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Factors affecting the Knee Pain among the Athlete at Bangladesh Krira Shikkha Protisthan (BKSP)

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We the undersigned certify that we have carefully read & recommend to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled

Factors affecting the Knee Pain among the Athlete at BKSP

Submitted by **Md. Rabbi Dewan,** for the partial fulfillment of the requirement for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT).

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Declaration

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of information of the study, I would be bound to take written consent from the Department of Physiotherapy, Bangladesh Health Professions Institute.

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List of acronyms

ACL   Anterior Cruciate Ligament

BHPI   Bangladesh Health Professions Institute.

BMRC   Bangladesh Medical and Research Council.

BKSP   Bangladesh Krira Shikkha Protisthan

IRB   Institutional Review Board.

SPSS   Statistical Package for the Social Science.

WHO   World Health Organization.

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Abstract

Purpose: To identify the Factors affecting the knee pain among the Athlete at BKSP. **Objectives:** To expose the injured participant's age, training duration and sporting event, identify other associated knee injuries, extract the types of injury, identify recurrence of injuries among the athlete, and know about the management of injury (medication, physiotherapy or both). **Methods:** A quantitative cross-sectional study design was chosen to achieve the objectives of the study. 40 subjects were selected through convenience sampling technique from the athlete, who trained in BKSP by using a structural questionnaire to collect data. **Results:** The factors of knee pain 78% (n=29) among the 40 participants. Among the injured participants most affected age was 17, 20.0% (n=8). Male athlete are more affected at the percentage of 77.5% (n=31). 42.5% (n=17) participants are suffered from ACL injury who are trainees of athletics and 41% (n=16) participants are injured whom training event is 2 years. Along with ACL injury 10.0% (n=4) participants are suffered from meniscus injury. 90.0% (n=36) injured participants are affected by direct hit and recurrence rate is 10.0% (n=4). Among 40 affected participants 41% (n=16) participants do their warm up cool down activities for 15 to 20 minutes and most of them about 60.0% (n=24) taken both medicines and physiotherapy treatment. **Conclusion:** The vulnerable age range 15-20 was frequent injury occurring among Athlete and noticeably flexibility and overuse are the key issues to cause of injury. Health education and perform regular physical activity along with physio therapeutic exercises can prevent injury

Key words: *Risk Factors, ACL Injury, Trainees, BKSP.*

1.1 Background

Knee pain is a typical worry for which athlete competitors are found in an essential consideration or general work on setting. Intense full scale injury to the knee, particularly in touch or crash sports is moderately less continuous and its administration regularly requires discussion with muscular specialist. Then again, abuse wounds influencing the knee represent by far most of knee pain. The hidden pathophysiology of an abuse outer muscle injury is tedious and extreme pressure to outer muscle structures. Different variables have been displayed to add to abuse injury. The variables demonstrated to be somewhat more reliably connected with abuse wounds are an abrupt expansion in the power, term, and volume of active work; helpless game explicit molding; deficient game explicit preparing; helpless preparing procedures, and unseemly hardware for the game (patel et al., 2017).

Anterior knee pain is exceptionally normal influencing 1 out of 4 competitors, 70% of whom are somewhere in the range of 16 and 25 years of age. Taking into account that the patellofemoral joint is one of the most profoundly stacked joint in the human body, the pervasiveness of anterior knee torment isn't to be expected. Athletes with anterior knee pain present a huge indicative and restorative test for the game medication guardian. An unmistakable comprehension of the etiology of patellofemoral pain in this populace is fundamental in directing an engaged history and actual assessment and accomplishing suitable analysis and treatment (Hiemstra et al., 2014).

Anterior knee pain is one of the most common knee complaints in physically active individuals. The reason for anterior knee pain is still unclear and suggested to be multifactorial, including anatomical patella abnormalities or being an extensor mechanism disorder, resulting in patellar malaligament during knee flexion and knee extension (Werner, 2014). Subluxation of the biceps femoris ligament is uncommon furthermore has been sparsely portrayed in the writing. The etiology and treatment are dubious in the trivial few articles found. Anatomic changes of the proxi-mal fibular

unmistakable quality or continuous microlesions because of injuries are accepted to occur, but even in these cases, intraoperative discoveries have unmistakably shown an odd inclusion of the ligament of the biceps femoris. (Duarte Junior et al., 2012).

Acute knee injury is normal in sports that include quick speed increase, deceleration, and shift in course or pivoting, like American football, soccer, ball, and skiing. ACL injury represents most of these, more than half in 1 cross-sectional review in a particular games ER. The noncontact system represents 70%-80% of these wounds (Salati et al., 2016). Anterior Cruciate Ligament (ACL) is an intraarticular and extra synovial tendon offered help to settle the knee joint. This tendon is situated into the tibiofemoral joint (Grindem, 2014).

ACL wounds are frequently a consequence of low-speed, noncontact, deceleration wounds and contact wounds with a rotational part and Contact sports likewise may deliver injury to the ACL auxiliary to bending, valgus stress, or hyperextension all straightforwardly identified with contact or impact. The picture underneath portrays a burst ACL (Cimino et al., 2010). Female soccer players are at up to multiple times higher danger for supporting ACL injury and the event of ACL injury in a soccer group communicated as a level of all wounds in that group is as 1.3% in male and 3.75% in female (Edward, 2007).

In USA ACL injury establish 6% of all match injury and 2% of all preparation wounds in female and under 1% of all wounds among guys (Ardern et al., 2011). As indicated by a poll study in Norway dependent on medical procedure records, ACL harmed female players were essentially more youthful (19 versus 27) than their male partners and in one more review dependent on revealed protection claims in Sweden, female players were four years more youthful (19 versus 23 years) supporting their physical issue then male players (Walden et al., 2011).

Intermittent or constant movement related knee pain is normal in youthful athletes. Various characteristic conditions influencing the knee can cause such pain. Likewise, knee pain can be alluded pain from low back, hip or pelvic pathology. The most widely recognized reason for knee pain in youthful Athletes is patellofemoral pain disorder, or

all the more properly named idiopathic anterior knee pain. Albeit, various physical and biomechanical factors have been hypothesized to contribute the knee pain in youthful athletes, the most well-known hidden explanation is abuse injury. In this paper, we have checked on chosen conditions that case knee pain in Athletes, including anterior knee pain disorder, Osgood-Schlatter infection, Sinding-Larsen-Johanssen condition, adolescent osteochondritis dissecans (JOCD), bipartite patella, plica condition, and tendonitis around the knee (Patel et al., 2017).

More established patients typically present with indications of patellofemoral osteoarthritis (PFOA). A vital component in PFPS advancement is dynamic valgus of the lower extremity point, which prompts sidelong patellar maltracking. Reasons for dynamic valgus incorporate powerless hip muscles and rearfoot eversion with pes pronatus valgus. These elements can likewise be seen in patients with PFOA. The accessible proof proposes that patients with PFP are best made do with a customized, multimodal, nonoperative treatment program that incorporates momentary relief from discomfort with nonsteroidal mitigating drugs (NSAIDs), inactive rectification of patellar maltracking with medially coordinated tape or supports, adjustment of the powerful valgus with practice programs that focus on the muscles of the lower limit, hip, and trunk, and the utilization of foot orthoses in patients with extra foot irregularities (clausen et al., 2016).

The common of knee pain inside the previous a year, consistent or repetitive knee pain, nonattendance from game and nonappearance from work because of knee pain , was 54%, 34%, 19% and 4%, individually. Knee pain was emphatically connected with long stretches of running and with week after week long periods of cooperation in serious acrobatic yet contrarily with week by week long periods of tennis. Steady or intermittent knee pain was decidedly connected with long periods of swimming. Nonattendance from sport because of knee torment was emphatically connected with week by week long stretches of soccer cooperation (Hahn et al., 1998).

Fifty two knees were inspected utilizing continuous top quality ultrasonography with a 7.5 MHz test. The extra-articular designs were effectively imagined and conclusion of patellar ligament injuries. While the meniscal ligaments were displayed as a homogeneous three-sided structure between the femoral condyle and the tibial level, no

sores were recognized. More profound intra-articular designs, like the cruciate tendons, were not shown by the sweep, accordingly their assessment was impractical. Given its minimal expense, wide accessibility, non-obtrusiveness and patients agreeableness of the strategy, ultrasonography might assume a significant part in the conclusion of delicate tissue sores in and around the knee joint (Maffulli et al., 1992)

Mechanisms of hamstring injuries have been mainly studied in sprint actions, but Askling et alreported a series of elegant and interesting articles where different types of hamstring strains related to specific patterns of injury where studied. They reported that hamstring injuries related to sprint actions affected mainly the proximal part of the biceps femoris, whereas overstretching injuries mainly involved the free proximal portion of the semimembranosus muscle (Mendiguchia et al., 2011).

Hamstring strains are common in athletes participating in high speed running or activities requiring extremes of range of motion (ROM) such as football, basketball, cricket etc posterior thigh strains were the most common diagnosis (16%) in a sports injuries surveillance study of the 2007 IAAF (International Association of Athletics Federations) World Athletics Championships. Possibly, anatomical reasons (spanning of the hip and knee joints) make them prone to injury and it is not uncommon as prolonged absence from training and re injury. For prescribing appropriate rehabilitation and predicting recovery time the characterization of the severity of muscle strain is important (Ekstrand et al., 2011).

Total popular has expanded in an awesome number, prominence of prominent recreations additionally expanded; therefore an ever increasing number of individuals are getting to be noticeably inspired by games of games. The quantity of games establishment are developing, they are masterminding continuous game occasion. Before taking part in a game occasion member requires overwhelming preparing; amid this instructional meeting, and keeping in mind that they take part, this game competitors begins understanding the need of physiotherapy to beat the harm and keep body fit for the actions (Domingues et al., 2013).

Injuries are the real dangers to every one of the competitors of the world. As we notice in day by day daily paper sports damage causes extraordinary enduring both the male and female competitors everywhere throughout the world. Numerous awesome competitors were not able take an interest in the immense occasion on account of being harmed, we find on the planet competitor history. This issue is more intense among Bangladeshi competitors (Fuller et al., 2006).

1.2 Rationale

Now a day's sports become one of the most popular ways of recreation to the young generation. It's now become profession. Both males and females are now participating in various sports. High pivoting sports such as football, basketball, and gymnastics are now very much popular in Bangladesh. So knee pain is now a days common in athletes. Although some studies have done on knee pain in other countries, the exact nature and prevalence of this injury has not been studied before in Bangladesh. This study was formulated to fill the gap of knowledge in this area. The aim of the study was to assess the knee pain among the athletes at BKSP. From this study awareness was increased and may provide proper recommendation for every single risk which was helpful for them. Beside this it was help to established proper guideline and proper technique. This study will also help to discover the lacking area of trainees especially about their posture before doing any activities and during playing. Beside this it will be helpful to professional development which is mandatory for current situation. So physiotherapist can help them to teach and give proper education about the posture the condition and preventive methods. And it was helped to discover the role and importance of physiotherapy in every sector of Bangladesh.

1.3 Research Question

What is the factor affecting knee pain among the athletes at BKSP?

1.4 Aim

To find out the knee pain associated factors among the athletes at BKSP

1.5 Objective of the study

1.5. a General objective

To explore the factors affecting knee pain among the athletes at BKSP.

1.5.b Specific objective

1. To determine the injured participant's age, training duration and sporting event.
2. To identify other associated knee injuries.
3. To fine out the types of injury which affects knee pain.
4. To explore recurrence of injuries among the trainees.
5. To know about the management of injury (medication, physiotherapy or both).

1.6 Conceptual Frame Work

Independent variable   **Dependent variable**

Socio-demography:
Age

Education

Participating event

Training

Posture ACL Injury   ACL Injury

Injury related question:

Warm up-cool down

Severity

Recurrence

Table: List of variable

1.7 Operational Definition

Prevalence: Period prevalence is the proportion of a population that has the condition at some time during a given period.

Knee pain: knee pain is pain in or around the knee. The knee joint consist of an articulation between four bones (the femur, tibia, fibula and patella)

Injury: Common types of physical injury are broken bones, soft tissue lesion (laceration, abrasion, contusion) poisoning and burns. Injury results from harmful contact between people and objects, substances, or other things in their surroundings .Sports injuries result from acute trauma or repetitive stress associated with athletic activities. Sports injuries can affect bones or soft tissue (ligaments, muscles, tendons).

Sports injury: Sports injuries are injuries that occur in athletic activities. In many cases, these types of injuries are often due to overuse or acute trauma of a part of the body when participating in a certain activity.

ACL Injury: ACL injury is the overstretching or tearing of the anterior cruciate ligament in the knee. ACL injuries are most often a result of low-velocity, noncontact, deceleration injuries and contact injuries with a rotational component. Contact sports also may produce injury to the ACL secondary to twisting, valgus stress, or hyperextension all directly related to contact or collision. The image below depicts a ruptured ACL.

BKSP: BKSP is run by a Board of Governors, which is headed by the Minister of Youth and Sports. At this moment Brig Gen A. K. M. Majharul Haq, is the Director General of BKSP. Present management is bringing lot of changes in this institute. BKSP admits students in different areas of sports such as athletics, basketball, cricket, football, gymnastics, hockey, swimming, shooting and tennis. Basic training

programme is of maximum eight years for athletics, basketball, cricket, football, hockey, shooting, tennis. Students under thirteen years of age are admitted to class VII. But in the categories of boxing, gymnastics and swimming students below ten years of age are admitted to class IV.

The knee is one of the most commonly injured joints in sports. Clinically, the knee accounts for nearly 50% of all sporting injuries. Within these, rupture of the ACL is common and devastating, occurring often during noncontact cutting and landing manoeuvres and Previous studies have shown that large loads are exerted on the knee during these sporting manoeuvres, placing the ACL at risk of injury, especially in unanticipated circumstances (Cimino et al., 2010). A major knee injury in many cases cause severe consequences such as an interrupted sports career, the risk for an early developing knee osteoarthrosis with permanent disability for the player must also be considered.

The human anterior cruciate ligament (ACL) primarily serves as a restraint against anterior tibial translation at low flexion angles and there are an estimated 80,000 to 250,000 cases annually where the stability of the knee is compromised and the ACL fails. Additionally, about 70% of these failures are classified as non-contact Activities in which non-contact ACL injuries occur include pivoting or side step cutting, decelerating while the knee is in an extended position, or landing from Most ACL tears occur from noncontact injuries (Hashemi et al.,2009).

According to Spindler & Wright, (2016) less than 10% isolated ACL injury occurs in athletes. The mechanism of ACL rupture can be divided into noncontact and contact. The noncontact mechanism occurs attributable to quadriceps loading with the knee in slight flexion, with valgus and internal rotation of the tibia. In the contact injury, a valgus load is applied to the knee. In this study, 86% of patients with ACL ruptures described a noncontact mechanism, and 14% had a contact mechanism, which is similar to findings of other studies

ACL injured patients also show altered movement patterns after injury, characterized by reduced internal knee extensor moments (Risberg et al.,2009), reduced knee flexion angles (Chmielewski et al.,2005; Risberg et al.,2009) and increased

contraction of the muscles surrounding the knee (Chmielewski et al.,2005). Limited evidence also suggests that the injury may cause a joint differentiation due to a reorganization of the central nervous system where the activity in sensory and motor areas are reduced and the activity in the pre-supplementary motor areas is increased (Kapreli & Athanasopouios,2006; Kapreli et al.,2009). However, while there is a positive relationship between altered movement patterns and functional limitations (Di Stassi et al., 2013) joint compartmental forces have recently shown to be reduced and equally distributed between the medial and lateral compartment early after ACL injury (Gardinier et al.,2013).

The less alteration of movement patterns is proposed as one of multiple factors that may drive the progression of knee osteoarthritis both directly, through prolong changes in joint loading and indirectly, through an increased risk of traumatic cartilage and meniscus injuries as a result of dynamic knee instability (Edward et al., 2007).

Younger athletes usually sustain growth plate injuries (avulsion fractures) rather than ligamentous injuries because of the relative weakness of the cartilage at the epiphyseal plate compared with the ACL (Cimino et al., 2010). The yearly incidence of ACL injuries has been reported to be 3 per 10000 inhabitants in Denmark, with a greater frequency among athletes. One large New Zealand study found an incidence of 36.9 injuries per 100,000 person-years. Many estimates suggest there are 80,000 to 100,000 ACL repairs performed each year in the United States. ACL injuries generally occur beginning in late adolescence. ACL injury has been estimated incidence of 78-81 injuries per 100,000persons- year and athletes aged 15-25 years have been found ACL injury (Grindem, 2014).

Sport-related injuries occurs 11 at ages 5–14 years and tapers gradually with age and visit rates for sports injury are highest for school-age children (5–12years), adolescents (13–18 years) and young adults(18–24 years), compared with other age groups (Adirim and Cheng, 2003). According to Walden et al., (2011) ACL injured female players are sigficantly younger than the male players. The age range is

usually 19-27 for both male and female athletes. Female players have 2-3 fold risk to sustaining ACL injury and in female elite soccer, athletes are found to sustain 2.2 ACL injuries, per 1000 match per hour (Grindem, 2014). The injury rate was not different compared to male soccer, but knee injuries were more common compared to male counterparts according to a recent Norwegian study (Nadler et al., 2010).

Specific to age distribution, the Scandinavian ACL registries of 2004 –2007 reported a total of 17 632 injuries, with a median age of injury of 25 years. The skeletally immature population appears to be sustaining rising numbers of ACL injuries and higher rates of mid substance tears. The general risk of ACL injury in those with open growth plates is still low, but participation in organized sports significantly increases the risk. In a US report by (Adirim & Cheng, 2003) of 5- to 18-year-old soccer players, 30.8% of all injuries involved the knee, and 6.7% of all injuries were ACL tears. (Statistics were garnered from insurance data documenting 6 million athlete-years). In a Finnish population-based cohort study of 14-, 16-, and 18-year-olds (46 472 responding; 78% response rate), 265 cruciate ligament injuries (194 in adolescent boys, 71 in adolescent girls; 92% were ACL tears) reflected an incidence rate of 60.9 per 100 000 person-years. Most interesting were the hazard ratios: 8.5 for adolescent girls and 4.0 for adolescent boys among those participating in organized sports 4 or more times per week.

Another risk factor is quadriceps dominance that's why there is excessive movement in frontal plane and limited movement in sagittal plane (Cimino et al., 2010). The next risk factor is trunk and leg dominance in which female's exhibit greater kinematic leg asymmetry in knee valgus angles, hip abduction and ankle abduction in performance situations (Ageberg et al., 2007).

According to Grindem (2014) More than 50% ACL injuries frequently occurring in sports such as- soccer, alpine skiing, basketball, handball, professional rustling, martial arts, artistic gymnastics etc. A study by Oeisted et al., (2011) showed that 48.5% number of injury occur in track and field events include running, long jump,

high jump and skipping. This study also showed that injury occurs in jogging- 12.8%, in gymnastics- 3.6% , in swimming- 3.2% and in shooting- 2.1%. In Sweden, ACL injuries comprise 43% of all soccer related knee injuries (Kvist, 2004).

Physiotherapy has a wide spectrum role to manage or improve the athletic injury related conditions. Several studies have revealed that physical fitness is associated with dramatic reductions in all causes of mortality, while patients and physicians alike are most familiar with the positive cardiovascular effects of exercise; the benefits extend beyond the heart. Increased physical activity is associated with additional benefits such as, decreased risk of diabetes, breast cancer, and even depression (Hall & Brody, 1999). Starting a regular exercise routine in adolescence can have a huge effect on overall health status later on. It has been shown that high 14 school female athletes who are active in sports have higher graduation rates, fewer unwanted pregnancies, and greater self-esteem than those who are not active. Physical activity positively influences almost every aspect of a young woman's health from her physiology to her social interactions and mental health (Freddie et al., 2001).

Because ACL injuries most often occur in athletically active people, great importance is placed on the resumption of sports participation after injury. A qualitative study (Agrberg et al., 2008) reported that, early after injury, patients can experience the potentiality of not being able to resume preinjury sport as a threat to personal self-value and self-respect. Still, far from all ACL-injured patients resume their preinjury sport participation. In a meta-analysis of 48 studies, it has been estimated that 18% do not return to any kind of sports participation, 37% do not return to their preinjury level of sports participation, and 56% do not returns to competitive sports (Ardern et al., 2011). However there is an extreme variation in study result on this topic, suggesting that factors other than the injury itself highly influence the reported rates. Furthermore, Agerberg et al.,(2007) reported that, 2-7 years after their injury, 80% of ACL-injured female soccer players who had retired did so due to the ACL injury. Thus both returning to sport and sustaining

participation in sports is challenge. While resumption of sports participation is associated with the functional status of the knee (Lentz et al., 2012) whether or not the patient resumes sports depends on several factors. Problems with the injured knee is reported to be the third most frequently cited reason for not returning to sport, with more patients attributing not returning to sports to a fear of reinjury or to reasons other than knee function, such as family commitments, lifestyle change and fear of job loss with reinjury (Ardern et al., 2011). However, the relationship between knee function, fear of reinjury and sports participation is not fully understood, as patients who have poorer knee function higher fear of reinjury (Kvist et al., 2005; Chemielewski et al., 2008; Kvist et al., 2012). While ceasing or changing sports participation may do not directly reflect poor knee function, resuming sports participation may also not reflect an asymptomatic knee. After returning to sports, ACL-injured patients still exhibit increased knee abduction angles and internal abduction moments compared with uninjured athletes (Oiestad et al., 2009).

Hamstring tears traditionally have been classified as mild (grade I), moderate (grade II), and severe (grade III). Grade I injuries signify a small tear of the muscle or tendon, minor swelling, and pain with no or minimal strength loss and restriction of movements. Grade II strains are more complete partial tears, with definite loss of strength and pain with greater damage of muscle. Grade III tears are complete ruptures of the musculotendinous unit with a complete loss of muscle function, and they typically develop a large hematoma.Rates of hamstring muscle injury vary by differing injury definitions and sporting populations. Prevalence rates range from 8% to 25%, with return to sport occurring from 2 week to never, with large variability based on severity. Hamstring injuries alone account for between 6% and 29% of all injuries reported in Australian rules football, rugby union, football, basketball, cricket and track sprinters revealed by epidemiological studies (Mendiguchia, et al., 2012).

Possible additional injury and non-optimal healing of the hamstring muscle-tendinous complex all are included in the term recurrence (Koulouris et al., 2007).

Recurrent hamstring injury rates generally are higher than initial injuries. Most studies found rates of reinjures for the ensuing sporting season higher than 30% and some up to 60%-70% (Prior et al., 2009).

Hamstring injuries are also very common in English rugby. Brooks et al. (2006) reported an incidence of 0.27 hamstring muscle strain injuries per 1000 player training hours and 5.6 injuries per 1000 player. A prospective cohort study showed return-to-play (RTP) data for different types of muscle injuries in male elite-level football players in Europe scrutinizing 89 European professional teams were observed over 2001-2013 time period and among them hamstring injuries evidently 83% occurred to the biceps femoris, 12% affected the semimembranosus and 5% the semitendinosus. Recurrence rate was higher among biceps femoris injuries (18%) Hamstring strain injury has a very high recurrence rate. In English professional soccer, hamstring strain injury reoccurred in between 12% and 48% of the players (Ekstrand et al., 2011).

The precise definitions of different grades may vary among specific classification systems. The averaged time losses for different grades of hamstring muscle strain injuries in European professional soccer are 17-10 days for Grade I, 22-11 days for Grade II, and 73-60 days for Grade III (Ekstrand et al., 2012).

Hamstring strains are very common in soccer, representing up to 37% of all time loss injuries at mens professional level. In a recent study in European professional soccer it was shown that a club with a 25 player squad can expect 15 muscle injuries each season and that muscle injuries accounted for more than one-fourth of all lay-off time from injuries. Injuries to four major muscle groups of the lower extremity - hamstrings, quadriceps, and calf - comprise more than 90% of all muscle injuries in professional soccer (Hagglund et al., 2013).

Understanding risk factors for hamstring strain injury is critical for developing prevention and rehabilitation strategies. Many risk factors for hamstring muscle strain injury have been identified in the literature, however, only a few of these are evidence-based while the majority are theory-based. These risk factors can be categorized as modifiable factors and no modifiable factors (Clark, 2008).

A recent study on male professional footballers showed that hamstring strain represent more than 30% of all injuries and cause about one quarter of total injury absence. Over 90% of muscle injuries affected the four major muscle groups of the lower extremity; hamstrings, adductors, quadriceps and gastrocnemius. Injury to the hamstring muscle group is reported to be the most common injury subtype representing 12% of all injuries. This means that a professional male football team with 25 players in the squad suffer about 5 hamstring injuries each season, equivalent to more than 80 lost football days. When an injury has occurred, the medical staff faces pressure to return the player to training and matches as soon as possible. The diagnosis and prognosis of muscular injuries is normally mainly based on clinical findings, but radiological methods such as magnetic resonance imaging (MRI) or ultrasound (US) are commonly used as complementary examinations in order to confirm a diagnosis and provide a prognosis of lay-off times. Recent studies of Australian Rules football players with hamstring injuries have indicated that lay-off could be related to MRI findings such as the longitudinal length or volume of the injury (Ekstrand et al., 2007).

Many young athletes initiate training and specialisation from a young age. The idea that participation in such training and competition may cause growth inhibition effects is still under debate. However, there is no evidence that intensive training in young athletes may affect, either positively or negatively, growth and maturation. Up to 30– 40% of all injuries in children and adolescents occur during football, but the rate of injury is lower in children than in mature adolescents. Nonetheless, given the aggressive over- scheduling of competitive events, some young athletes may be exposed to intense training for over 18 h per week . This training load may have

negative psychological effects, resulting in body image distortions and subsequent low caloric intake or abuse of drugs to alter body shape. Overuse sports injuries are increased by training schedules of this magnitude. Consequently, the beneficial effects of sport at a young age have to be balanced by injury risk (Maffulli et al., 2011).

Understanding risk factors for hamstring strain injury is critical for developing prevention and rehabilitation strategies. Many risk factors for hamstring muscle strain injury have been identified in the literature, however, only a few of these are evidence-based while the majority are theory-based. These risk factors can be categorized as modifiable factors and no modifiable factors (Clark, 2008).

Askling et al., (2014) conducted a prospective randomized comparison of two rehabilitation protocols compare the effectiveness of two rehabilitation protocols after acute hamstring injury in Swedish elite sprinters and jumpers by evaluating time needed to return to full participation in the training process. Fifty-six Swedish elite sprinters and jumpers with acute hamstring injury, verified by MRI, were randomly assigned to one of two rehabilitation protocols. Twenty-eight athletes were assigned to a protocol emphasizing lengthening exercises, L-protocol, and 28 athletes to a protocol consisting of conventional exercises, C-protocol. The outcome measure was the number of days to return to full training. Re-injuries were registered during a period of 12 months after return. Time to return was significantly shorter for the athletes in the L-protocol, mean 49 days (1SD±26, range 18–107 days), compared with the C-protocol, mean 86 days (1SD±34, range 26–140 days). Irrespective of protocol, hamstring injuries where the proximal free tendon was involved took a significantly longer time to return than injuries that did not involve the free tendon, L-protocol: mean 73 vs. 31 days and C-protocol: mean 116 vs. 63 days, respectively. Two recurrent injuries were registered, both in the C-protocol. A rehabilitation protocol emphasizing lengthening type of exercises is more effective than a protocol containing conventional exercises in promoting time to return in Swedish elite sprinters and jumpers.

Modifiable risk factors include shortened optimum muscle length, lack of muscle flexibility, strength imbalance, insufficient warm-up, fatigue, low back injury, and increased muscle neural tension. Non-modifiable risk factors include muscle compositions, age, race, and previous injuries, as described in the literature, are not associated with TTRTP. For clinical practice, prognosis of the TTRTP in these injuries should better be based on clinical parameters (Moen et al., 2014).

CHAPTER-III	METHODOLOGY

3.1. Study design

This study was done through using cross sectional retrospective survey under a quantitative study design. This methodology was chosen to fulfill the aim of the study as an effective way to collect data. For conducting the research work, in the form of a retrospective type of survey design quantities research model is used. Survey is a way to research where information is collected from a large number of people using interview or questionnaire, by which a complete picture of the group can be found in the fact of any characteristics which fulfils the demand and purpose of the research.

This research analyzes different facts, events, similar points to find result and drawing a calculative decision. For this, retrospective approach is taken to conduct this research work.

3.2. Study site

The study was conducted at Bangladesh Krira Shikkha Protisthan, Savar, Dhaka. Researcher chosen this organization as study site because this is the only one institute which aim to find out the promising sports talents among young boys and girls in our country to provide adequate facilities and opportunities for their intensive training. This institute directly controlled by the ministry of youth and sports.

3.3. Study population

The study population was the athlete of Bangladesh Krira Shikkha Protisthan who had injuries in last 1 year.

3.4. Sampling technique

A sample was selected by convenience sampling technique, to meet the athlete easily.

3.5. Sample size

The equation of sample size calculation are given below-

$$n = \left\{ \frac{Z\left(1 - \frac{\alpha}{2}\right)}{d} \right\}^2 \times pq$$

Here,

$Z\left(1 - \frac{\alpha}{2}\right)$ = 1.96

P= 0.10 (Here P=Prevalence and P=10 %)

q= 1-p

=1-0.10

=0.90

d= 0.05

According to this equation the sample should be more than 139 people but due to lack of accessibility and time the study was conducted with 40 athletes by convenience sampling.

3.6. Inclusion criteria

➢ Age group: 15 to 30 years (Walden et al., 2011).

➢ Both male and female athlete at BKSP (Spindler & Wright, 2016).

➢ Sports related knee injuries (Spindler & Wright, 2016).

➢ Injuries in last 1 year (Hashemi et al., 2010).

3.7. Exclusion criteria

➢ Those trainees who were not injured

➢ Trainees who were not willing to participate

3.8. Data collection procedure

Though there was several ways of collecting data, it was easy and reliable if the questionnaire completed or filled up in the presence of the researcher (Bailey, 1997). Subjects were chosen under convenience sampling procedure and the data will be taken from the previous documents and filled up the questionnaire form by the researcher.

In the questionnaire participant's socio-demographic information including age, level of education, training age, health and history including their injury were asked. Data collection was one of the most crucial parts of research. For this study data collection includes- method of data collection, materials sued for data collection and duration.

3.9. Method of data collection

The data was collected from the institution BKSP. Data was collected by using a close ended structured questionnaire. Questionnaire was used, because it is still a very popular and very useful technique of data collection within the health care area (Hicks, 2009). The aim of the study was to identify the factors affecting of knee pain among athletes at BKSP. So, it is easier to identify these problems by using questionnaire than any other methods. The strength of structured questionnaire is the ability to collect unambiguous and easy to count answer leading to quantities data for analysis (Bowling, 1998). So, Structural questionnaire is the most suitable way for data collection.

3.10. Materials and tools

The materials and tools for this study were consent form, questionnaire, pencil, pen, pages, file, tape, laptop, modem and SPSS software-20 version to analyze data.

3.11. Duration of data collection

Data was collected within 4 weeks of time. Data was collected carefully as much as possible from the field data. To collect data necessary time was taken, for each sample. This time varied for each participant.

3.12. Data analysis

Data was analyzed with the software named SPSS, version 20.0. And descriptive statistics was used to analyze data because a descriptive statistics refers methods of describing a set of results in terms of their most interesting characteristics (Hicks, 2009). The variables were labeled in a list and a researcher is keeping a computer based data record file. And after calculation; data is presented by using bar graph, pie chart and table by using Microsoft Office Excel 2010.

3.13. Ethical consideration

The ethical guideline of WHO, IRB & BMRC was strictly followed. The research proposal was submitted to the ethical review committee of BHPI for approval & to CRP's ethical committee for getting permission for data collection. After the proposal was approved to carry on with the study the researcher had moved the study. Then collect the approval to carry out with the study from BKSP. Data collection was started and completed within the allocated time frame. Initially a consent form was given to each participant. This form explains the title, objective, confidentiality & anonymity of the research project. The participant was also informed that, they are free to withdraw at any time. The researcher was assured them that it would be never harmful for them & it would never affect in their lives. Otherwise they not give the right information. The researcher was also assured that their information was kept in a secured place. The interview notes and recording words was not be shared or discussed with others. It will being explained to all the participants that their personal identity was to be kept confidential, their name & address was not be written, except for social number or a pseudonym. Before participating in the study the researcher had provided them a written consent form to sign, responsible physiotherapist sign as a witness. The researcher had also signed in the consent form. Only principle investigator had the access of that information. The raw data destroyed after the completion of the research &all the data on computer file were deleted. Finally the study was reviewed & appropriate by the authorities. Considering all those ethical norms &values no ethical problem arises as there are

some personal & sensitive questions. The participants will be informed that they have the right to withdraw consent & discontinue participation at any time.

Socio-demographic finding of this study

4.1 Age of the participates

Out of the 40 participants, the minimum age 16 years, maximum age 25 years, the mean of the age is 19.90 and the stander deviation is 2.56.

Variable	Minimum	Maximum	Mean	Std. Deviation
Age	16	25	19.90	2.56

Table 1: Age of the participants

4.2 Age group of the participants

Among the 40 participants, maximum patient was between 15-20 and 21-25 age group range. In the age group 15-20 were 60 %(n=24), age group 21-25 were 40 %(n=16).

Age group	N	Percentage
15-20 Year	24	60.0
21-25 Year	16	40.0

Table 2: Age group of the participants

4.3 Sex of the participants

Among the 40 participants, females are about 22.5% (n = 9) and the rest of the participants were males, which was about 77.5% (n = 31).
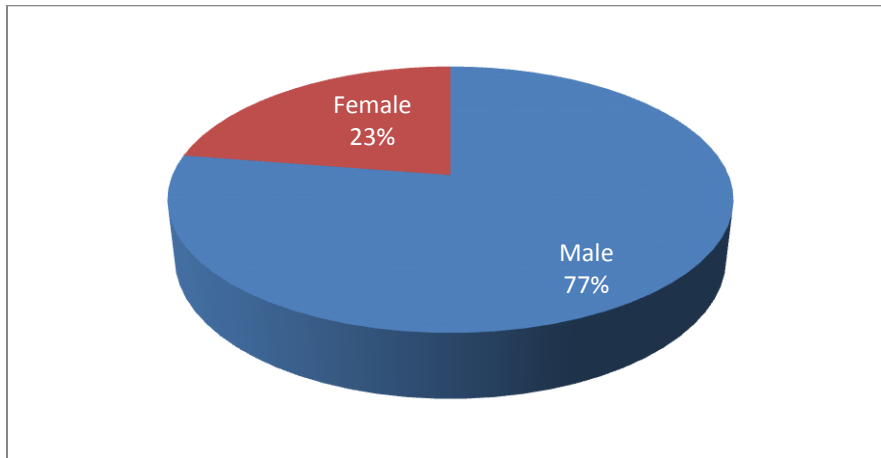

Figure 1: Sex of the participants

4.4 Occupation of the participants

In this case of occupational level of the participants 17.5%(n=7) were playing cricket,32.5%(n=13) were playing football,7.5%(n=3) were basketball,7.5%(n=3) were hockey,2.5%(n=1) were swimming,2.5%(n=1) were tennis, 17.5%(n=7) were shooting, 2.5%(n=1) were volleyball, 10.0%(n=4) were gymnastic.
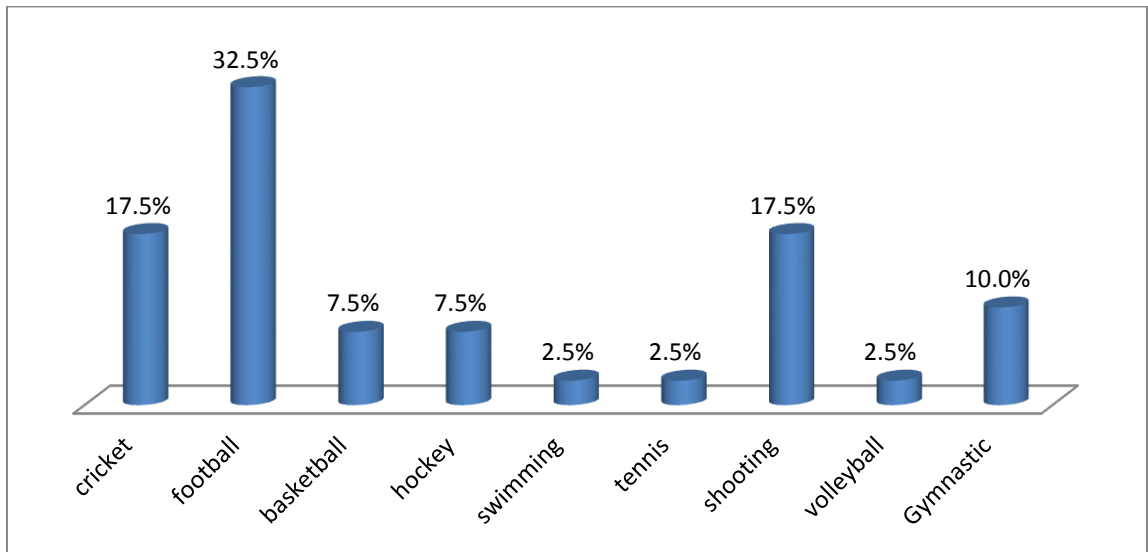

Figure 2: Occupation of the participant

4.5 Weight group of the participants

 Among the 40 patients was participant in this study. In this case of weight the most participants was attended from 51-60 weight group 55 %(n=22). Among 40 of the participants 35 %(n=14) participants were in 61-70 weight group, 10% (n=4) participants were in 41-50 weight group.
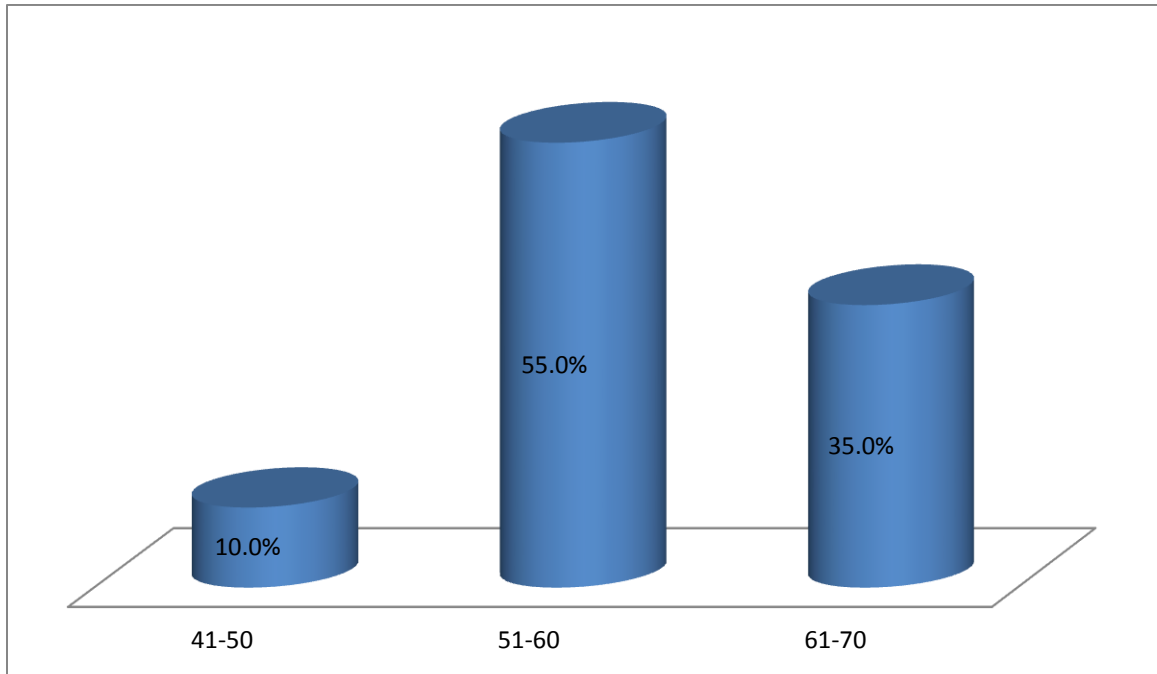

Figure 3: Weight group of the participants (Kg)

4.6 Educational level of the participants

In this case of educational level of the participants 2.5 %(n=1) participants were secondary, 30.0 %(n=12) were SSC, 65 %(n=26) participants had HSC, 2.5 %(n=1) participants got graduate.
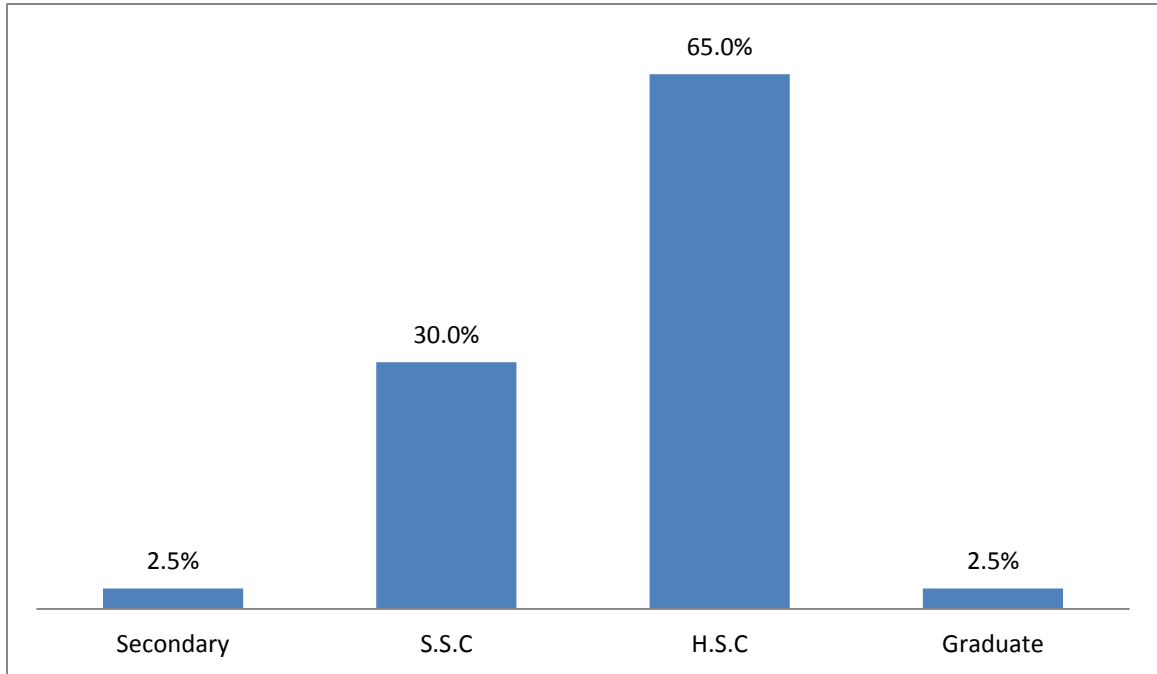

Figure 4: Educational level of the participants

4.7 Individual factors finding of this study

4.7.1 Mental stress of the participants

In this case of mental stress of the participants 47.5% (n=19) participants were only little, 50.0% (n=20) were to some extent,2.5% (n=1) participants had rather much or much.
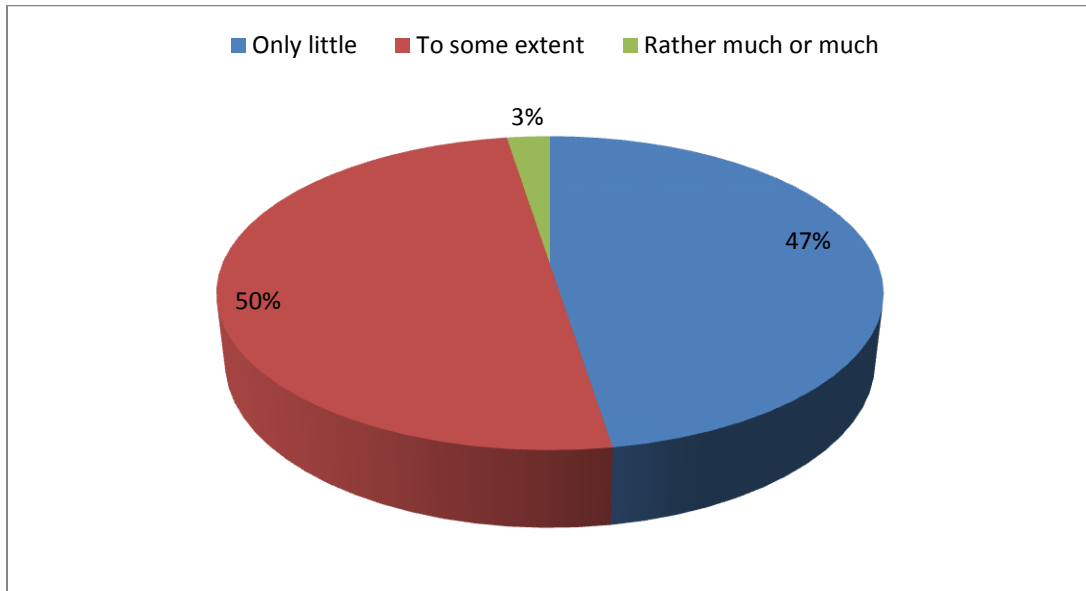

Figure 5: Mental stress of the participants

4.7.2 Smoking of the participants

Among the 40 participants, all of are no smokers.

4.7.3 Previous knee injury of the participants

Among 40 participants, most participants were not previous knee injury patients. Data showed 42.4% (n=17) were yes, 57.5% (n=25) were no previous knee injury.
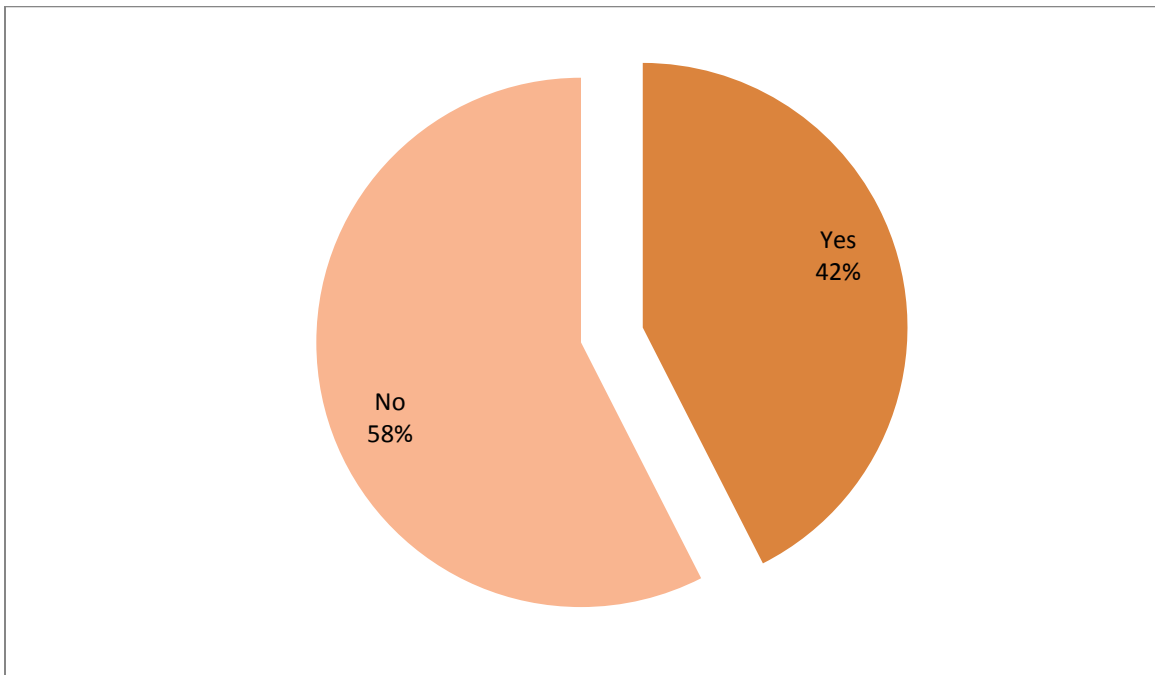

Figure 6: Previous knee injury of the participants

4.8 Work related factors

4.8.1 Working in kneeling or squatting position (hours/day)

In this study of Working in kneeling or squatting position (hours/day) of the participants 85% (n=34) participants were <1/2 hours, 15% (n=6) were 1/2-1hours.
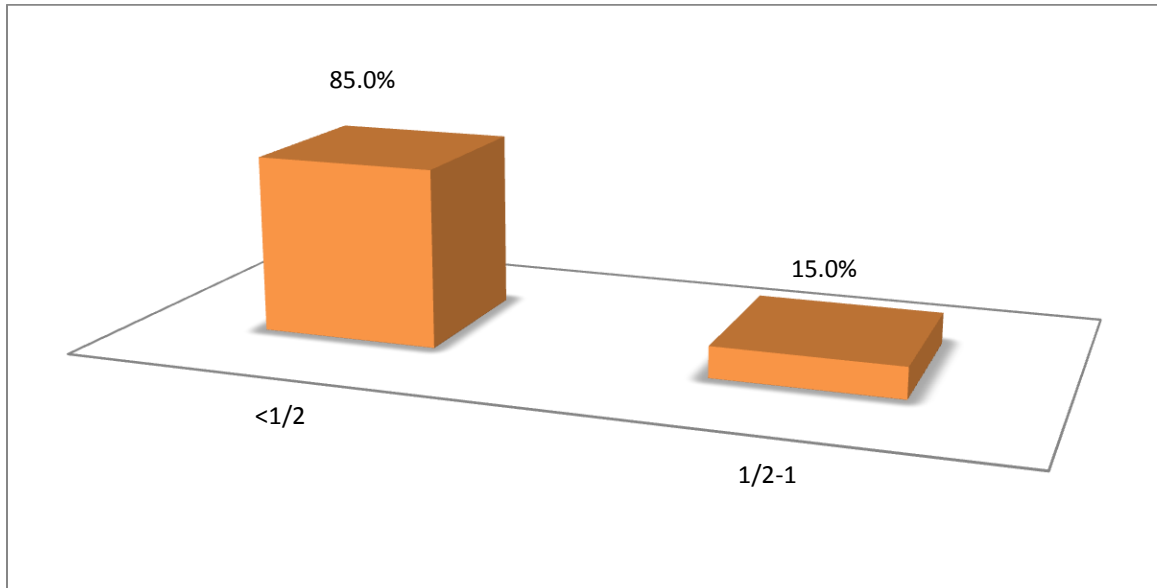

Figure 7: Working in kneeling or squatting position of the participants

4.8.2 Working in sitting position (Hours/day)

In this study of Working in sitting position (hours/day) of the participants 32.5% (n=13) participants were <2 hours, 67.5% (n=27) were 2-4 hours.
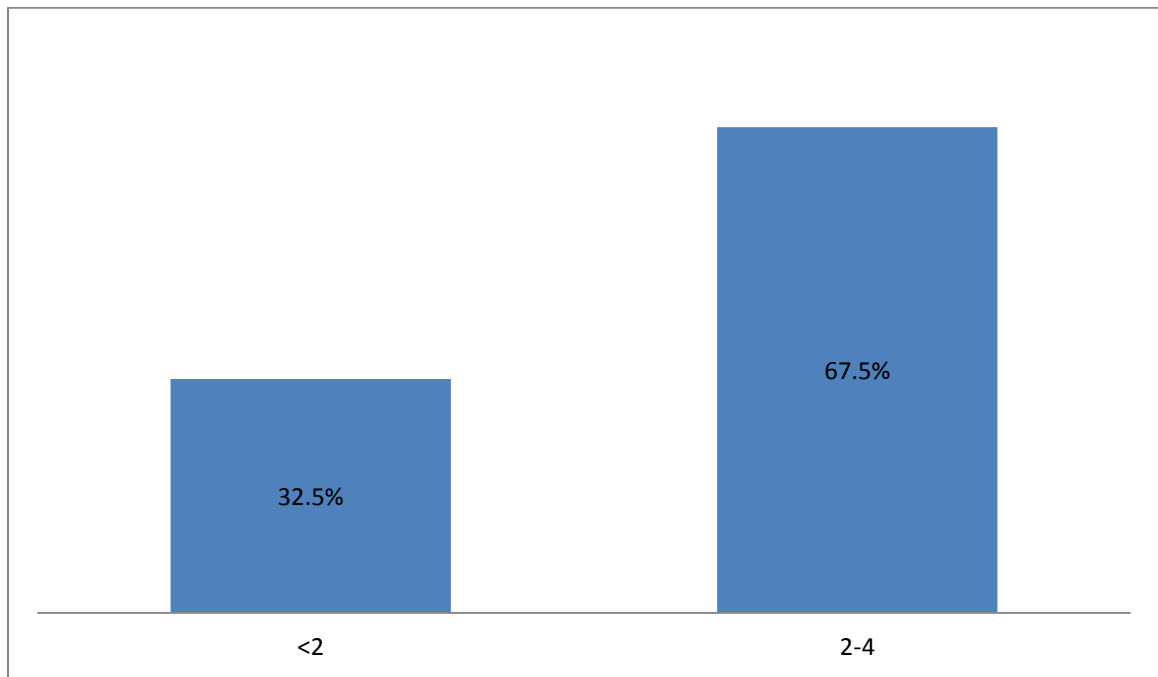
Figure 8: Working in sitting position of the participants

4.8.3 Working with the trunk forward flexed in standing or kneeling position

In this study of Working with the trunk forward flexed in standing or kneeling position (hours/day) of the participants 57.5% (n=23) participants were <1/2 hours, 42.5% (n=17) were 1/2-1 hours.
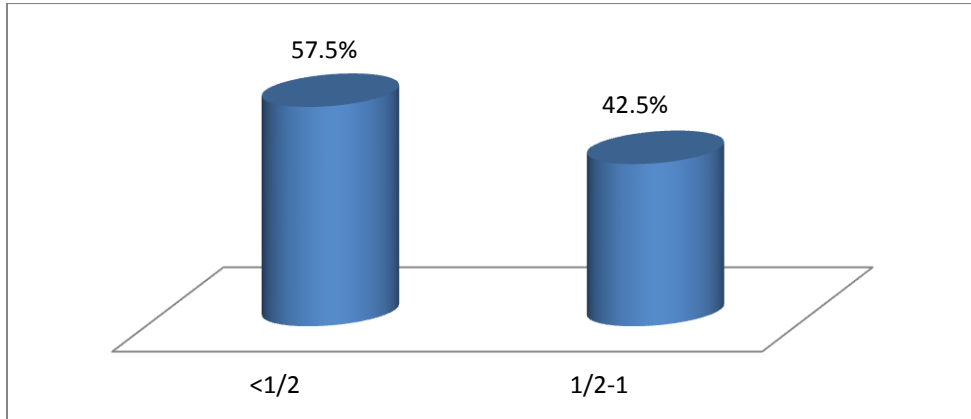
Figure 9: Working with the trunk forward flexed in standing or kneeling position of the participants

4.8.4 Amount of twisting movements of the trunk during a work day

In this case amount of twisting movements of the trunk during a work day of the participants 62.5% (n=25) participants were not at all, 37.5% (n=15) were moderate.
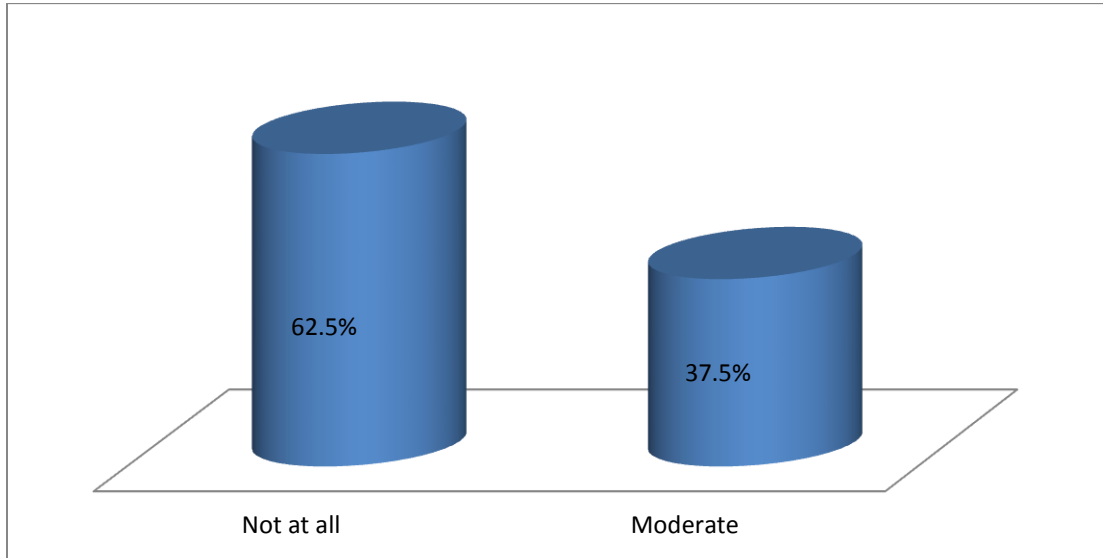
Figure 10: Amount of twisting movements of the trunk during a work day of the participants

4.8.5 Overload at work of the participants

In this case overload at work of the participants 60.0% (n=24) participants were little, 40.0% (n=16) were definite.
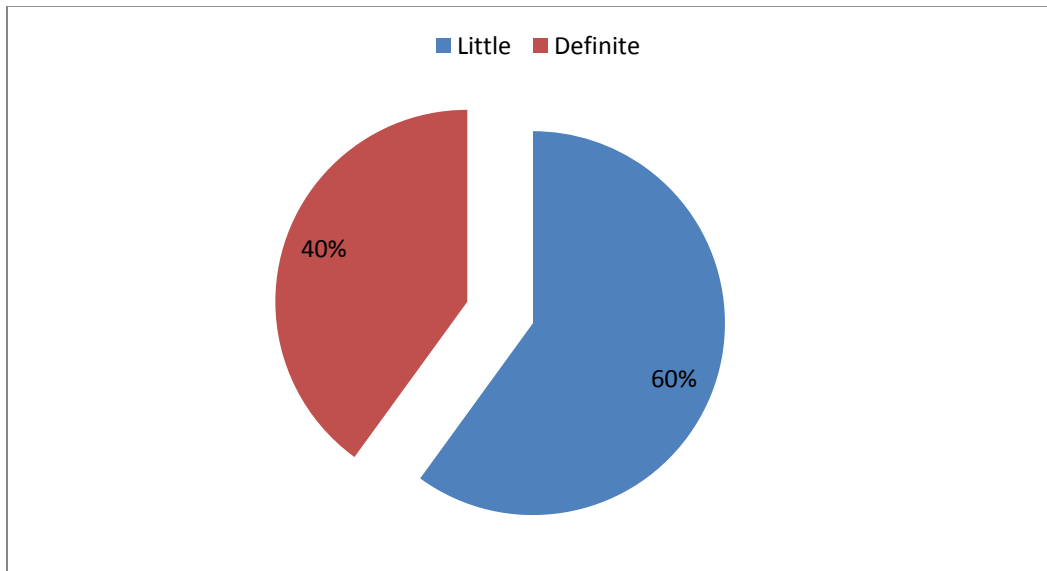
Figure 11: Overload at work of the participants

4.8.6 Posture of the participants

In this study posture of the participants 7.5% (n=3) participants were lordotic, 2.5% (n=1) were kyphotic, 90.0% (n=36) participants were normal curvature.
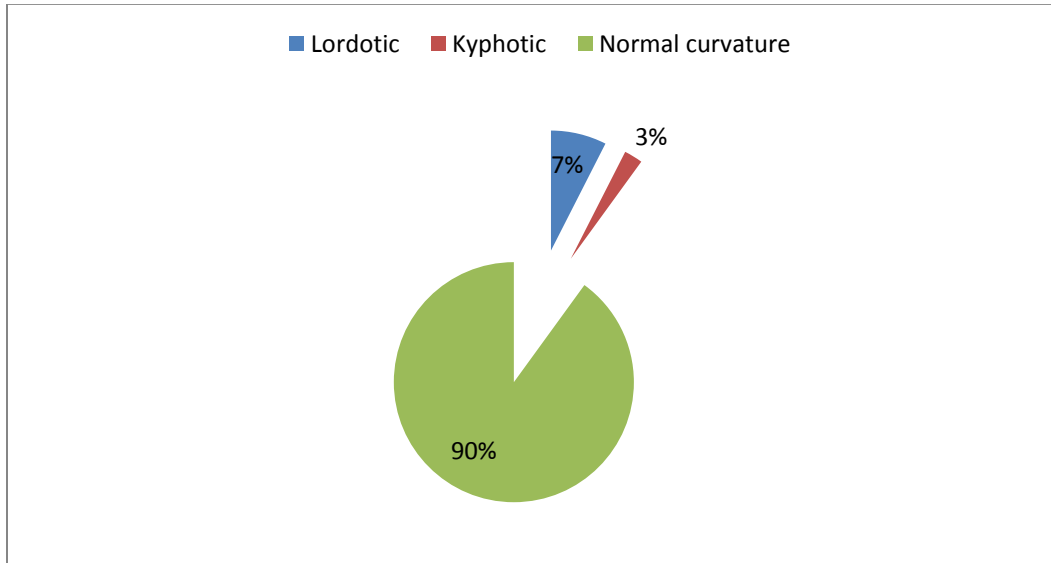
Figure 12: Posture of the participants

4.8.7 Associated knee injuries of the participants

In the injured participants along with knee pain, 42.5 %(n=17) were suffered with ACL injury, 10.0% (n=4) were suffered with meniscus injury, 2.5% (n=1) were suffered with medial cruciate ligament injury,5% (n=2) were suffered with PCL injury, 7.5% (n=3) were suffered with subchondral injury,27.5% (n=11) were suffered with collateral ligament injury, 2.5% (n=1) were suffer with patellar injury, 2.5% (n=1) were suffer with tendon injury.
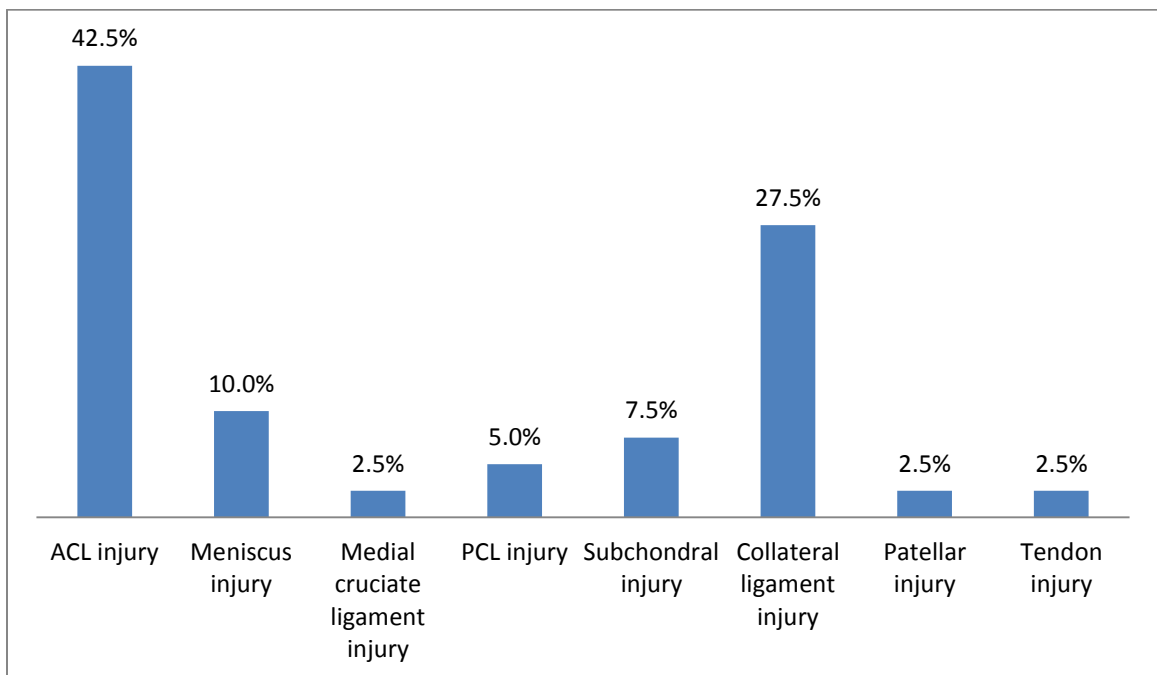
Figure 13: Associated knee injuries of the participants

4.8.8 Type of injury of the participants

Among the total injured participants 90% (n=36) got injured by direct hit during training time and rest 10% (n=4) got injured because of overuse.
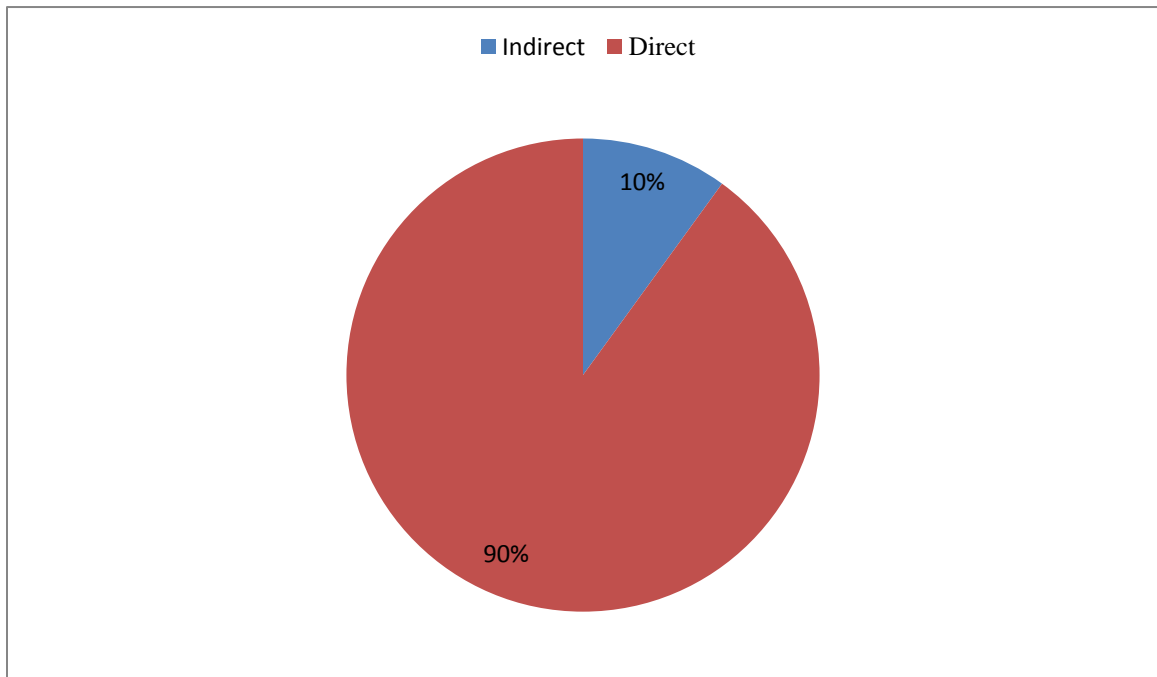
Figure 14: Type of injury of the participants

4.8.9 Severity of injury

42.5% (n=17) participants were got moderate injured, 10% (n=4) were severe injured and 47.5% (n=19) were mild injured among the injured participants.
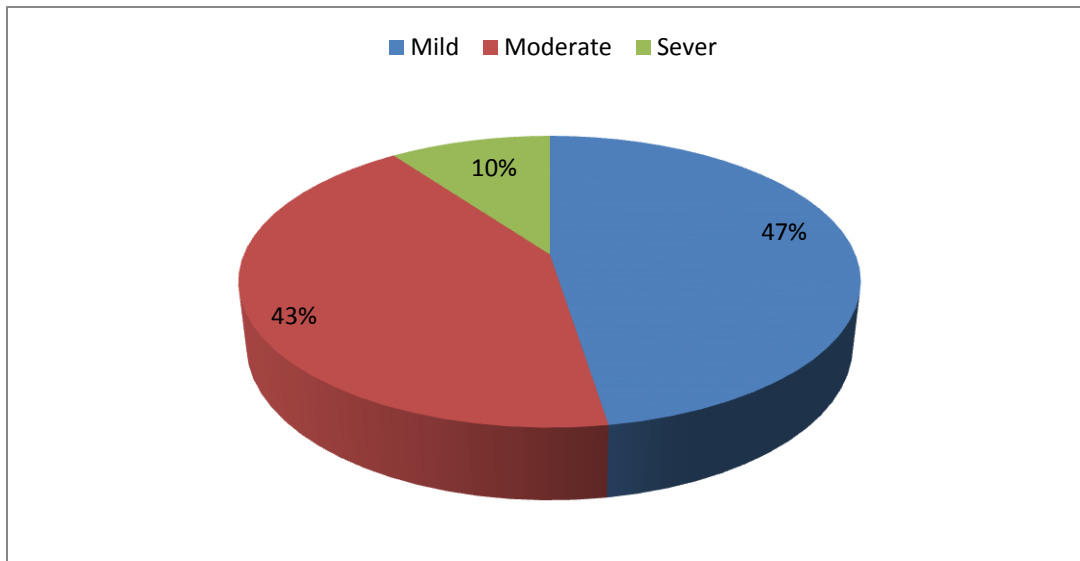
Figure 15: Severity of injury

4.8.10 Nature of pain (according to NPRS scale)

Among injured participants pain nature is moderate in 42.5% (n= 17) participants, severe in 10% (n=4) participants and mild in 47.5% (n=19) participants.
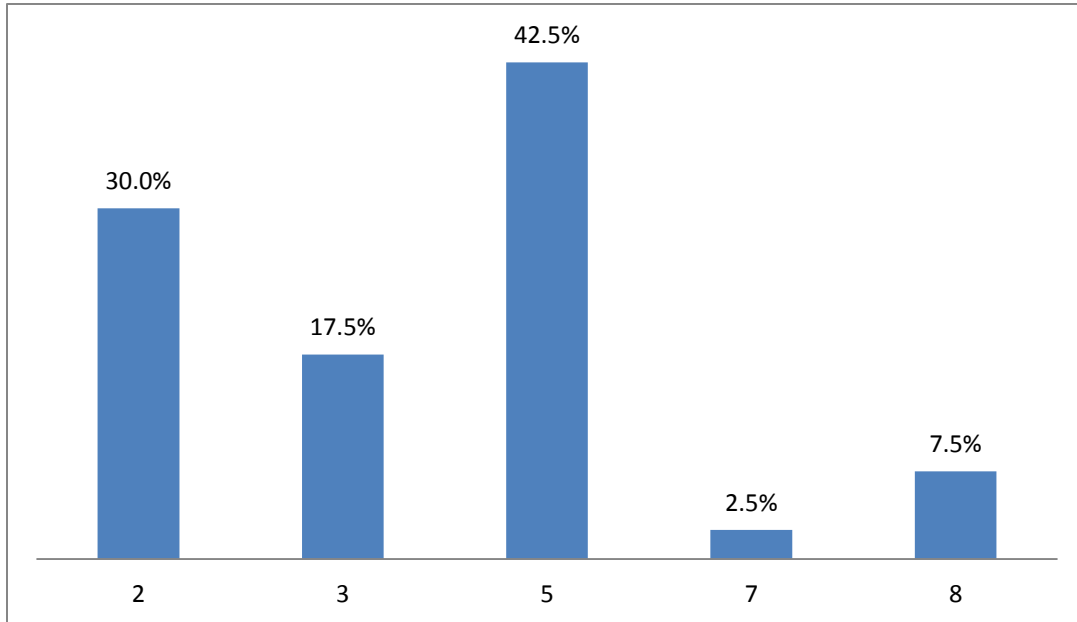
Figure 16: Nature of pain

4.8.11 Recurrence of injury

In the injured participants 75% (n=30) had recurrent injury in the same side and 25% (n=10) had no recurrent injury.
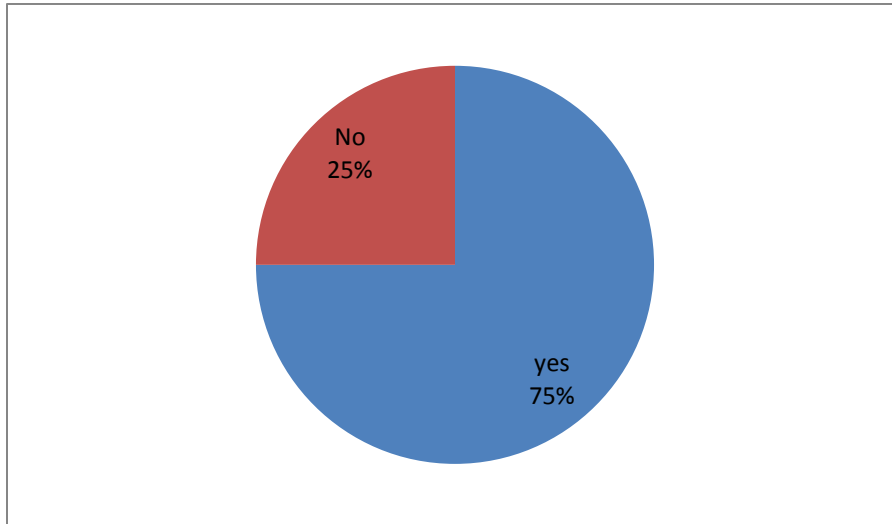
Figure 17: Recurrence of injury

4.8.12 How many times you experience this injury

Among 75% recurrent injuries 42.5% (n=17) had 2 times of injury and 57.5% (n=23) had 1 time of injury.
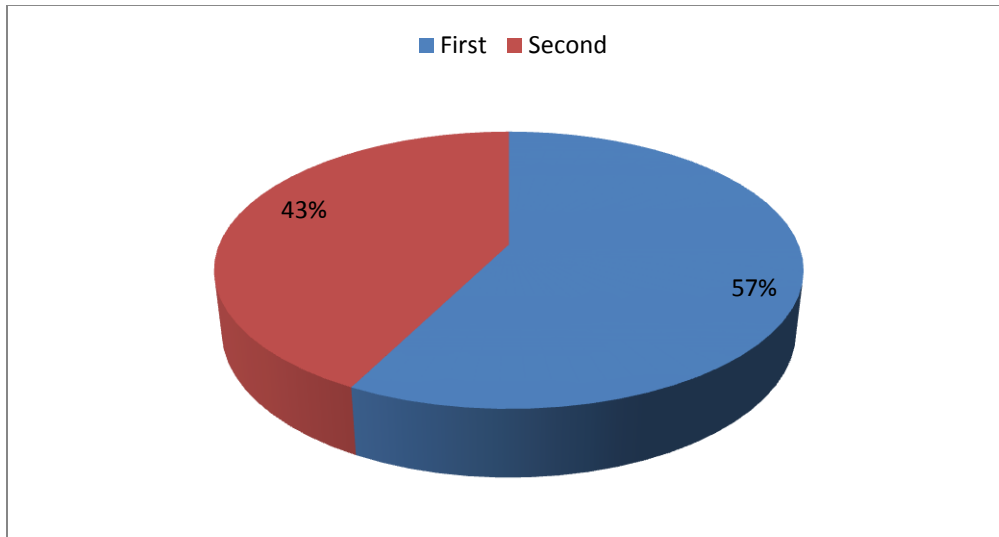
Figure 18: How many times you experience this injury

4.8.13 Duration of warm up and cool down

In the study among the injured participants 27.5% (n=11) participants do their warm up and cool down activities both for 15 minutes and between 15 to 20 minutes and rest of 40% (n=16) do their war up and cool down activities for 20 minutes and 22.5% (n=9) do their warm up and cool down activity for 10 minutes and 10%(n=4) do their warm up and cool down activity for 25 minutes.
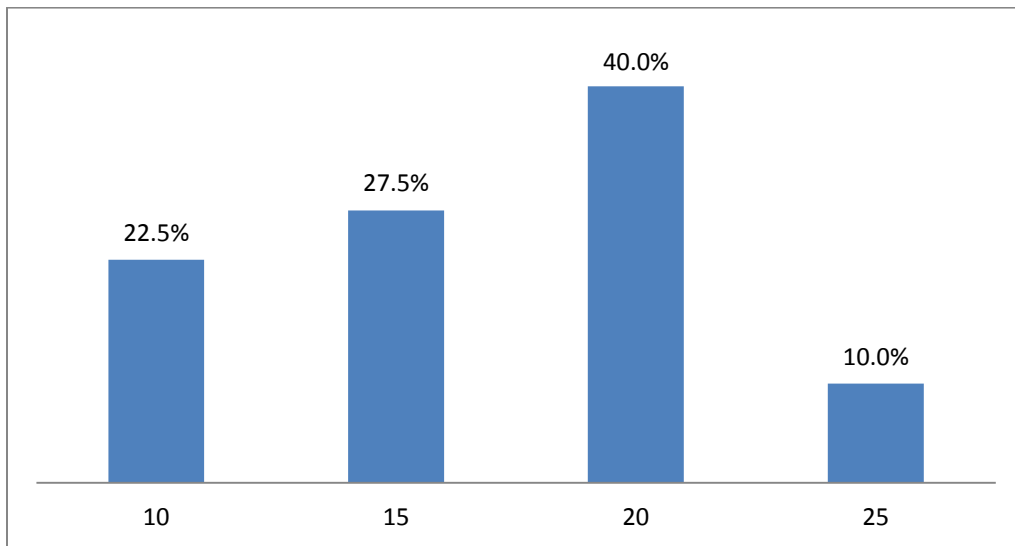
Figure 19: Duration of warm up and cool down

4.8.14 Treatment

The participants are mostly 60% (n=24) taken both medicines and physiotherapy treatment. Rest of the 37.5% (n=15) taken only physiotherapy treatment and 2.5 %(n= 1) taken drugs treatment.
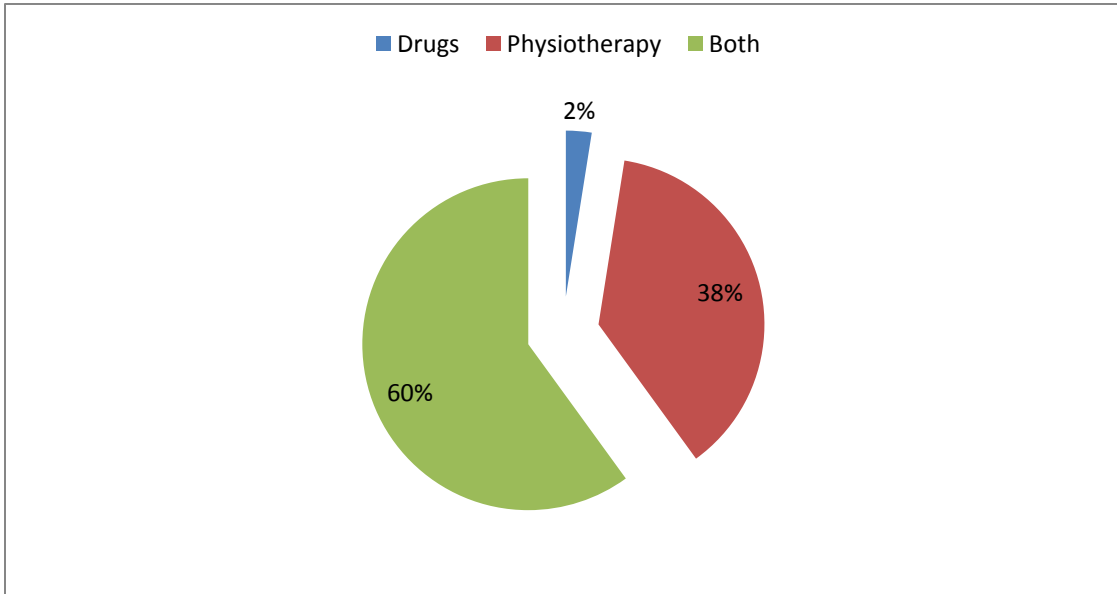
Figure 20: Treatment

4.8.15 Surgery

The participants are mostly 35% (n=14) taken surgery. Rest of the 65% (n=26) taken no surgical treatment.
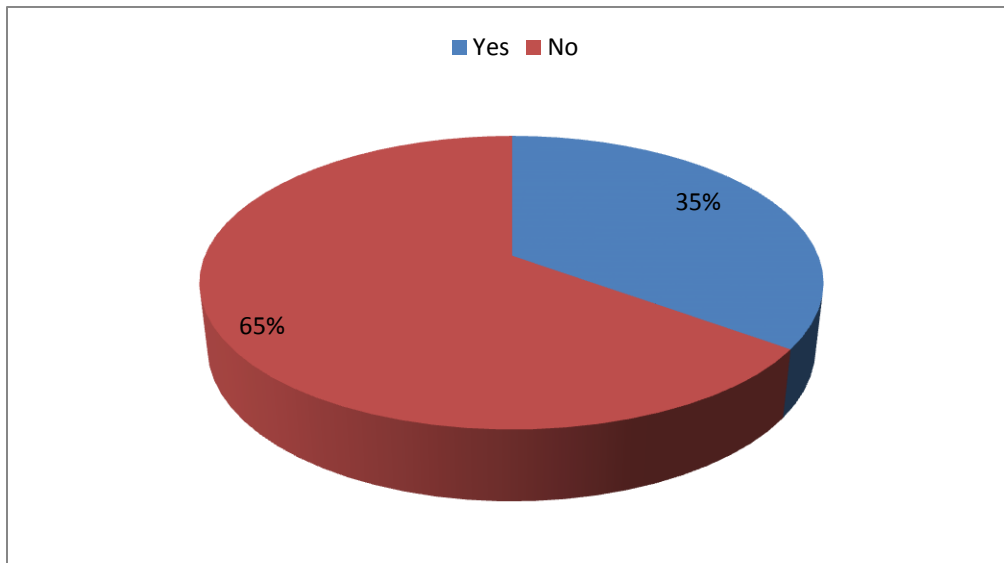
Figure 21: Surgery

4.9 Correlations between amount of twisting movement of the trunk during a work day and socio-demographic related variables of the participants

At the chart show that, after Correlations between amount of twisting movement of the trunk during a work day and socio-demographic related variables among the 40 patients at over-all age Pearson test value is 1.777; at sex Chi-square test value is 6.967; at previous knee injury Chi-square test value is 1.152; at education category Kruskal Wallis Test value is 2.415; at occupation category Kruskal Wallis Test value is 3.953; P-Value of sex ,occupation are less than 0.05 which means this are significant with amount of twisting movement of the trunk during a work day. Then we declare that sex, occupation variables are correlated with amount of twisting movement of the trunk during a work day. And the age, education, previous knee injury has P-Value more than 0.05 which are nor significant with amount of twisting movement of the trunk during a work day. That's means there has no correlation between the ages, education, previous knee injury with amount of twisting movement of the trunk during a work day.

Dependent Variable: Amount of twisting movement of the trunk during a work day			
Independent Variable	**Test Name**	**Test Value**	**P-Value**
Age :	Pearson	1.777	0.182
Sex :	Chi-square	6.967	0.008
Occupation:	Kruskal Wallis Test	3.953	0.046
Education:	Kruskal Wallis Test	2.415	0.120
Previous Knee Injury	Chi-square	1.152	0.283

Tabel 3: Correlations between amount of twisting movement of the trunk during a work day and socio-demographic related variables of the participants

4.10 Correlations between Type of injury and socio-demographic related variables of the participants

At the chart show that, after Correlations between type of injury and socio-demographic related variables among the 40 patients at over-all age Pearson test value is 2.268; at sex Chi-square test value is 1.290; at previous knee injury Chi-square test value is 3.285; at

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education category Kruskal Wallis Test value is 0.072; at occupation category Kruskal Wallis Test value is 4.910; P-Value of previous knee injury ,occupation are less than 0.05 which means this are significant with type of injury. Then we declare that previous knee injury, occupation variables are correlated with type of injury. And the age, education, sex has P-Value more than 0.05 which are nor significant with type of injury. That's means there has no correlation between the ages, education, sex with type of injury.

Dependent Variable: Type of injury			
Independent Variable	**Test Name**	**Test Value**	**P-Value**
Age :	Pearson	2.268	0.132
Sex :	Chi-square	1.290	0.255
Occupation:	Kruskal Wallis Test	4.910	0.026
Education:	Kruskal Wallis Test	0.072	0.787
Previous Knee Injury	Chi-square	3.285	0.069

Tabel 4: Correlations between Type of injury and socio-demographic related variables of the participants

4.11 Correlations between recurrence of injury and socio-demographic related variables of the participants

At the chart show that, after Correlations between recurrence of injury and socio-demographic related variables among the 40 patients at over-all age Pearson test value is 0.000; at sex Chi-square test value is 0.047; at previous knee injury Chi-square test value is 0.034; at education category Kruskal Wallis Test value is 0.357; at occupation category Kruskal Wallis Test value is 7.922; P-Value of occupation is less than 0.05 which means this are significant with recurrence of injury. Then we declare that occupation variables are correlated with recurrence of injury. And the age, education, sex, previous knee injury has P-Value more than 0.05 which are nor significant with recurrence of injury. That's means there has no correlation between the ages, education, sex, previous knee injury with recurrence of injury.

Dependent Variable: Recurrence of injury			
Independent Variable	**Test Name**	**Test Value**	**P-Value**
Age :	Chi-square	0.000	1.000a**
Sex :	Chi-square	0.047	0.826**
Occupation:	Kruskal Wallis Test	7.922	0.004b*
Education:	Kruskal Wallis Test	0.357	0.549**
Previous Knee Injury	Chi-square	0.034	0.853**

a= chi square, b= Kruskal Wallis Test * Significance **Non- Significance

Tabel 5: Correlations between recurrence of injury and socio-demographic related variables of the participants

4.12 Correlations between Total IKDC Score and socio-demographic related variables of the participants

At the chart show that, after Correlations between total IKDC score and socio-demographic related variables among the 40 patients at over-all age Pearson test value is 18.472; at sex Chi-square test value is 17.252; at previous knee injury Chi-square test value is 16.811; at education category Kruskal Wallis Test value is 26.560; at occupation category Kruskal Wallis Test value is 30.308; P-Value of occupation is less than 0.05 which means this are significant with total IKDC score. Then we declare that occupation variables are correlated with total IKDC score. And the age, education, sex, previous knee injury has P-Value more than 0.05 which are nor significant with total IKDC score. That's means there has no correlation between the ages, education, sex, previous knee injury with total IKDC score.

Dependent Variable: Total IKDC Score			
Independent Variable	**Test Name**	**Test Value**	**P-Value**
Age :	Chi-square	18.472	0.359**
Sex :	Chi-square	17.252	0.437**
Occupation:	Kruskal Wallis Test	30.308	0.024*
Education:	Kruskal Wallis Test	26.560	0.064**
Previous Knee Injury	Chi-square	16.811	0.467**

* Significance **Non- Significance

Tabel 6: Correlations between Total IKDC Score and socio-demographic related variables of the participants

Table 7: Association between ACL injury and its associated factors

Variable	Description of data Mean (median) ± Std.Deviation / Frequency (percent)
Age in category(years) -	
15-20	24(60.0%)
21-25	16(40.0%)
26-30	0(0.0%)
Sex -	
Female	9(22.5%)
Male	31(77.5%)
Educational level-	
Secondary education	1(2.5%)
S.S.C	12(30%)
H.S.C	26(65%)
Graduation	1 (2.5%)
Occupation-	
Cricket	7(17.5%)
Football	13(32.5%)
basketball	3(7.5%)
Hockey	3(7.5%)
Swimming	1 (2.5%)
Tennis	1(2.5%)
Shooting	7(17.5%)
Volleyball	1(2.5%)
Gymnastic	4(10.0%)
Weight -	
41-50	4(10%)
51-60	22(55%)

61-70	14(35%)
Mental stress-	
Only little	19(47.5%)
To some extent	20(50.0%)
Rather much or much	1(2.5%)
Previous knee injury	
Yes	17(42.5%)
No	23(57.5%)
Working in kneeling or squatting position(hours/day)-	
<1/2	34(85.0%)
1/2-1	6(15.0%)
>1	0(0.00%)
Working with the trunk forward flexed in standing or kneeling position:	23(57.5%)
<1/2	17(42.5%)
1/2-1	0(0.00%)
1-2	0(0.00%)
>2	
Amount of twisting movements of the trunk during a work day	
Not at all	25(62.5%)
Moderate	15(37.5%)
Much	0(0.00%)
Overload at work-	
Not at all	0(0.00%)
Little	24(60%)
Definite	16(24%)

Posture -	
Lordotic	3(7.5%)
Kyphotic	1(2.5%)
Scoliotic	0(0.00%)
Normal curvature	36(90%)
Associated knee injury-	
ACL injury	17(42.5%)
Meniscus injury	4(10.0%)
Medial cruciate ligament injury	1 (2.5%)
PCL injury	2(5.0%)
Subcohondral injury	3(7.5%)
Collateral ligament injury	11(27.5%)
Patellar injury	1(2.5%)
Tendon injury	1(2.5%)

CHAPTER-V	DISCUSSION

In this study ACL injury is present in 42.5 %(n=17), 10.0% (n=4) were suffered with meniscus injury, 2.5% (n=1) were suffered with medial cruciate ligament injury,5% (n=2) were suffered with PCL injury, 7.5% (n=3) were suffered with subchondral injury,27.5% (n=11) were suffered with collateral ligament injury, 2.5% (n=1) were suffer with patellar injury, 2.5% (n=1) were suffer with tendon injury , According to Kvist et al., (2004) The yearly incidence of ACL injuries has been reported to be 3 per 10000 inhabitants in Denmark, with a greater frequency among athletes. In Sweden, ACL injuries comprise 43% of all soccer-related knee injuries and one large New Zealand study found an incidence of 36.9 injuries per 100,000 person-years.

Among the injured participants 2.5% (n=1) participants were at the age of 16. 20% (n=8) was at the age of 17, 15% (n=6) was at the age of 18, 17.5% (n=7) was the age 19 and 5% (n=2) was the age of 20. Sport-related injuries occurs at ages 5–14 years and tapers gradually with age and visit rates for sports injury are highest for school-age children (5–12years), adolescents (13–18 years) and young adults(18–24 years), compared with other age groups (Adirim and Cheng,2003). According to Walden et al., (2011) ACL injured female players are significantly younger than the male players. The age range is usually 19-27 for both male and female athletes.

Among the 40 injured participants 77.5% (n=31) were male trainees and 22.5% (n=9) were female participants. Incidence of ACL tear is 3.2% for men and 3.5% for women during a 4 year period. (Kurt et al. , 2016). According to Grindem (2014) women have a 2 – 3 fold of sustaining ACL injury and sustain their injuries at a lower leg then men. Female soccer players are at up to six times higher risk for sustaining ACL injury and the occurrence of ACL injury in a soccer team expressed as a percentage of all injuries on that team is as 1.3% in male and 3.75% in female (Eduard et al. , 2009). In USA ACL injury constitute 6% of all match injury and 2% of all training injuries in female and less than 1% of all injuries among males (Westin & Noyes,2011). But in BKSP we found that less trainees are injured than male. Because in Bangladesh less females are participate in sports than other countries due to our culture and social environment. But now a day

circumstances are changing and hopefully the number of female players will increase in sports.

This study shows that 2.5 %(n=1) participants were secondary, 30.0 %(n=12) were SSC, 65 %(n=26) participants had HSC, 2.5 %(n=1) participants got graduate. The National Federation of State High School Associations data shows that between 1988 and 1998 participation in girls high school sports has risen, nearly 40% of the female participants were below graduation level (Powell & Foss, 2006).

The highest number of injured participants 32.5% (n=13) were football trainees, 17.5% (n= 7) were cricket trainees, 17.5% (n= 7) were shooting trainees, 7.5% (n= 3) were hockey trainees, 2.5% (n=1) were tennis trainees, 10% (n=4) were gymnastic trainees and 2.5% (n=1) were swimming, judo and volleyball trainees. ACL injury is more commonly occur in sports like football, basketball, professional rustling, martial arts, artistic gymnastics, alpine skiing (Grindem, 2014). Knee injury in football is known to be high and ACL injury incidence is also increased and the annual prevalence is between 0.5 and 6.0% 0f all female players and between 0.6 and 8.5% of all male player (Markus et al., 2011). A study showed that most participants, 48.5% number of injury occur in track and field events which includes running, long ,jump, high jump and skipping,12.8% injury occur in jogging, 3.6% in gymnastics, 3.2% in swimming, shooting 2.1% (Orava et al., 2011). Surveillance of high school organized sports has found that football had the highest injury rate with 41–61%of athletes injured; annually injury rates include wrestling and gymnastics (40–46%), basketball (31-37%) volleyball, baseball, soccer, cross country, softball and track (7–18%). (Hawkins & Fuller, 2006).

In the injured participants 90% (n=36) had normal curvature of spine, 7.5% (n=3) were lordotic, 2.5% (n=1) were kyphotic. In a study it was found that No differences between groups were found in nine of the ten posture components examined However, a significant difference (P < 0.01) was found in lumbar lordosis between groups. A greater deviation in lumbar posture was found in the injured group than in the control group. (Konishi et al., 2007).

According to Spindler & Wright, (2016) prevalence of associated meniscus injuries with ACL tear is up to 60 to 75%,articular cartilage injuries up to 46%, subchondral bone injuries 80% and complete collateral ligament injuries 5 to 24%. Among the total injured participants 90% (n=36) got injured by direct hit during training time and rest 10% (n=4) got injured because of indirect. 42.5% (n=17) participants were got moderate injured, 10% (n=4) were severe injured and 47.5% (n=19) were mild injured among the injured participants.

Among injured participants pain nature is moderate in 42.5% (n= 17) participants, severe in 10% (n=4) participants and mild in 47.5% (n=19) participants. In the injured participants 75% (n=30) had recurrent injury in the same side and 25% (n=10) had no recurrent injury. Among 23.1% recurrent injuries 15.4% (n=6) had 2 times of injury and 7.7% (n=3) had 1 time of injury. A Cohort studies suggest that a prior history of ACL injury may be a risk factor for another ACL injury on the 40 ipsilateral or contralateral sides. Family history of ACL injury also appears to increase risk. (Edward et al., 2008).

In the study among the injured participants 27.5% (n=11) participants do their warm up and cool down activities for15 minutes and between 15 to 20 minutes and rest of 40% (n=16) do their war up and cool down activities for 20 minutes. In the American Journal of Sports Medicine a study shows that less than 4 year practice session higher rate (55.9%) of injury occurs among 509 female athlete. The elevated number 65%, participants duration of warp up and cool down were more than 16 min and 33.3% were under duration of less than or equal 15 min in this study. Another study shows that 9.1% within 76 participants done warm up and cool down activity to prevent athletic injury (Payne et al., 2007).

The participants are mostly 60% (n=24) taken both medicines and physiotherapy treatment. Rest of the 37.5% (n=15) taken only physiotherapy treatment. As mentioned by Freddie et al. (2001) trainees among 1200 trains in England National Federation of Athletics have taken physiotherapy 84% after injury and 26% took conservative or

surgical treatment. The differences of treatment ratio between these two studies occur due to different sample size and socio-demographic characteristics.

CHAPTER-VI	LIMITATION

- ➢ Limitation of the study was the expected sample size was 139, but the number of injured trainees in BKSP is very small amount.
- ➢ Due to resource constrain researcher was elect to choose just 40 samples which is very small to generalize the result in all over the Bangladesh.
- ➢ There are a few literatures found about ACL injury among the trainees of Bangladesh so it is difficult to compare the study with the other research.
- ➢ In this study only Bangladesh Krira Shikkha Protisthan (BKSP) was the study area to generalize for wider population.
- ➢ On the other hand in Bangladesh Krira Shikkha Protisthan (BKSP) number of female athletes is very few in comparison to other researches. So making a comparison between male and female trainees was difficult.

CHAPTER-VII	CONCLUSION AND RECOMMENDATION

Bangladesh Krira Shikkha Protisthan is the largest governmental organization aims to explore talents in sports and train them, also give opportunity to play in different national or international competitions. From this study it was found that ACL injury is one of the most common injuries among the trainees and which is most common in male trainees. Trainees of athletic were more vulnerable than other events like football, cricket, gymnastics etc. Sometimes many associated injuries were present with ACL injury among them meniscus injury is the most common, subchondral bone injury, medial collateral injury are also common with ACL injury. Most of the ACL injuries among the trainees were occurred by direct hit rather than overuse. Se-verity of injury was commonly moderate. Recurrence of injury occurs in few participants among them 2 times of recurrence was common. Warm up and cool down session was also variable among them, most of their warm up and cool down session was for both 15 minutes or between 15 to 20 minutes. Most of the injured participants in BKSP took both medicines and physiotherapy treatment for their injury.

The researcher proposed the following recommendation to certain authority and Personnel to prevail over limitation: In BKSP the total number of female athlete or trainee is very small amount; limitation of sample size researcher did not gather total participants and use convenience sampling consequently the result cannot be generalized in all over the Bangladesh. So for the further proposal it is strongly recommendation to increase sample size and use simple random sampling by include participants from different sports organizations with adequate time to generalize the result in all over the country. And the result of the study demonstrates the frequency of injury among trainees, characteristics of athletic injury and factors associating injury in sports trainees. In this study only prevalence of injury identified it could be more specified if and effectiveness of physiotherapy treatment also done among sports trainees which might be play an vital role in improving the professional efficacy.

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Consent Form

Assalamualaikum,

I am Md Rabbi Dewan, Final Year of B.Sc. in Physiotherapy student of Bangladesh Health Professions Institute (BHPI) under the Faculty of Medicine, University of Dhaka. To obtain my Graduation degree, I have to conduct a research project and it is a part of my study. The participants are requested to participate in the study after a brief following.

My research title is "**Factors affecting the knee pain among the athlete at BKSP".**

To fulfill my research project, I need to collect data. So, you can be a respected participant of this research.

I would like to inform you that this is a purely academic study and will not be used for any other purposes. I assure that all data will be kept confidential. Your participation will be voluntary. You may have the rights to withdraw consent and discontinue participation at any time of the experiment. You also have the rights to answer a particular question that you don't like.

Do you have any questions before I start?
So, may I have your consent to proceed with the interview?

Yes □   No □

Signature of participant and Date ……………………………..
Signature of the researcher and Date……………………………..
Signature of the witness and Date………………………………..

Questionnaire

Title: Factors affecting the knee pain among the athlete at BKSP

English questionnaire

Personal details

Code no:	
Name of participant:	
Address:	Village/house no.. Post office... Thana.. District...
Contact number:	
Date of interview:	

1. Socio demographic information:

Age:	Years
Sex:	

	☐ 1= male ☐ 2= female
Occupation :	☐ 1= Cricket ☐ 2= Football ☐ 3= Basketball ☐ 4= Hockey ☐ 5= Swimming ☐ 6= Tennis ☐ 7= Shooting ☐ 8= Volleyball ☐ 9= Gymnastic ☐ 10= General Athletic
Weight:	KG
Hight:	
Educational level:	☐ 1 = Illiterate ☐ 2=literate ☐ 3= Primary ☐ 4=Secondary ☐ 5= S.S.C ☐ 6=H.S.C. ☐ 7= Graduate ☐ 8= Post Graduate

Individual factors

Mental stress:	☐ 1= Not at all ☐ 2= Only little ☐ 3=To some extent ☐ 4=Rather much or much
Smoking :	☐ 1= Non smoker ☐ 2= Ex-smoker ☐ 3= Current smoker
Previous knee injury:	☐ 1= Yes ☐ 2= No

Work related factors

Working in kneeling or squatting position(hours/day)	☐ 1= <1/2 ☐ 2= 1/2 - 1 ☐ 3= >1
Working in sitting position (Hours/day)	☐ 1= <2 ☐ 2= 2-4 ☐ 3= >4
Working with the trunk forward flexed in standing or kneeling position (Hours/day)	☐ 1= <1/2 ☐ 2= 1/2-1 ☐ 3= 1-2 ☐ 4= >2

Amount of twisting movements of the trunk during a work day	☐ 1=Not at all ☐ 2=Moderate ☐ 3=Much
Overload at work	☐ 1=Not at all ☐ 2=Little ☐ 3=Definite
Posture	☐ 1=Lordotic ☐ 2=Kyphotic ☐ 3=Scoliotic ☐ 4=Normal curvature
Associated knee injuries	☐ 1=ACL injury ☐ 2=Meniscus injury ☐ 3=Medial cruciate ligament injury ☐ 4=PCL injury ☐ 5=Subchondral injury ☐ 6=Collateral ligament injury ☐ 7=Patellar injury ☐ 8= Fracture ☐ 9=Tendon injury ☐ 0= None
Type of injury	☐ 1= Indirect ☐ 2=Direct

Severity of injury	☐ 1=Mild ☐ 2=Moderate ☐ 3=Sever
Nature of pain (according to NPRS scale)	0……………5………………..10
Recurrence of injury	☐ 1=Yes ☐ 2=No
How many time you experienced this injury	………………times
Warm up and cool down activity	☐ 1=Yes ☐ 2=No
Duration of warm up and cool down	……………..mint
Treatment	☐ 1=Drugs ☐ 2=Physiotherapy ☐ 3=Both
Surgery	☐ 1=Yes ☐ 2=No

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তারিখ: ৪ বৈশাখ ১৪২৯
১৭ এপ্রিল ২০২২

বিষয়: **প্রবন্ধের জন্য তথ্য সংগ্রহ প্রসংগে।**
সূত্র: আপনার ২২ মার্চ, ২০২২ তারিখের আবেদন।

উপর্যুক্ত বিষয় ও সূত্রের প্রেক্ষিতে আপনার সদয় অবগতির জন্য জানানো যাচ্ছে যে, বর্তমানে অত্র প্রতিষ্ঠানের প্রশিক্ষণার্থীরা পবিত্র মাহে রমজানের ছুটিতে আছে এবং তারা আগামী ৬/৫/২০২২ তারিখে প্রতিষ্ঠানে প্রত্যাবর্তন করবে। এমতাবস্থায়, আপনার প্রতিষ্ঠানে অধ্যয়নরত প্রশিক্ষণার্থী জনাব মো: রাক্কি দেওয়ানকে আগামী ৮/৫/২০২২ তারিখে তথ্য সংগ্রহের জন্য নির্দেশক্রমে অনুরোধ করা হলো।

১৭-৪-২০২২
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ফিজিওথেরাপি

স্মারক নম্বর: ৩৪.০৪.০২০০.০০৪.০০.০১৩.১৭.৫৩১/১(১২)

তারিখ: ৪ বৈশাখ ১৪২৯
১৭ এপ্রিল ২০২২

সদয় অবগতি ও কার্যার্থে প্রেরণ করা হল:
১) মহাপরিচালক, মহাপরিচালকের দপ্তর, বাংলাদেশ ক্রীড়া শিক্ষা প্রতিষ্ঠান
২) পরিচালক, পরিচালক (প্রশাসন ও অর্থ), বাংলাদেশ ক্রীড়া শিক্ষা প্রতিষ্ঠান
৩) পরিচালক, প্রশিক্ষণ শাখা , বাংলাদেশ ক্রীড়া শিক্ষা প্রতিষ্ঠান
৪) অধ্যক্ষ, কলেজ শাখা, বাংলাদেশ ক্রীড়া শিক্ষা প্রতিষ্ঠান
৫) উপ-পরিচালক, উপ-পরিচালক (ক্রীড়া বিজ্ঞান), বাংলাদেশ ক্রীড়া শিক্ষা প্রতিষ্ঠান
৬) উপ-পরিচালক, প্রশিক্ষণ শাখা , বাংলাদেশ ক্রীড়া শিক্ষা প্রতিষ্ঠান
৭) সিনিয়র গবেষণা কর্মকর্তা-৪, উপ-পরিচালক (ক্রীড়া বিজ্ঞান), বাংলাদেশ ক্রীড়া শিক্ষা প্রতিষ্ঠান
৮) নির্বাহী প্রকৌশলী, প্রকৌশল শাখা, বাংলাদেশ ক্রীড়া শিক্ষা প্রতিষ্ঠান
৯) সহকারী পরিচালক, প্রশাসন শাখা , বাংলাদেশ ক্রীড়া শিক্ষা প্রতিষ্ঠান

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Ref: Date:

CRP/BHPI/IRB/03/2022/577

02/03/2022

Md Rabbi Dewan
4th year B.Sc. in Physiotherapy
Session: 2016 – 2017
BHPI, CRP, Savar, Dhaka- 1343, Bangladesh

Subject: Approval of the research project proposal **"Factors affecting the knee pain among the athlete at BKSP"** by ethics committee.

Dear Md Rabbi Dewan,
Congratulations.
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator and Shazal Kumar Das as thesis supervisor. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Dissertation Proposal
2	Questionnaire (English and Bengali version)
3	Information sheet & consent form.

The purpose of the study is to find out the factors affecting the knee pain among the athlete at BKSP. Since the study involves questionnaire that takes maximum 20-30 minutes and have no likelihood of any harm to the participants, the members of the Ethics committee approved the study to be conducted in the presented form at the meeting held at 09:00 AM on 12th October, 2021 at BHPI (30th IRB Meeting).

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

Millat Hossain

Muhammad Millat Hossain
Assistant Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404
E-mail : principal-bhpi@crp-bangladesh.org, Web: bhpi.edu.bd, www.crp-bangladesh.org

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The Chairman
Institutional Review Board (IRB)
Bangladesh Health Professions Institute (BHPI), CRP
Savar, Dhaka-1343.Bangladesh

Subject: Application for review and ethical approval.

Dear Sir,

With due respect, I am Md Rabbi Dewan, student of final year B.Sc. in Physiotherapy program at Bangladesh Health Professions Institute (BHPI) the academic institute of Centre for the Rehabilitation of the Paralysed (CRP) under the Faculty of Medicine, University of Dhaka. As per the course curriculum, I have to conduct a research project entitled "**Factors affecting the knee pain among the athlete at BKSP**"under the supervision of Shazal Kumar Das, Lecturer, Department of Physiotherapy, BHPI.

The purpose of the study is to gain in-depth insight and understandings from people with athletes in order to understand their own experiences and perspectives on knee pain. The study involves face-to-face and/ or by over phone interview by using questionnaire to explore the perception of people with knee pain at BKSP in Saver that may take 20 to 30 minutes to fill in the questionnaire and there is no likelihood of any harm to the participants. Related information will be collected from the patients' guide books. Data collectors will receive informed consent from all participants and the collected data will be kept confidential.

Therefore, I look forward to having your kind approval for the research project and to start data collection. I can also assure you that I will maintain all the requirements for study.

Sincerely,

Rabbi 10.02.22
Md Rabbi Dewan
Final Year B.Sc. in Physiotherapy
Session: 2016 – 2017,
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Recommendation from the Supervisor

Sd/h 10/2/22
Shazal Kumar Das
Lacturer
Department of Physiotherapy, BHPI.

Thesis presentation date: 17th October 2021

Head of Department
B.Sc. in Physiotherapy, BHPI.

Md. Shofiqul Islam
Associate Professor & Head
Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Chapain, Savar, Dhaka-1343