

# An Observational Study on the Flexibility among Health Care Professional Students

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**Abstract:** *This is a study to analyze the flexibility among health care professional students. Need of the Study: This study is designed to understand and analyze the outcomes of flexibility among health care professional students. Objective and Methodology: This study is to evaluate the flexibility using sit and reach test and forward best test This study was conducted on 400 subjects of age group 18 to 26 years. Conclusion: The present study concluded that there is significant lack of flexibility. It underscores the need for better physical education programs within the curriculum to ensure students to maintain their physical health while focusing on their demanding academic responsibilities.*

**Keywords:** Flexibility, Health care professionals

## 1. Introduction

Health care professionals are individuals that include doctors, physiotherapists, nurses, health care support staff, health care administrators, allied health professionals who provide health care services to patients. They work in various settings such as primary, secondary and tertiary health care centers.

Majority of them participate less in the structured exercise program or physical activity. Hence they lack components of physical fitness. Flexibility has been considered as an important component of physical fitness and good health [1][3].

Flexibility refers to the ability of muscle, joint and soft tissue to move through an unrestricted, pain free range of movement. It involves the capacity of these structures to stretch, lengthen and contract without limitation allowing for smooth and efficient movement. [2] [6]

Although flexibility varies widely from person to person, minimum range is necessary for maintaining joint and total body health. Many variables affect the loss of normal joint flexibility, including genetic age, activity level and previous injuries. The range of motion will be influenced by mobility of soft tissue that are present around the joint including muscles, ligaments, tendons, joint capsules and skin. A lack of stretching especially when combined with activity, can lead to fatigue - induced soft tissue shortening over time. This result in pain and require more energy to do activity. [4] [5] [7]

## 2. Need of the Study

Now - a - days students pursuing health care profession indulge in academic schedules, clinicals and practical's related to their curriculum which restrain them to participate in structural exercise program regularly compared to other professional students.

There are several studies which have focused on the flexibility and various tests associated with physical fitness.

But the literature is minimal in health care professional students.

Hence this study has been chosen to determine the level of flexibility among health care professional students. Based on this research outcome we would like to interpret the level of flexibility among various health care professionals.

### Aim of the Study

To determine the flexibility among the health care professional students.

### Objectives of the Study:

- To evaluate the flexibility using sit and reach test
- To evaluate the flexibility using forward bend test

## 3. Methodology

**Study Design:** observational study

**Sample Size:** 400 students

**Study Setting:** SVIMS

**Sample Collection:** SVIMS [COP, AHS, CON]

**Sampling Method:** Convenience sampling

### Materials

Tools used:  
Inch tape  
Chalk piece  
Pen  
Paper

### Inclusion Criteria

- Age: 18 to 26 years
- Gender: both males and females

**Exclusion Criteria**

- Age: Above 26 yrs and below 18 yrs
- Orthopedic and neurological abnormalities
- Previous surgical history

**Method**

In this study, we approached 550 health care professional students among which 400 students accepted to participate in this study.

The subjects were explained about the study and the procedure involved in detail. Informed consents were obtained from all the students. Flexibility was measured by using sit and reach test and forward bend test

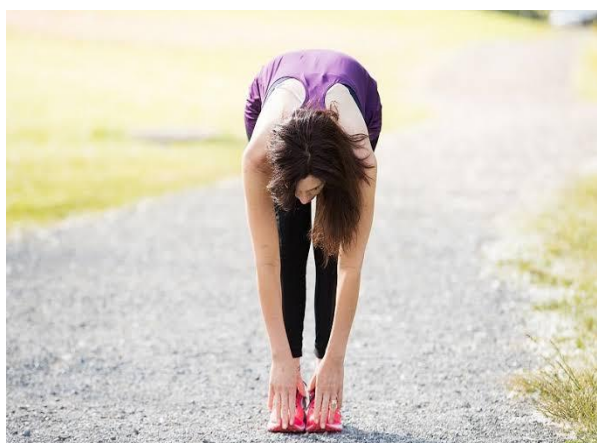
**Procedure of Sit and Reach Test/ Toe Touch Test**

Students were asked to wear stretchable or loose clothes and were asked to sit in long sitting position by widening his/her legs up to 12 to 15 inches and the line is drawn between both the heels and the subject is asked to stretch or bend forward by using their at most effort to reach the length as far as possible and the measurement is taken using inch tape and recorded in centimeters. The test was performed for 3 times and the average value was recorded.



**Procedure of Forward Bend Test**

Students were asked to wear stretchable/loose clothes and were asked to stand with feet together in upright position with knees extended. They were asked to bend forward and touch the ground using their maximum effort. The measurement was taken between the middle finger and the ground through inch tape. The test was performed for 3 times and the average value was recorded.



**Normative Scale Used to Assess the Test**

Category	Men (cm)	Women (cm)
High excellent	>27	>30
Excellent	17 - 27	21 - 30
Good	6 - 16	11 - 20
Mean	0 - 5	1 - 10
Regular	- 8 to - 1	- 7 to 0
Poor	- 20 to - 9	- 15 to - 8
High poor	< - 20	< - 15

The data stored in MS Excel spreadsheet and statistical analysis was performed.

**Statistical Analysis**

The data is analyzed using SPSS software. The baseline data was analyzed for homogeneity, all continuous data are presented as mean, mode, standard deviation.

**4. Results**

**Table 1: Baseline descriptive statistics**

	Mean	Mode	Standard Deviation
Age	21.42	21	1.397
Gender	1.82	2	0.385
Sit & Reach Test	- 2.900	- 2.000	9.2292
Forward Bend Test	- 3.55	- 2.00	9.001

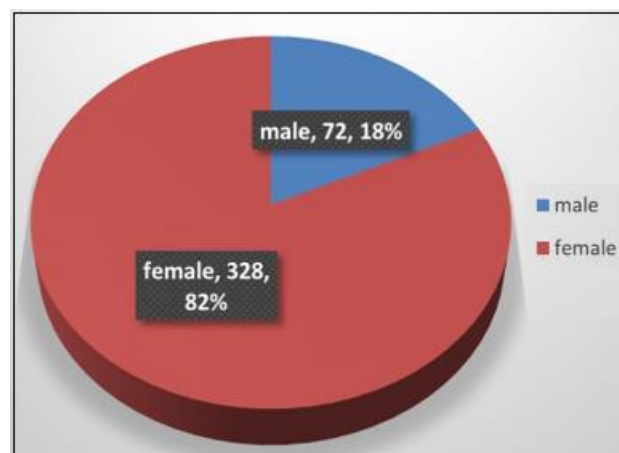
The students included in this study were in the age group between 18 to 25 with mean age of 21.42±1.397.

The mean score for sit and reach test for students is - 2.90±9.22

The mean score for forward bend test for students is - 3.55±9.001

**Table 2: Demographic characteristics of the study population**

Variable	Frequency (n)	Percentage %
Gender		
Male	72	18%
Female	328	82%
Age (years)		
>20	108	27%
21 - 25	284	71%
26+	8	2%



**Figure 1: Pie Diagram showing distribution of gender**

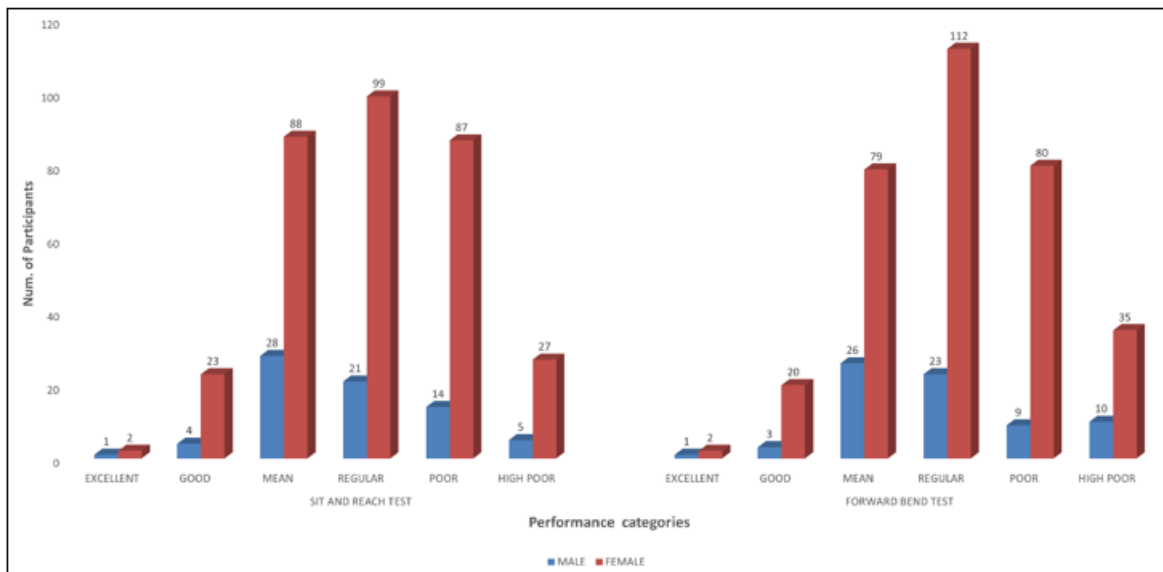
**Interpretation:**

Frequency of males out of 400 students is 72 with percentage of 18.

Frequency of females out of 400 students is 328 with percentage of 82.

**Table 3:** Data of sit and reach test and forward bend test

Test	Frequency (n)		Percentage
	Male	Female	
Sit and reach test			
Excellent	1	2	8%
Good	4	23	6.80%
Regular	21	99	30%
Mean	28	88	28%
Poor	14	87	25%
High poor	5	29	8.50%
Forward bend test			
Excellent	1	2	8%
Good	3	20	5.80%
Regular	23	112	33.80%
Mean	26	79	26.30%
Poor	0	80	22.30%
High poor	10	35	11.30%



**Figure 2:** Histogram showing performance in sit and reach test and forward bend test

**Interpretation:**

Out of 400 students, excellent flexibility was shown among 3 (8%) [1 males, 2 females] using sit and reach test and forward bend test.

Out of 400 students, good flexibility was shown among 27 (6.8%) [4 males, 23 females] using sit and reach test whereas 23 students (5.8%) [3 males, 20 females] using forward bend test.

Out of 400 students, mean flexibility was shown among 116 (28%) [28 males, 88 females] using sit and reach test whereas 105 students (26.3%) [26 males, 79 females] using forward bend test.

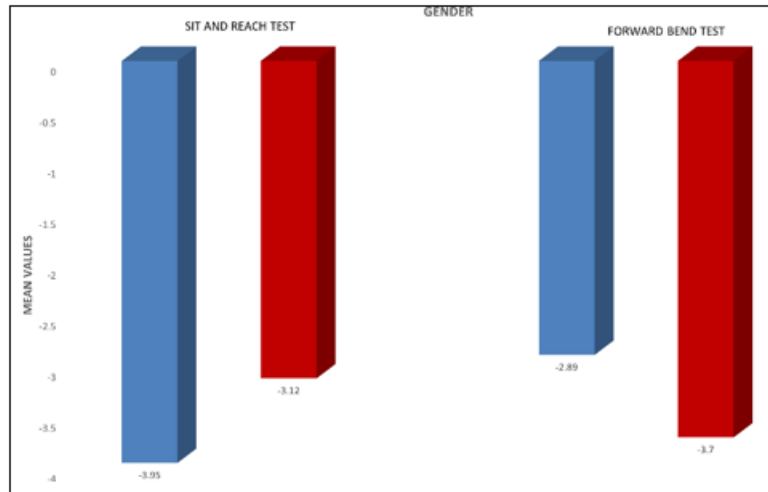
Out of 400 students, regular flexibility was shown among 120 (30%) [21 males, 99 females] using sit and reach test whereas 135 students (33.8%) [23 males, 112 females] using forward bend test.

Out of 400 students, poor flexibility was shown among 101 (25%) [14 males, 87 females] using sit and reach test whereas 89 students (22.3%) [9 males, 80 females] using forward bend test.

Out of 400 students, high poor flexibility was shown among 34 (8.5%) [5 males, 29 females] using sit and reach test whereas 45 students (11.3%) [10 males, 35 females] using forward bend test.

**Table 4:** Gender wise descriptive data of sit and reach test and forward bend test

Test	Gender	Mean ± SD	Maximum	Minimum
		Sit & reach test	Male	- 3.95 ± 8.89
	Female	- 3.128 ± 9.29	25.0	- 29.0
Forward bend test	Male	- 2.89 ± 8.44	24	- 23
	Female	- 3.70 ± 9.12	18	- 29



**Figure 3:** Bar graph showing mean of sit and reach test and forward bend test

### Interpretation

The mean score of flexibility in males using sit and reach test is  $-3.95 \pm 2.0$  and in females is  $-3.128 \pm 9.28$

The mean score of flexibility in males using forward bend test is  $-2.89 \pm 8.44$  and in females is  $-3.70 \pm 9.22$

## 5. Discussion

This observational study on flexibility among healthcare professional students explores an important aspect of physical fitness that is often overlooked within academic and clinical settings. The study is well-grounded in the need to understand the physical well-being of students who are training for physically demanding professions. Here's a detailed discussion of the key aspects:

This study addresses a clear gap in the literature, focusing specifically on healthcare students who may not engage more in physical activity due to the demand of their studies. This study is crucial for identifying and addressing potential fitness deficiencies early on.

Flexibility is essential for injury prevention and maintaining overall musculoskeletal health. If healthcare professional students lack flexibility, this could predispose them to musculoskeletal issues in their future career, where they may face physical strain.

While convenience sampling may have its limitations in generalizability, it allows for a relatively large and easily accessible sample size (400 students). This approach is practically given the context of the study.

Repeating each test three times and averaging the results helped to reduce the effect of outliers or anomalies, leading to more reliable data.

The mean scores for the sit and reach test ( $-2.90$  cm) and the forward bend test ( $-3.55$  cm) suggest that healthcare students, on average, fall into the below-average range for flexibility. According to the normative scale used in the study, these results indicate that a significant portion of students were lacking optimum flexibility.

This study used statistical methods like mean, mode and standard deviation. This allows for a comprehensive interpretation of the flexibility levels among students.

One of the most important takeaways is the potential need for institutions to incorporate more structured physical fitness programs into healthcare education. Given that flexibility is critical for physical well-being, educational programs could benefit from including flexibility training to improve student's health and prevent long-term issues.

Healthcare students may be at risk of long-term joint and musculoskeletal problems if their flexibility remains poor. This could lead to decreased job performance and increased sick leave due to physical ailments once they enter their professional careers.

## 6. Limitations

Since the study was conducted within a single institution (SVIMS), the findings may not be generalizable to all healthcare students in different geographic or cultural contexts.

Convenience sampling method allows for a larger sample size, it may introduce bias. Future studies might aim for a randomized sampling method for more representative results.

This study focuses only on flexibility, one component of physical fitness. Future studies could explore other areas such as strength, power, musculoskeletal endurance, cardiorespiratory endurance, agility etc., which are equally important for all the students.

## 7. Future Recommendations

To better understand the long-term effects of flexibility on healthcare professionals, longitudinal studies could track students throughout their academic and professional career.

This study could pave the way for research on specific interventions aimed at improving flexibility in healthcare students. For example, integrating yoga, stretching routines, or flexibility exercises into the curriculum and measuring the outcomes could provide actionable solutions.

While this study touches on factors like gender and age, future research could explore the impact of additional variables such as previous athletic experience, current physical activity levels, and even psychological stress (which can affect flexibility indirectly).

## 8. Conclusion

The present study concludes that there is significant lack of flexibility. It underscores the need for better physical education programs within the curriculum to ensure students maintain their physical health while focusing on their demanding academic responsibilities.

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