

**LEVEL OF PHYSICAL FITNESS AMONG STUDENTS OF VIKHE PATIL
INSTITUTE OF MEDICAL SCIENCES, AHMEDNAGAR**

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Abstract

Numerous studies have been carried out on physical fitness in medical students. Angyan et al.^[4] reported that medical students had low physical activity levels as a result of high work load and less free time thus affecting their physical fitness. Nada Otmani et al.^[3] (Imperial Journal of Interdisciplinary Research, vol. 2, issue 2, 2016) suggested that physical activity is a major determinant of the health of individuals and hence it is essential to promote physical fitness among students and the population in general. Such studies suggest that physical fitness should be accepted as the milestone of a healthy lifestyle. With this background in mind, the current study is designed to assess the physical fitness in medical students. The ethical clearance from ethical committee of college of physiotherapy was obtained. Subjects fulfilling the inclusion and exclusion criteria were included in the study. The entire procedures involved in the study were explained to each subject. After explaining the purpose of the study a written informed consent was obtained from the participants. Initially the demographic data was assessed. Cardiovascular endurance was assessed using the step test. Strength was assessed using the push up test. Flexibility was assessed using the sit and reach test. Heart rate will be measured using the STEP TEST to assess cardiovascular endurance.^[12] The total number of push-ups will be counted using the PUSH UP TEST to assess strength.^[12] The distance between the toes and the finger-tips will be measured using the SIT AND REACH TEST to assess flexibility.^[12] The result shows the physical fitness among the nursing, MBBS and physiotherapy students and the comparison of their fitness amongst each other. Sedentary lifestyle is quite common among universities, particularly among medical students, future doctors whose working conditions are quite laborious and time consuming. The field of medicine demands an optimal level of physical fitness to be able to deliver quality treatment to the patients. However, medical education is quite stressful. The students have to study for long hours which results in a decrease in their physical activity. Therefore, in order to promote physical fitness among the students, it is necessary to incorporate physical fitness in the college curriculum.

Keywords: Physical fitness, medical students, strength, endurance, flexibility, step test, push up test, sit and reach test.

Introduction

According to World Health Organization (1948), “Health is a state of complete physical, mental and social well-being and not merely an absence of disease”^[1]. Good health widely depends on physical fitness. It is a major criterion to achieve success and to lead a healthy life. Physical fitness widely depends on strength and endurance of the individual. Muscle strength is a broad term that refers to the ability of contractile tissue to produce tension and a resultant force based on the demands placed on the muscle.^[2] Endurance is a broad term that refers to the ability to perform low-intensity, repetitive, or sustained activities over a prolonged period of time.^[2]

At present, a sedentary lifestyle is a very important universal issue. Sedentary lifestyle is a low or null physical activity with energy expenditure close to zero^[3]. Computerization and industrialization have radically reduced human physical activity. People who participate in large amount of sedentary behaviors such as using cell phones, prolonged sitting, etc. are less physically active, less physically fit and therefore prone to various health issues such as obesity, various cardiovascular and musculoskeletal diseases, depression, etc. Sedentary lifestyle is therefore now considered to be a major hazard to ill-health and unnecessary death. In the past few years, it has been observed that sedentary lifestyle is widespread among universities, particularly among medical students, future doctors whose working conditions are quite laborious and time consuming. They have to sit and study for prolonged period of time and also on the other hand work for long hours during the clinical postings- examining patients, taking medical histories, prescribing medications and ordering, performing and interpreting diagnostic tests. This seems to have a negative impact on the life of students leading to deterioration of their physical fitness levels. This has progressively decreased the efficiency of such students.

The field of physiotherapy demands an optimal level of physical fitness to be able to deliver quality treatment to the patients. The practitioners have to perform various laborious physical tasks such as moving the body segment of the patients, gait training, providing resistance and support to the patients during treatment sessions. Therefore physiotherapy students are expected to have an optimal level of physical fitness.

Nurses have a lot of physical contact with the patients and therefore are prone to many diseases. They have to perform various laborious physical tasks such as providing hands-on care to the patients by administering medications, managing intravenous line, observing and monitoring patients' conditions, maintaining records and coordinating with physicians and other health care professionals. Also, they have to work for long hours. It is therefore important for the nursing students to be physically fit.

Numerous studies have been carried out on physical fitness in medical students. Angyan et al.^[4] reported that medical students had low physical activity levels as a result of high work load and less free time thus affecting their physical fitness. Nada Otmani et al.^[3] (Imperial Journal of Interdisciplinary Research, vol. 2, issue 2, 2016) suggested that physical activity is a major determinant of the health of individuals and hence it is essential to promote physical fitness among students and the population in general.

Such studies suggest that physical fitness should be accepted as the milestone of a healthy lifestyle. With this background in mind, the current study is designed to assess the physical fitness in medical students.

NEED FOR STUDY-

Medical education is quite stressful. The students have to study for long hours which results in a decrease in their physical activity. On the other hand, they require a lot of strength and endurance to handle the patients and deal with all the laborious and time-consuming tasks. This results in a decline in the nutritional behaviors, an increase in stress and therefore a general decline in the physical fitness affecting health. But, medical students require an optimum level of physical fitness in order to deal with the academics as well as the patients successfully. Due to these reasons, it is essential that physical fitness should be added as a criterion subject in the medical college curriculum in order to maintain the physical fitness of the students.

REVIEW OF LITERATURE-

- 1) **Farshid Daneshvar et.al,** ^[5] conducted a study on cardiorespiratory fitness in internal medicine residents and concluded that there is significant decrease in the physical activity and fitness of these residents.

JOURNAL OF GRADUATE MEDICAL EDUCATION (FEBRUARY 2017)

- 2) **Gustavo Tovar et.al,** ^[6]conducted a study on institutionalized physical activity curriculum benefits of medical students in Colombia and concluded that physical activity course within the medicine curriculum had a positive impact on health related fitness indicators in Colombian students.

EDUCATION FOR HEALTH, VOLUME 29, ISSUE 3 (SEPTEMBER-DECEMBER 2016)

- 3) **S.V.SARANYA et.al,** ^[7]conducted a study on dietary habits and physical activity among medical students of a teaching hospital in South India and concluded that it is essential to identify and take corrective actions to promote healthy lifestyle practices.

TROPICAL JOURNAL OF MEDICAL RESEARCH, VOL 19, ISSUE 2, (JUL-DEC 2016)

- 4) **Ajediran I. Bello et.al,** ^[8]conducted a study on physical fitness of Ghanaian physiotherapists and its correlation with age and exercise engagement: a pilot study and concluded that the sampled physiotherapists had relatively low physical fitness compared to the age adjusted values.

BELLO ET AL. ARCHIEVES OF PHYSIOTHERAPY (2016)

- 5) **Nada Otmani et.al,** ^[3]conducted a study on physical activity among medical students in Casablanca, Morocco and concluded that the average number of hours the students spent in a seated position was high. Hence it is essential to establish measures to promote a favorable physical activity to health among students.

IMPERIAL JOURNAL OF INTERDISCIPLINARY RESEARCH (IJIR), VOLUME 2, ISSUE 2, 2016

- 6) **Shantanu Kulkarni et.al,** ^[9] conducted a study on assessment of selected physical fitness parameters in Malaysian female medical students and concluded that percentage of underweight is more in Malaysian students. Physical fitness values are on lower side compared to normal classification of physical fitness parameters. So there is need for physical education and training for the medical students.

IOSR JOURNAL OF DENTAL AND MEDICAL SCIENCES (IOSR-JDMS), VOLUME 14, ISSUE 6 VER. VII (JUN 2015)

- 7) **Mohammed Abou Elmagd et.al,** ^[10] conducted a study on the impact of physical activity on the academic performance among medical and health Sciences students: A cross sectional study from RAKMHSU -Ras Alkhaimah-UAE and concluded that the college age students benefit from the physical activity to improve their academic performance in spite of their tight timings, overloaded curriculum and variations in their gender, nationalities and study materials.

INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION, SPORTS AND HEALTH (2015)

- 8) **Makr B. Stephens et.al,** ^[11] conducted a study on physical fitness during medical school: a four year study at the Uniformed Services University and concluded that individual levels of physical fitness decline during medical school. Declines are most notable during the preclinical years. To promote student wellness, medical schools should

Incorporate student wellness activities as a routine part of the curriculum.

FAMILY MEDICINE, VOLUME 44, NO. 10 (NOVEMBER-DECEMBER 2012)

AIM-

The aim of this study is to assess the physical fitness levels among students of Vikhe Patil Institute of Medical Sciences.

OBJECTIVES-

- 1) To assess the cardiovascular endurance of medical students.
- 2) To assess the strength of medical students.
- 3) To assess the flexibility of medical students.

METHODOLOGY-

- **STUDY DESIGN-** Cross-sectional
- **STUDY DURATION-** 1 year
- **STUDY SETUP-** Dr. Vitthalrao Vikhe Patil Institute of Medical Sci.e.nces, Ahmednagar
- **SAMPLE TECHNIQUE-** Simple random samplings
- **SAMPLE SIZE-** 300

- **INCLUSION CRITERIA-** i) Healthy individuals in medical college
ii) Age group 18-30 years
iii) Prior consent
- **EXCLUSION CRITERIA-** i) Students with any cardiovascular and respiratory disorders
ii) Students with any musculoskeletal disorders
iii) Students with any neurological disorders
iv) Students not willing to participate
- **MATERIALS-** i) 12 inch tall step, bench or box
ii) A stopwatch
iii) A mat
iv) Sit and reach equipment
v) A weighing machine
vi) Stadiometer
- **PROCEDURE-**
 - After the clearance from ethical committee meeting by the institutional ethical committee, the demographic data of the subjects will be taken.
 - The subjects will be instructed to remove their shoes and socks and to stand on the weighing machine for weight measurement. The weight will be measured in kilograms (kgs).
 - They will be then asked to stand on the stadiometer for height measurement. The height will measured in meters (m).
 - With the help of these details the BMI will be calculated for each subject so as to mention it in the demographic data.
 - The subjects will be then explained about the tests that are used to assess their physical fitness.
 - They will then be asked to warm up for 10-15 minutes before beginning the tests.
 - After the warm up, the subjects will instructed to perform three tests. One for cardiovascular endurance, another one for strength and the last one for the flexibility of the subjects.
 - The values for all the three tests will be noted down and compared with the normal values.

➤ The following tests will be performed:

1. TO ASSESS CARDIOVASCULAR ENDURANCE- STEP TEST IS USED:

- Set the metronome to 96 beats per minute and turn the volume up loud enough that you can hear each beat.
- Stand facing your step.
- When ready to begin start the stopwatch or timer and begin stepping on and off the step to the metronome beat following a cadence of up, up, down, down.
- Continue for 3 minutes.
- As soon as you reach 3 minutes, stop immediately and sit down on your step.
- Perform a manual pulse reading and count the number of beats for an entire 60 seconds
- Record your pulse when you have reached 1 minute and then locate your score on the rating scale below.

2. TO ASSESS STRENGTH- PUSH UP TEST IS USED:

- Have the client begin in push up position, making sure the feet are shoulder
- width apart, hands are in correct position (this depends on the type of push
- up chosen), and head is neutral.
- Have them do as many push-ups they can until they can't do any more.
- If the client loses proper form it is not counted.

3. TO ASSESS FLEXIBILITY- SIT AND REACH TEST^[12] IS USED:

- This test is best completed after a substantial amount of warm up is completed in order to ensure the best results as well as being a safety precaution. When a warm up is involved it is critical that the same warm up is completed each time the test is conducted.
- To begin this test, have the client sit on the floor with both feet straight out against a box for them to press their feet against.
- Make sure their feet are bare, both knees are pressed down to the floor, and their palms are facing downward.

- Have them reach as far as they can towards their toes, or if they are really flexible, over the box.
- With a ruler, or some sort, record the length of which the client can reach measuring from their toes to their fingertips.
- Make sure that both hands are even and one is not reaching further than the other.
- The client is allowed some practice reaches before you record their final hold.
- The client should not be making any jerky or quick movements while recording.

OUTCOME MEASURES-

- 1) Heart rate will be measured using the STEP TEST to assess cardiovascular endurance.^[12]
- 2) The total number of push-ups will be counted using the PUSH UP TEST to assess strength.^[12]
- 3) The distance between the toes and the finger-tips will be measured using the SIT AND REACH TEST to assess flexibility.^[12]

STATISTICAL ANALYSIS- It was analyzed using the descriptive test. All the qualitative variables were expressed in percentages and the mean/average of the quantitative ones was taken.

RESULTS-

300 medical students were assessed from the Vikhe Patil Institute of Medical Sciences with an average age group of 18-25 years. 75 were nursing students, 125 students were from MBBS and 100 were physiotherapy students.

1) NURSING STUDENTS: 75 nursing students were assessed out of which 16 students were from 1st year (11 females and 5 males) and 59 students belonged to the preclinical years (46 females and 13 males).

1) 1st year- The mean endurance of nursing females was 99.45 +- 26.26 i.e. above average. The mean endurance of the nursing males was 101.6 +- 15.64 i.e. above average.

The mean strength of nursing females was 19.27 ± 7.10 i.e. poor. The mean strength of nursing males was 12.2 ± 9.65 i.e. poor.

The mean flexibility of nursing females was 8.63 ± 6.57 i.e. average. The mean flexibility of nurse males was 1.8 ± 5.44 i.e. fair.

2) preclinical years- The mean endurance of nursing females was 99.08 ± 21.83 i.e. above average. The mean endurance of nursing males was 87 ± 14.71 i.e. above average.

The mean strength of nursing females was 20.80 ± 14.57 i.e. fair. The mean strength of nursing males was 22.53 ± 6.88 i.e. fair.

The mean flexibility of nursing females was 7.02 ± 6.57 i.e. average. The mean flexibility of nursing males was 5.84 ± 8.54 i.e. average.

MBBS STUDENTS: 125 MBBS students were assessed out of which 40 students were from 1st year (23 females and 17 males) and 85 students belonged to the preclinical years (41 females and 44 males).

1) 1st year- The mean endurance of MBBS females was 92.78 ± 17.89 i.e. good. The mean endurance of the MBBS males was 95.11 ± 17.15 i.e. average.

The mean strength of MBBS females was 14.52 ± 8.99 i.e. poor. The mean strength of MBBS males was 22.94 ± 13.93 i.e. fair.

The mean flexibility of MBBS females was 3.39 ± 7.93 i.e. average. The mean flexibility of MBBS males was 4.70 ± 9.46 i.e. average i.e. fair.

2) Preclinical years- The mean endurance of MBBS females was 121.29 ± 21.16 i.e. poor. The mean endurance of MBBS males was 118.06 ± 21.05 i.e. poor.

The mean strength of MBBS females was 17.53 ± 7.76 i.e. poor. The mean strength of MBBS males was 18.95 ± 12.06 i.e. poor.

The mean flexibility of MBBS females was 1.84 ± 6.90 i.e. average. The mean flexibility of MBBS males was 0.53 ± 8.96 i.e. average.

PHYSIOTHERAPY- 100 physiotherapy students were assessed out of which 30 students were from 1st year (24 females and 6 males) and 70 students belonged to the preclinical years (63 females and 7 males).

1) 1st year- The mean endurance of physiotherapy females was 93.5 +- 19.59 i.e. good. The mean endurance of the physiotherapy males was 88.66 +- 15.37 i.e. above average.

The mean strength of physiotherapy females was 21.41 +- 17.38 i.e. fair. The mean strength of physiotherapy males was 24.66 +- 15.25 i.e. fair.

The mean flexibility of physiotherapy females was 5.31 +- 7.70 i.e. average. The mean flexibility of physiotherapy males was 6.5 +- 10.13 i.e. average.

2) Preclinical years- The mean endurance of physiotherapy females was 117.71 +- 31.06 i.e. below average. The mean endurance of physiotherapy males was 103 +- 30.40 i.e. below average.

The mean strength of physiotherapy females was 11.87 +- 8.22 i.e. poor. The mean strength of physiotherapy males was 16.14 +- 8.22 i.e. poor.

The mean flexibility of physiotherapy females was 3.83 +- 6.91 i.e. average. The mean flexibility of physiotherapy males was 0.57 +- 9.90 i.e. average.

COMPARISON:

1) NURSING STUDENTS-

a) ENDURANCE: table 1.1 represents the endurance among nursing students-

ENDURANCE				
	1ST YEAR		PRECLINICAL YEARS	
	FEMALES	MALES	FEMALES	MALES
EXCELLENT	27%	-	26.08%	23.07%
GOOD	18%	20%	8.69%	23.07%
AVERAGE	9.09%	40%	17.39%	23.07%
POOR	9.09%	20%	6.52%	-%

b) STRENGTH- TABLE 1.2 represents the strength among nursing students-

STRENGTH IN NURSING STUDENTS				
	1ST YEAR		PRECLINICAL YEARS	
	FEMALES	MALES	FEMALES	MALES
EXCELLENT	-	-	-	-
GOOD	-	-	-	-
AVERAGE	-	-	6.52%	-
FAIR	45.45%	40%	45.65%	76.92%
POOR	54.54%	60%	47.82%	23.07%

c) FLEXIBILITY- TABLE 1.3 represents flexibility among nursing students-

FLEXIBILITY IN NURSING STUDENTS				
	1ST YEAR		PRECLINICAL YEARS	
	FEMALES	MALES	FEMALES	MALES
EXCELLENT	-	-	-	-
GOOD	36.36	-	21.73	38.46
AVERAGE	54.54	40%	63.04%	46.15
FAIR	9.09%	60%	13.04%	23.07%
POOR	-	-	-	-

2) MBBS-

a) ENDURANCE- TABLE 2.1 represents the endurance among MBBS students-

ENDURANCE IN MBBS STUDENTS				
	1ST YEAR		PRECLINICAL YEARS	
	FEMALES	MALES	FEMALES	MALES
EXCELLENT	21.73%	17.64%	7.31%	6.81%
GOOD	26.08%	17.64%	7.31%	6.81%
AVERAGE	13.04%	35.29%	7.31%	9.09%
POOR	4.34%	11.76%	17.07%	20.45%

b) STRENGTH- TABLE 2.2 represents the strength among MBBS students-

STRENGTH IN MBBS STUDENTS				
	1ST YEAR		PRECLINICAL YEARS	
	FEMALES	MALES	FEMALES	MALES
EXCELLENT	-	5.88%	-	4.54%
GOOD	-	5.88%	-	2.27%
AVERAGE	8.69%	11.76%	9.75%	2.27%
FAIR	26.08%	29.41%	36.58%	34.09%
POOR	65.21%	52.94%	53.65%	56.81%

c) FLEXIBILITY- TABLE 2.3 represents the flexibility among MBBS students-

FLEXIBILITY IN MBBS STUDENTS				
	1ST YEAR		PRECLINICAL YEARS	
	FEMALES	MALES	FEMALES	MALES
EXCELLENT	-	5.88%	-	-
GOOD	26.08%	23.52%	12.19%	15.90%
AVERAGE	34.78%	35.29%	41.46%	29.54%
FAIR	30.43%	29.41%	36.58%	36.36%
POOR	8.69%	5.88%	9.75%	18.18

3) PHYSIOTHERAPY-

a) ENDURANCE- TABLE 3.1 represents the endurance among physiotherapy students-

ENDURANCE IN PHYSIOTHERAPY STUDENTS				
	1ST YEAR		PRECLINICAL YEARS	
	FEMALES	MALES	FEMALES	MALES
EXCELLENT	29.16%	33.33%	12.69%	14.28
GOOD	12.5%	16.66%	11.11%	14.28%
AVERAGE	8.33%	33.33%	4.76%	-
POOR	4.19%	-	6.34%	14.28%

b) STRENGTH- TABLE 3.2 represents the strength among physiotherapy students-

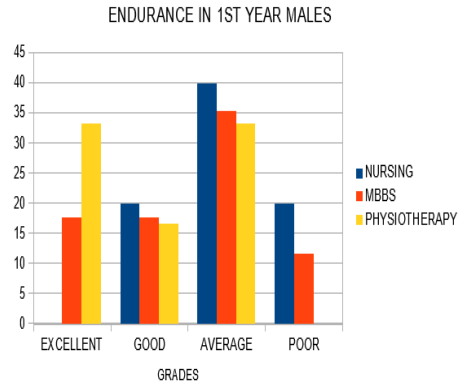
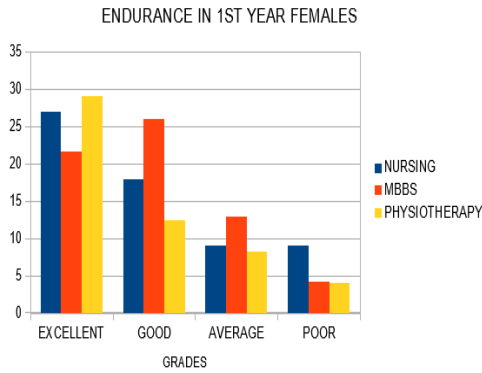
STRENGTH IN PHYSIOTHERAPY STUDENTS				
	1ST YEAR		PRECLINICAL YEARS	
	FEMALES	MALES	FEMALES	MALES
EXCELLENT	-	16.66%	-	-
GOOD	-	-	-	-
AVERAGE	-	-	1.58%	
FAIR	45.83%	50%	14.28%	28.57%
POOR	54.16%	33.33%	84.12%	71.42%

c) FLEXIBILITY- TABLE 3.3 represents the flexibility among physiotherapy students-

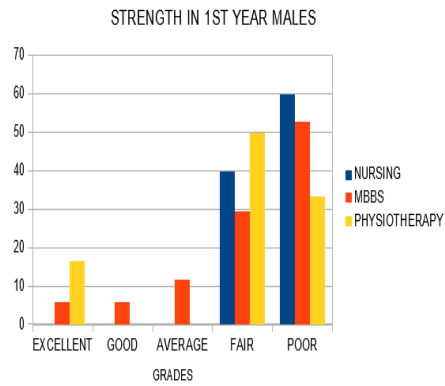
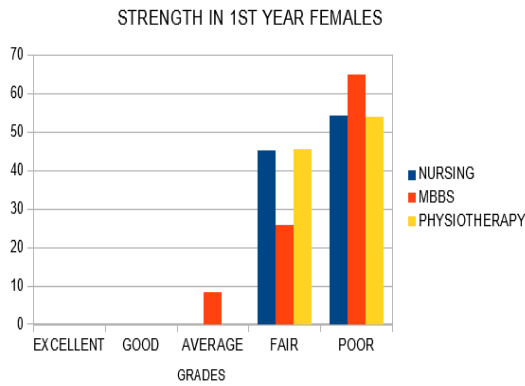
FLEXIBILITY IN PHYSIOTHERAPY STUDENTS				
	1ST YEAR		PRECLINICAL YEARS	
	FEMALES	MALES	FEMALES	MALES
EXCELLENT	-	-	-	-
GOOD	29.16%	33.33%	14.28%	14.28%
AVERAGE	37.5%	33.33%	57.14%	42.85%
FAIR	29.16%	33.33%	26.98%	14.28%
POOR	4.16%	-	1.58%	28.57%

• **COMPARISON AMONG 1ST YEAR STUDENTS OF NURSING, MBBS AND PHYSIOTHERAPY-**

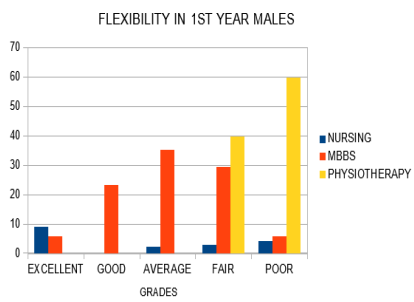
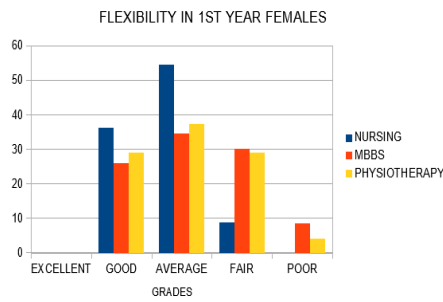
a) ENDURANCE-



b) STRENGTH-

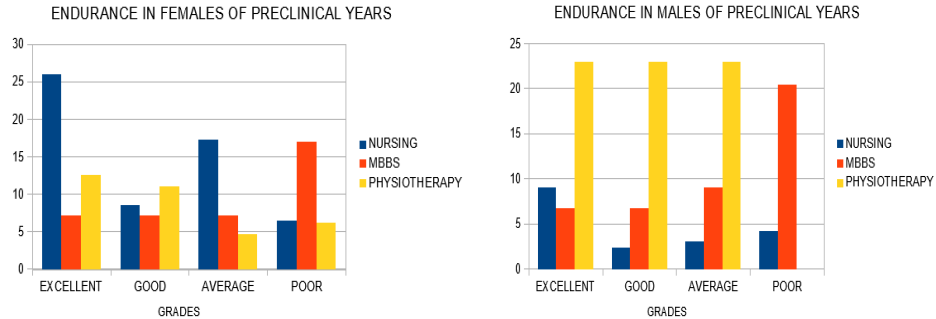


c) FLEXIBILITY-



• COMPARISON AMONG NURSING, MBBS AND PHYSIOTHERAPY STUDENTS BELONGING TO PRECLINICAL YEARS-

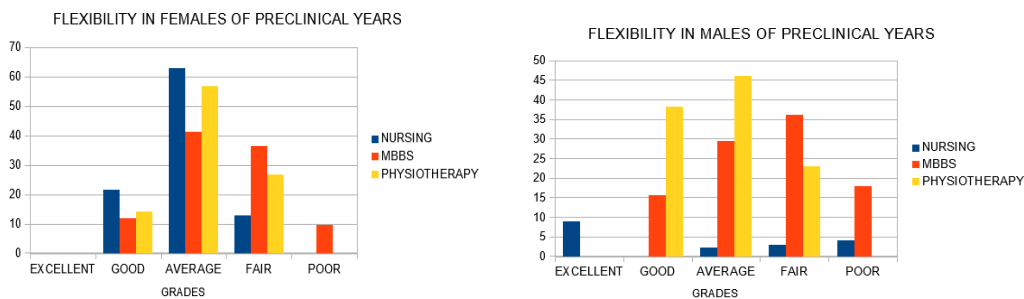
a) ENDURANCE-



b) STRENGTH-



c) FLEXIBILITY-



DISCUSSION-

- PARTICIPATION RATE-** Out of the 300 consent forms issued, the participation rate of nursing students was 25% (19% females and 6% males). The participation rate of MBBS students was 41.66% (21.33% females and 20.33% males). The

participation rate of physiotherapy students was 33.33% (27.66% females and 5.66% males)

- **ENDURANCE-** The endurance among the 1st year students was good as compared to the students of preclinical years.

When the endurance of 1st year students was compared, it was highest in physiotherapy students followed by MBBS students followed by nursing students in females. In males, again, it was highest in physiotherapy students followed by MBBS students followed by nursing students.

When the endurance of students belonging to the preclinical years was compared, it was highest in nursing students followed by physiotherapy students followed by MBBS students in females. In males, it was highest in physiotherapy students followed by nursing students followed by MBBS students.

- **STRENGTH-** The strength among the 1st year students was good as compared to the students of preclinical years.

When the strength of 1st year students was compared, it was highest in MBBS students followed by physiotherapy students followed by nursing students in females. In males, it was highest in physiotherapy students followed by MBBS students followed by nursing students.

When the strength of students belonging to preclinical years was compared, it was highest in nursing students followed by MBBS students followed by physiotherapy students in females. In males, it was highest in MBBS students followed by nursing students followed by physiotherapy students.

- **FLEXIBILITY-** the flexibility of 1st year students was good as compared to the students of preclinical years.

When the flexibility of 1st year students was compared, it was highest in nursing students followed by physiotherapy students followed by MBBS students in females. In males, it was highest in MBBS students followed by nursing students followed by physiotherapy students.

When the flexibility of students belonging to preclinical years was compared, it was highest in nursing students followed by physiotherapy students followed by MBBS students in females. In males, it was highest in physiotherapy students followed by nursing students followed by MBBS students.

- Our findings support the contention that students are relatively fit when they enter the medical college. During their preclinical years, their physical fitness begins to decline due to adaptation of sedentary lifestyle and improper nutrition. Overall, our findings suggest that objective measurements of physical fitness decline during medical college.
- According to the current studies, we can confirm that the physical fitness was quite low among the medical students of Vikhe Patil Institute of Medical Sciences and therefore it is essential that physical fitness should be added as a criterion subject in the medical college curriculum in order to maintain the physical fitness of the students.
- **CONCLUSION-**
Sedentary lifestyle is quite common among universities, particularly among medical students, future doctors whose working conditions are quite laborious and time consuming. The field of medicine demands an optimal level of physical fitness to be able to deliver quality treatment to the patients. However, medical education is quite stressful. The students have to study for long hours which results in a decrease in their physical activity. Therefore, in order to promote physical fitness among the students, it is necessary to incorporate physical fitness in the college curriculum.
- **KEYWORDS-**
Physical fitness, medical students, strength, endurance, flexibility, step test, push up test, sit and reach test.

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