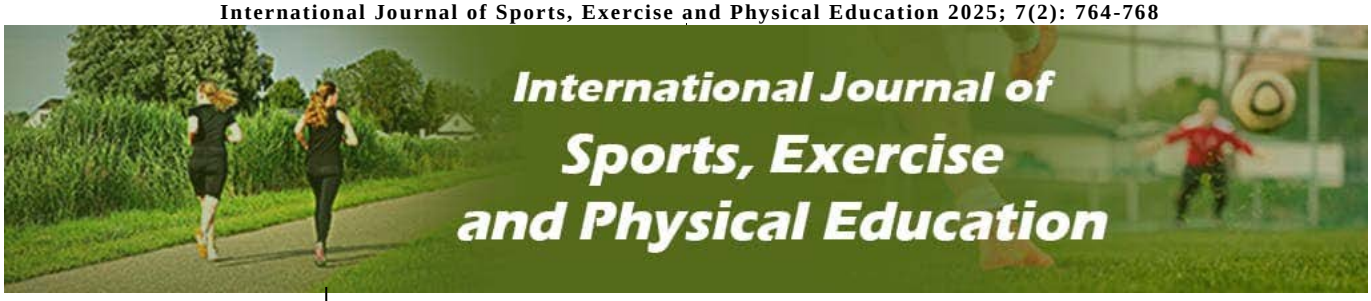

ISSN Print: 2664-7281
ISSN Online: 2664-729X
Impact Factor: RJIF 8.15
IJSEPE 2025; 7(2): 764-768
https://www.sportsjournals.net
Received: 15-10-2025
Accepted: 20-11-2025

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Prevalence of Jumper's Knee in Military Personnel (Soldier) and to find relation between service years (year of experience) With Visa-P Score

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DOI: https://www.doi.org/10.33545/26647281.2025.v7.i2j.301

Abstract
Study Objectives: To assess the prevalence of jumper's knee in military personnel (soldier) with associated risk factors & To assess the relation between number service year in army with VISA-P score.
Design: Observational Study.
Setting: Soldiers of 966 TPT regiments were taken in study.
Methods: A total of 100 subjects were recruited for the study on the basis of inclusion and exclusion criteria after signing the informed consent form. Assessment was done to find out the subjects with jumper's knee. To assess severity, those athletes with current symptoms suggestive of jumper's knee also filled out the Dutch version of the VISA-P questionnaire. After this relation between numbers of service year with VISA-P score was done.
Outcome Measure: Pain thresh hold was measured using VAS (Visual Analog Scale), Victorian institute of Sports Assessment (VISA-P)
Result: This study showed that the overall prevalence of jumper's knee, which is a kind of overuse injury, is about 15.15% among military personnel. Soldiers with jumper's knee reported a mean VISA-P score 44.200 (SD 6.27011) and had mean years of experience of 10.733 years (SD 2.12020). Soldiers with jumper's knee are of mean age 30.467 (SD 2.41622), mean height of 173.8 (SD 2.80815) and weight of 72.533 (SD 4.51769).
Conclusion: Prevalence of jumper's knee is present among soldier's 966 TPT regiment and it's about 15%. About 60% soldiers have pain in their knee joint. And there exist a linear relationship between numbers of service year and VISA-P score.

Keywords: Jumper's Knee, Patellar Tendinopathy, BCT (Basic Combat Training), Advanced Individual Training (AIT)

Introduction

Patellar Tendinopathy, commonly known as "Jumper's Knee", occurs due to overuse of the Patellar Tendon. This injury frequently affects athletes involved in jumping sports, which is included in a group of activities that are classified as high impact sports. High impact sports are physical activities that place above normal force on joints, bones, tendons, and ligaments. These high impact sports include basketball, volleyball, soccer, football, track and field (distance running, high- and long-jump), mountain climbing, figure skating, tennis and skiing. Others who may suffer from Patellar Tendinopathy include military recruits. The patellar tendon is one of the most common sites of tendinitis occurring in BCT (Basic Combat Training). Activities such as marching or running downhill, jumping off obstacles, performing jumping jacks, or playing sports can lead to patellar tendinopathy in the military. Military women tend to suffer a higher incidence of injuries than military men. Several studies have identified female gender as a risk factor for injury in Army basic training programs in the United States and around the world. For example, one study shows the cumulative injury incidence in Basic Combat Training (BCT) was 52% for women versus 26% for men. It was 30% for women versus 24% for men in Advanced Individual Training (AIT). Other studies showed a similar incidence for training injuries in BCT populations: approximately 50% for women and 25% for men. In addition, the proportion of trainees discharged from BCT for medical reasons was 12.7% for women, compared with only 5.2%

for men. Lower extremity injuries are the most common in BCT and AIT, and account for 79% to 88% of new injuries for women. Lower extremity biomechanical differences between men and women may account for gender differences in training injury rates. There are also significant differences in physical performance after ages 10 to 12. Women reach skeletal and physiological maturity before males. They have more body fat and less lean body mass than males, which are attributed to increased estrogens in women and increased androgens in males.

In the Army, sports and physical training are associated with the largest proportion of injuries in men and women. Acute and chronic musculoskeletal problems associated with injuries are consistently the leading causes of outpatient visits and hospitalizations in the Army, and the Army's rate of such types of hospitalizations is more than twice that of the Air Force and almost three times that of the Navy. The third leading cause of musculoskeletal injury requiring hospitalization in the Army is physical training, athletics, and sports combined. On BCT installations, the incidence of injury is 1.4 to 2.2 times higher than the overall Army installation average. Running, in particular, seems to be the primary physical activity associated with overuse injuries in BCT and AIT and in Army occupations. Other possible causes include marching, walking, drill and ceremony, and jumping. Possible causes of injury in the military include the following:

- Initial entry training (BCT and AIT);
- Field training exercises;
- MOTOR skills training;
- Physical training

a) running,
b) calisthenics,
c) marching,
d) jumping;

- Military training (airborne, air assault, etc);
- Specific military occupational specialties; and
- SPORTS, weight lifting, and recreation.

In the general population, volleyball and soccer are the most common sports involved in patellar tendinopathy, and the greatest incidence occurs between the late teen years into the 30s. Patellar tendinitis and tendinosis are commonly referred to as "jumper's knee" because repetitive jumping can lead to tendinopathy. However, other causes of patellar tendinopathy include those that produce eccentric quadriceps muscle contractions, such as marching downhill, descending stairs, or lowering a weight. This group is also involved in training activities that stress the knee which makes them more likely to develop Patellar Tendinopathy. "Jumper's Knee" is most commonly found in the sport of basketball. The overall occurrence of Patellar Tendinopathy among sporting athletes has been estimated at 15% with a higher prevalence of about 50% in elite jumping athletes, such as volleyball and basketball players. The key warning sign of "Jumper's Knee" is a shooting pain just below the Patella, commonly known as the kneecap, when walking, working out, or performing daily activities. In a survey that was independent of any treatment strategies, one-third of the athletes with Patellar Tendinopathy were unable to practice or participate in their sport for six months (Peers, 2005). Tendon overload occurs when "forces of 3 to 8% strain are applied to the tendon, which causes microtrauma. The unexpected athletes affected by Patellar Tendinopathy include military recruits during high impact training. The most common warning signs of knee inflammation are pain, aching, and swelling generated in the location of the Patellar Tendon. These symptoms may be found on the lower side of the patella on the front (anterior) of the knee during walking, jumping, and exercising. Inflammation that occurs during Patellar Tendinopathy may be found in several areas - the top of the Patellar Tendon, the bottom of the kneecap, the bottom of the Patellar Tendon, and the top of the Tibia. The inflammation is caused by overuse of the joint without a sufficient amount of rest (Donohue, 2008).

Methods

Sample

100 subjects randomly selected from 966 TPT Regiment New Cantt Allahabad.

Study Design

Observational study

Inclusion criteria

- The subjects must be serving soldiers of 966 TPT Regiment Allahabad.
- Age group of 18 to 35yrs are only included.

Exclusion Criteria

1. Presence of soft tissue injury
2. Recent direct trauma at the site or an active infection close to the joint
3. Degenerative or rheumatic condition
4. Those who are in medical branch of military are excluded in the study
5. Radiating pain

Instrumentation and Outcome Measures

- Victorian Institute of Sport Assessment SCORE (VISA-P)
- Weighing machine
- Measuring tape
- VAS

Procedure

This study was designed to establish the prevalence of Jumper's knee in military personnel in New Cantt, Allahabad 2013.

As per inclusion and exclusion criteria participants were selected for the study. After that consent form was signed by them and then assessment was done. The diagnosis of jumper's knee was deducted from several answers in Assessment form combining:

1) A typical history of gradually developed activity-related anterior knee pain; and

2) A circumscript most painful spot just - pointed out in a diagram of the knee - at the upper or lower pole of the patella, in the patellar tendon or at its tibial insertion; and/ or

3) Previous diagnosis of this condition by a physician or physical therapist.

On the bases of assessment, soldier with jumper's knee were selected and then VISA-P questionnaire was given to them. To assess severity, those athletes with current symptoms suggestive of jumper's knee also filled out the Dutch version of the VISA-P questionnaire. This questionnaire consists of eight questions, six of them rating pain during activities of daily living and simple tests of function on a visual analogue scale ranging from 0 to 10 points, with 10 representing optimal health. Two questions concern the ability to participate in sporting activities. The maximum VISA score for an asymptomatic athlete is 100 points. After

that patient with jumper's knee were categorized according to Hayman, 2008 based on their activity level.
After this relation between numbers of service year with VISA-P score was done

Data Analysis
The data was analyzed by using SPSS version 16.0 software. The statistical significance was set as 0.05 at 95% confidence interval and P value was <0.05 was considered significant.

Results
100 subjects of mean age 30.467, height 173.8 and weight 72.533 were studied with SD of 2.41, 2.80 and 4.51of age, height and weight respectively.''

Table 1: Shows mean value of Age, Height and Weight and their respective SD value

	Mean	SD
Age	30.467	2.41622
Height	173.8	2.80815
Weight	72.533	4.51769

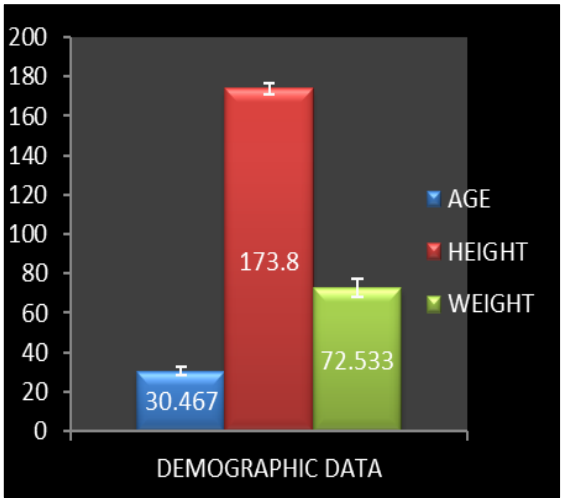

Fig 1: Shows demographic data of age, height & weight and their co relation.

Of total 100 solider, 40 solider were pain free and remaining 60 shows pain in their knee joint.

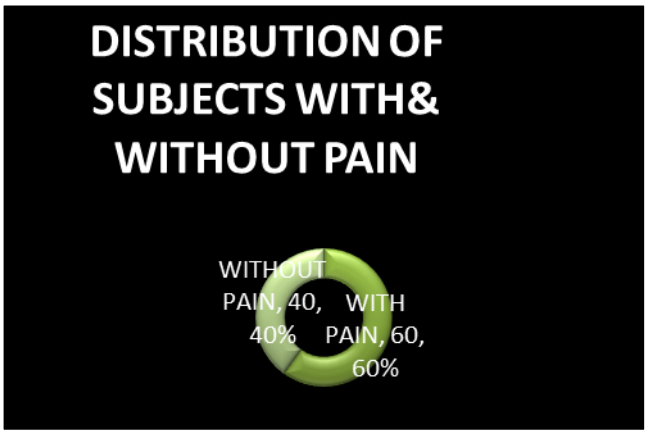

Fig 2: Distribution of subjects with & without pain

Out of 60 cases, 38 cases are of overuse injury, 12 cases are of direct trauma which occurred mainly during physical drill or participating in sports and 10 cases are of degenerative changes.

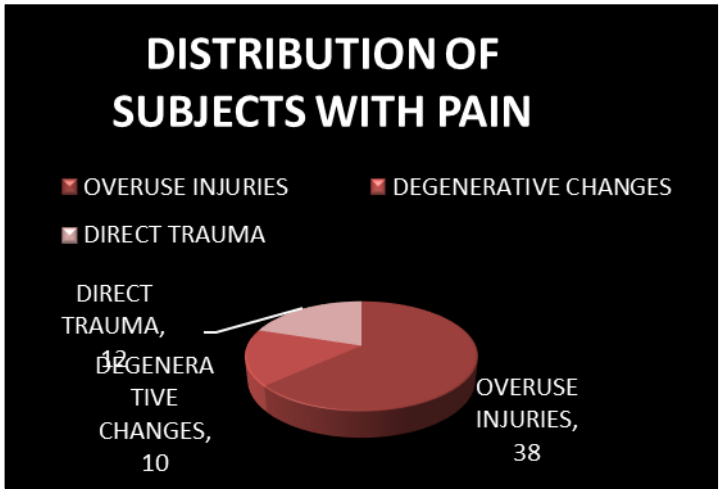

Fig 3: Distribution of subjects with pain in overuse injuries, degenerative changes and trauma

Out of 100 solider, only 15 currently had a jumper's knee, which is an overall prevalence of 15%.

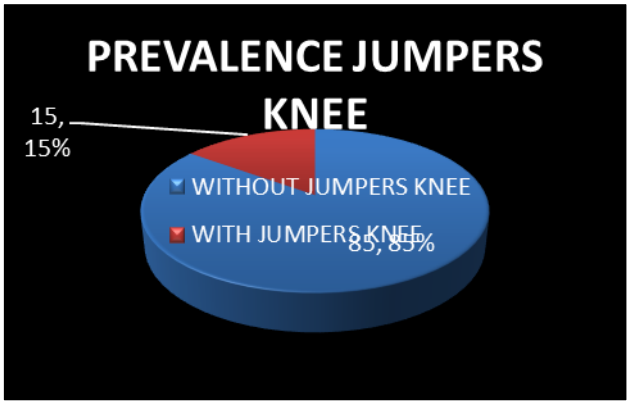

Fig 4: Prevalence of jumper's knee.

Then after knowing the prevalence we studied the relationship between years of service means years of experience with VISA-P score. VISA-P score is an index of severity of jumper's knee.

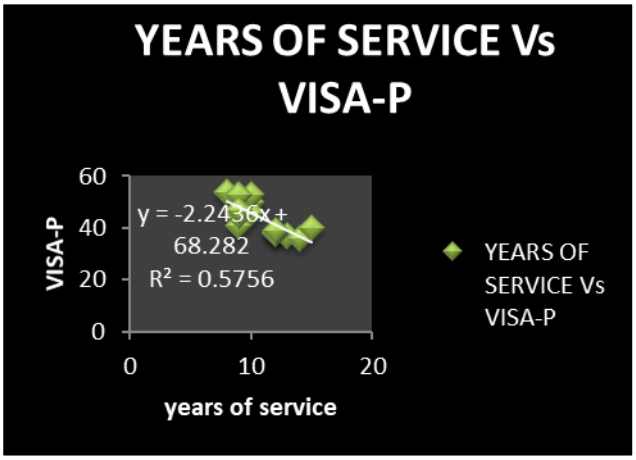

Fig 5: Shows a linear relation between years of service and VISA-P score

Table 2: Correlation between years of experience and VISA-P

	Mean	SD	r	p
Years of Experience	10.733	2.12020	-.759	.001
VISA-P	44.200	6.27011		

Discussion

This survey study was conducted among soldiers of Indian Regiment who are mostly involved in physical drill which make them more prone towards injury. This study showed that the overall prevalence of jumper's knee, which is a kind of overuse injury, is about 15.15% among military personnel. This study showed that out of 100 military personnel 60 are having pain in their right of left knee joint, out of these 60, 38 cases are of overuse injury and within these 38 cases, 15 cases are of jumper's knee. Rest of 10 and 12 cases are of degenerative changes and direct trauma cases.

Soldiers with jumper's knee reported a mean VISA-P score 44.200 (SD 6.27011) and had mean years of experience of 10.733 years (SD 2.12020). Soldiers with jumper's knee are of mean age 30.467 (SD 2.41622), mean height of 173.8 (SD 2.80815) and weight of 72.533 (SD 4.51769).

This is the 1st study conducted in India to describe the prevalence of jumper's knee in soldiers of army personnel of 966 TPT Regiment. The study's reported prevalence of 15.5% indicates that jumper's knee, is also a common problem in this population and not only prevalence among sport's athletes. Lian *et al*. showed a prevalence of current jumper knee in male athlete of around 45% in volleyball, 32% in basketball, 23% in athletes, 15% is handball and 12% in soccer where as in our survey a prevalence of 15% was found among soldier of India who are mostly involved in physical drill which include running on different surface jumping, marching and other type of physical stress like front roll, walking on knees, B.C.T.

We also founded that there exist a linear relationship between numbers of service year with VISA- P score. Ferretti already described a linear relationship between training volume and prevalence of jumper's knee in volleyball players. So there seems to be association between numbers of service year with prevalence of jumper's knee in them.

So after analyzing the data it's reasonable to say that with increasing year of service the prevalence of jumper's knee (overuse injury) is also increasing. And from this survey we also founded that 38 soldiers are having overuse injuries in their knee joint which means that they are participating in their physical drill without taking proper rest and treatment, in future their condition is going to become worst and may leads to degenerative changes. As our study also shows about 10 soldiers of older age group, shows degenerative changes in their knee joint.

We also tried to categorized subjects according to their symptoms in different stages of jumper's knee (Hayman (2008) concept). Compared with men, women have increased pelvic width, forefoot pronation, heel valgus angulation, pes planus, external tibial torsion, and femoral anteversion. Furthermore, women often have a quadriceps angle greater than 15 degrees and a hypoplastic vastus medialis obliquus. Risk factors that contribute to the injury of the Patellar Tendon are inflexibility of the Quadriceps and Hamstring muscles. Other risk factors include inappropriate quantity and intensity of training, hardness of the playing surface, and limited evidence of inherited biomechanical risk factors (Vulpiani, 2007) [27]. Landing and jumping surfaces should be padded to assist in the process of reducing micro tears in tendons, ligaments, and muscle tissue.

Conclusion

Prevalence of jumper's knee is present among soldier's 966 TPT regiment and it's about 15%. About 60% soldier's have pain in their knee joint. And there exist a linear relationship between numbers of service year and VISA-P score.

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