the body are given due importance in these definitions. For the development and maintenance of the body exercises are highly necessary. But the syllabus introduced for teacher training in Kerala are not sufficient to fulfill these aims. Because of that the health awareness of our teacher trainees are very poor and it will affect the health of the students and ultimately the health of the nation.
This study will enlighten the awareness of the health related physical fitness programme and bio-chemical variables of the teacher trainees and this knowledge will be fruitful to the health of the nation.

The findings of this study will be significant in the following ways.

1. The study will enable the students to be aware of their fitness and will help them to compare the fitness with the students of different age groups, thereby to improve their amount of fitness status.

2. The study may help to understand the present physical fitness level of training college students on health related physical fitness.

3. It may also throw light on the field of measurement highlighting the need for and direction of further research.

4. The study will enable in the realization of the need for health related physical fitness throughout life span.

5. The study may help to understand about the various physical components and how to improve the physical fitness components.

6. The finding of the study may add to the existing fund of knowledge with regard to the walking and yogasanas training to improve the physical fitness variables and bio-chemical variables.

7. The data of the study may be useful to the fitness experts, health consultants and conditioning experts.
8. The study will help to highlight about the need and significance of the health related physical fitness among teacher trainees.

**Statement of the problem**

The problem is entitled “Isolated and combined effect of walking and yogasanas on selected health related physical fitness variables and bio-chemical variables among teacher trainees”.

**Delimitations**

The study is delimited to the following aspects.

1. The study was restricted to randomly selected 80 women teacher trainees of Government college of teacher education, Kozhikode, Kerala state.

2. The age of subjects ranged from 21 to 27 years.

3. The number of experimental groups for the study was delimited to four, named as experimental group-I (walking group) experimental group-II (yogasanas group), experimental group-III (walking and yogasanas group) and group IV acted as controlled group. The number of subjects in each group was confined to twenty.

4. The duration of the training period was restricted to twenty four weeks and the number of sessions per week was confined to four, which was considered adequate enough to cause changes in kinanthropometric, physical and bio-chemical variables.
5. The criterion variable chosen for the present study were confined to the kinanthropometric variable namely body composition, physical fitness variables viz: cardio-respiratory fitness, abdominal strength endurance, flexibility of the low back and posterior thigh, shoulder strength and bio-chemical variables like blood pressure, resting heart rate, blood glucose, lipoprotein profile and hemoglobin.

Limitations

The following uncontrollable factors associated with the study were accounted as the limitations of the study.

1. The subjects for the study did not come from the same socio-economic and cultural back ground

2. Certain factors like habits, daily routine, work, diet etc., may influence the results, which are not considered in the study.

3. The motivation and willingness to perform the training with 100% sincerity is a limiting factor.

4. Meteorological factors such as atmospheric temperature, relative humidity and wind velocity may had an impact on the subjects during the training and testing period, which could not be controlled.

5. The previous experience of the subjects in the field of sports and games, which may influence on the walking and yogasanas training were not considered.
6. Though all the subjects were residing in the different atmospheric conditions, no effort was made to control or assess the quality and quantity of their food intake and life style.

7. The subjects’ socio-economic status, health habits and family background were not taken into consideration.

8. Though the subjects were motivated verbally, no attempt was made to differentiate the motivation level during the period of training and testing.

HYPOTHESES

It was hypothesized that there will be significant improvement in the health related physical fitness variables such as cardiovascular fitness, abdominal strength endurance, shoulder strength, flexibility of lower back and posterior thigh, kinanthopometric variables such as body fat, biochemical variables such as blood glucose level, haemoglobin, HDL, LDL, TC-HDL, VLDL triglyceride and physiological variables like diastolic blood pressure, systolic blood pressure, body fat and heart rate among teacher trainees due to walking, yogasanas and combined yogasanas and walking interventions.

METHODOLOGY

To achieve the purpose of this study 80 women teacher trainees were randomly selected from government college of teacher education, Kozhikode, Kerala, as subjects and their age ranged between 21 and 27 years. The selected subjects were segregated into four equal groups consisting of 20 each by adopting random procedure. Out of this three
groups served as experimental groups and one group as controlled
group. Experimental group I was imparted training in walking,
experimental group II was imparted training in yogasanas and
experimental group III was imparted training in combined yogasanas
and walking and the fourth group was the controlled group. The
duration of the training intervention was six months. 30 to 60 minutes
training was given per day. The subjects were trained four days a week.

**DEPENDENT VARIABLES**

Kinanthropometric variable such as body composition, physical
fitness component variables such as abdominal strength endurance,
flexibility of the low back and posterior thigh, shoulder strength and
cardio-respiratory endurance, bio-chemical variables such as blood
glucose level, lipoprotein profile, haemoglobin, and physiological
variables such as blood pressure and the resting pulse rate were selected
as the dependent variables. Thus the present study consists of ten
dependent variables.

**Tools and materials used**

The Harpenden skin fold calliper was used to assess the double
thickness of the fat layer under the skin called subcutaneous fat. Seven
skin fold sites were measured namely chest, midaxillary, triceps,
suprailiac, abdomen (belly), subscapular and thigh. The body density
was calculated by using the 7-site formula for women, body
density=1.097-0.00046971(sum of seven skin folds)+ .00000056(sum of
7 skin folds)²-0.00012828(age). For calculating the percentage of body
fat Brozek equation for %body fat=(457-414.2/body density) is applied. (ACSM’S Health Related Physical Fitness Assessment Manual (2004)).

The physical fitness variables like cardio respiratory fitness, abdominal strength endurance, flexibility of low back and posterior thigh and shoulder strength were measured by one mile run/walk test, sit-ups test, sit and reach test and push-ups test respectively.

Pre and post blood test were conducted 24 hours before and after the training programme for the following bio-chemical variables at the public health lab Kozhikode, Kerala. Participants arrived at the laboratory in a fasting (10 h) state. The blood test were conducted to assess the blood glucose, lipoprotein profile and haemoglobin.

The blood pressure was tested with the equipment sphygmomanometer. Manual method was used to assess the resting pulse rate.

RESULTS

The results of the present study are as follows:

1. The walking group has significantly improved the health related physical fitness variables such as cardio-respiratory endurance, but the abdominal strength endurance, shoulder strength and flexibility of low back and posterior thighs has not improved significantly.

2. The walking group has significantly improved the bio-chemical variables such as haemoglobin and HDL in the blood and significantly reduced the LDL and TC-HDL content in the blood.
But there was no significant changes in the case of blood glucose level, VLDL and triglyceride due to walking intervention.

3. The physiological variables such as diastolic pressure, systolic pressure and resting heart rate were not significantly changed due to walking intervention.

4. The kinanthropometric variable, the body composition was not significantly changed due to walking intervention.

5. The yogasanas group has significantly improved the health related physical fitness variables such as abdominal strength endurance, shoulder strength and flexibility of low back and posterior thigh and there was no significant improvement in the case of cardio-respiratory endurance.

6. The yogasanas group has significantly improved the biochemical variables such as haemoglobin in the blood and significantly reduced the blood glucose level, LDL and TC-HDL content in the blood. But there was no significant change in the case of VLDL and triglyceride due to yogasanas intervention.

7. The physiological variables such as diastolic pressure, systolic pressure and resting heart rate are not significantly changed due to yogasanas intervention.

8. The kinanthropometric variable, the body composition was not significantly changed due to yogasanas training.

9. The combined yogasanas and walking group has significantly improved the health related physical fitness variables such as
cardio-respiratory endurance and abdominal strength endurance, and there was no significant improvement in the case of shoulder strength flexibility of low back and posterior thighs.

10. The combined yogasanas and walking group has significantly reduced the blood glucose level TC-HDL and LDL content in the blood. But there was no significant change in the case of haemoglobin, HDL, VLDL and triglyceride due to combined yogasanas and walking intervention.

11. The physiological variables such as diastolic pressure, systolic pressure and resting heart rate were not significantly changed due to combined yogasanas and walking intervention.

12. The kinanthropometric variable, the body composition was not significantly changed due to combined yogasanas and walking intervention

**CONCLUSIONS**

Based on the results of the study the following conclusions have been made.

1. Walking and combined yogasanas and walking interventions improved the cardio-respiratory fitness than yogasanas training.

2. It was found that the yogasanas intervention had significantly improved the shoulder strength and flexibility of low back and posterior thigh when compared to walking and combined yogasanas and walking interventions.
3. Yogasanas and combined yogasanas and walking interventions had significantly improved the abdominal strength endurance than walking intervention.

4. The yogasanas and the combined yogasanas and walking interventions had significantly reduced the blood glucose level than walking intervention.

5. The yogasanas and the walking interventions had significantly improved the haemoglobin in the blood than combined yogasanas and walking intervention.

6. The walking intervention had significantly improved the HDL in the blood than the yogasanas and the combined yogasanas and walking interventions.

7. The walking, yogasanas and the combined yogasanas and walking interventions had significantly reduced the TC-HDL and LDL in the blood.

8. It was found that the diastolic pressure, systolic pressure and resting heart rate were not significantly changed due to walking, yogasanas and combined yogasanas and walking interventions.

9. It was found that the percentage of body fat was not significantly changed due to walking, yogasanas and combined yogasanas and walking intervention.

10. It was found that the heart rate is not significantly changed due to walking, yogasanas and combined yogasanas and walking intervention.