

Correlation Between Interpupillary Distance and Reaction Time Among Male and Female Kabaddi Players

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Abstract

“Efficient eye movements help athletes gather precise visual cues from their environment, which are crucial for controlling body movements in sports. Vision supports both real-time corrections and anticipatory adjustments for effective performance (Pointer, 2012).” Sporting environments are complex and often require rapid responses; thus, eye movements play a critical role in anticipation, practice, motor learning, development, and expertise (Botwinick & Thompson, 1966).

The purpose of this study was to examine the relationship between interpupillary distance (IPD) and reaction time among male and female kabaddi players. Another purpose was to identify whether a significant difference exists in IPD on the basis of gender. A total of 60 kabaddi players (30 male, 30 female) were randomly selected from Kottayam district. Interpupillary distance and reaction time were measured, and statistical analysis was performed. Results revealed a significant positive relationship between IPD and reaction time among both male and female kabaddi players. However, no significant difference in IPD was found between genders.

Keywords: Interpupillary Distance, Reaction Time, Kabaddi Players, Sports Vision, Motor Response

INTRODUCTION

In this study, the researcher investigated the relationship between interpupillary distance (IPD) and reaction time among kabaddi players and examined the potential gender differences. Both variables are essential in the field of sports performance. “Interpupillary distance (IPD) is the millimetre distance between the centres of the pupils (Fesharaki et al., 2012). Reaction time describes the interval between a stimulus and the individual’s motor response (Nikam & Gadkari, 2012).”

Statement of the Problem

The primary objective of this study was to determine the relationship between interpupillary distance and reaction time among male and female kabaddi players. Additionally, the study aimed to examine whether a significant difference exists in these measures based on gender.

Delimitations

- The study was limited to 60 kabaddi players.

- It included 30 male and 30 female kabaddi players.
- Age range was 18 to 25 years.
- The study was restricted to physical variables: IPD and reaction time.
- Participants were selected from Kottayam district only.

Limitations

- Health status of subjects was a limitation.
- Lifestyle factors such as personal habits, daily routines, and environment were not controlled.
- Psychological factors during testing were not considered.

Objectives

- To examine the relationship between IPD and reaction time among male and female kabaddi players.
- To assess gender differences in IPD.

Hypotheses

- H1: There will be no significant relationship between IPD and reaction time among male and female kabaddi players.
- H2: There will be no significant difference in IPD between male and female kabaddi players.

Definition of Terms

- Interpupillary Distance (IPD): “The distance measured in millimeters between the centers of the pupils of the eyes” (Medical Dictionary, as cited in Fesharaki et al., 2012).
- Reaction Time: “The time between a stimulus and a response” (Fang, as cited in Nikam & Gadkari, 2012).

Significance of the Study

- Provides insights into the reaction time of kabaddi players.
- Helps monitor and improve player performance.
- Educates students about the importance of vision and reaction time in sports.
- Can serve as a screening tool for assessing kabaddi players’ physical variables.

Methodology

The methodology and procedure precisely included the selection of subjects, selection of variables, collection of data and the statistical techniques employed for the analysis of the data. This study was investigating the relationship between interpupillary distance and reaction time among male and female kabaddi players and to find out the significant difference on interpupillary distance based on gender.

Subjects:

For the purpose of the study - 60 kabaddi players (30 male, 30 female), aged 18–25, randomly selected from Kottayam district.

Variables:

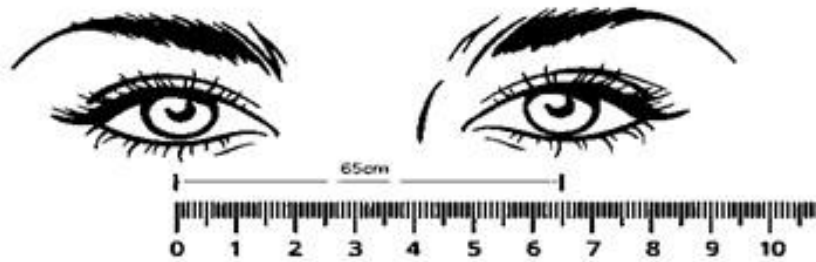
- Interpupillary distance (measured using a pupillary distance ruler).
- Reaction time (measured using ruler drop test).

Data Collection:

- **Interpupillary Distance:** Measured with a pupillary distance ruler, aligning zero with the right pupil and recording the millimeter value at the left pupil.

Pupillary Distance Ruler

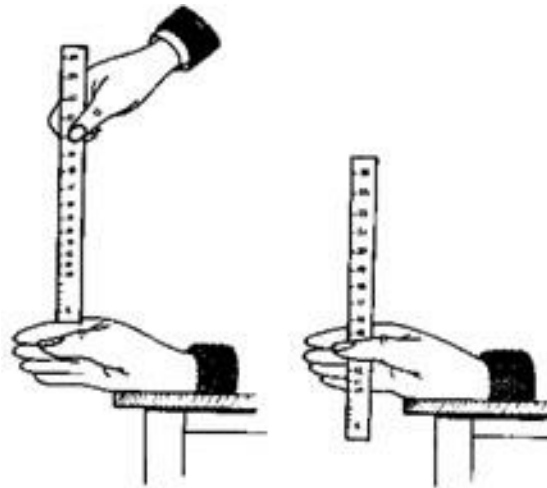
Figure 1. Measurement of Interpupillary Distance (IPD)



The figure 1 illustrates the standard procedure for measuring interpupillary distance (IPD). The pupillary distance ruler is aligned horizontally with the centres of both pupils and the distance between them is recorded in centimetres or millimetres. This method ensures accurate assessment of the distance between the visual axes of the eyes and is commonly used in clinical and sports vision assessments.

Reaction Time: Measured using the ruler drop test (Nikam & Gadkari, 2012).

Figure 2 Measurement of Reaction Time Using the Ruler Drop Test



Purpose: - To measure reaction time, hand-eye quickness and attentiveness.

Equipment required: - 1 meter long ruler or Yardstick, calculator.

Procedure: Figure 2 demonstrates the standard procedure for assessing reaction time using the ruler drop test. The examiner holds a ruler vertically between the participant’s thumb and index finger without contact. Upon sudden release of the ruler, the participant attempts to catch it as quickly as possible. The distance fallen before being caught is recorded and used to calculate reaction time. This method evaluates hand–eye coordination, attentiveness, and neuromuscular response speed. Repeat this procedure several times (e.g. 10 times) and take the average score.

Statistical procedure to be employed

Mean, standard deviation, Pearson product-moment correlation, and independent t-test were applied using

SPSS (Version 20.0).

Analysis of data and results of the study

The major objective of the present study was to find out the relationship between interpupillary distance and reaction time among male and female kabaddi players. Another objective of the study was to find out the significant difference on interpupillary distance on the basis of gender. The statistical techniques adopted were Arithmetic mean and standard deviation. To find out the significant difference independent t test were used. The data collected for the present study were analyzed with a view to throwing light on the objectives of this study. The analysis and interpretation of data are presented below. To test the hypothesis the level of significance was set at 0.05 levels.

Table 1: Descriptive statistics of interpupillary distance and reaction time among male and female kabaddi players.

	Male			Female		
	N	Mean	SD	N	Mean	SD
Interpupillary Distance	30	6.65	1.22	30	6.02	1.56
Reaction Time	30	22.03	2.34	30	22.60	2.01

Table 1 indicates that mean and standard deviation of interpupillary distance among male kabaddi players was 6.65 and 1.22. Mean and standard deviation of Reaction Time among male kabaddi players was 22.03 and 2.34. Mean and standard deviation of interpupillary distance among Female kabaddi players was 6.02 and 1.56. Mean and standard deviation of Reaction Time among Female kabaddi players was 22.60 and 2.01.

Table 2: Inter-Relationship of Interpupillary distance and Reaction Time among male kabaddi players

Sl.No	Variables	N	Pearson Correlation (r)	Sig. (2- tailed)
1	Interpupillary distance	30	0.84	0.03
2	Reaction Time	30		

Correlation is significant at the 0.05 level (2 – tailed)

Table 2 shows that there is positive correlation between Interpupillary distance and Reaction Time. The Interpupillary distance is significantly related to the Reaction Time because the coefficient correlation value (0.84) was statistically significant at 0.05 level of confidence, $r(28) = 0.84, P = 0.03$.

Figure 3: Scatter Diagram of Interpupillary distance and Reaction Time among male kabaddi players

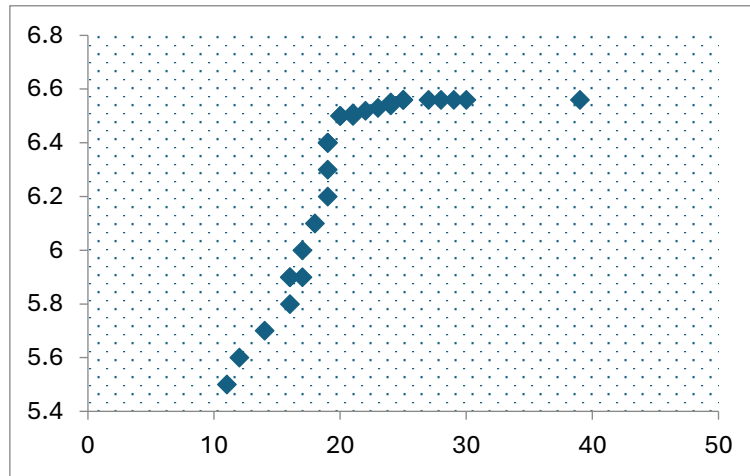


Figure 3 illustrates a positive correlation between interpupillary distance and reaction time among male kabaddi players, indicating that greater IPD is associated with longer reaction times.

Table 3: Inter-Relationship of Interpupillary distance and Reaction Time among female kabaddi players

Sl.No	Variables	N	Pearson Correlation (r)	Sig. (2- tailed)
1	Interpupillary distance	30		
2	Reaction Time	30	0.83	0.024

Correlation is significant at the 0.05 level (2 – tailed)

Table 3 shows that there is positive correlation between Interpupillary distance and Reaction Time. The Interpupillary distance is significantly related to the Reaction Time because the coefficient correlation value (0.83) was statistically significant at 0.05 level of confidence, $r(28) = 0.83, P = 0.024$.

Figure 4: Scatter Diagram of Interpupillary distance and Reaction Time among female kabaddi players

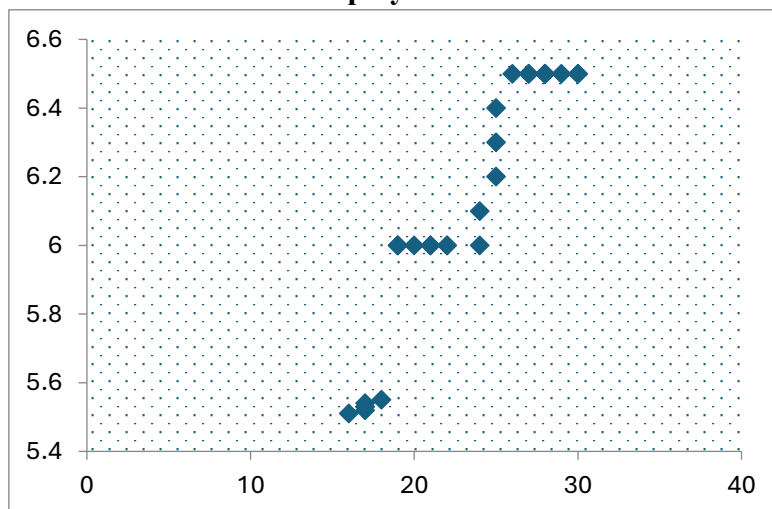


Figure 4 Shows that there is a positive correlation exists between Interpupillary distance and Reaction Time among female Kabaddi players. Hence we conclude that if Interpupillary distance of the female increased the Reaction Time also increased.

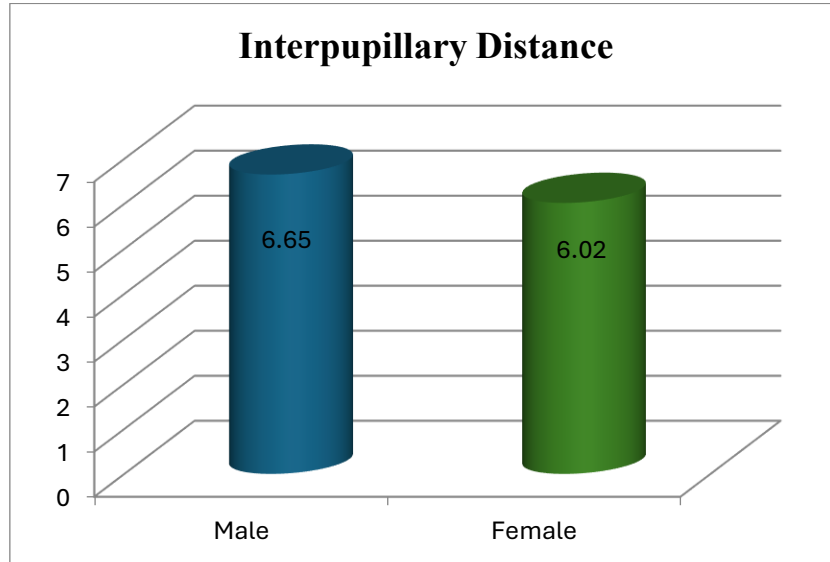
Table 4: Independent t test of Interpupillary distance among male and female kabaddi players

Interpupillary distance	Mean	SD	Mean Difference	t-Ratio	Sig. (2 Tailed)
Male	6.65	1.22	0.63	0.32	0.74
Female	6.02	1.56			

Not Significant at 0.05 level, df=28

Table 4 indicates that the mean value of Interpupillary distance among male and female kabaddi players was 6.65 & 6.02 and the Standard deviations were 1.22 & 1.56 respectively. The mean difference was 0.63. The calculated t test value was 0.32. Since the obtained t test value 0.32 lesser than the table value 2.04 with df 28 at 0.05 level. So, it was concluded that there was no significant difference exists on Interpupillary distance among male and female kabaddi players

Figure 5: Graphical representation of Interpupillary distance among male and female kabaddi players



Discussion

In this study, kabaddi players with wider interpupillary distance tended to display longer reaction times. Similar trends have been reported in previous work linking ocular dimensions with psychomotor responses (Hofstetter, 1972; Nikam & Gadkari, 2012). However, no significant gender difference was noted in IPD, aligning with previous research reporting variability across populations but not necessarily across genders (Pointer, 2012; Kumah et al., 2016).

Conclusion

- A significant positive relationship exists between interpupillary distance and reaction time among kabaddi players.
- No significant gender difference was found in interpupillary distance.

Recommendations

1. Conduct similar studies in different sports.
2. Replicate at state or national level with elite athletes.
3. Explore additional ocular measurements.
4. Extend research to school-age athletes.
5. Compare across regions, states, and universities.
6. Use larger and more diverse samples.

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