Chapter-III

Methodology

CHAPTER-III

METHODOLOGY

This chapter involves selecting subjects and variables, conducting a pilot study, determining criterion measures, ensuring data reliability, assessing instrument and testing reliability, maintaining subject reliability, orienting subjects, administering tests or questionnaires, and applying statistical procedures have been discussed.

3.1 THE SELECTION OF SUBJECTS / PARTICIPATION

For the study purpose, two hundred thirty-two persons with locomotor disabilities were included as subjects the players were selected randomly from the various state and national tournament levels. The subjects ages ranged from 28 to 35 years and subjects with paraplegia (74), monoplegia (72), and polio (86).

3.2 SELECTION OF THE VARIABLES

Study selected motor-sensory dimensions variables strength endurance (SE), eye-hand coordination (EHC), reaction time (RT), oxygen saturation (OX), pulse rate (PR), The psychological variables measured through standardized questionnaires, the Psychological Skill Inventory for Sports (PSIS-R5) were motivation (MT), confidence (CF), anxiety control (AC), mental preparation (MP), team emphasis (TE), and concentration (CN). The Sports performance of the subjects measured were through subjective rating.

3.3 PILOT STUDY

The researcher conducted a pilot study including twenty male persons with locomotor disabilities (PWDs) not participating in the main study, were selected. The chosen variables motor-sensory dimensions variables were measured to establish inspection guidelines, measure the suitability of the research design, document the measurement, compute scores, and identify the field tools made use of this research.

3.4 CRITERION MEASURES

The present study's main objective was to determine the efficacy of analysis of selected motor-sensory dimensions impact on sports performance among persons with locomotor disabilities.

The following test tools collected the required data on the selected motor-sensory dimensions variables table-I

TABLE I

MOTOR-SENSORY DIMENSIONS VARIABLES TEST ADMINISTRATION AND UNIT OF MEASUREMENTS

S.NO	VARIABLES	EQUIPMENTS/ TOOL	UNIT OF MEASURE
MOTOR-SENSORY DIMENSIONS VARIABLES			
1.	Strength endurance	Seated Dumbbell Press Test (Cited by Joesph p. Winnick 1993)	Count
2.	Eye Hand Coordination	Finger dexterity (Mutter, 1875)	Minutes
3.	Reaction Time	Chronoscope (Goeckel, 1990)	Mic seconds
4.	Oxygen Saturation	Pulse Oximeter (Dr. Takuo Aoyagi 1988)	Percentage
5.	Pulse Rate	Pulse Oximeter (Dr. Takuo Aoyagi 1988)	Percentage
6.	Motivation	The Psychological Skill Inventory for Sports (PSIS-R5) (Mahoney et al., 1987).	Score
7.	Confidence		
8.	Anxiety Control		
9.	Mental Preparation		
10	Team emphasis		
11.	Concentration		
12.	Sports Performance	Subjective Rating	Score

3.5 RELIABILITY OF INSTRUMENT

The measures implemented in this research, dumbbell, wheelchair, chronoscope, board of finger dexterity, pulse oximeter, software online platforms, and stopwatches were confirmed. Certified manufacturers supplied these instruments to meet standard quality requirements. This study used questionnaires to assess sensory variables recognized and had been previously utilized by researchers in the field. Furthermore, the validity and reliability of these tools were established by their authors, making them deemed reliable for the research works.

3.6 THE RELIABILITY OF DATA

The reliability of data was selected from randomly 232 (PWDs) subjects from state and national tournaments. The present study tests conditions on each criterion variable. multiple correlation and inter-correlation used for this research found out reliability of the data

3.7 TESTER'S RELIABILITY

The competency of the testers were established in conjunction with the reliability of the test. to achieve twenty subjects were randomly selected and tested on chosen variables. To Assess all the subjects under similar conditions by different testers. The reliability testers help to verify the consistent performance of testers and testing procedures.

3.8 RESEARCH DESIGN

This study formulated a static group comparison design. Age ranged from 28 to 35 years subjects were selected. The subjects (N=232) were randomly selected. It consists of seventy-four (74) paraplegia, seventy-two (72) monoplegia, and eighty-six (86) polio.

3.9 ORIENTATION OF SUBJECT

To achieve accurate and reliable results, the subject received a comprehensive test explanation of administration and procedures. Intended this secure that they understood the process fully and cooperated effectively throughout the testing.

3.10 SUBJECT RELIABILITY

The inter-correlation of the coefficient, finding out the reliability of the test correlation was used and data Table II presented.

TABLE - II

CORRELATION VALUE SPORTS PERFORMANCE (SP) WITH MOTOR-SENSORY DIMENSIONS VARIABLES

S.No	Variables	Obtained 'r' value
1	Sports Performance with Strength Endurance	0.98*
2	Sports Performance with Eye-Hand Coordination	0.89*
3	Sports Performance with Reaction Time	0.93*
4	Sports Performance with Oxygen Saturation	0.92*
5	Sports Performance with Pulse Rate	0.87*
6	Sports Performance with Motivation	0.97*
7	Sports Performance with Confidence	0.97*
8	Sports Performance with Anxiety Control	0.98*
9	Sports Performance with Mental Preparation	0.99*
10	Sports Performance with Team Emphasis	0.98*
11	Sports Performance with Concentration	0.95*

3.11 ADMINISTRATION OF TEST

To assess the criterion determinant variables tests using standardized. The purpose, equipment, procedure, and tests scoring was explained below:

3.11.1 Strength Endurance

Test: Seated Dumbbell Press Test

Purpose :

Strength endurance is measured on the shoulder.

Materials and Equipment:

Dumbbell (6.8kg), Wheelchair or sturdy chair, Stopwatch, Spotter, Pen, Score sheet.

Procedure:

The participants sit in a wheelchair or some other sturdy chair. The subject then grasps the dumbbell with the dominant hand, holding it close to the shoulder. From this starting position participants extend the elbow and lift the weight straight up and above the shoulder, making sure the elbow is completely extended (arm straight). The weight is then returned to the starting position. The exercise continues this action at a steady pace (3 to 4 seconds per rep) until they can no longer perform a correct repetition or complete 50 repetitions.

Scoring:

The maximum number of full repetitions successfully completed is recorded, up to a maximum of 50. The test is also terminated if the subject rests for more than 4 seconds. **(**Joesph P. Winnick, 1993)

3.11.2 Eye-hand Coordination

Test: Finger Dexterity

Purpose:

Eye-hand coordination measured hand movement.

Equipment and facilities:

Board of Finger Dexterity, pins, stopwatch, pen, score sheet.

Procedure:

The board of finger dexterity was set in front of participant. The participant inserted pins in those holes under two conditions: 1) Using right hand, and 2) Using left hand

Right-Hand Instructions: the participants hold the pins in their right hand, the participants might not face any difficulty picking up in the pins. The insertion process started from the participant's right-hand side, moving from right side to left side, and then from left to right. Repeating the same approach until the work was fully finalized

Left-hand Instructions: the participants hold the pins in their left hand, the participants might not face any difficulty in picking up the pins. The insertion process started from the participant's left-hand side, moving from left to right, and then from right to left, Repeating the same approach until the work was fully finalized

Scoring:

Taken time to complete 100 pins by participant (Mutter, 1875).

3.11.3 Reaction Time

Test: Chronoscope

Purpose:

Reaction time assess.

Equipment and facilities:

Chronoscope, Pen, Score sheet

Procedure:

Reaction time apparatus consisted of small base with a 16-inch vertical stand. All vertical supports were mounted vertically and contained 2 small neon lights and a microswitch. Another microswitch was placed at the bottom of the reaction timer. The top light, amber in color, acted as a get-ready to signal. The test conductor could adjust the preparation time from half a second to 4 seconds. When the bottom green light appeared as a stimulus, it triggered two fixed electric timers. The first timer was stopped when the participant's finger brushed the top microswitch to the light button located at the bottom. Response time was recorded using the first timer. All participant was given three attempts, and the average of all trials was used as the final score for calculation.

Scoring:

The average of all trials was used as the final score recorded in microseconds. (Goeckel, 1990)

3.11.4 Oxygen Saturation

Test: Pulse Oximeter

Purpose:

To determine whether the blood is well-oxygenated

Used equipment's:

Pulse Oximeter, pen, and Score sheet.

Procedure:

Hand Should be relaxed and below heart level place the device on the finger, don't remove the finger until test is complete, once test is complete, two readings will be shown oxygen saturation and pulse rate, an oxygen saturation 95% to 100% is considered normal.(Dr. Takuo Aoyagi 1988)

3.11.5 Pulse Rate

Test: Pulse Oximeter

Purpose:

Measured pulse rate (beats per minute).

Used equipment's:

Pulse Oximeter, pen and score sheet.

Procedure:

The portable pulse oximeter is a device that clips onto the finger and reads heart rate as well as the percent of oxygen in blood. It was developed to detect way of hypoxia (a condition caused by insufficient oxygen). The hemoglobin in blood bonds to oxygen and carries it across the circulatory pathway to body's cells. A pulse oximeter works by emitting an infrared light that shines through your body's tissue to a photo sensor on another's side. The infrared light is able to detect the of quantity hemoglobin that is saturated with (or carrying) oxygen. The pulse oximeter will display a number that indicates the percent of hemoglobin that is saturated with oxygen. A pulse oximeter reading (denoted by SpO2) in the high 90s (i.e. 96%-99%) is considered normal. (Dr. Takuo Aoyagi 1988)

3.11.6 Psychological Skill

TEST: Test for Psychological Skill Inventory for Sports (PSIS-R-5)

The test was used for psychological variables Motivation (MT), Confidence (CF), Anxiety Control (AC), Mental Preparation (MP), Team Emphasis (TE), and Concentration (CN).

Purpose:

Measure profile of psychological skills, how the subjects feel right now at that particular minute.

Procedures:

The (PSIS-R-5) Psychological Skills Inventory for Sports consists of 5-point Likert-type elements spread across 6 scales (Mahoney et al., (1987)). It presents 45 5-point Likert-type items, elements spread across 6 scales as the PSIS-R-5: 8 items for Motivation (MT), 8 items for Confidence (CF), 8 items for Anxiety Control (AC), 7 items for Mental Preparation (MP), 7 items for Team Emphasis (TE), and 7 items for Concentration (CN).

Scoring:

Responses range from 1 for "almost never" to 5 for "almost always." Items phrased negatively (reflecting a problem or concern) are adjusted by reversing this 1–5 scale. This ensures that a higher score on each scale indicates a greater presence of the psychological skill being measured.

3.11.7 Ability (Para-athletic)

Test: Sports Performance

Purpose:

measure the overall ability (performance para-athletic) of the subject.

Procedure:

To determine the para-athletic performance ability of subjects were subjectively rated by three experts in actual playing situations during the event participation. The following criteria adopted to rating the subject.

TABLE-III

SUBJECTIVE RATING CRITERIA FOR PARA-ATHLETIC ABILITY

S.NO	VARIABLES	MARKS
1	**Individuals technics** 1. Grip 2. Arm movement 3. Balance 4. Accuracy 5. Follow through	 10 10 10 10 10
2	**Contribution to the event** 1. Body position specific to the event 2. Adopting the principles of event 3. Event-specific fitness 4. Awareness of the rules of the event 5. Situational awareness	 10 10 10 10 10
	Total	100

Criteria of Subjective Rating

To assess the playing ability of Para-athletes, the participants' performance was evaluated by three experts - two certified coaches and the investigator. Specific performance-based Para-athletic events were chosen as the standard for the experts' subjective ranking of throwing ability. The criteria evaluation was divided into two categories: five individual skills worth 50 marks and five situational contributions to an event, also worth 50 marks, a total mark of 100 (Table III). The final criterion score was calculated by averaging the marks given by three experts.

3.11.8 Playing ability (Wheelchair Basketball)

Test: Sports Performance

Purpose:

Wheelchair basketball overall playing ability is measured by the subject.

Procedure:

Determine Wheelchair basketball performance playing ability of the subjects was subjectively rated by three experts in actual playing situations during the match play. The following criteria were adopted to rant the subject.

TABLE IV

SUBJECTIVE RATING CRITERIA FOR WHEELCHAIR BASKETBALL PLAYING ABILITY

S.NO	VARIABLES	MARKS
1	**Individuals skills**	
	1. Shooting percentage	10
	2. Execution of the shooting	10
	3. Passing	10
	4. Assist	10
	5. Receiving the ball	10
2	**Contribution to the event**	
	1. Position of play	10
	2. Knowledge of the rules and regulations	10
	3. Specific fitness	10
	4. Situational awareness	10
	5. Consistency in performance	10
	Total	100

Criteria for Subjective Ranking

To assess the playing performance of wheelchair basketball players, performance was evaluated by three experts - two certified coaches and the investigator. Individual performance-based wheelchair basketball skills were chosen as the basis for the experts' subjective evaluation of the players' abilities. The scoring criteria were divided into two sections: five individual skills worth 50 marks and five team-contribution situations, also worth 50 marks, for a total of 100 marks (Table IV). The final score was calculated by averaging the ratings given by the three experts.

3.11.9 Playing ability (Wheelchair cricket)

Test: Sports Performance

Purpose:

Wheelchair cricket overall playing ability is measured by the subject.

Procedure:

To determine the Wheelchair cricket playing ability, the performance of the subjects was subjectively rated by three experts in actual playing situations during the match play. The following criteria were used to rank the subject.

TABLE V

SUBJECTIVE RATING CRITERIA FOR WHEELCHAIR CRICKET PLAYING ABILITY

S.NO	VARIABLES	MARKS
1	**Individuals skills** 1. Batting 2. Bowling 3. Fielding 4. Efficiency in wheelchair movement 5. Wheelchair movement	 10 10 10 10 10
2	**Contribution to the event** 1. Position of play 2. Knowledge of the laws 3. Consistency in Performance 4. Specific fitness 5. Situational awareness	 10 10 10 10 10
	Total	100

Criteria for Subjective Ranking

To evaluate the playing performance ability of wheelchair cricket, the participants' performance was assessed by three experts - two certified coaches and the investigator. Individual performance-related wheelchair cricket skills were identified as the basis for the experts' subjective assessment of the players' abilities. The scoring system was divided into two categories: five individual skills worth 50 marks and five team-contribution scenarios, also worth 50 marks, making a total of 100 marks (Table V). The final score was determined by averaging the ratings provided by the three experts.

3.12 STATISTICAL TECHNIQUE

The data gathered from selected Motor-sensory dimensions variables and sports performance were analyzed using appropriate statistical methods. Descriptive statistics, including the mean and standard deviation, were calculated alongside multiple correlation and Pearson product-moment correlation techniques. Analysis of Variance (ANOVA) was applied to identify significant differences between means. When the ‘F’ value indicated significance, the Bonferroni post hoc test was conducted to further examine the relationships between the selected variables and sports performance. A significance level of 0.05 was used for all hypotheses tests

Figure-1

FLOWCHART FOR METHODOLOGY