

# PREVALENCE OF WRIST INJURIES IN VOLLEYBALL PLAYERS

MISS.SHRAVANI SACHIN PANAOKAR , DR.GAJANAN BHALERO

INTERN, PRINCIPAL & PROFESSOR

Department of Physiotherapy ,Tilak Maharashtra Vidyapeeth,Pune ,India

## **Abstract:**

Volleyball is a sport played among college students, due to repetitive wrist movements it can lead to overuse injuries. Wrist pain can significantly affect players' performance and daily activities. Such injuries can prevent to long-term complications. Therefore, this study aims to observe the prevalence of wrist injuries among volleyball players using the Patient Rated Wrist Evaluation (PRWE) scale. To determine the prevalence of wrist injuries in volleyball players aged 18-25 years with the help of Patient Rated Wrist Evaluation (PRWE) Scale. An observational study was conducted among 100 volleyball players aged 18–25 years with one year of playing experience. Data was collected using the Patient-Rated Wrist Evaluation (PRWE) scale to assess wrist pain and functional limitations. Participants were selected through convenient sampling, and responses were taken to determine the prevalence and severity of wrist injuries. 100 volleyball players were assessed for wrist injuries using the PRWE Scale. Descriptive statistics, frequency distribution, and comparison was done of the Pain score, function score and the total score of PRWE Scale with respect to gender and the affected side. The prevalence of wrist pain or injury among volleyball players was 100%, with 47% showing involvement of the dominant hand, 16% of the non-dominant hand, and 37% having bilateral involvement. Both male and female players reported wrist pain, indicating a 100% prevalence.

## Keywords:

Wrist injuries, Prevalence, Volleyball Players, Observational study, Pain assessment, Functional disability, PRWE Scale.

## **INTRODUCTION**

Volleyball is known for its benefit in health but on the other hand it is associated with a risk of injuries both acute and overused[1]

It is a non-contact sport where players of each team are separated by net, but this does not

avoid injuries because the high level of competitions seems to be risky for traumatic and overuse injuries.[2]

There are many injuries happen in volleyball players like Ankle sport injury, Patellofemoral injuries, Shoulder injuries and Wrist injuries.[2]

Wrist injuries are Scaphoid Fractures, Scaphulunate Ligament Tear, Radial-sided Tendinopatnies, Ulnar -sided Wrist injuries, Phalangeal Fracture, Finger Sprain , Wrist Sprain[3]

Our hands are complex and dynamic structures they manage function, However hand are vulnerable and can be exposed to all types of harms and hand injuries are common affecting all ages, genders and geographic regions.[3]

Volleyball playing largely involves jumping, stretching, twisting, diving, spiking and turning movements that place the players to greater risk of injuries[4]

The overhead motions of serving and spiking of the volleyball can generate significance force.[4]

With so many bones, ligaments, tendons, and joints keeping hands and wrists working, there is ample opportunity for injury. In fact, injuries to the hand and wrists are some of the most common ailments facing athletes[5]

Approximately 25% of all sports-related injuries involve the hand or wrist incidence is growing not only due to the competitive level of high school and collegiate athletes but also due to the activity level of the general population.

Hand and wrist injuries are common and can have a significant impact, especially if initially disregarded with a resultant delay to treatment [8]

In general, there are 2 types of MSK injuries within volleyball:

- (1) acute trauma directly from external variables—such as the floor, ball, other players, and equipment.
- (2) overuse injuries from continuous upper extremity use.

Previous studies have evaluated volleyball-related injuries in high school, and collegiate populations and found that direct trauma—most commonly involving the fingers, wrists,

and shoulders—is the greatest contributing mechanism of injury (MOI) in all age groups.

On the other hand, it is well documented that repetitive unilateral overhead movements such as spiking, serving, and blocking lead to upper extremity strength asymmetry, decreased glenohumeral external rotation range of motion (ROM), and increased internal rotation (IR) strength, which may contribute to overload injuries or other maladaptive limitations.

As a result, repetitive unilateral overhead movements predispose individuals to degenerative disease and a higher risk of overload injuries like shoulder dislocation.[7]

Hand and wrist injuries are common in volleyball, accounting for nearly 9% of all related injuries. Blockers and hitters are particularly at risk due to ball impact, net contact, or collisions[41]

A previous study of over 200 cases by Bhairo et al found that most injuries occurred during blocking (36%, defense (37%), or falling (18%).<sup>16</sup> Sprains and strains were most common at 39%, followed by fractures (25%) and contusions (16%), with the thumb metacarpal-phalangeal joint most frequently affected. Baugh et al found that hand/wrist injuries caused 12.9% of time-loss injuries in men compared to 3.7% in women.<sup>5</sup> Another study by Kostianen et al described blunt wrist trauma leading to radial and ulnar artery injuries, known as antebrachial-palmar hammer syndrome, which can cause pain and distal hand cyanosis.<sup>17</sup> These injuries may follow contact with the floor or ball during diving or “pancake” hits and require prompt evaluation.[41]

Volleyball is a dynamic, high-intensity sport that demands frequent and repetitive upper limb movements such as spiking, serving, setting, and blocking. These actions place considerable biomechanical stress on the shoulder, elbow, wrist, and hand, increasing the risk of musculoskeletal pain and related functional impairments. Despite rising awareness about sports injuries, there is limited evidence on the prevalence and impact of such conditions among volleyball players in Gujarat. To address this gap, a cross-sectional study was conducted over three months among 200 volleyball players aged 18–35 years, selected through convenient sampling. Both recreational (65%) and competitive (35%) players

participated. Data collection involved a Google Form-based questionnaire incorporating the Disabilities of the Arm, Shoulder, and Hand (DASH) scale to assess symptoms, functional limitations, and the impact on quality of life. Ethical consent was obtained from all participants prior to data collection. Findings revealed that shoulder pain was the most prevalent complaint (72%), followed by wrist pain (55%), elbow pain (38%), and thumb pain (23%). More than half of the players (54%) reported functional limitations, and (44%) experienced associated symptoms such as stiffness or tingling. Pain-related sleep disturbances were reported by 28% of players, while 41% acknowledged an overall decline in quality of life. The study concludes that upper limb musculoskeletal pain is highly prevalent among volleyball players in Gujarat, significantly affecting performance, daily function, and emotional well-being. Early preventive measures, targeted physiotherapy, and injury awareness programs are crucial to protect athletes' health and career longevity.[41]

A sprain in the wrist is an injury to its ligaments, the tough bands of fibrous tissue that connect bones to one another inside a joint. Although most people speak of the wrist as a single joint between the forearm and hand, the wrist actually contains many joints that link 15 separate bones. The ligaments that connect these bones can be torn by any extreme twist, bend, or impact that suddenly forces the wrist into a position beyond its normal range of motion.

There are three levels of sprain:

Mild (Grade I) — The wrist's ligaments are stretched or have microscopic tears.

Moderate (Grade II) — The damage is more severe, and some wrist ligaments may be partially torn.

Severe sprains (Grade III) — One or more wrist ligaments are entirely torn, or torn away from where they normally attach to bones.

Sprains of the wrist are fairly rare in everyday life and in the workplace. Under certain weather conditions, such as during ice storms or after a snowfall, a wrist sprain is commonly caused by a fall in which a person lands on an outstretched arm.[20]

For athletes, sprains and other injuries to the wrist or hand account for 3% to 9% of all sports injuries. They are especially common among athletes who play football, basketball, or baseball. In addition, at least 36 Olympic events have been linked to an unusually high rate of wrist sprains, including roller hockey, baseball, boxing, basketball, volleyball, weightlifting, ice hockey, wrestling, and judo.[15]

Among skiers, wrist sprains commonly occur when the skier falls while still gripping a ski pole or still having the pole strapped to the hand. Falls are also a frequent cause of wrist sprains and fractures among snowboarders and inline skaters. In platform divers, wrist sprains can occur when the wrist absorbs an unusually forceful impact as the athlete hits the water. Wrist sprains also occur in racquet sports, wrestling, and pole vaulting because the wrist is subjected to extreme twisting movements during these sports.[35]

Acute Injuries of the Wrist, Bone Fractures, Scaphoid fractures represent about 70% of all carpal fractures (1). The most common mechanism is a fall on an outstretched hand, pronated and medially deviated, typically with the wrist at greater than 90° of dorsiflexion (2). Such fractures are frequently seen in contact sports (football, rugby) and sports involving high velocities (such as skating and rollerblading). Patients may exhibit only minimal swelling and mildly decreased range of motion, which increases the risk of missing an occult fracture.

The Herbert classification divides stable and unstable fractures, which is important to define surgical and nonsurgical treatment. Scaphoid tubercle fractures and incomplete waist fractures are stable, whereas comminuted fractures, fracture-dislocations, oblique distal pole fractures, proximal pole fractures, and complete/displaced waist fractures are all considered unstable (3).

Radiographs pertinent to better assess scaphoid fractures include posteroanterior and lateral views with the wrist in a neutral position, an oblique view at 45°–60° pronation, and a posteroanterior view with the wrist in 45° ulnar deviation and pronation (3). Pediatric patients demonstrate a greater propensity to fracture the scaphoid tuberosity (corner of the distal pole) than adults, who are prone to development of scaphoid waist fractures (4) (Fig

EI [online]). In patients with clinical suspicion of scaphoid fracture and negative radiographs, one treatment option is to place the patient in a thumb spica splint short arm cast and repeat radiographs at 10–14 days (5). Another and more reasonable option is to obtain computed tomographic (CT) or magnetic resonance (MR) images at once, to rule out scaphoid fracture and avoid unnecessary immobilization of an athlete without a fracture. If a fracture line is already visible on the radiographs, advanced imaging may not be necessary. However, CT scanning does give a better idea of the three-dimensional characteristics of the fracture and aids in planning a surgical approach and the choice of implant (3). Overlooked scaphoid fractures may progress to nonunion, due to the precarious blood supply of this bone, and to osteoarthritis through carpal instability, known as scaphoid nonunion advanced collapse (or “SNAC”) wrist.

Hamate hook fractures usually occur in golf, baseball, or racket sports due to the position of the implement in the hand, which leaves the palm vulnerable to a direct blow. The dominant hand is more likely involved in tennis players, whereas the nondominant hand is usually involved in baseball players and golfers (1,6). Such fractures may also result from an avulsion of the flexor retinaculum attachment due to an indirect trauma that can occur either when falling on an outstretched hand or during power grips. Pain in the ulnar side of the wrist may be minimal and point tenderness should be sought at the hamate hook, which is not easily palpated.[56]

Ligament injuries can lead to progressive instability and further deterioration of the wrist joint. Scapholunate dissociation, resulting from injury of the scapholunate ligament (SLL), is the most common form of carpal instability. Athletes of almost any sport involving violent contact with other players or the ground are prone to this injury on a hyperextended wrist. Cumulative microtraumatic injuries may also result in SLL damage.

### Triangular Fibrocartilage Complex Injuries

Traumatic injuries of the TFCC most often result from a forced axial load on the wrist in an extension-pronation position, as with a fall on an outstretched hand (25). They may also result from a distraction force applied to the volar forearm or wrist, a situation frequently

encountered in racket sports (25).

The PRWE is a self-administered, patient-specific questionnaire that consists of 15 items. It was designed to measure wrist pain and disability in activities of daily living, and consists of two subscales: pain and function. The pain subscale comprises five items, while the subscale function is divided into six specific activities and four usual activities. Both subscales are summed and scored on a ten-point ordinal scale.<sup>7,19</sup> The 'pain' subscale score is the sum of the five items. The 'function' subscale score is calculated by the sum of the ten items divided by two. The total score of the PRWE is the sum of the scores of both subscales. A score of 100 represents the worst functional score, whereas 0 represents no disability.<sup>[57]</sup>

In 2004, the PRWE was modified to become the PRWHE (patient-rated wrist/hand evaluation). The PRWHE consists of the same items and scoring system as the PRWE, with minor changes.<sup>20</sup> In the PRWHE, the term 'wrist' was replaced by 'wrist/hand'. Also, two aesthetic items, that are not part of the scoring system, were added. Therefore, measurement properties of these two items were not assessed in this study. The PRWHE-Dutch Language Version (PRWHE-DLV) was used in this study.<sup>21</sup><sup>[57]</sup>

The DASH is a self-administered questionnaire, developed to evaluate symptoms and physical function of the whole upper limb. It is scored in two components: the main disability/symptom section and two optional sections. The main component of the DASH is a 30-item scale concerning the patient's health status during the preceding week: 21 items regarding the degree of difficulty in performing certain physical activities; five items pertaining to the severity of pain, activity-related pain, tingling, weakness, and stiffness; and four items concerning the effect that the upper limb problem has had on social activities, work, sleep, and self-image. Each item is scored on a five-point ordinal scale. To calculate the main DASH score, all completed responses are summed and the mean is calculated. The total score is calculated by subtracting 1 from the mean and multiplying by 25  $((n-1)*25)$ . This gives a total score ranging from best to worst on a scale of 0 to 100.<sup>22</sup> At least 27 of the 30 items must be completed to calculate a score

Patients were eligible for inclusion if they were 18 years of age or older, and were presenting in the emergency department with a displaced distal radial fracture that required reduction. Both conservatively and surgically treated patients were included. Patients were excluded if they 1) had a prior fracture or pathology of the ipsilateral distal radius, 2) had multiple fractures, 3) had cognitive impairment.[57]

In order to conduct high-quality clinical studies in the treatment of patients with a distal radial fracture, and to exchange results globally in a standardized way, there must be consensus on the use of outcome measures. Instruments such as patient-reported outcome measures (PROMs) are gaining importance in clinical trials of fracture treatment.<sup>1</sup> The methodological quality of these instruments is important; they should be valid and reliable. Ideally, this should be determined prior to use, as the quality of such instruments directly affects the quality of the information obtained with these instruments.<sup>2</sup> If not, one risks imprecise or biased results, potentially leading to incorrect conclusions.<sup>3</sup> To assess the methodological quality of a PROM, standards are needed.

Recently, we performed a systematic review in which we used this COSMIN checklist to determine the methodological quality of studies that evaluated measurement properties of various PROMs for patients with a distal radial fracture.<sup>4</sup> The patient-rated wrist evaluation (PRWE) and the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire were most extensively evaluated in terms of measurement properties. However, strong evidence supporting any available PROMs in patients with a distal radial fracture is lacking. We found that, overall, the measurement properties are good, but the methodological quality of the studies assessing these properties is low.<sup>5-16</sup> Based on this review, we currently risk imprecise or biased results when using these PROMs in, for instance, clinical studies, and may base our knowledge on incorrect conclusions. This review has shown that studies of higher methodological quality are needed to determine the quality of measurement properties. If the methodological quality of clinimetric studies continues to improve, PROMs can be selected more carefully.<sup>4</sup>[57]

In the current study, we aim to examine in greater depth which PROMs have the best

measurement properties for evaluation of functional outcome in patients with a distal radial fracture. We will therefore attempt to establish the content validity, test-retest reliability, internal consistency, measurement error, and floor and ceiling effects of the Dutch PRWE and DASH in patients with a distal radial fracture. The measurement properties will be assessed according to the recently formulated COSMIN standards[57].

We studied the long-term sequelae of hand injuries as a result of playing Volleyball. In a retrospective study, 226 patients with injuries of the hand who were seen over a 5-year period at our Trauma Department, were investigated. Females accounted for 66% of all injuries. The mean age was 26 years, with a peak in the age group of 15 to 29 years. Sprains and strains were observed most frequently (39%), followed by fractures (25%) and contusions (16%). The fingers were involved in 44% of the cases. Most injuries of the hand occurred in recreational players. Recreational players had more left-sided injuries, whereas competition players had more right-sided injuries ( $P < 0.005$ ), suggesting that lack of skill is an important determinant. Left-handedness was associated with an increased risk of hand injury in recreational players. One third of the Volleyball players did not go to work or school for a median of 4 weeks as a result of the injury. In a survey after a mean period of 5 years, a high percentage of patients had complaints: 28% cited stiff and crooked fingers with limitations and tender-ness in the movements as main inconveniences. We consider this incidence disturbingly high, regarding the seemingly innocent nature of these injuries.[42]

Top most position acquired in the field of competitive game as per the spectators concern that is soccer. Second position grasp in the game of volleyball at International level has one of the highest participation rates in worldwide, including both indoor and beach volleyball. It is one of the unique team sports that has evolved into two distinct Olympic events—indoor and beach. Although injury patterns differ between indoor and beach volleyball, there are similar injuries commonly seen between the two sports. Overall, overuse injuries are more common than acute injuries, because of the amount of repetition, improper technique, and type of playing surface. Overuse conditions of the knee, shoulder

and lower back are not unusual in volleyball[51].

Volleyball players repeatedly use their shoulders for spiking and blocking, overuse of injuries of the shoulder are common. Sprains and strains, most often around ankle, also occur. Finger injuries (phalanges), such as dislocations and tendon tears, frequently occur during setting and blocking in the game of volleyball.[52]

The researcher has the experience of more than 30 years in the game of volleyball, as a player, as a coach for the Mangalore University. Hence, investigator would like to educate the present and future players about the common injuries in the game of volleyball.[52]

## **NEED OF THE STUDY:**

There are many chances of having upper extremity injuries like wrist injuries and ligament tear due to repetitive impact of volleyball on hand and forearm. Hence, the present study is carried to know the prevalence of wrist injuries in volleyball players.

### **Population And Sample**

Sample Size: 100

### **Data And Sources Of Data**

Study Design: Prevalence study  
Study Type: Observational study  
Study Settings: Sports Club

### **Theoretical Framework**

The aim of the present was to assess the prevalence and severity of wrist pain and functional disability among volleyball players using the Patient-Rated Wrist Evaluation (PRWE) scale. The findings show that there is 100% prevalence of wrist pain or injury among the volleyball players. Most of players (47%) had pain in their dominant hand, 16% of the participants had involvement of the non-dominant hand and 37% had bilateral involvement. These results are suggestive of the fact that the repetitive and high-impact nature of volleyball places significant stress on the wrists, especially the dominant side, which is majorly used for sport specific actions like serving, setting,

## RESEARCH METHODOLOGY

The 100 participants were taken for this study in sports club Ethical clearance was taken from Institute. Potential participants were identified and approached through sports academies. The purpose of the study was clearly explained to the participant Participants submitted the completed offline forms and were ensured the confidentiality of participant responses. Collected data was stored securely and access was restricted to authorized personnel only. Summarized the data, prevalence rate and association found in the analysis. The materials required was consent form, Patient Rated Wrist Evaluation (PRWE) Scale, data sheet & pen. inclusion criteria was Age group of young adults (18 to 25 yrs) Both Gender (Male & Females) Players who has the experience of 1 year and subjects who are willing to participate in the process. Exclusion criteria was any cardiological and neurological conditions and fractures of Upper limb & Lower limb.

## DATA ANALYSIS & RESULT:

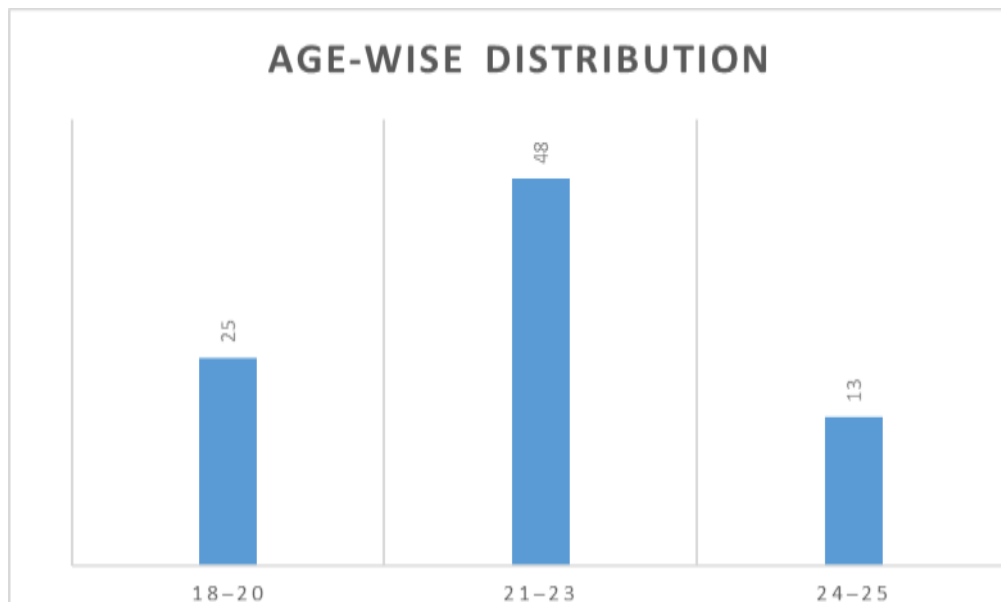
100 volleyball players were assessed for wrist injuries using the PRWE Scale. Descriptive statistics, frequency distribution, and comparison was done of the Pain score, function score and the total score of PRWE Scale with respect to gender and the affected side. Statistical analysis was done using the SPSS version 26.0 software

### Discriptive Statistics of Age

	<b>Age (in years)</b>
<b>Mean</b>	21.57
<b>Median</b>	21
<b>Mode</b>	21
<b>Standard Deviation</b>	2.14
<b>Minimum</b>	18
<b>Maximum</b>	25

### Distribution as per Age

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–20	28	25
	21–23	52	48
	24–25	20	13



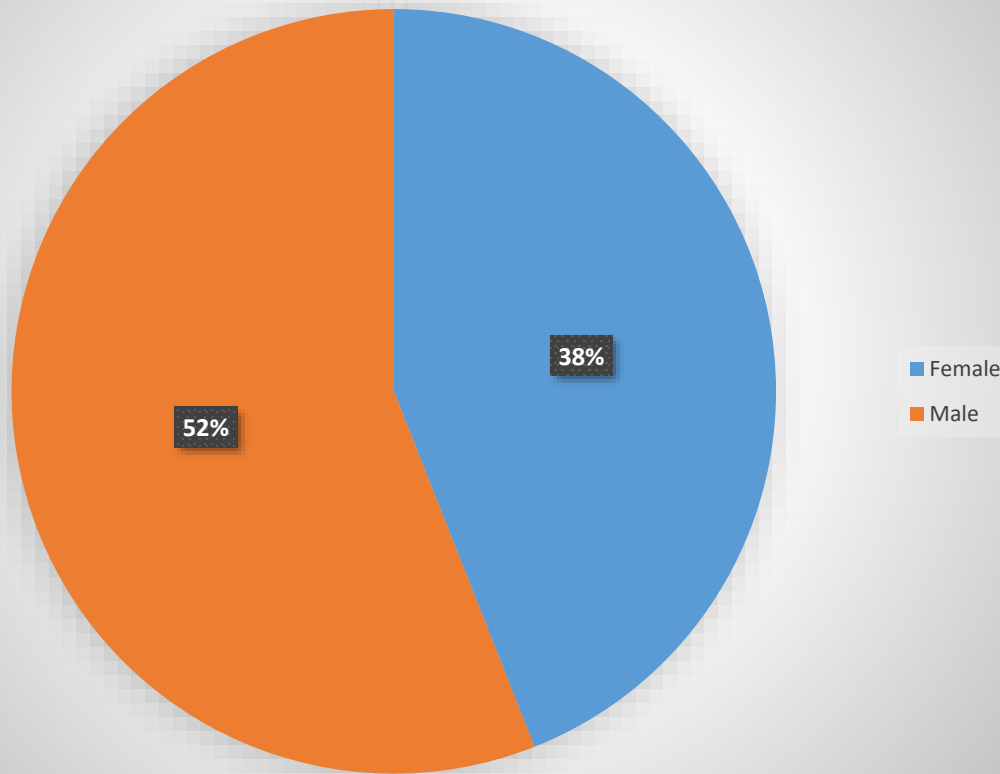
### Interpretation:

The study included 100 volleyball players aged between 18 and 25 years. The mean age of participants was 21.57 years, with a median and mode of 21 years, indicating that most participants were around this age. The standard deviation of 2.14 years suggests a relatively homogeneous age group. The age-wise distribution revealed that the majority of players (48%) were between 21 and 23 years, followed by 25% between 18 and 20 years, and 13% between 24 and 25 years. This shows that the sample primarily comprised young adult athletes in their early twenties, a group most actively engaged in competitive volleyball.

### Distribution as per Gender

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	56	52
	Female	44	38

### Gender-wise Distribution



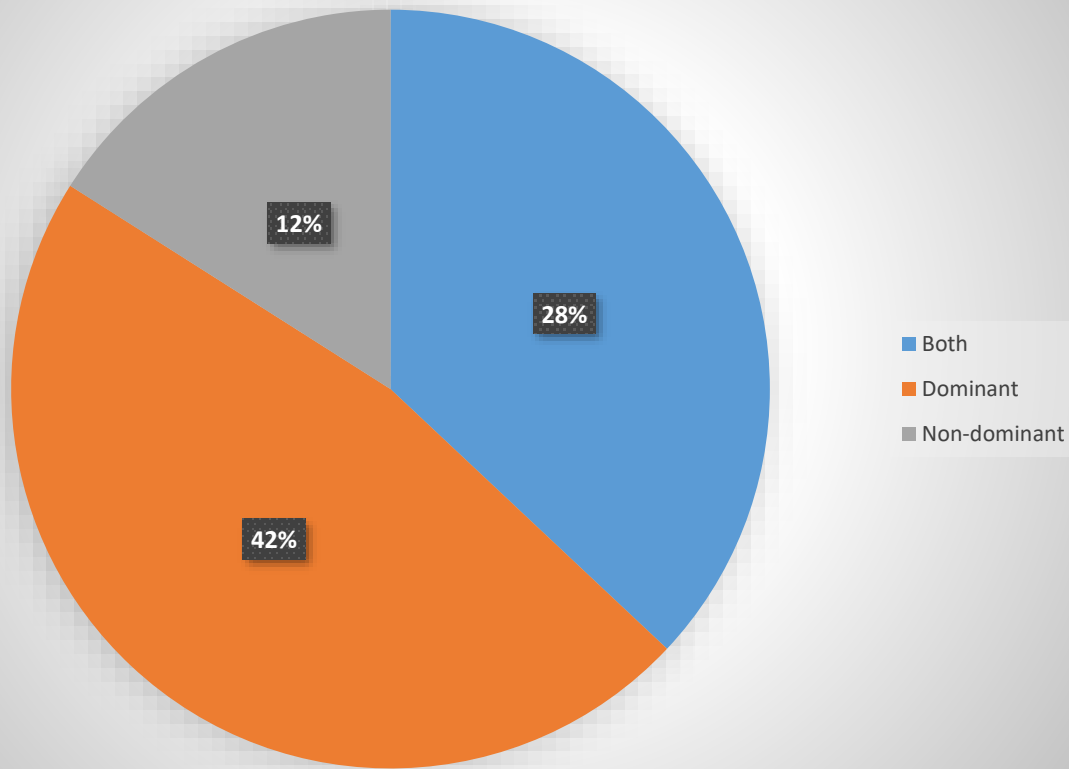
### Interpretation:

Out of the total 100 participants, 56 were males and 44 were females, constituting 52% and 38% of the total sample, respectively. This indicates a slightly higher representation of male volleyball players in the study compared to females, though the gender distribution was fairly balanced, allowing for comparison between both groups.

### Distribution as per Wrist Injury Involvement

Affected Hand	Frequency (n)	Percentage (%)
Dominant	47	42
Non-dominant	16	12
Both Hands	37	28

## Distribution As Per Wrist Injury Involvement



### Interpretation:

Regarding the side of wrist injury involvement, 42% of the players had injury on the dominant hand, 12% on the non-dominant hand, and 28% reported involvement of both hands. The higher prevalence of dominant-hand injuries could be attributed to repetitive use and greater load during playing actions such as serving, spiking, and blocking. The considerable proportion of bilateral wrist involvement (37%) highlights the extensive physical demands of volleyball, where both hands are frequently used in overhead and impact activities.

### Descriptive Statistics of PRWE Scores

Variable	Mean	Median	SD	Minimum	Maximum
PRWE Pain Score (0–50)	24.6	19	19.9	0	66
PRWE Function Score (0–50)	22.8	18.5	19	0	76

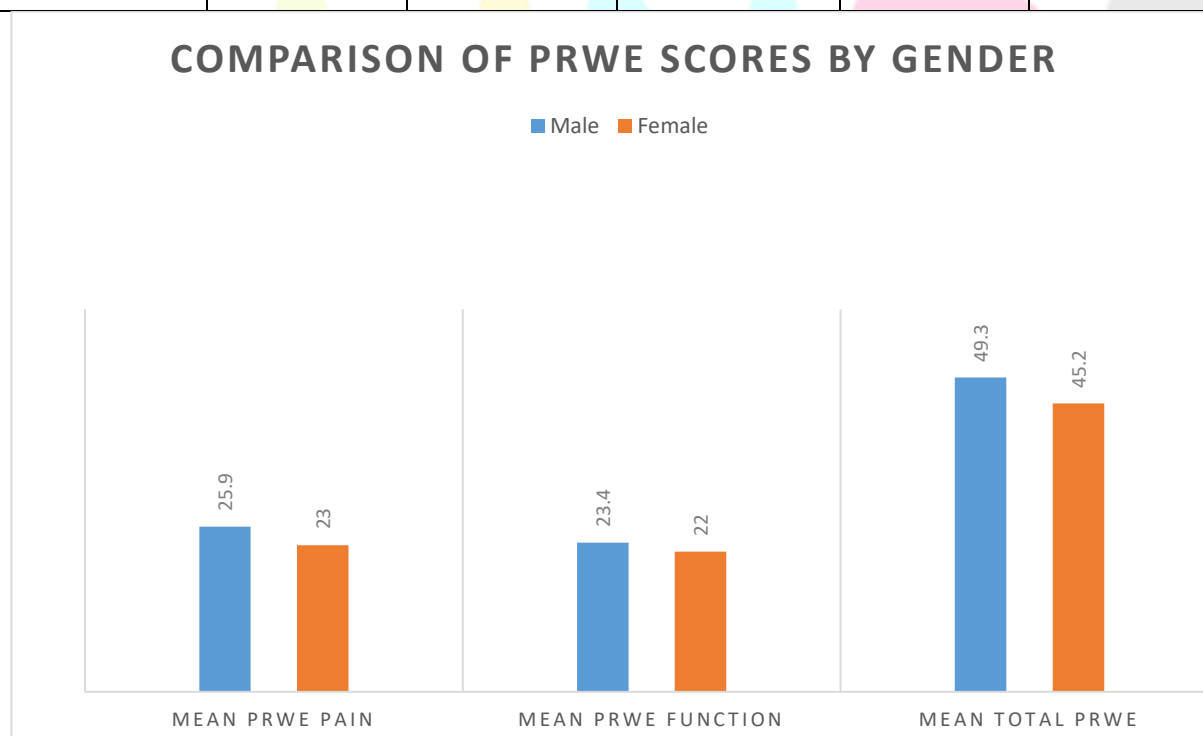
<b>Total PRWE Score (0–100)</b>	47.5	46.5	35.4	3	138
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### Interpretation:

The mean PRWE pain score among the players was 24.6 (SD = 19.9), with a median of 19, indicating that most players experienced mild to moderate levels of wrist pain. The PRWE function score had a mean of 22.8 (SD = 19), suggesting a similar pattern of mild to moderate functional impairment. The total PRWE score ranged widely from 3 to 138, with a mean of 47.5 (SD = 35.4), reflecting variability in the severity of wrist-related symptoms among participants. These findings indicate that while some players experienced minimal discomfort, others faced significant pain and functional limitations affecting wrist performance.

### Comparison of PRWE Scores by Gender

Gender	N	Mean PRWE Pain	Mean PRWE Function	Mean Total PRWE	SD (Total)
Male	56	25.9	23.4	49.3	34.2
Female	44	23	22	45.2	36.8

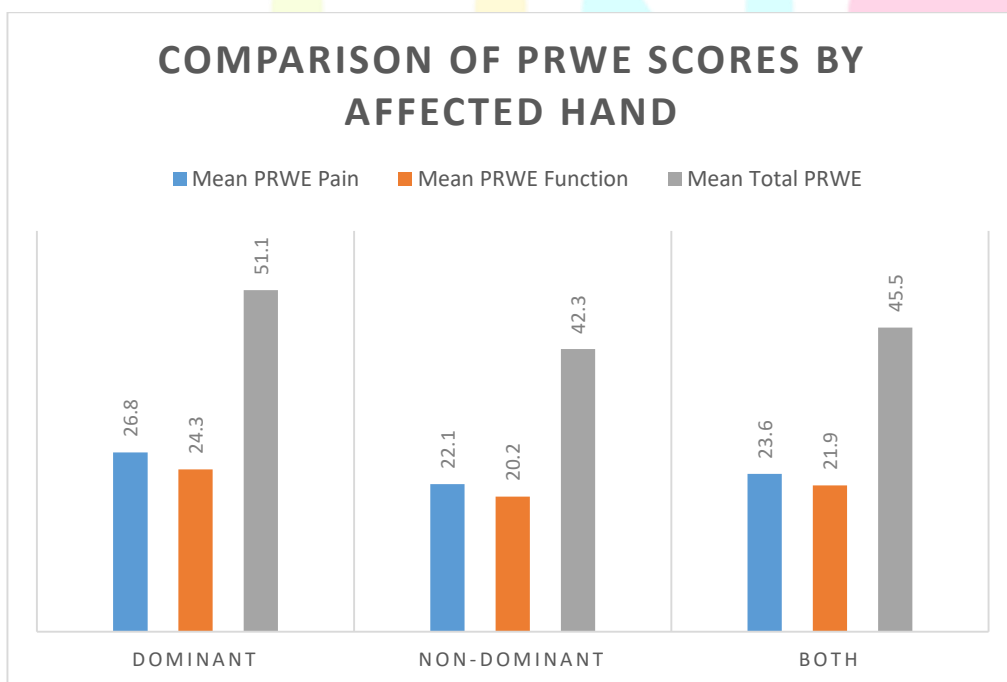


### Interpretation:

Comparison between genders showed that male players had slightly higher mean scores for pain (25.9) and function (23.4) compared to females (pain = 23, function = 22). The total PRWE score was also marginally higher in males (49.3) than in females (45.2). The standard deviations were similar across groups, indicating comparable variability. These results suggest that while both male and female players reported wrist discomfort, male players experienced slightly higher levels of pain and functional impairment, possibly due to differences in training intensity, playing position, or biomechanical loading during play.

### Comparison of PRWE Scores by Affected Hand

Affected Hand	N	Mean PRWE Pain	Mean PRWE Function	Mean Total PRWE	SD (Total)
Dominant	47	26.8	24.3	51.1	34.9
Non-dominant	16	22.1	20.2	42.3	32.8
Both	37	23.6	21.9	45.5	36.7



## Interpretation:

When comparing PRWE scores based on the affected hand, players with dominant hand involvement reported higher mean pain (26.8) and total PRWE scores (51.1) compared to those with non-dominant hand injuries (pain = 22.1, total = 42.3). Players with bilateral involvement had intermediate scores (pain = 23.6, total = 45.5). The results indicate that dominant-hand injuries were associated with greater pain and functional limitation, likely because the dominant hand is crucial for executing high-impact volleyball movements such as serving and spiking. This emphasizes the need for preventive strategies and wrist-strengthening interventions targeting the dominant limb.

## Prevalence of Wrist Pain/Injury among Volleyball Players

Variable	Category	Frequency (n)	Percentage (%)
<b>Overall Wrist Pain/Injury</b>	Present	100	100
	Absent	0	0
<b>Affected Hand</b>	Dominant	47	47
	Non-dominant	16	16
	Both Hands	37	37
<b>Gender-wise Distribution</b>	Male (n=56)	56	100
	Female (n=44)	44	100

## Interpretation:

The prevalence of wrist pain or injury among volleyball players was 100%, with 47% showing involvement of the dominant hand, 16% of the non-dominant hand, and 37% having bilateral involvement. Both male and female players reported wrist pain, indicating a 100% prevalence

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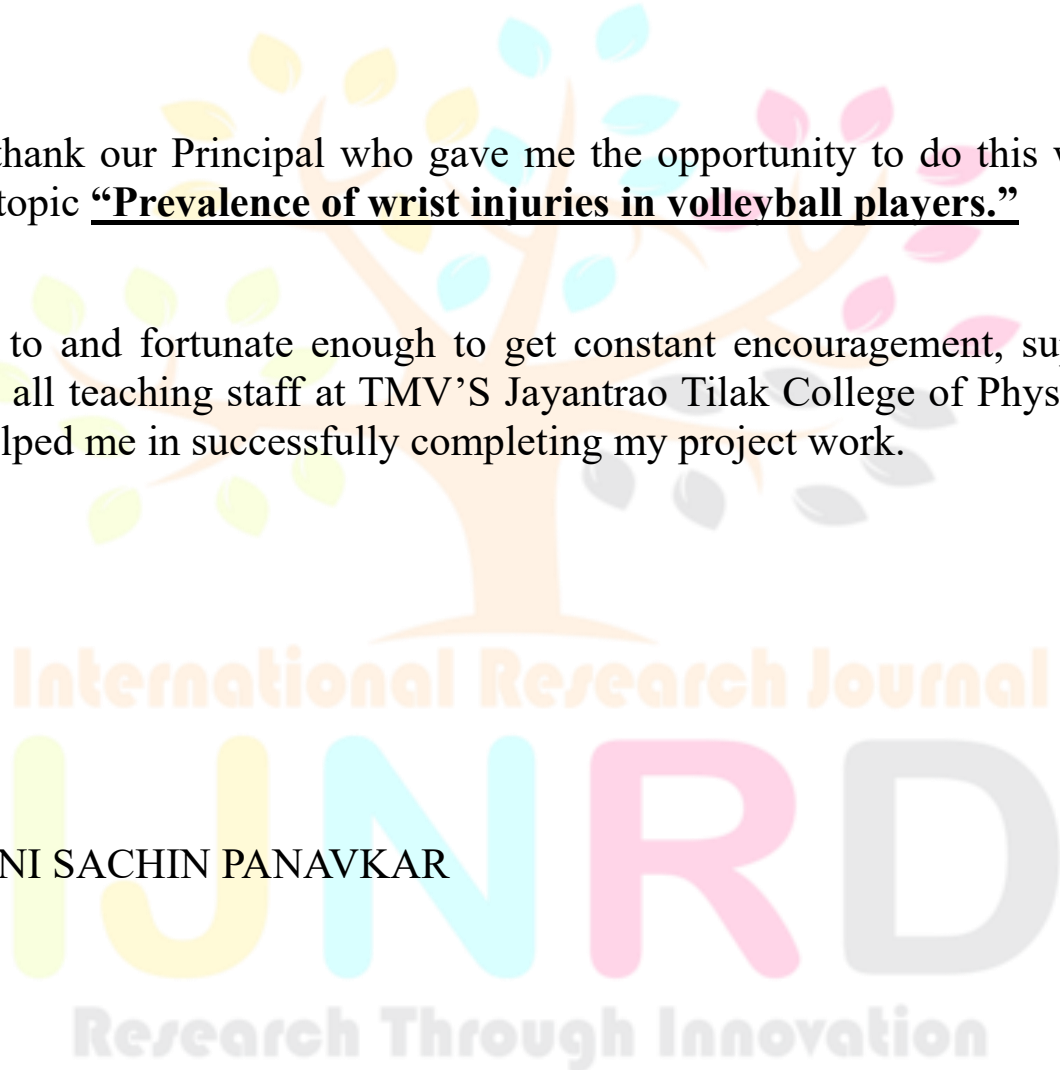
The success and result of this project required a lot of guidance and I am extremely privileged to have got this all along the completion of my project.

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MS. SHRAVANI SACHIN PANAOKAR



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