

# Difference in Visual Reaction Time Among Male and Female Physiotherapy Students: A Comparative Study

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## Abstract

**Introduction:** Visual reaction time is a component of cognitive function. Reaction time is defined as the interval of time between presentation of stimulus and appearance of appropriate voluntary response in subject. The measurement of visual reaction time has been used to evaluate Processing speed of central nervous system and coordination between Sensory and motor system. It determines the alertness of a person because how quickly a person responds to stimulus depends on reaction time.

**Method:** a comparative study was conducted on physiotherapy students at DR BR Ambedkar college of physiotherapy, Bangalore, Karnataka. The population of students includes UG students and interns. By ruler drop method students were examined for visual reaction time.

**Result:** There was no statically significant difference in visual reaction time among male and female physiotherapy students.

**Conclusion:** This study concluded that there is no significant difference in visual reaction time among male and female physiotherapy students of Dr.Br. Ambedkar college of physiotherapy.

**Keywords:** Reaction Time, Visual Reaction Time, Ruler Drop Method.

## INTRODUCTION:

The human body reacts to a variety of external environmental stimuli in various ways. The human body responds voluntarily and purposefully to various stimuli. A deliberate, voluntary reaction to a stimulus is called a reaction. Between the application of the stimulus and the proper motor response, there is a certain amount of time. The period between the introduction of the stimulus and the emergence of the subject's proper voluntary response is referred to as the reaction time. Reaction time is a straightforward, non-invasive test for both peripheral and central brain structures with physiological significance. Measuring reaction times is an indirect indicator of the central nervous system's processing power. Measuring reaction times can be used to assess an individual's performance and sensory-motor integration. It establishes a person's level of attentiveness since a person's reaction time defines how quickly he reacts to a stimulus. Age, sex, left or right hand, central vision versus peripheral vision, practice, exhaustion, hunger, breathing cycle, personality types, exercise, and subject intellect are some of the variables that affect human reaction

time<sup>1</sup>. RT frequently used for the evaluation of cognitive processes that are known to have an impact on academic performance.<sup>2</sup> An intentional, voluntary reaction to various stimuli, such as visual stimuli, is called a reaction. The amount of time required to respond to visual stimuli is known as visual reaction time (VRT). Physiotherapy Students can use it to identify bones, tools, create graphs, and answer viva questions in exams for many medical disciplines. Thus, with practice, pupils may recognize, comprehend, and respond with speed. Practice reduces reaction time. By training, skills can be enhanced. In daily life, visual information is used to complete the bulk of tasks. The amount of time needed for stimulus recognition and reaction can be reduced by performing an essential task.<sup>3</sup> Responses that take longer to commence are thought to require more time to digest information. RT measurement is a typical method for assessing psychomotor fitness.<sup>4</sup>

### **Need of the study:**

As RT is responsible for identifying bones, distinguish tools, answer questions in exams, diagnosis patients and respond with speed in Physiotherapy students, there is a lack of literary evidence in the field of difference in Visual reaction time among male and female physiotherapy students. Thus, need for this research study arises.

### **METHODOLOGY:**

STUDY DESIGN : Comparative study

STUDY SETTING: Dr BR Ambedkar College of Physiotherapy

SAMPLE SIZE : 100

SAMPLING METHOD: Convenient Sampling

MATERIALS USED:

- 30cm ruler
- Paper
- Pen

### **CRITERIA FOR SAMPLE SELECTION:**

The participants are selected for the study based on following criteria

#### **INCLUSION CRITERIA:**

- Age between 18-25 years.
- Include both male and female students from Dr. BR Ambedkar College of Physiotherapy.
- Participants must be able to respond to simple commands.

#### **EXCLUSION CRITERIA:**

- Any cognitive impairment.
- Unable or decreased hearing.
- Impaired vision.
- Orthopedic or rheumatoid condition interfering with upper extremity function.

**OUTCOME MEASURE:**

**RULER DROP METHOD:**

- To measure Reaction time (RT) by ruler drop method (RDM) the participants will be made to sit with their dominant side elbow flexed at 90° with mid-pronated forearm resting on a flat horizontal table surface, with the open hand at the edge of the surface. Ruler will be suspended vertically by the examiner, such that the lower end will be aligned across 5 cm between the web space (i.e. thumb and index finger) of the students hand. Then the student will be asked to catch the ruler as quickly as possible, once it is released from the examiner’s hand. Distance the ruler travelled from starting 5 cm will be recorded. Then this distance will be converted into time by using following formula.
- $t = (2d / G)^{1/2}$  Where
- d is the distance travelled by ruler
- G is the gravitational constant (9.8m/s<sup>2</sup>)
- d distance travelled in centimeters
- Three trials will be taken, and then mean of this will be used for the analysis.
- Using this method average visual reaction time of male physiotherapy students is determined , average visual reaction time of female physiotherapy students is determined, and then the difference in visual reaction time among male and female physiotherapy students is determined .

**Results:**

The statistical analysis of the data was done using SPSS 20.0. Age and genders were analyzed using frequency and percentages. The between group comparison were done using unpaired t test. A p value less than 0.05 (p<0.05) was considered statistically significant.

Age (in years)	Male		Female	
	Frequency	%	Frequency	%
18-20	12	34.3	24	36.9
21-23	12	34.3	35	53.8
24 and above	11	31.4	6	9.2
Total	35	100	35	100

The above table depicts, in the male group 12(34.3%) belonged to age groups 18-20 years and 21-23 years respectively and 11(31.4%) belonged to age group 24 years and above. In female group majority 35(53.8%) belonged to age group 21-23 years, 24(36.9%) belonged to age group 18-20 years and 6(9.2%) belonged to age group 24 years and above.

**Table 2: Showing distribution of gender**

Gender	Frequency	%
Male	35	35.0
Female	65	65.0
Total	100	100.0

Among the 100 physiotherapy students, 65(65%) were female and 35(35%) were male.

**Table 3: Showing comparison of average reaction time in male and female**

Reaction Time	Mean	Std. Deviation	t value	p value
Male	1.801	0.242	1.540	0.126
Female	1.913	0.389		

The average reaction time in male was  $1.801 \pm 0.242$  sec and in female was  $1.913 \pm 0.389$  sec. The comparison of average reaction time between male and female shows no significant difference with  $p > 0.05$  and t value 1.540.

## DISCUSSION:

The human body responds voluntarily and purposefully to various stimuli. A deliberate, voluntary reaction to a stimulus is called a reaction. The amount of time required to respond to visual stimuli is known as visual reaction time (VRT).

The main objective of this study was to know the visual reaction time between male physiotherapy students and female physiotherapy students using ruler drop method,

However, the statistical analysis shows that there is no significant difference in reaction time of male physiotherapy students and female physiotherapy students.

In the present study, the physiotherapy students are segregated into group A and group B, where group A are male physiotherapy students and group B are female physiotherapy students.

The age category in the groups within 18 years – 24 years, where in the group A, 35 male physiotherapy students, 12 (34.3%) were within the age group of 18 years-23 years and 11 (31.4%) were within age group of 24 years-25 years were male physiotherapy students. Whereas group B, 65 female physiotherapy students, 24 (36.9%) were within the age group of 18 years-20 years, 35 (53.8%) were within the age group of 21 years-23 years, 6 (9.2%) were within age group of 24 years-25 years female physiotherapy students.

This is in line with the study done by Rithesh M karia et al, which included students of age within 17 years-20 years for evaluating the effect of gender difference on visual reaction time.<sup>1</sup> This is in line with the study done by Reena Kumari Jha et al, included students of age with 17 years – 25 years for evaluating the effect of gender on visual reaction time.<sup>5</sup>

In the present study, the gender distribution was based on group A male physiotherapy students and group B female physiotherapy students, in which males were 35 (35.0%) and females were 65 (65.0%) with a total of 100 (100%) physiotherapy students. In this study, the gender ratio results in female predominance within 35 males and 65 females. This shows that there is a female predominance in physiotherapy students.

This was in line with a study done by Priyal P shah et al.<sup>6</sup>

In the study done by Reena Kumari Jha et al, included 67 females and 46 were males, which shows female predominance.<sup>5</sup>

In the present study, the average visual reaction time between the male physiotherapy and female physiotherapy students was, male physiotherapy student's visual reaction time was  $1.801 \pm 0.242$  sec and in female was  $1.913 \pm 0.389$  sec. The comparison of average reaction time between male and female shows no significant difference with  $p > 0.05$  and t value 1.540. This is in line with the study done by KVP Vamsi, D Imuetinyan et al, which also yields similar result in which the difference between male reaction time and female reaction time was not statistically significant.<sup>7</sup> This is in line with the study done by Monika garg, Hem Lata which also yields similar result in which the difference between male reaction time and female reaction time was not statistically significant.<sup>4</sup>

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