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‘‘Epidemiology of Sports Injury among the Taekwondo Athletes in Dhaka City-A Descriptive Type of Cross Sectional study’’

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

''Epidemiology of Sports Injury among the Taekwondo Athletes in Dhaka City-A Descriptive Type of Cross Sectional study''

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Declaration

This work has not previously been accepted in substance for any degree and isn't concurrently submitted in candidature for any degree. This dissertation is being submitted in partial fulfillment of the requirements for the degree of B.Sc. in Physiotherapy.

I confirm that if anything identified in my work that I have done plagiarism or any form of cheating that will directly awarded me fail and I am subject to disciplinary actions of authority. I confirm that the electronic copy is identical to the bound copy of the Thesis.

In case of dissemination the finding of this project for future publication, research supervisor will highly concern, it will be duly acknowledged as graduate thesis and consent will consent taken from the physiotherapy department of *Saic College of Medical Science and Technology (SCMST).*

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CONTENTS

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LIST OF ACRONYMS

WTF: World Taekwondo Federation.

NPRS: Numerical Pain Rating Scale.

TKD: Taekwondo.

IIR: Injury Incidence Rate.

IRB: Institutional Review Board.

SPSS: Statistical Package for Social Science.

SCMST: Saic College of Medical Science and Technology

List of Figure

List of Tables

Abstract

Introduction: Taekwondo, a globally practiced martial art, emphasizes dynamic techniques such as sparring, poomsae, and demonstrations, all of which carry injury risks. Despite advancements in protective gear and training methodologies, taekwondo remains associated with a high injury rate. This study focuses on identifying common injury patterns among taekwondo athletes in Dhaka City, Bangladesh, to address safety concerns and guide injury prevention strategies. **Objectives:** This research aims to determine the prevalence, types, and causes of injuries among taekwondo athletes in Dhaka City. Secondary objectives include assessing injury severity, identifying injury sites, and evaluating protective materials. **Methodology:** A descriptive type of cross-sectional study was conducted with 111 taekwondo athletes affiliated with the Bangladesh Taekwondo Federation. Data were collected using semi-structured questionnaires, Visual Analog Scale (VAS). Convenience sampling technique was employed. Descriptive statistical analyses were performed using SPSS software to identify injury patterns and their associations with demographic and training variables. **Results:** The study revealed that (62.2%) of participants experienced between 3 to 9 injuries, with knee and hamstring injuries being most common, reported by 90.1% and 92.8% of participants, respectively. Strains (93.7%) and sprains (80.2%) were the most frequent injury types. Male athletes exhibited a higher injury frequency (58.5%). The majority of injuries (63.1%) occurred during competitions. Protective gear use was universal, yet insufficient warm-up routines and prolonged training were significant contributors to injury. **Conclusion:** Injury prevention strategies, including tailored warm-up routines, improved training practices, and enhanced protective measures, are essential for reducing injury risks. This study underscores the need for localized interventions and education programs to ensure the safety and well-being of taekwondo athletes.

Key words:

Taekwondo, sports injuries, injury prevention, martial arts, athlete safety, Dhaka City.

CHAPTER-I INTRODUCTION

1.1 Background

Taekwondo is a traditional Korean martial art that is performed in more than 206 countries worldwide. It is highly regarded for its physical and intellectual qualities. Taekwondo diverse kicking and effective attacking methods have made it a popular sport throughout the world, and since the Sydney Olympics in 2000, it has been fully recognized as an Olympic sport. Taekwondo is a martial art discipline that emphasizes dynamic techniques for adopting mobile stances. The skill requires endurance, agility, speed, and flexibility to execute the entire procedure well. Taekwondo can help individuals' mental and physical health in terms of fitness (Minjoon et al. 2016, p. 45)

As a recognized Olympic sport that has been a part of the schedule since the Sydney Olympics in 2000. It takes a combination of strength, speed, endurance, balance, flexibility, and coordination for a taekwondo practitioner to be able to perform the extremely dynamic kicking combinations used in the sport. These sets of kicks frequently involve more complex kicks, like jumping, spinning, and sliding kicks, among others (Lystad, Pollard & Graham 2009, p. 620). There are several varieties of taekwondo where competitors engage according to various sparring guidelines, such as non-contact, semi-contact, and full-contact. The World Taekwondo Federation (WTF), which oversees Olympic taekwondo tournaments, permits full-contact sparring with punches to the front of the body and kicks to the head and torso. During play, players must wear protective gear such as a mouthpiece, gloves, shin guards, forearm guards, groin guards, and trunk protectors (Zhao et al. 2020, p. 23).

In taekwondo, the weakest parts of the human body are attacked with rapid force using the hands and feet. For this reason, participating in Taekwondo competitions and training might result in fatal sports injuries. Taekwondo necessitates combative interactions with the opponent, which can lead to a variety of injuries. There are three different kinds of taekwondo: sparring, poomsae, and demonstration. In sparring, the number of strikes between the participants determines whether they win or lose. This means that there is a very high danger of harm from difficult motions or shocks from the outside, and even in the absence of physical contact, acute injury can result from

an imbalance of internal force. Poomsae is a set of methods for practicing offensive and defensive maneuvers against a computer-generated opponent. The poomsae set's force dynamics, accuracy, and proficiency determine whether they win or lose. While there is no striking involved in poomsae, precise kicks and motions earn extra points, and performing related moves can lead to a variety of injuries (Altarriba-Bartes et al. 2014, p. 24).

The self-defense methods taught in martial arts involve the use of various body parts as weapons. Translated as "the art and spirit of the foot and hand," taekwondo is a modern Korean martial art. All kicking techniques are referred to as tae, the first is known as know, and do is the heart and spirit of every Taekwondo practitioner a disciplined and respectful mindset both within and outside the Taekwondo club. In addition to the standard pattern training, often known as forms, and other non-contact aspects of Taekwondo, there is now a significant focus on athletic performance in the sport. The World Taekwondo Federation, which has 120 member countries, has made Taekwondo competitions more and more the focus of sports medicine (Schluter-Brust et al. 2011, p. 65)

One of the most popular full-contact sports is taekwondo. Approximately 80 million people practice Taekwondo worldwide, according to estimates. The competitors confront one another in an 8 m ~ 8 m square while wearing protective gear (head, mouth, forearm, and shin guards; padded trunk protector; gloves; groin pads; and foot wear). For a hit to be considered genuine and earn points it must be directed solely towards the opponent's chest or face with the feet; fists can only be directed towards the chest (Fortina et al. 2017, p. 143).

Beginning with the rank of "white belt," a beginner advances through several higher ranks, including colored belts (in descending order of rank: Yellow, Orange, Green, Purple, Blue, Brown, and Red) and black belts (in descending order of Dan level, from first to ninth). The athlete must weigh in within the weight category they applied for on the day before the competition in order to qualify for the provincial tournament. They must also possess a first degree black belt from the WTF. These rules are not present in local events, although athletes are divided according to weight, age, and gender. Kicks to the head and body that make complete contact earn points in

competition. Three two-minute rounds make up a match, which calls for both physical and mental stamina. Injury risk needs to be considered because of the pressures involved in full contact sparring and the physical demands placed on the athlete (Kazemi et al. 2019, p. 234).

Specifically, Taekwondo features one-on-one competition with an opponent and is known to cause a high number of sporting injuries. Sports injury often happens when striking an opponent or placing the foot down after performing a foot move, according to the rules of Taekwondo competition. Approximately 66.7% of individuals sustain injuries, with lower limb injuries outnumbering upper limb injuries (Park et al. 2018, p. 321).

During Taekwondo matches, ankles, knees, and thighs are the three lower extremity locations where sports injuries typically occur (Kim et al. 2020, p. 65). These sports injuries seem to have a major effect on Taekwondo athletes' stress, anxiety, and confidence levels as well as their level of sport continuing. Additionally, coaches have serious concerns about sports injuries. Earlier research on sports injuries in Taekwondo tournaments was carried out at major events or competitions, including the World Cup or national team competitions. A study on sports injuries among high school athletes was carried out in Korea. These studies offered information about sports injuries and how to prevent them, but they were unable to pinpoint specific details on the mechanisms behind the injuries that players sustain. Furthermore, the athletes' training regimens and performance abilities adapt in tandem with the ongoing changes in Taekwondo competition regulations (Oh, Lim & Jeon 2021, p. 211).

Few studies have been done on the causes of Taekwondo-related sports injuries, despite prior research indicating that these injuries are mostly related to strained muscles and sprained joints. Currently, the majority of the causes that academia considers are conjectures from specialists and researchers for which there is no concrete evidence. Coaches and medical professionals thus have significant challenges in the prevention and treatment of Taekwondo-related sports injuries. It is inevitable that various sports injuries and teaching accidents will occur during the implementation of Taekwondo instruction. This not only negatively impacts the physical and mental health of young students, but it also significantly slows down the

advancement and satisfaction of Taekwondo instruction. For this reason, precautions against injuries must be taken teenagers and coaches (Chen 2022, p. 123).

1.2 Justification:

Taekwondo, a popular martial art, is associated with a high incidence of sports injuries due to its physically demanding nature. Understanding the epidemiology of these injuries can inform public health strategies to enhance athlete safety, reduce injury rates, and promote long-term health among taekwondo practitioners in Dhaka City. This research could also have broader implications for sports injury prevention programs in other martial arts and contact sports. While there is substantial research on sports injuries in general, there is a lack of specific data on taekwondo athletes in Dhaka City. The unique environmental, social, and infrastructural factors of Dhaka can influence injury patterns differently than in other regions. This study will fill this gap by providing localized epidemiological data, which is essential for designing targeted interventions. Understanding the types and causes of injuries can help coaches and athletes implement better training regimes, enhance performance, and extend the athletes' careers.

By identifying common injury mechanisms, preventive measures can be integrated into training programs, reducing downtime and improving overall athletic outcomes. Sports injuries have significant economic implications, including medical costs and loss of productivity. By reducing injury rates through informed prevention strategies, this research can contribute to economic savings for athletes, their families, and the healthcare system. It can also reduce the financial burden on sports organizations and sponsors.

The findings of this research can guide policymakers in developing and implementing regulations and policies to improve sports safety standards in Dhaka. It can also inform the design and development of sports facilities and medical support systems tailored to the needs of taekwondo athletes.

This study will add to the global body of knowledge on sports injury epidemiology. Comparative studies can be conducted to see how injury patterns in Dhaka compare to those in other cities and countries, leading to a better understanding of the global epidemiology of taekwondo injuries and contributing to international standards for athlete safety.

Taekwondo is often practiced by youth, and injuries can deter participation in sports. By making the sport safer, this research can encourage more young people to engage in physical activity, promoting physical and mental health, discipline, and social skills development among the youth of Dhaka. The study can also explore gender-specific injury patterns, as male and female athletes might experience different types and frequencies of injuries. This understanding can lead to tailored prevention and treatment strategies, ensuring equitable safety and health benefits for all athletes.

In conclusion, the epidemiology of sports injuries among taekwondo athletes in Dhaka City is a critical area of research that holds significant potential for improving public health, enhancing athletic performance, reducing economic burdens, guiding policy development, and contributing to global sports safety knowledge.

1.3 Research questions:

- What is the prevalence of sports injury among the taekwondo athletes in Dhaka city?
- What are the common sites of injury among the taekwondo athletes?
- What are the common types of injury among the taekwondo athletes?
- What is the level of severity of pain among the taekwondo athletes?
- What is the duration of practice time among the taekwondo athletes?
- What is the injury ratio of male and female taekwondo athletes?

1.4 Objectives of study

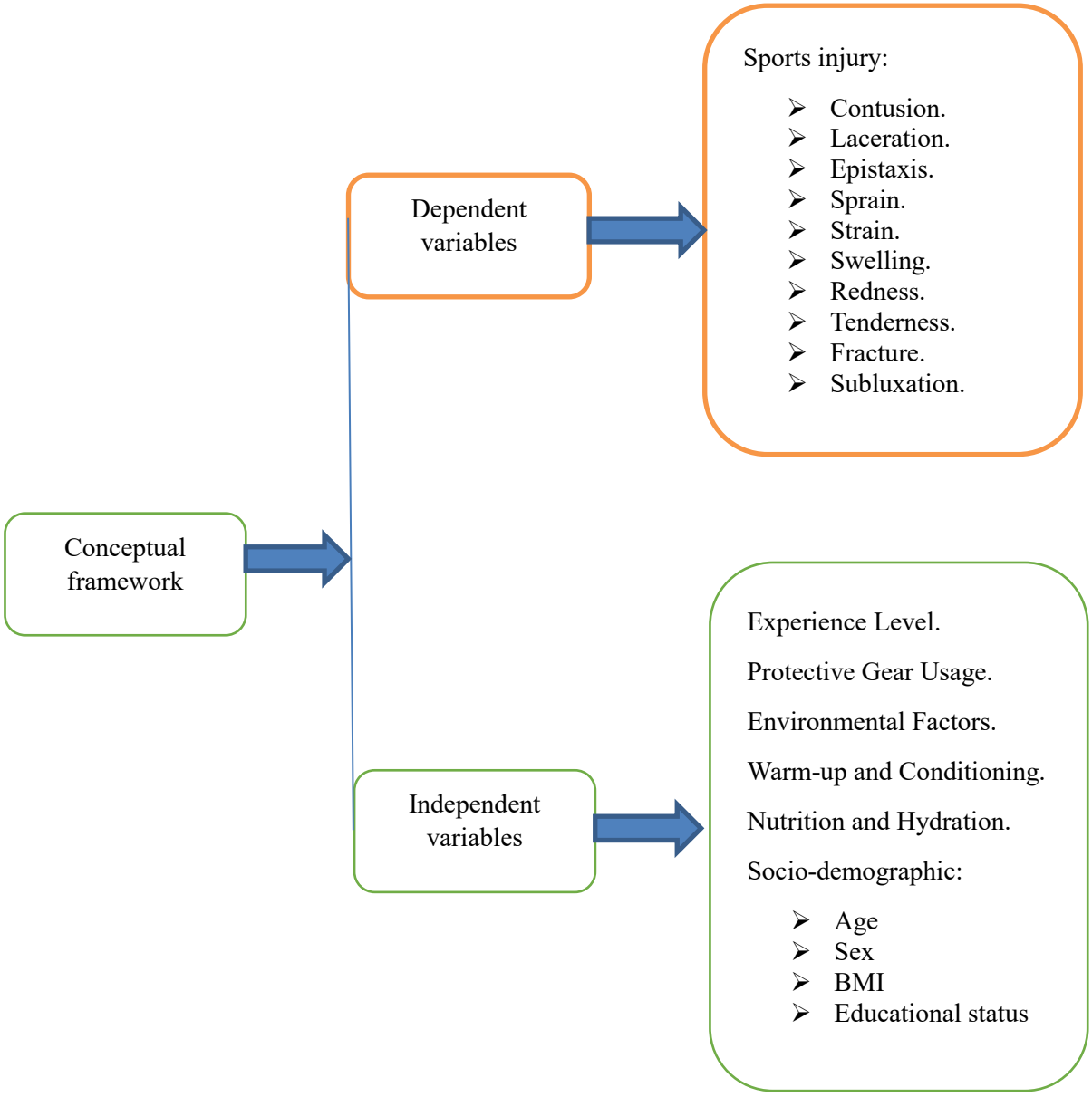
1.4.1 General Objective:

1. To determine the prevalence, types, sites and factors related to injuries experienced by the Taekwondo Athletes in the Dhaka city.

1.4.2 Specific objectives:

1. To calculate the prevalence of sports injury among the taekwondo athletes in the Dhaka city.
2. To identify the site and type of injury of the taekwondo athletes.
3. To assess the severity of pain in Taekwondo practitioners.
4. To calculate the duration of practice time daily of the study subjects.
5. To determine the ratio of injury between male and female Taekwondo practitioners.
6. To evaluate the length of experiences as a Taekwondo Athlete.
7. To find out the protective materials used by the participants.
8. To determine the level of nutritional status of to the taekwondo athletes by BMI.
9. To assess the socio demographic status of the participants through interview.

1.5 Conceptual framework:



1.5 Operationalizing definition:

Taekwondo: Taekwondo is a modern martial art and combat sport originating from Korea that emphasizes striking techniques, particularly dynamic kicks, as well as punches, blocks, and other defensive maneuvers.

Epidemiology: Epidemiology is the scientific study of the distribution, determinants, and patterns of health and disease conditions in defined populations. It is a cornerstone of public health, providing data and insights essential for preventing diseases, promoting health, and guiding health policy decisions.

Mixed martial arts: A mixed martial arts style combines several different forms of fighting, such as ground fighting, throwing, and takedowns, which include pushing an opponent from an upright or standing position into a more vulnerable or grounded position. Three to five rounds of fighting, each lasting three to five minutes, are part of competitive bouts. Typically, competitors are barefoot and wear tiny gloves with exposed fingers.

Kickboxing: kickboxing is a full-contact, punch-and-kick hybrid martial art and boxing style. Originating in the 1950s and 1960s was kickboxing. The fight occurs in a boxing ring, typically with shorts, no footwear, mouth guards, and boxing gloves to encourage the usage of kicks. Kickboxing is practiced for competition, general fitness, and self-defense.

Karate: Karate is a striking and stand-up martial art that originating in Okinawa, Japan. Basic self-defense involves blocking an opponent's blows with punches, kicks, knees, elbows, and open palms, then quickly striking the opponent to render them helpless. Takedowns are often performed in order to create space for finishing blows. In most forms of karate, weapons are employed.

Boxing: Boxing is a combat sport and martial art in which two participants trade punches for a set period of time in a boxing ring while wearing protective gloves and other safety gear like mouth guards and hand wraps.

Poomsae: Poomsae is a Korean word that refers to a sequence of Taekwondo techniques that are performed in a pattern. Poomsae is a non-contact martial arts exercise that is practiced individually.

Contusion: A contusion is a type of injury that occurs when small blood vessels are damaged due to a direct impact or trauma to the skin or underlying tissues. This results in bleeding beneath the skin without breaking the skin's surface, leading to discoloration commonly known as a bruise. Contusions can occur in soft tissues, muscles, or bones and are common in sports and everyday accidents.

Laceration: A laceration is a type of wound that occurs when the skin, and sometimes the underlying tissues, are torn, cut, or deeply incised. It is typically caused by trauma from sharp objects, such as a knife or glass, or from blunt force that causes the skin to split. Lacerations can vary in depth, length, and severity, and they may result in bleeding, pain, and swelling.

Epistaxis: Epistaxis is the medical term for a nosebleed**,** which occurs when blood vessels inside the nasal mucosa break and bleed. It can range from a minor inconvenience to a more serious condition requiring medical attention, depending on the cause and severity.

Strain: A strain is an injury to a muscle or tendon, which is the fibrous tissue that connects muscles to bones. It typically occurs when the muscle or tendon is stretched or torn due to excessive force or overuse.

Sprain: A sprain is an injury to a ligament, which is the tissue that connects bones at a joint. It typically occurs when a joint is forced beyond its normal range of motion, causing the ligament to stretch, tear, or rupture. Sprains are most common in joints like the ankle, wrist, and knee.

Redness: Redness is a physical sign characterized by the appearance of a red or pinkish discoloration on the skin, mucous membranes, or other tissues. It occurs when blood vessels in the affected area dilate, increasing blood flow, often as a result of inflammation, irritation, heat, injury, infections.

Tenderness: Tenderness refers to the sensation of pain or discomfort experienced when pressure is applied to a specific area of the body, often indicating underlying inflammation, injury, or infection. In a medical context, tenderness is typically assessed during a physical examination by palpating or pressing on the affected area to evaluate its sensitivity and identify potential conditions. It is commonly associated with musculoskeletal injuries, abdominal issues, or localized infections.

Fracture: A fracture is a medical condition characterized by the breaking or cracking of a bone. This can occur as a result of trauma, during sports activity, fall, impact, or collision, or due to underlying conditions that weaken the bones, such as osteoporosis or bone cancer.

Subluxation: Subluxation refers to a partial dislocation of a joint where the bones are displaced, but not completely. This can cause pain, instability, and limited range of motion, but the bones typically stay in relatively close proximity to each other. It often results from trauma, overuse, or weakness of the muscles and ligaments around the joint. Subluxation may occur in various joints, including the spine, shoulders, or knees. It can sometimes resolve on its own, but in other cases, medical intervention may be required.

Protective gear: Protective gear in Taekwondo refers to specialized equipment designed to ensure the safety of athletes during training and competition by reducing the risk of injuries. This gear absorbs impact, provides coverage to vulnerable areas, and complies with official rules for fair play.

CHAPTER-II LITERATURE REVIEW

Taekwondo, a popular martial art, has gained popularity over the past 50 years, leading to its inclusion as an Olympic sport in 2000. However, the sport's double point scoring techniques, such as circular and roundhouse kicks, pose a constant risk of injury. A cross-sectional study examined 100 young taekwondo practitioners aged 14-20, who had undergone injuries to their muscles and skeleton outside of training or competition. The study found that male athletes had a 43.75% injury rate, while female athletes had a 56.25% rate. The majority of injuries occurred in the lower extremity (83.33%), with the upper extremity following closely behind (62.50%). These findings align with Canadian research and the BMC Musculoskeletal Disorders journal's findings on national taekwondo competitions (Pingale & Ghagare 2017, p. 76). Over 120 million individuals worldwide practice the traditional Korean martial art of taekwondo in over 206 countries. The world taekwondo federation is in charge of it and it was accepted as an Olympic sport during the 2000 Sydney Olympic Games. (Ji 2016, p. 122).

Olympic-style taekwondo matches are marked by full-contact, powerful, and fast-paced combat using a lot of punching and kicking strikes. This calls for a great deal of endurance and flexibility (Bridge et al. 2014, p. 43). The study analyzed injury incidence rates of 82 elite taekwondo athletes from a national Olympic training center over five years. The main outcome was to compare injury incidence rates (IIRs) between practice fights and competition fights. The study found that exposure-adjusted IIR was significantly higher during competition, with the most afflicted areas being the ankle and foot region, as well as the hand and wrist. The most common injuries were fractures, bruises, and joint injuries, with most fractures occurring in the hand and wrist areas. The study highlights the importance of understanding injury rates and profiles linked to training and competition in the elite taekwondo community (Geblein et al. 2020, p. 441).

The competitive sport of taekwondo, which has amazing talents and a history of violent confrontation, developed in Korea. It is extensively dispersed globally. After being listed as an official event at the 10th Asian Games in 1986, it was again listed as such for the Sydney Olympic Games. Even though Taekwondo hasn't been popular in

China for a while, things have changed for the better recently. Specifically, women's Taekwondo has been at the forefront of the global scene. Taekwondo aggressive and confrontational style contributes to a greater injury rate. (Kim & Park 2020, p. 332)

One of the many martial arts sports, taekwondo, is in the category of contact sports that have a significant risk of oral trauma. The World Taekwondo Federation (WTF) recently updated the rules of competition and implemented a variable scoring system that increases points for head attacks which increases the likelihood of orofacial injuries (Lee et al. 2013, p. 221).

Popular fighting sports taekwondo is one of the modern summer Olympic sports. Korea is the birthplace of taekwondo, which teaches unarmed combat techniques (Park KJ et al., 2018). Athletes competing in Taekwondo at the 2016 Rio Olympics had the fourth-highest risk of injury, according to earlier research (Soligard et al. 2017, p. 114). A study involving 102 female and 117 male elite adolescent Taekwondo competitors from Korea between January and December 2019 found that female athletes suffered higher incidences of injuries than male competitors. The study also found that injury rates were significantly higher when athletes were losing weight. The lower extremities accounted for the majority of injuries (63.2%), followed by the trunk (14.2%), upper extremities (16.3%), and head and neck region (6.3%). The severity of the damage was highly influenced by the body parts in weight categories. In conclusion, athletes who lose weight quickly tend to experience sports-related injuries, and weight loss phases are the times when most injuries occur in South Korean elite adolescent Taekwondo athletes. Weight class also affects both the severity and rate of injuries. (Kim & Park 2021, p. 221)

Combat techniques have been practiced for thousands of years, with martial arts being mentioned in ancient Greece and Egypt. These martial arts can be categorized into weapons-based, health-based, grappling or throwing, and striking-based systems. A 2019 study published in the Turkish Journal of Sport and Exercise investigated the prevalence of injuries among professional taekwondo athletes during competitions. The study involved 287 athletes, all black belts, and found that 539 injuries were discovered during the interuniversity Taekwondo championship in Urdu. The most common injuries were found in the lower extremities (77%), with the foot, ankle, and

front portion of the tibia being the most commonly injured regions. Hematomas in the dorsum of the foot and sprains in the metatarsals of the foot were the most frequent types of injuries. Blocks against the kick technique (15%) and with the lower extremity (21%) were the most common injuries (Boyali et al. 2019, p. 44).

Pain and injury are expected after contact sports. Recreational and sports activities cause an estimated 8.6 million injuries annually in the United States. (Sheu et al. 2016, p. 331). Sports injury incidence and rehabilitation are covered in most sports medical literature, but little is known about how athletes experience pain throughout these injuries. The study was conducted by the relationship between the perception of pain from injuries in a Taekwondo collegiate conference and injury characteristics such as injury type, location, mechanism, time loss, and the athlete's competitive experience. There were 42 men and 20 women injured during our study. Most participants were black belts (75.8%). Pain was recorded using the Numeric Rating Scale for Pain (NRS). Lower body injuries, as well as sprains and strains, had the greatest pain scores. By mechanism, the most painful experiences were reported during falls. A substantial positive correlation was seen between pain and lost time, a one-point increase in pain score corresponded to approximately 0.85 days or training time. Notably, head injuries were regarded as less painful even if they may have been more severe and caused considerable concern (Zhao, et al. 2020, p. 82).

One of the main Olympic sports is taekwondo, which primarily uses the hands and feet for fighting or confrontation. Because of the intense competition, taekwondo is more likely to cause sports-related injuries to the muscles and joints (Sonesson et al. 2017, p. 134). Consequently, the focus of modern sports medicine research has shifted to how to successfully avoid sports injuries. One of the hottest topics at the moment is the study of the traits and causes of sports injuries sustained by Taekwondo athletes (Erickson and Sherry 2017, p. 333). The study was conducted in china 2021 about characteristics of sports injuries in taekwondo athletes in physical training, the study aim were To understand the characteristics of taekwondo sports injuries and the Methods were Using the literature and questionnaire survey methods, mathematical statistics is used to investigate the sports injuries of young Taekwondo athletes. The sample size was 100. A survey of 100 young Taekwondo athletes revealed that of the total number of injuries, 160, or 1.6 times per capita, were sustained by 93 people

with varying degrees of sports injuries, or 93% of the total number of survey participants. The remaining 7 people did not have any sports injuries, or only 7% of the total number of surveys. The total injury was 160. The most common joint to sustain an injury is the knee, which accounted for 61 person times. In second place, there were 39 ankle injuries, or 25% of the total surveyed, Twenty-four athletes or 15% of all athletes surveyed had hip joint issues, placing them in third place. Twenty individuals on the waist ranked fourth, making up 12.5% of all survey respondents there were sixteen upper limb injuries, or 10% of all injuries, placing it in fifth place (Chen et al. 2022, p. 81).

A study was conducted in Jiangxi University of Finance and Economics, School of Physical Education, Nanchang, Jiangxi, China in 2022 about characteristics and prevention of sports Injuries in taekwondo training, here the objective was this study discusses joint injuries in Taekwondo and analyzes the characteristics of Taekwondo sports injuries and preventive methods. And the sample size was 42 Taekwondo athletes from Provincial Sports School, including 31 male athletes and 11 female athletes. Athletes participate in Taekwondo training for 1 to 6 years. And the result was the feet and joints were the most often injured areas. The majority of the injuries are of the soft tissue, ligament, and muscular strain varieties. Kidney and perineal injury are the most significant injuries. (Xiao 2022, p. 622)

The high frequency of injuries in Taekwondo can be attributed to several factors (Kim et al. 2017, p. 432).a study was conducted by (Pieter & Kim 2013, p. 51) and found that higher belt ranks, such as black belts, are more prone to specific types of injuries, including muscle strains and joint injuries, due to the demanding nature of their training regimens. The study also indicated that injury rates are influenced by the type of competition and training, with full-contact sparring posing a higher risk compared to non-contact forms like poomsae.

A study was conducted in Portugal in 2019 about musculoskeletal injuries in taekwondo athletes: a nationwide study in Portugal. In this study they found that belt ranking or level of experience was a factor about injury incidence and prevalence. In this study sample size was 341 taekwondo athletes, aged between 7 and 62, 237 (69.5%) were male, and 104 (30.5%) were female. The data were collected at a

national level, 72 (21.1%) athletes belonged to the northern region of the country, 110 (32.3%) to the central region, and 159 (46.6%) to the southern region. Regarding belt rank the distribution of injury percentage were 13 (3.8%) athletes had white belt, 39 (11.5%) yellow, 40 (11.7%) green, 26 (7.6%) blue, 18 (5.3%) red, 4 (1.2%) black. (Minghelli, Machado & Capela 2020, p. 109)

Children and teenagers are still at risk for dental and orofacial injuries related to sports. Mouth guard use has been recommended for over 40 years to prevent dental and orofacial injuries, and athletic communities around the world have begun to recognize its benefits. Dental trauma can range in severity from a small chip in the enamel to many orofacial lesions. The primary factors that determine tooth injuries may be the ferocity and frequency of the competition amongst participants. Wearing a mouth guard that fits properly can often prevent or lessen dental injuries (Levin & Zadik 2012, p. 286).

A study was conducted in Croatia in 2014 the research objective was to evaluate the occurrence of dental and facial injuries, the habit of wearing mouth guard and the awareness regarding injury prevention and first aid after tooth avulsion among young taekwondo athletes in Croatia. The sample size was 484 taekwondo athletes were conducted, which included 271 male (56%) and 213 female (44%) athletes aged between 8 and 28 years. According to the poll, out of the 484 players, 300 (62%) experienced one major injury, 103 (21%) had an orofacial injury, and 194 (40%) had seen a player suffer a tooth injury. Males experienced a higher percentage of orofacial injuries (24%) compared to females (18%). Additionally, 98 athletes (20%) reported having one or more dental injuries. Of these 98, 60 athletes (61%) were male and 38 athletes (39%). The elder group had a greater frequency of orofacial injuries (42%) compared to three younger groups. 465 athletes (96%) were found to wear mouth guards, 47.1% of them wore stock mouth guards, 47.6% wore boil and bite mouth guards, and just 5.3% wore custom-made mouth guards (Gorseta et al. 2014, p. 65).

A study was conducted in Sri Lanka about “Epidemiological study of injuries in Sri Lankan Female Taekwondo Athletes: A Prospective Study” published on July 2020. This study set out to determine the injury profile of female taekwondo competitors that took part in the 2017 National Sports Festival. Where sample size was 71. Out of

the 71 competitors, 22 (or 31%) sustained injuries, and 25 (35.2%) of those injuries were reported by the athletes themselves. The most prevalent injury type was contusions (80%) and most of the injuries were (88%) reported at the 2nd and 3rd rounds of the match. Considering the belt color, Red and Black belters had more injuries (68%) during the championship. (Ranaweera, Kumari & Kodikara 2020, p. 329).

A university taekwondo championship was conducted in Italy in 2017 and the title was Analysis of Injuries and Risk Factors in Taekwondo during the 2014 Italian University Championship. The purpose was of this study "to analyze the risk factors and type of injuries occurring in Taekwondo athletes participating in a national competition" and their sample size was 127. And the result was of this study during the elimination rounds and the opening match of the day, bruising accounted for around 89% of the injuries, which were mostly detected on the lower limbs (61%). There was a greater chance of injury in the second round (56%), and in the day's opening match (72%). 83% of the athletes who had injuries were able to finish the game. When comparing the average age of injured athletes (23.6-2.06) years to their average training years (8.4-7.05), it becomes apparent that these athletes started this discipline somewhat later. The number of completed matches evens those with injuries increases with training age and weekly hours. (Chen 2022, p. 431).

CHAPTER-III METHODOLOY

3.1 Study design:

This was a descriptive type of cross-sectional study. Because cross sectional study is helpful to find out the patterns of sports injuries and associated factors among the Taekwondo athletes. For this reason cross sectional design has been selected.

3.2 Study area:

The relevant data for the present study were collected from the athletes at Bangladesh Taekwondo Federation.

3.3. Study place

The study was conducted at SAIC College of Medical Science and Technology (SCMST), Mirpur in Dhaka. But data was collected from Bangladesh Taekwondo Federation.

3.4 Study period:

The period of the study was one year extending from 1st August 2023 to July 2024.

3.5 Study population:

Taekwondo athletes in Dhaka city constituted the study population for the present study.

3.6 Sample size:

The sample size of the study was calculated by the following statistical formula.

We know that –

$$n = \frac{Z^2 pq}{d^2}$$

Here,

n = required sample size

$\boldsymbol{Z}$= confidence level at 95% (standard value of 1.96)

$P = P$ is the prevalence taken as 48.7% (Pingale and Ghagare 2017, p. 2)

d = margin of error at 5% (standard value of 0.05)

So, sample size is 383.

So, the researcher aim to focus his study by 383 sample following the calculation above initially.

3.7 Inclusion criteria:

1. Age of the participants 15 to 40 years (Minghelli, Machado and Capela, 2020).
2. Both professional and amateur athletes were included.
3. Male and female taekwondo athletes who were willing to take part in the study.
4. Taekwondo athletes who were sports injured in selected sports institute in different location.

3.8 Exclusion criteria:

5. Exclude individuals who were not actively practicing or competing in taekwondo.
6. Participants who did not experience an injury.
7. Exclude participants who failed to complete survey information or provide unreliable data.
8. Exclude this athlete who is ruled out from practice or competition due to any severe injury.

3.9 Sampling technique:

Convenience sampling technique was used to select athletes from the federation.

3.10 Method of Data collection

3.10.1 Techniques of data collection

The technique of data collection was face to face formal interview with the participants.

3.10.2 Instrument of data collection

A Pretested structured questionnaire was used to collect information on pattern of sports injuries and its associated factors among the Taekwondo athletes & related variables.

3.11 Procedure of data collection

The researcher obtained permission from the Ethical Review Board of SAIC College of Medical Science and Technology to carry out the study. A written permission was also taken from the concerned authority of Bangladesh taekwondo Federation, Dhaka for data collection. After that the researcher approached the taekwondo players and the aim and objectives of the study was explained in details to them. Interested players were included in the study. Participants were asked to fill up written consent form with their signature to ensure volunteer participation. They were informed about the privacy and confidentiality of the information. Then the researcher started interview with the participants by using the pretested questionnaire. The interview was in a cordial environment. At the end of the interview, the researcher thanked the participants.

3.12 Data management:

3.12.1 Editing of data:

The questionnaires were reviewed after data collection to identify any mistakes or inconsistencies. Necessary corrections were done as required. All responses were adequately coded for analysis.

3.12.2 Entry of data:

The coded data were entered into a computer based on the variables of the study.

3.12.3 Analysis of data

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) program. Descriptive statistics, such as frequency, distribution, range, mean, and percentage were performed. For inferential statistics the relationship between independent and dependent variables were analyzed accordingly.

3.13 Result

The findings of the study are presented in the result section of the thesis, including tables, charts, graphs, and descriptions of the variables.

3.14 Ethical consideration:

The researcher submitted a study protocol to the Ethical Review Board of Saic College of medical science and technology (SCMST). The ERB of SCMST approved

the research protocol on time. The researcher also obtained permission from the authority of Taekwondo Federation to collect data from the Taekwondo players.

All participants were provided with detailed information about the study's purpose, procedures, benefits, and risks. Written informed consent was obtained from all participants before their inclusion in the study. Personal and medical information of the participants were kept strictly confidential. Data were anonymized by assigning unique identification codes, and only the researcher had access to the data.

Participation in the research was entirely voluntary, and participants had the right to withdraw from the study at any time without any negative consequences or loss of benefits. There was minimum risk to participants, as it involved only non-invasive data collection methods (e.g., interviews and medical record reviews). No experimental treatments or procedures were administered. The study's findings might help improve understanding and management of preventive measures and protection, potentially benefiting Taekwondo in the long term. Data collected will be used solely for research purposes and will not be shared with unauthorized individuals or entities.

CHAPTER-IV RESULTS

The present research was a descriptive type of cross-sectional one carried out with the objective of determining the pattern of sports injuries of the Taekwondo athletes in Dhaka city. The required data were collected from a sample size of 111 players by interview using a pretested questionnaire. The collected data were analyzed by SPSS software and the results of the study have been presented in the following section.

Table no. 1: Frequency distribution of respondents according to socio-demographic variables.

Variables	Category	Frequency (N)	%
Age in years	Less than 20	22	18.0
	20 - 32	70	57.4
	More than 32	19	15.6
Sex of the respondents	Male	55	49.5
	Female	56	50.5
Living area	Urban	40	36.0
	Rural	71	64.0
Marital status	Married	56	50.5
	Unmarried	55	49.5
Educational status	Illiterate	0	0.0
	Primary	13	11.7
	Secondary	65	58.6
	Higher secondary	26	23.4
	Graduate and above	07	6.3
Family income in TK	Less than 16000	21	18.9
	16000-36000	74	66.7
	More than 36000	16	14.4
BMI of the respondents	Under weight	6	5.4
	Normal weight	89	80.2

	Pre obesity	14	1.6
	Obesity type-I	1	0.9

Regarding frequency distribution of the respondents by age, it was found that 70 (57.4%) respondents belonged to the age group of 20 – 32 years. It was also found that ages of 22 (18.0%) respondents were less than 20 years and age of 19 (15.6%) respondents was more than 32 years. The mean age and standard deviation was 26.47 years and 6.416 respectively. About gender of the athletes, it was found that 55 (49.5%) respondents were male and 56 (50.5%) respondents were female.

It was found that 56 (50.5%) participants were married and 55 (49.5%) participants were unmarried. The study showed that 71 (64.0%), out of the 111 respondents were living in rural areas, while 40 (36.0%) respondents were living in urban areas.

The study revealed that, the educational qualifications of the respondents in the study area, none of the individuals were illiterate and 13 (11.7%) participants had completed primary education, 65 (58.6%) participants had attained secondary education, 26 (23.4%) participants had completed higher secondary education and 7 individuals (6.3%) were graduates. It was found that 21 (18.9%) respondents family income was less than Taka 16000 and 74 (66.7%) respondents' family income was between 16000 – 36000. The mean income was Taka 25,909.92 and SD was 10,274.903.

About BMI of the respondents, it was revealed that 6 (5.4%) participants were underweight (BMI less than 18.4), 89 (80.2%) respondents had normal weight (BMI = 18.5 – 29), with 14 (1.6%) being pre-obese, and 1 (0.9%) having Obesity Type-I. (Mean = 2.0901, SD = 0.459)

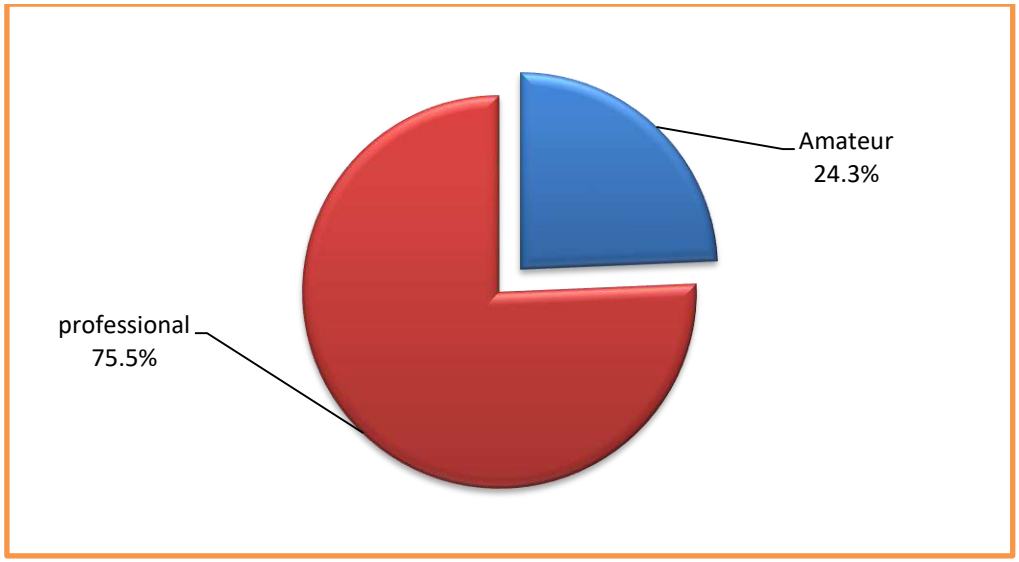


Figure no. 1 Frequency distribution of the respondents by level of competition.

About type of competition, 84 (75.5%) participants were professional and 27 (24.3%) players were amateur competitors, highlighting a significantly higher representation of professional athletes compared to amateurs (Figure no. 2).

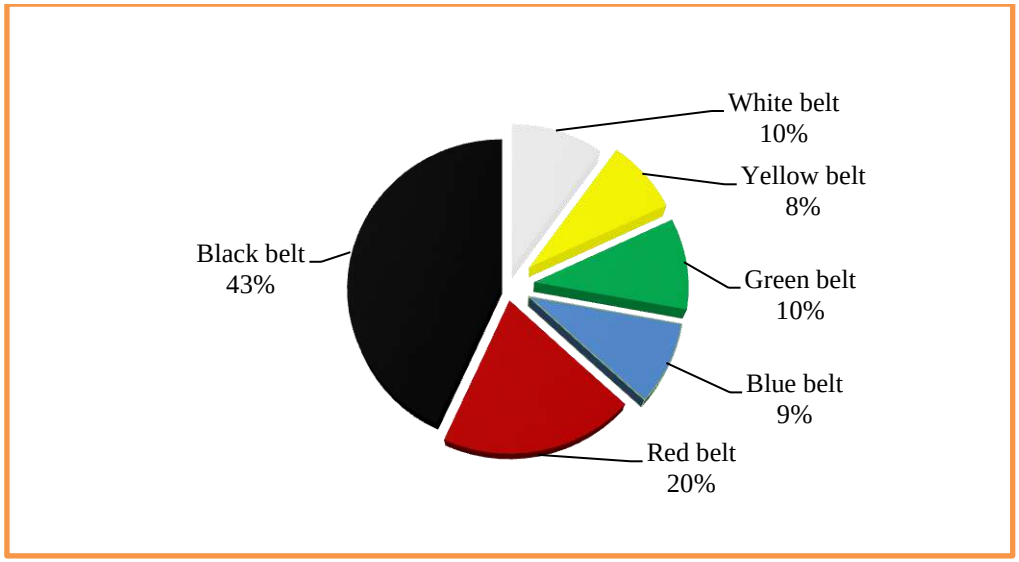


Figure no. 2. Belt used by the taekwondo athletes

Regarding type of belt used by the participants, it was found that 48 (43.0%) players were found to be using black belt, 11 (9.9%) respondents were using white belt rank, 9 (8.1%) respondents were using yellow belt rank, 11 (9.9%) participants were using green belt rank, 10 (9.0%) participants were using blue belt rank, 22 (19.8%) participants were using red belt (Figure no. 3).

Table no. 2. Frequency distribution of the respondents by experience in Taekwondo.

Experience in years	Frequency	
	N	%
less than 2	17	15.3
2 - 13	76	68.5
More than 13	18	16.2
Total	111	100

Mean = 7.71, SD = 5.539

The study revealed that 17 (15.3%) participants had less than 2 years of experience, 76 (68.5%) participants had experienced 2 - 13 years and 18 (16.2%) players had more than 13 years (Table no. 2).

Table no. 3. Frequency distribution of the respondents by matches per week.

Match per week	Frequency	
	N	%
less than 3	41	36.9
3 - 8	70	63.1
Total	111	100

Mean = 3.60, SD = 1.527

About match per week, it was found that 41(36.9%) participants used to play less than 3 matches per week while 70 (63.1%) respondents used to play 3 - 8 matches per week (Table no. 3).

Table no. 4. Frequency distribution of the respondents by average duration of the each training or competition session.

Match duration per day in hours	Frequency	
	N	%
less than 2	44	39.6
2 - 3	58	52.3
More than 3	9	8.1
Total	111	100

Mean = 2.53, SD = 0.851

The study showed that 44 participants (39.6%) reported less than 2 hours of training per sessions, 58 participants (52.3%) reported 2-3 hours of training or competition per session, and 9 participants (8.1%) reported more than 3 hours of training per session (Table no.4).

The study indicated that all 111 participants (100%) reported performing specific injury prevention exercises before competing or training. Additionally, all 111 participants in taekwondo experienced an injury during practice or competition, highlighting the common occurrence of injuries within the sport, with 100% of respondents acknowledging this.

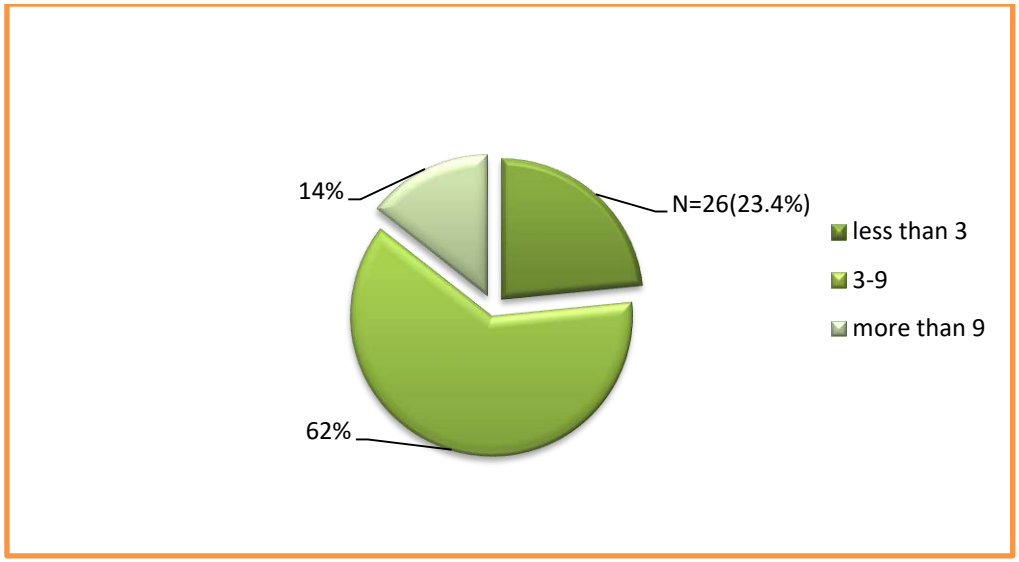


Figure no. 3. Distribution of the respondents by injury.

The injury frequency in this study shows that 62.2% of athletes experienced 3 to 9 injuries, while the majority (69) experienced more than nine injuries. A smaller group (23.4%) had fewer than three injuries, and 14.4% had more than nine. This suggests a moderate injury frequency among athletes (Figure no.5).

Table no. 5. Frequency distribution of the respondents by type of injury.

Types of injury	Frequency					
	Yes		No		Total	
	N	%	N	%	N	%
Sprain	89	80.2	22	19.8	111	100.0
Strain	104	93.7	7	7.3	111	100.0
Fracture	15	13.5	96	86.5	111	100.0
Dislocation	25	22.5	86	77.5	111	100.0
Concussion	89	80.2	22	19.8	111	100.0
Brain injury	09	8.1	109	91.9	111	100.0
Cuts	37	33.3	74	66.7	111	100.0
Epistaxis	81	73.0	30	27	111	100.0

The findings on the types of injuries among participants show that sprains were reported by 89 (80.2%) participants, strains by 104 (93.7%), fractures by 15 (13.5%), dislocations by 25 (22.5%), concussions by 89 (80.2%), brain injuries by 9 (8.1%), cuts by 37 (33.3%), and epistaxis (nosebleeds) by 81 (73.0%) participants (Table no. 5).

Table no. 6. Frequency distribution of the respondents by site of injury.

Sites of injury	Frequency					
	Yes		No		Total	
	N	%	N	%	N	%
Head	38	34.2	73	65.8	111	100
Neck	32	28.8	79	71.2	111	100
Shoulder	13	11.7	98	88.3	111	100
Elbow/arms	60	54.1	51	45.9	111	100
Wrist	73	65.8	38	34.2	111	100
Waist	34	30.6	77	69.4	111	100
Thigh	77	69.4	34	30.6	111	100
Knee	100	90.1	11	9.9	111	100
Hamstring	103	92.8	8	7.2	111	100
Foot	71	64.0	40	36.0	111	100
Spine	5	4.5	106	95.5	111	100

The study reveals that injuries to the head were reported by 38 (34.2%) participants, neck injuries by 32 (28.8%), shoulder injuries by 13 (11.7%), and injuries to the elbow/arms by 60 (54.1%) participants. Wrist injuries were reported by 73 (65.8%) participants, waist injuries by 34 (30.6%), thigh injuries by 77 (69.4%), knee injuries by 100 (90.1%), and hamstring injuries by 103 (92.8%). Foot injuries were reported by 71 (64.0%), and only 5 (4.5%) participants reported spine injuries (Table no.6).

Table no. 7. Frequency distribution of the respondents by cause of injury.

Causes of injury	Frequency	
	N	%
Competition	70	63.1
Training	33	29.7
Conditioning exercise	7	6.3
Accidental	1	0.9
Others	0	0
Total	111	100

Regarding the cause of injury, it was found that 70 (63.1%) athletes were injured during competition, 33 (29.7%) during training, 7 (6.3%) during conditioning exercises, and 1 (0.9%) accidentally. No other causes of injury were reported (Table no.7).

Table no. 8. Frequency distribution of the respondents by unable to train or compete.

Unable to train or compete	Frequency	
	N	%
Less than 21	97	87.4
21 - 48	12	10.8
More than 48	2	1.8
Total	111	100.0

Mean = 13.82, SD = 34.00

Regarding the frequency distribution of respondents who were unable to train or compete, it was found that 97 (87.4%) players were unable to train for less than 21 days and 12 (10.8%) players were unable to train for duration of 21 to 48 days (Table No. 8).

Table no. 9. Frequency distribution of the respondents by receiving treatment after injury.

Receiving treatment after injury	Frequency	
	N	%
Yes	109	98.2
No	2	0.2
Total	111	100

The study showed that 109 (98.2%) participants had received treatment for their recent injury, while only 2.8% had not received treatment, indicating high medical engagement among the participants (Table no.9).

Table no.10. Frequency distribution of the respondents by types of treatment taken.

Types of treatment taken	Frequency	
	N	%
Specialist in orthopedic medicine	26	23.4
Specialist in sports injury	37	33.3
Physiotherapist	48	43.2
Total	111	100

Regarding the type of treatment received by the injured players, it was revealed that 26 (23.4%) respondents were receiving treatment from a specialist in orthopedic medicine, 37 (33.3%) were receiving treatment from a specialist in sports injuries, and 48 (43.2%) were receiving treatment from a physiotherapist (Table no.10). It was revealed that all athletes were using protective gear during training or competition. The study showed that all athletes 111(100%) were using all type of protective gear including, mouth guard, head guard, shine guard, hand gloves, during competition and training.

Table no. 11.Frequency distribution of the respondents by specific warm-up routine exercise before training or competition.

Specific warm-up exercise routine before training or competition	Frequency	
	N	%
Always	77	69.4
Sometimes	22	19.8
Seldom	12	10.8
Total	111	100.0

The study showed that 77 (69.4%) participants always maintained a specific warm-up exercise routine before training or competition, 22 (19.8%) maintained it sometimes, and 12 (10.8%) maintained it seldom (Table no. 11).

Table no.12. Frequency distribution of the respondents by specific cool down routine exercise before training or competition.

Specific cool down exercise routine before training or competition	Frequency	
	N	%
Always	83	74.8
Sometimes	14	12.6
Seldom	14	12.6
Total	111	100.0

It was revealed that 83 (74.8%) participants always maintained a specific cool-down exercise routine before training or competition, 14 (12.6%) maintained it sometimes, and 14 (12.6%) maintained it seldom (Table no.12). It was found that all of athletes were getting education about injury prevention in taekwondo. The study showed that all participants 111 (100%) were stated that injury prevention education reduced athletes risk of injury.

Table no.13. Frequency distribution of the respondents by level of pain among the taekwondo athletes.

Numerical pain rating scale.	Frequency	
	N	%
Mild	3	2.7
Moderate	74	66.7
Severe pain	34	30.6
Total	111	100.0

The results showed that the majority of participants, 74 (66.7%), reported experiencing moderate pain. Severe pain was reported by 34 participants (30.6%), while a small minority, consisting of only 3 participants (2.7%), reported mild pain (Table no. 13).

Table no.14. Frequency distribution of the respondents by level of profession and number of injuries.

Number of injuries	Level of profession					
	Amateur		Professional		Total	
	N	%	N	%	N	%
Less than 3	16	59.26	10	11.90	26	23.42
3 - 9	11	40.74	58	69.04	69	62.16
More than 9	0	0.0	16	19.04	16	14.41
Total	111	24.3	84	75.7	111	100.00

$$\chi^2 = 27.338,\ df = 2,\ p = 0.000$$

Regarding the frequency distribution of respondents by injury and profession type, it was found that 27 (24.3%) were amateur athletes. Among them, 16 (59.26%) had experienced fewer than three injuries, while 11 (40.74%) had sustained between 3 and 9 injuries. There were 84 professional players, of whom 58 (69.04%) had experienced 3 to 9 injuries, 16 (19.04%) had reported more than 9 injuries, and 10 (9.9%) had sustained fewer than 3 injuries. The findings indicated that the relation between type of profession and number of injury was statistically highly significant ($\chi^2 = 27.338$, $df = 2$, $p = 0.000$) [Table no. 14].

Table no.15. Frequency distribution of the respondents by number of injuries and level of experience.

Number of injuries	Level of experience in years							
	Less than 2 yrs		2 – 13 yrs		More than 13 yrs		Total	
	N	%	N	%	N	%	N	%
Less than 3	9	52.94	17	22.37	0	0.0	26	23.4
3 - 9	8	47.05	52	68.42	9	50.0	69	62.2
More than 9	0	0.0	7	9.21	9	50.0	16	14.4
Total	17	15.3	76	68.5	18	16.2	111	100.0

$$\chi^2 = 31.799,\ df = 4,\ p = 0.000$$

Among participants with less than 2 years of experience, 9 (52.941%) reported fewer than 3 injuries, and 8 (47.05%) reported 3 to 9 injuries. For those with 2 to 13 years of experience, 17 (22.37%) reported fewer than 3 injuries, 52 (68.42%) reported 3 to 9 injuries, and 7 (6.3%) reported more than 9 injuries. Among participants with more than 13 years of experience, 9 (9.21%) reported 3 to 9 injuries, and 9 (50.0%) reported more than 9 injuries. The association between years of experience and the number of injuries was found to be statistically highly significant ($\chi^2 = 31.799$, $df = 4$, $p = 0.000$) [Table no. 15].

Table no.16. Frequency distribution of the respondents by number of injury and sex.

Number of Injury	Sex of the respondents					
	Male		Female		Total	
	N	%	N	%	N	%
Less than 3	8	14.54	18	32.14	26	23.4
3 - 9	39	70.90	30	53.57	69	62.2
More than 9	8	14.54	8	14.28	16	14.4
Total	55	49.54	56	50.45	111	100.0

$\chi^2 = 5.011$, $df = 2$, $p = 0.082$

Regarding the frequency distribution of respondents by number of injuries and sex, it was found that out of 55 male participants, 39 (70.90%) experienced 3 to 9 injuries, and 8 (14.54%) experienced fewer than 3 injuries. Among female participants, 30 (53.57%) reported experiencing 3 to 9 injuries, while 18 (32.14%) experienced fewer than 3 injuries. The study showed that the association between number of injury and sex of the participants was statistically near significant ($\chi^2 = 5.011$, $df = 2$, $p = 0.082$) [Table no. 16].

Table no.17. Frequency distribution of the respondents by unable to play and experience.

Experience in years	Unable to play							
	Less than 21 days		21 – 48 days		More than 48 days		Total	
	N	%	N	%	N	%	N	%
Less than 2	17	100.0	0	0.0	0	0.0	17	15.3
2 - 13	69	90.79	6	7.89	1	1.3	76	68.5
More than 13	11	61.11	6	33.33	1	5.56	18	16.2
Total	97	87.39	12	10.81	2	1.8	111	100.0

$$\chi^2 = 14.527,\ df = 4,\ p = 0.006$$

It was observed that due to injuries, players were unable to play for some days. Among the 76 players with 2 to 13 years of experience (68.5%), 69 players (90.79%) were unable to play for fewer than 21 days, while 6 players (7.89%) were unable to play for 21 to 48 days. Additionally, there were 18 players with more than 13 years of experience. Among them, 11 players (61.11%) reported being unable to play for fewer than 21 days. The association between years of experience and the duration of time unable to play was found to be statistically highly significant. ($\chi^2 = 14.527$, $df = 4$, $p = 0.006$) [Table no. 17].

Table no.18. Frequency distribution of the respondents by belt rank and hours of training or competition.

Belt rank	Hours of training or competition							
	Less than 2 hrs		2 – 3 hrs		More than 3 hrs		Total	
	N	%	N	%	N	%	N	%
White belt	0	0.0	10	90.9	1	0.9	11	9.9
Yellow belt	0	0.0	6	66.66	3	33.33	9	8.1
Green belt	2	18.18	7	63.63	2	18.18	11	9.9
Blue belt	6	60.00	3	30.0	1	10.0	10	9.1
Red belt	21	95.45	1	4.55	0	0.0	22	19.8
Black belt	15	31.25	31	64.59	2	4.17	48	43.2
Total	44	39.6	58	52.3	9	8.1	111	100.0

$$\chi^2 = 55.298,\ df = 10,\ p = 0.000$$

The frequency distribution of respondents by belt rank and hours of training showed that 48 participants (43.2%) were black belt holders. Among them, 31 participants (64.59%) trained for 2 to 3 hours, while 15 participants (31.25%) trained for less than 2 hours. The study also found that 22 participants (19.8%) were red belt holders. Among these, 21 participants (95.48%) trained for less than 2 hours. Of the 11 green belt holders, 7 participants (63.63%) trained for 2 to 3 hours. The association between belt rank and hours of training was found to be statistically highly significant. ($\chi^2 = 55.298$, $df = 10$, $p = 0.000$) [Table no. 18].

Table no.19. Distribution of the respondents by belt use in taekwondo athletes and injury frequency.

Belt rank	Injury frequency							
	Less than 3		3 - 9		More than 9		Total	
	N	%	N	%	N	%	N	%
White belt	8	72.72	3	27.27	0	0.0	11	9.9
Yellow belt	3	33.33	6	66.66	0	0.0	9	8.1
Green belt	2	18.18	9	81.81	0	0.0	11	9.9
Blue belt	6	60.0	4	40.0	0	0.0	10	9.1
Red belt	5	22.72	15	68.18	2	9.09	22	19.8
Black belt	2	4.16	32	66.66	14	29.16	48	43.2
Total	26	23.42	69	62.16	16	14.41	111	100.0

$$\chi^2 = 16.424,\ df = 10,\ p = 0.088$$

Regarding the distribution of respondents by belt rank and injury frequency in taekwondo athletes, it was found that 48 players (43.2%) were black belt holders. Among them, 32 players (66.66%) experienced injury 3 to 9 times, while 14 players (29.16%) experienced more than 9 times. The study also showed that 22 players (19.8%) were red belt holders, with 15 players (68.18%) having an injury frequency of 3 to 9. Among the green belt holders, 9 players (81.81%) had an injury frequency of 3 to 9 (Table no. 19).

Table no.20. Frequency distribution of the respondents by belt used in taekwondo with their causes of injury.

Belt rank	Causes of injury									
	Competition		Training		Conditioning exercise		Accidental		Total	
	N	%	N	%	N	%	N	%	N	%
White belt	1	9.09	5	45.45	5	45.45	0	0.0	11	9.9
Yellow belt	0	0.0	7	77.78	2	22.22	0	0.0	9	8.1
Green belt	5	45.45	6	54.54	0	0.0	0	0.0	11	9.9
Blue belt	6	60.0	4	40.0	0	0.0	0	0.0	10	9.0
Red belt	20	90.90	1	4.55	0	0.0	1	4.55	22	10.8
Black belt	38	79.17	10	20.83	0	0.0	0	0.0	48	43.2
Total	70	63.06	33	29.73	7	6.30	1	0.9	111	100.0

$\chi^2 = 72.632$, $df = 15$, $p = 0.000$

The frequency distribution of respondents by belt level and their causes of injury revealed that 48 (43.2%) participants were black belt holders. Among these, 38 (79.17%) players sustained injuries due to competition, while 10 (20.83%) players' injuries were caused by training. The study also found that 22 (10.8%) players were red belt holders, with 20 (90.90%) sustaining injuries from competition. Among the green belt holders, 5 (45.45%) players were injured during competition, while 6 (54.54%) sustained injuries from training. The association between type of belt used and cause of the injury of the players was found to be statistically highly significant ($\chi^2 = 72.632$, $df = 15$, $p = 0.000$) [Table no. 20].

Table no.21. Frequency distribution of the respondents by type of injury and level of profession.

Type of injury	Frequency		χ^2 value and P value
	Amateur	Professional	
	N (%)	N (%)	
Sprain	20 (22.5)	69 (77.5)	$\chi^2 = 0.837$ $p = 0.360$
Muscle strain	23 (22.1)	81 (77.9)	$\chi^2 = 4.371$ $p = 0.037$
Bone fracture	3 (20.0)	12 (80.0)	$\chi^2 = 0.167$ $p = 0.675$
Joint dislocation	11 (44.0)	24 (56.0)	$\chi^2 = 6.786$ $p = 0.009$
Concussion	21(23.6)	68 (76.4)	$\chi^2 = 0.553$ $p = 0.758$
Bone injury	6 (66.7)	3 (33.3)	$\chi^2 = 9.539$ $p = 0.002$
Cuts	10 (27.0)	27 (73.0)	$\chi^2 = 0.220$ $p = 0.639$
Epistaxis	16 (19.8)	65 (80.2)	$\chi^2 = 3.402$ $p = 0.065$

The frequency distribution of respondents by type of injury and level of profession revealed the following: Among the respondents, 22 (22.5%) amateur players and 69 (77.5%) professional players sustained sprains. In the group of amateur players, 23 (22.1%) experienced muscle strain, 11 (44.0%) had joint dislocations, 6 (66.7%) suffered bone injuries, and 16 (19.8%) had epistaxis. In the professional player group, 81 (77.9%) had muscle strain, 24 (56.0%) sustained joint dislocations, 33.3% experienced bone injuries, and 65 (80.2%) had epistaxis. Among the injuries, muscle strain, joint dislocation, bone injury, and epistaxis were found to have a statistically significant association with the level of profession of the players (Table no.21).

Table no. 22. Frequency distribution of the respondents by sites of injury and level of profession.

Sites of injury	Level of competition		χ^2 value and P value
	Amateur	Professional	
	N (%)	N (%)	
Head	6 (5.4)	32(28.8)	$\chi^2 = 2.287$ $p = 0.131$
Neck	7 (6.3)	25(22.5)	$\chi^2 = 0.147$ P = 0.702
Shoulder	5 (4.5)	8(7.2)	$\chi^2 = 1.599$ $p = 0.206$
Arm/Elbow	14 (12.6)	46(41.4)	$\chi^2 = 0.070$ $p = 0.792$
Wrist/hand	15 (13.5)	58(52.3)	$\chi^2 = 1.652$ $p = 0.199$
Waist	6 (5.4)	28(25.2)	$\chi^2 = 1.187$ $p = 0.276$
Thigh	16 (14.4)	61(55.0)	$\chi^2 = 1.716$ $p = 0.190$
Knee	23 (20.7)	77 (69.4)	$\chi^2 = 0.961$ $p = 0.327$
Hamstring	20 (18.0)	83 (74.8)	$\chi^2 = 18.693$ $p = 0.000$
Ankle	19 (17.1)	19 (17.1)	$\chi^2 = 0.635$ $p = 0.425$
Spine	3 (2.7)	3 (2.7)	$\chi^2 = 3.620$ $p = 0.057$

The frequency distribution of respondents by injury sites and professional level revealed that among amateur players, 6 (5.4%) experienced head injuries, 14 (12.6%) had arm injuries, 15 (13.5%) sustained wrist injuries, 16 (14.4%) had thigh injuries, 23 (20.7%) had knee injuries, 20 (18.0%) suffered hamstring injuries, and 19 (17.1%) experienced ankle injuries. Among professional players, 32 (28.8%) had head injuries, 25 (22.5%) had neck injuries, 46 (41.4%) sustained elbow injuries, 58 (52.3%) had hand injuries, and 83 (74.8%) experienced hamstring injuries. Hamstring injuries were found to be associated with the players' professional level (Table no. 22).

Table no. 23. Frequency distribution of the respondents by site of injury and sex of the player.

Sites of injury	Sex of the respondents		χ^2 value and *p* value
	Male	Female	
	N (%)	N (%)	
Head	19(17.1)	19(17.1)	$\chi^2 = 0.005$ $p = 0.945$
Neck	21(18.9)	11(9.9)	$\chi^2 = 4.648$ $p = 0.031$
Shoulder	7(6.3)	6(5.4)	$\chi^2 = 0.109$ $p = 0.742$
Arm/Elbow	25(22.5)	35(31.5)	$\chi^2 = 3.246$ P = 0.072
Wrist/hand	33(29.7)	40(36.0)	$\chi^2 = 1.610$ $p = 0.205$
Waist	22(19.8)	12(10.8)	$\chi^2 = 4.504$ $p = 0.034$
Thigh	36(32.4)	41(36.9)	$\chi^2 = 0.786$ $p = 0.375$
Knee	49(44.1)	51(45.9)	$\chi^2 = 0.122$ $p = 0.727$
Hamstring	51(45.9)	52(46.8)	$\chi^2 = 0.001$ $p = 0.979$
Ankle	36(32.4)	35(31.5)	$\chi^2 = 0.105$ $p = 0.746$
Spine	2(1.8)	3(2.7)	$\chi^2 = 0.191$ $p = 0.662$

The study found that head injuries occurred equally in both males and females, with 19 (17.1%) in each group ($\chi^2 = 0.005$, $p = 0.945$), indicating no significant difference. Neck injuries were significantly higher in males (21, 18.9%) compared to females (11, 9.9%) ($\chi^2 = 4.648$, $p = 0.031$). Shoulder injuries occurred in 7 (6.3%) males and 6 (5.4%) females, but this difference was not statistically significant ($\chi^2 = 0.109$, $p = 0.742$). Injuries to the arm and elbow were observed in 35 (31.5%) females and 25 (22.5%) males, with no statistically significant difference ($\chi^2 = 3.246$, $p = 0.072$). Wrist and hand injuries were more common in females (40, 36.0%) than in males (33, 29.7%), but the difference was not significant ($\chi^2 = 1.610$, $p = 0.205$). Waist injuries occurred in 22 (19.8%) males and 12 (10.8%) females, with a statistically significant difference ($\chi^2 = 4.504$, $p = 0.034$). Thigh injuries were observed in 41 (36.9%) females and 36 (32.4%) males, but the difference was not statistically significant ($\chi^2 =$

0.786, $p = 0.375$). Knee injuries were reported in 49 (44.1%) males and 51 (45.9%) females ($\chi^2 = 0.122$, $p = 0.727$). Hamstring injuries occurred in 51 (45.9%) males and 52 (46.8%) females, with no significant difference ($\chi^2 = 0.001$, $p = 0.979$). Ankle injuries were found in 36 (32.4%) males and 35 (31.5%) females ($\chi^2 = 0.105$, $p = 0.746$). Finally, spine injuries were reported in 2 (1.8%) males and 3 (2.7%) females, with no significant difference ($\chi^2 = 0.191$, $p = 0.662$) [Table no.23].

Table no. 24. Frequency distribution of the respondents by sex of the patient and types of injury.

Types of injury	Frequency		χ^2 value and *p* value
	Male	Female	
	N (%)	N (%)	
Sprain	41(36.9)	48(43.2)	$\chi^2 = 2.178$ $p = 0.148$
Muscle strain	48(43.2)	*56(50.5)*	*$\chi^2 = 7.607$* *P = 0.006*
Bone fracture	11(9.9)	4(3.6)	$\chi^2 = 3.925$ $p = 0.048$
Joint dislocation	14(12.6)	11(9.9)	$\chi^2 = 0.537$ $p = 0.464$
Concussion	44(39.6)	45(40.5)	$\chi^2 = 1.050$ $p = 0.592$
Brain injury	6(5.4)	3(2.7)	$\chi^2 = 1.148$ $p = 0.284$
Cuts	21(18.9)	16(14.4)	$\chi^2 = 1.153$ $p = 0.283$
Epistaxis	48(43.2)	33(29.7)	$\chi^2 = 11.309$ $p = 0.001$

The study showed the frequency of various injuries among male and female athletes. Sprains were slightly more common in females (43.2%) than in males (36.9%), with no significant difference ($p = 0.148$). Muscle strains were significantly more prevalent in females (50.5%) compared to males (43.2%) ($p = 0.006$). Bone fractures were more frequent in males (9.9%) than in females (3.6%), showing a significant difference ($p = 0.048$). Joint dislocations occurred in 14 (12.6%) males and 11 (9.9%) females, with no significant difference ($p = 0.464$). Concussions were nearly equal between males (39.6%) and females (40.5%) ($p = 0.592$). Brain injuries and cuts were slightly more common in males, but the differences were not statistically significant ($p > 0.05$). However, epistaxis was significantly more prevalent in males (43.2%) compared to females (29.7%) ($p = 0.001$ [Table no. 24].

Table no. 25. Frequency distribution of the respondents by level of pain and age.

Age group in years	Level of pain							
	Mild pain		Moderate pain		Severe pain		Total	
	N	%	N	%	N	%	N	%
Less than 20	2	9.09	17	77.27	3	13.63	22	19.8
20 - 22	1	1.42	50	71.42	19	27.14	70	63.0
More than 22	0	0.0	7	36.84	12	63.16	19	17.1
Total	3	2.7	74	66.7	34	30.6	111	100.0

$$\chi^2=16.315,\ df = 4,\ p = 0.003$$

The study revealed that among respondents under 20 years of age, mild pain was experienced by 2 (9.09%), moderate pain by 17 (77.27%), and severe pain by 3 (13.63%). In the 20–22 age group, mild pain was reported by 1 (1.42%), moderate pain by 50 (71.42%), and severe pain by 19 (27.14%). For participants over 22 years, no cases of mild pain were recorded, while moderate pain was reported by 7 (6.3%) and severe pain by 12 (63.16%). The study found that the association between pain level and age of the players was statistically highly significant ($\chi^2=16.315$, $df = 4$, $p = 0.003$). [Table no. 25].

Table no. 26. Frequency distribution of the respondents by level of pain and profession.

Level of pain	Level of profession					
	Amateur		Professional		Total	
	N	%	N	%	N	%
Mild	3	100.0	0	0.0	3	2.7
Moderate	18	24.32	56	75.67	74	66.7
Severe	6	17.65	28	82.35	34	30.6
Total	27	24.32	84	75.68	111	100.0

$\chi^2 = 10.157$, $df = 2$, $p = 0.006$

The study showed that, in the mild category, 3 (100.0%) amateur athletes reported experiencing mild pain, while no professional athletes reported mild pain. In the moderate category, 18 (24.32%) amateur athletes experienced moderate pain, and 56 (75.67%) professional athletes experienced moderate pain. In the Severe category, 6 (17.65%) amateur athletes experienced severe pain, while 28 (82.35%) professional athletes reported severe pain. The study revealed that the association between pain level and the profession of the players was statistically highly significant ($\chi^2 = 10.157$, $df = 2$, $p = 0.006$) [Table no. 26].

Table no. 27. Frequency distribution of the respondents by level of pain and sex of the players.

Level of pain	Sex of the respondents					
	Male		Female		Total	
	N	%	N	%	N	%
Mild pain	0	0.0	3	5.36	3	2.7
Moderate pain	31	56.36	43	76.78	74	66.7
Severe pain	24	43.63	10	17.86	34	30.6
Total	55	49.54	56	50.45	111	100.0

$$\chi^2 = 10.703,\ df = 2,\ p = 0.005$$

Regarding the frequency distribution of respondents by level of pain and sex, it was found that 55 (49.5%) players were male and 56 (50.5%) players were female. Among the males, 31 (56.36%) experienced moderate pain, and 24 (43.63%) experienced severe pain. Among female players, 43 (76.78%) experienced moderate pain, and 10 (17.86%) experienced severe pain. The association between pain level and sex of the participants was found to be statistically highly significant ($\chi^2 = 10.703$, $df = 2$, $p = 0.005$). [Table no. 27].

Table no. 28. Distribution of the respondents by BMI and frequency of injury.

BMI score	Frequency of injuries							
	Less than 3		3 - 9		More than 9		Total	
	N	%	N	%	N	%	N	%
Underweight	3	50.0	2	33.33	1	16.67	6	5.4
Normal weight	22	24.44	57	63.33	11	12.22	90	81.1
Pre obesity	1	7.14	10	71.43	3	21.43	14	12.6
Obesity type 1	0	0.0	0	0.0	1	100.0	1	0.9
Total	26	23.42	69	62.16	16	14.41	111	100.0

$$\chi^2 = 11.158,\ df = 6,\ p = 0.083$$

About distribution of the respondents by BMI and frequency of receiving injury, it was found that 6 (5.40%) players were under weight. Among them frequency of receiving injury of 3 (50.0%) players was less than 3 times and 2 (33.33%) players was 3 -9 times. It was found that 90 (81.1%) players had normal weight. Among them frequency of receiving injury of 22 (24.44%) players was less than 3 times and 57 (63.33%) players was 3 – 9 times. The association between frequency of injury and BMI was found nearly statistically significant ($\chi^2 = 11.158$, $df = 6$, $p = 0.083$) [Table no.28].

CHAPTER-V DISCUSSION & LIMITATION

The objective of the present study was to determine the prevalence of sports related injury, type and sites of injury among the taekwondo athletes in Dhaka city. The cause of injury was also explored in the study. In this study the sample size were 111. Data were collected from the participants by interview using a questionnaire and analyzed with the help of SPSS software program. The discussion part of the research has been presented in the following section.

About distribution of the participants by age, it was found that 57.4% players belonged to the age group of 20 – 32 years and 18.0% players were less than 20 years. The mean age and standard deviation was 26.47 years and 6.416 respectively. About gender of the athletes, 49.5% players were male and 50.5% players were female. It was found that 50.5% participants were married and 49.5% participants were unmarried. The study revealed that 58.6% participants had attained secondary education, 23.4% participants had completed higher secondary education. The study showed that 5.4% participants were underweight, 80.2% respondents had normal weight (Table no.1).

It was found that 75.5% participants were professional and 24.3% players were amateur competitors, highlighting a significantly higher representation of professional athletes compared to amateurs (Figure no. 2).

About type of belt used by the participants, 43.0% players were black belt holders, 9.9% respondents were white belt, 8.1% respondents were yellow belt, 9.9% participants were green belt, 9.0% participants were blue belt 19.8% participants were red belt holders (Figure no. 2).

The study revealed that 15.3% participants had less than 2 years of experience, 68.5% participants had experienced 2 - 13 years and 16.2% players had more than 13 years (Table no. 2).

About match per week, 36.9% players used to play less than 3 matches per week while 63.1% respondents used to play 3 - 8 matches per week (Table no. 3).

The study showed that 39.6% reported less than 2 hours of training per sessions, 52.3% participants reported 2-3 hours of training and 8.1% participants reported more than 3 hours of training per session (Table no.4). In another study the mean duration the athletes participated in training was 2 hours (0.8 hour) each session (Covarrubias et al. 2015, p. 45), that was nearly close to my study.

The study indicated that all 111 participants (100%) reported performing specific injury prevention exercises before competing or training. Additionally, all 111 participants in taekwondo experienced an injury during practice or competition, highlighting the common occurrence of injuries within the sport, with 100% of respondents acknowledging this. Similar to findings by (Altarriba-Bartes et al. 2014, p. 76) and (Kim et al. 2017, p. 72), the study indicates a high prevalence of injuries among professional athletes, with 100% of participants reporting at least one injury during practice or competition that is close to my study.

About injury frequency 62.2% of athletes experienced 3 to 9 injuries, while the majority (69) experienced more than nine injuries. A smaller group (23.4%) had fewer than three injuries, and 14.4% had more than nine. This suggests a moderate injury frequency among athletes (Figure no.3). Zhao et al. (2020, p. 211) stated that total of 111 injuries were documented. The distribution of the number of injuries were: 56.45% of athletes sustained only one injury, 25.81% sustained two injuries, 8.06% sustained three injuries, 6.45% sustained four injuries, and the remaining two athletes had 6 and 7 injuries, respectively.

Regarding type of injury, sprains were reported by 80.2% participants, strains by 93.7%, and fractures by 13.5% and dislocations by 22.5% and concussions by 80.2% and epistaxis (nosebleeds) by 73.0% participants (Table no. 5). Another study showed that contusions were the most common injury type, accounting for 41.7%, with sprains (22.6%), strains (13.9%), and fractures (11.3%) also reported. Concussions were relatively rare, occurring in only 2.6% of athletes (Covarrubias et al. 2015, p. 122). Another study was conducted by (Del et al. 2018, p. 211) where the result was the most frequent injuries included sprains (32%), contusions (27%), and fractures (15%), Anatomical regions affected the most commonly injured areas were the lower

extremities (48%), followed by the upper extremities (27%), and the head/neck region (18%), that is also closed to my study,

The study showed that injuries to the head were reported by 34.2% participants, neck injuries by 28.8%, and injuries to the elbow/arms by 54.1% participants. Wrist injuries were reported by 65.8% participants, waist injuries by 30.6%, thigh injuries by 69.4%, knee injuries by 90.1%, and hamstring injuries by 92.8%. Foot injuries were reported by 64.0%, and only 4.5% participants reported spine injuries (Table no.6). One study was conducted by (MinJoon 2016, p. 19) showed that the injury site of taekwondo athletes were the foot (n = 93), knee (n = 86), ankle (n = 80), thigh (n = 64), and head (n = 61).

Regarding the cause of injury, 63.1% athletes were injured during competition, 29.7% during training and 6.3% during conditioning exercises (Table no.7). Another study were conducted by (Covarrubias et al., 2015) and stated that 63.2% of injuries occurred during sparring, 26.3% occurred during forms practice, 10.5% occurred during other training activities, another study showed that training session 72.91% injuries were noted while in competition 27.08% injuries were noted (Pingale & Ghagare 2017, p. 39). Another study showed that during training sessions, 24 injuries (32%) were found, while 51 injuries (68%) occurred during competition fights that are close to my study. In the same context (Kazemi et al.,) reported that 54% of injuries were sustained during competitions, while 36% were related to training incidents. Another study showed that A total of 172 injuries were recorded, of which 106 (62 %) occurred during training and 66 (38 %) during competition. (Geblein et al. 2021, p. 87).

Due to injury, 87.4% players were unable to training for less than 21 days and 10.8% players were unable to training for duration of 21 to 48 days (Table No. 8). Another study showed that a relatively similar pattern was found for the sparring and poomsae athletes, where most injured athletes required 1 week or less to return to training regarding return to training, sparring and poomsae athletes mostly required 1 week or less to return to training, while some required 2–3 weeks. Demonstration athletes mostly required 2–3 weeks, while some required 2–3 months. (Jeong & Chun 2022).

The study showed 98.2% participants had received treatment and 2.8% did not receive treatment, indicating high medical engagement among the participants (Table no.9).

About type of treatment 23.4% players were treated by specialists in orthopedic medicine, 33.3% were treated by specialists in sports injuries, and a good percentage of the players (43.2%) were treated by physiotherapists (Table no.10). Another study showed that the consumption of medicinal products was necessary in 55 cases (82.1%), 23 injuries (34.8%) needed medical attention, eight (11.9%) demanded physiotherapy, and five (7.5%) were subject to surgery (Del et al. 2018, p. 311).

The study showed that all athletes (100%) were using all type of protective gear including, mouth guard, head guard, shine guard, hand gloves, during competition and training. Another study showed that all athletes reported using protective gear, similar to the focus on safety protocols highlighted by (Jung-Woo Lee et al. 2013, p. 62).

It was found that 69.4% players always maintained a specific warm-up exercise routine before training or competition and 19.8% players maintained it sometimes (Table no. 11).
The study showed that 74.8% participants always maintained a specific cool-down exercise routine before training or competition and 12.6% maintained it sometimes (Table no.12). It was found that all of athletes were getting education about injury prevention in taekwondo. Another study showed that only six of 28 respondents (21%) reported they always engaged in post-training cool-down exercises, other than stretching. Over sixty-four and fourteen percent (n = 22) of respondents reported occasionally and never using cool down exercises, respectively. (Kazemi, Shearer & Choung 2005, p. 119).

It was revealed that majority of the participants (66.7%) had moderate pain and severe pain was reported by 30.6% players (Table no. 13). Another study showed that the greatest pain scores, with an average of 5.4 on the NRS, according to a study conducted on 62 Taekwondo athletes during the 2008–2009 Pacific West Taekwondo Conference season. (Zhao et al. 2020, p. 176)

About distribution of respondents by injury and profession type, 59.26% amateur athletes experienced fewer than three injuries, while 40.74% amateur athletes had sustained between 3 and 9 injuries. Among the professional players, 69.04% experienced 3 to 9 injuries and 19.04% reported more than 9 injuries. The association between type of profession and number of injury was statistically highly significant (p = 0.000) [Table no. 14].

Among participants with less than 2 years of experience, 52.941% had fewer than 3 injuries and 47.05% players had 3 to 9 injuries. In case of 2 to 13 years of experience, 22.37% had fewer than 3 injuries and 68.42% had 3 to 9 injuries. The association between experience and the number of injuries was found to be statistically highly significant (p = 0.000) [Table no. 15].

About number of injuries and sex, 70.90% male players experienced 3 to 9 injuries. Among female participants, 53.57% had 3 to 9 injuries, while 32.14% experienced fewer than 3 injuries. The association between number of injury and sex of the participants was statistically near significant (p = 0.082) [Table no. 16]. A study conducted by (Yoon et al., 2019) found that the overall injury rate in Taekwondo was approximately 25% among male athletes and 18% among female athletes. A study conducted by (Alonso et al. 2010, p. 161) on sports injuries in Taekwondo found that male athletes accounted for a larger proportion of total injuries (62.5%) compared to females (37.5%). This difference in injury rates may be attributed to male athletes' participation in more intense forms of competition and their physical attributes.

It was observed that due to injuries, players were unable to play for some days. About 91.0% 90.79% players with 2 to 13 years of experience were unable to play for fewer than 21 days. There were 61.11% players with more than 13 years of experience reported being unable to play for fewer than 21 days. The association between experience and the duration of time unable to play was found to be statistically highly significant (p = 0.006) [Table no. 17].

About belt rank and hours of training 64.59% black belt holders had training for 2 to 3 hours, while 31.25% players had training for less than 2 hours. Among the red belt

holders, 95.48% players had training for less than 2 hours. The association between belt rank and hours of training was found to be statistically highly significant (p = 0.000) [Table no. 18].

Among black belt holders, 79.17% players sustained injuries due to competition, while 20.83% players' injuries were caused by training. The study showed that 90.90% players of red belt holders sustained injuries from competition. Among the green belt holders, 45.45% players were injured due to competition, while 54.54% sustained injuries from training. The association between type of belt and cause of the injury of the players was found statistically highly significant (p = 0.000) [Table no. 20].

About type of injury and level of profession, 22.5% amateur players and 77.5% professional players sustained sprains. Among the amateur players, 22.1% experienced muscle strain, 44.0% had joint dislocations, 66.7% suffered bone injuries and 19.8% had epistaxis. In the professional player group, 77.9% had muscle strain, 56.0% sustained joint dislocations, 33.3% experienced bone injuries, and 80.2% had epistaxis. The type of injury was found to have a statistically significant association with the level of profession of the players (p = 0.000) [Table no.21].

The study revealed that among amateur players, 12.6% had arm injuries, 13.5% sustained wrist injuries, 14.4% had thigh injuries, 20.7% had knee injuries, 18.0% suffered hamstring injuries, and 17.1% experienced ankle injuries. Among professional players, 28.8% had head injuries, 22.5% had neck injuries, 41.4% sustained elbow injuries, 52.3% had hand injuries, and 74.8% experienced hamstring injuries. Hamstring injuries were found to be associated with the players' professional level (Table no. 22)

The study found neck injuries were significantly higher in males (18.9%) compared to females (9.9%) (p = 0.031). Waist injuries occurred in 19.8% males and 10.8% females, with a statistically significant difference (p = 0.034). Thigh injuries were observed in 36.9% females and 32.4% males, but the difference was not statistically significant (p = 0.375). Knee injuries were reported in 49 (44.1%) males and 51

(45.9%) females (p = 0.727). Hamstring injuries occurred in 51 (45.9%) males and 52 (46.8%) females, with no significant difference (p = 0.979). Ankle injuries were found in 36 (32.4%) males and 35 (31.5%) females (p = 0.746). [Table no.23].

It was found that muscle strains were significantly more prevalent in females (50.5%) compared to males (43.2%) (p = 0.006). Bone fractures were more frequent in males (9.9%) than in females (3.6%), showing a significant difference (p = 0.048). Joint dislocations occurred in 14 (12.6%) males and 11 (9.9%) females, with no significant difference (p = 0.464). However, epistaxis was significantly more prevalent in males (43.2%) compared to females (29.7%) (p = 0.001) [Table no. 24].

The study revealed that among respondents less than 20 years of age, moderate pain by 77.27%. In the 20–22 age groups, moderate pain by 71.42% players and severe pain by 27.14% players. For participants over 22 years, severe pain reported by 63.16% players. The association between pain level and age of the players was statistically highly significant (, p = 0.003) [Table no. 25].

It was found that in the moderate category, 24.32% amateur athletes' experienced moderate pain, and 75.67% professional athletes' experienced moderate pain. In the Severe category, 17.65% amateur athletes experienced severe pain, while 82.35% professional athletes reported severe pain. . Another study conducted by (Moussa et al. 2022, p. 42), shows that professional athletes reported higher prevalence of musculoskeletal pain compared to amateurs, suggesting that increased training intensity and frequency might contribute to greater pain experiences. The association between pain level and the profession of the players was statistically highly significant (p = 0.006) [Table no. 26].

About level of pain and sex, 56.36% male players experienced moderate pain and 43.63% experienced severe pain. Among female players, 76.78% experienced moderate pain and 17.86% experienced severe pain. The association between pain level and sex of the participants was found to be statistically highly significant (p = 0.005) [Table no. 27].

5.2 Study limitation:

1. First, using the proper statistical formula, the sample size was determined. 383 was the number. However, because of time constraints, 111 taekwondo athletes provided data to the researcher. To guarantee that the study population is truly representative, a sufficient sample size is required.
2. The study's participants were chosen using the convenience sampling technique. Therefore, it was impossible to guarantee that the sampling units were representative. Consequently, it had an impact on the study's quality.
3. The small sample size and lack of representativeness prevented the result from being generalized.
4. The study's allowed time was insufficient. As a result, the researcher had to sacrifice the study's quality.
5. The researcher is student of 4^{th} year BSc in Physiotherapy. This thesis is his first work. Student had limited experience with techniques and strategies in term of the practical aspect of research. So, a number of short comings are present in the thesis.

CHAPTER VI CONCLUSION & RECOMMENDATION

6.1 Conclusion:

In this study 57.4% of participants were aged 20-32 years, with 18.0% fewer than 20, and 49.5% were male and 50.5% female, with a mean age of 26.47 years and a standard deviation of 6.416. The study revealed that 75.5% of participants were professional athletes, with 24.3% being amateurs. The majority were black belt holders, with 43.0% holding black belts. The majority had experience ranging from 2-13 years, with 15.3% having less than 2 years, 68.5% having 2-13 years, and 16.2% having more than 13 years.

This study underscores the high prevalence of sports injuries among taekwondo athletes, revealing critical patterns, causes, and associated factors. Injuries are a pervasive issue in taekwondo, with nearly all participants reporting past injuries. Most common were strains (93.7%), sprains (80.2%), and knee injuries (90.1%), with the lower extremities bearing the highest burden. Competition was identified as the primary cause of injuries (63.1%), followed by training (29.7%) and conditioning exercises (6.3%). The data also revealed that male and female athletes are affected similarly, with slight variations in injury type and frequency.

The majority of athletes (87.4%) experienced training interruptions of fewer than 21 days, while only a small percentage faced prolonged disruptions exceeding 48 days. Despite the physical demands of taekwondo, medical engagement among athletes was commendable, with 98.2% seeking treatment for injuries. Physiotherapists were the most commonly consulted professionals, treating 43.2% of the athletes, followed by sports injury specialists (33.3%) and orthopedic specialists (23.4%). The universal use of protective gear among participants (100%) highlights awareness of safety measures but also points to potential gaps in their effectiveness.

The study findings emphasize the necessity for targeted preventive strategies. Extended training durations, insufficient warm-ups, and inadequate recovery periods were strongly associated with higher injury rates. Athletes with longer competitive experience or those training intensively were more prone to sustaining injuries, emphasizing the importance of balancing training intensity with adequate recovery.

6.2 Recommendations

Enhanced Training Programs:

- **Warm-Up and Cool-Down:** Ensure all training sessions incorporate comprehensive warm-up and cool-down routines. Dynamic stretches, mobility drills, and progressive intensity exercises can significantly reduce injury risks.
- **Strength and Conditioning:** Implement tailored strength and conditioning programs to improve athletes' resilience, particularly focusing on the lower extremities, core stability, and joint flexibility.

Protective Measures:

- **Evaluation of Protective Gear:** Regularly assess and improve the quality and design of protective equipment. Innovations should focus on better coverage and absorption of high-impact forces, especially for the knees and ankles.
- **Mandatory Usage Enforcement:** Reinforce strict policies on using protective gear during both training and competition to minimize preventable injuries.

Education and Awareness:

- **Athlete and Coach Training:** Conduct workshops to educate athletes and coaches on injury prevention strategies, recognizing early signs of overuse injuries, and managing acute injuries effectively.
- **Nutritional Guidance:** Provide dietary advice tailored to athletes' needs, focusing on muscle recovery and overall physical resilience.

Medical Support and Rehabilitation:

- **Access to Physiotherapy:** Ensure availability of physiotherapy services for all athletes, focusing on preventive care and post-injury rehabilitation.
- **Regular Medical Checkups:** Schedule periodic medical evaluations to identify and address potential issues before they escalate.

Monitoring and Research:

- **Injury Surveillance Systems:** Establish robust injury reporting and tracking mechanisms to monitor trends and evaluate the effectiveness of preventive measures.
- **Ongoing Research:** Encourage continuous research into injury mechanisms and prevention strategies, particularly focusing on specific factors like gender differences, age, and competition level.

Policy Development:

- **Competition Regulations:** Modify competition rules to minimize high-risk moves and enforce safety protocols rigorously.
- **Rest and Recovery Guidelines:** Mandate minimum rest periods between matches and training sessions to prevent overuse injuries.

Customized Interventions:

- **Individualized Training Plans:** Develop athlete-specific training plans that consider their physical condition, competitive level, and injury history.
- **Psychological Support:** Offer mental health resources to address the psychological impact of injuries and promote a balanced approach to competition and recovery.

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Verbal Consent Form

Assalamuaalaikum/ Namashkar,

I am Kapil Deb Bain, a student of B.Sc. in Physiotherapy, SAIC College of Medical Science and Technology (SCMST), affiliated with Faculty of Medicine, University of Dhaka. For the partial fulfillment of my bachelor degree, I have to conduct a research project and it is a part of my study. My Research title is "**Epidemiology of Sports Injury among the Taekwondo Athletes in Dhaka city**"

I do expect that the interview will take 20-30 minutes. I also offer you to ask any sort of questions when you fell it is necessary to get insight.

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

If you have any query about the study, you may contact with me (01794032975) or my supervisor Dr. Abul Kasem Mohmmad Enamul Haque, Principal of SCMST

So, may I have your consent to proceed with the interview? Yes……., No……

Signature of the participant & Date…….

Signature of the researcher & Date……..

Signature of the witness & Date……..

Questionnaire

Part-1 Personal information:

Sl no	Question	Answer
1.1	Name of participants:	/_____/
1.2	Address: Upazila: District:	/_____/
1.3	Mobile number:	/_____/

Part-2 Socio-demographic information:

Sl no	Question	Answer
2.1	Age:……(years)	/_____/
2.2	Sex : [1]Male [2]Female [3]Others……..	/_____/
2.3	What kind of area do you live in? [1] Urban [2] Rural	/_____/
2.4	What is your marital status? [1] Married [2] Unmarried [3] Others……	/_____/
2.5	What is your educational qualifications? [1] illiterate [2] Primary [3] Secondary [4] Higher Secondary [5] Graduate and above	/_____/
2.6	What is your family income? ……TK./month	/_____/
2.7	What is your height?…….……cm	/_____/
2.8	What is your weight?……..Kg	/_____/
2.9	BMI……..	/_____/

Part-3 Training and practice

Sl no	Question	Answer
3.1	Level of Competition: [1]Amateur [2]Professional	/_____/
3.2	Which belt do you use in taekwondo? [1] White Belt [2] Yellow Belt [3] Green Belt [4] Blue Belt [5] Red Belt [6] Black Belt	/_____/
3.3	How many years of experience do you have in Taekwondo? …….…..……..years	/_____/
3.4	How often do you play matches per weeks? ……times	/_____/
3.5	What is the average duration of each training or match session? …….hours	/_____/
3.6	Do you perform specific injury prevention exercise before competing or training? [1] Yes [2] No	/_____/

Part-4 Injury history

Sl no	Question	Answer
4.1	Have you ever sustained an injury while practicing or competing in Taekwondo? [1] Yes [2] No	/_____/
4.2	If yes, how many injuries have you sustained in the past year? ..…… times	/_____/

4.3	Please specify the type of injury you have sustained : [1] Sprain [2] Muscle strain [3] Bone fracture [4] Joint dislocation [5] Concussion [6] Brain injury [7] Cuts [8] Epistaxis [9] Other (please specify)……..	/_____/
4.4	Mention which part of your body was injured? [1] Head [2] Neck [3] Shoulders [4] Arms/Elbows [5] Wrists/Hands [6] Waist [7] Thighs [8] Knees [9] Hamstrings [10] Ankles/Foots [11] Spine [12] Other (please specify): …….	/_____/

Part-5 Injury Details

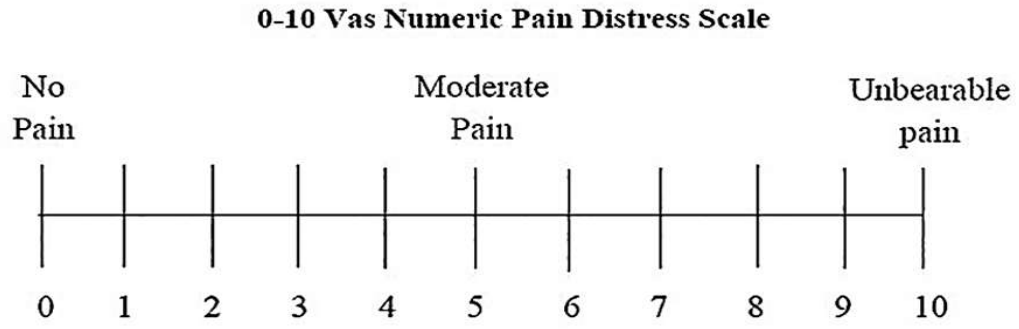
Sl no	Question	Answer
5.1	What was the cause of your most recent injury? [1] Competition [2] Training [3] Conditioning Exercise [4] Accidental (eg slip/fall) [5] Other (please specify): ……	/_____/
5.2	How long were you unable to train or compete due to your recent injury? ..... days	/_____/
5.3	Have you received any treatment for your recent injury?? [1] Yes [2] No	/_____/
5.4	If yes, what kind of medical professional have you consulted? If yes then have you consulted any medical professional? [1] Specialist in Orthopedic Medicine [2] Specialist in Sports	/_____/

	Medicine [3] Physiotherapist [4] Other (please specify)…….	

Part-6 Prevention and Management

Sl no	Question	Answer
6.1	Do you use any protective gear during training and competition? [1] Yes [2] No	/_____/
6.2	If yes, please specify the types of protective gear [1] Head-guard [2] Mouth-guard [3] Chest-guard [4] Shin-guard [5] Hand-grappling gloves [6] All type of protective gear including above	/_____/
6.3	Do you follow a specific warm-up routine before training or competition? [1] Always [2] Sometimes [3] Seldom [4] Never	/_____/
6.4	Do you follow a specific cool-down routine after training or competition? [1] Always [2] Sometimes [3] Seldom [4] Never	/_____/
6.5	Have you receive any education on injury prevention in Taekwondo? [1] Yes [2] No	/_____/
6.6	Do you feel that injury prevention measures have reduced your risk of injury? [1] Yes [2] No	/_____/

7.1 How is the severity of your pain according to visual analogue scale (VAS):



সম্মতি পত্র

আসসালামুয়ালাইকুম/নমস্কার,

আমি কপিল দেব বাইন, সাইক কলেজ অভ মেডিকেল সায়েন্স অ্যান্ড টেকনোলজি (এসসিএমএসটি) এর বি.এস সি. ইন ফিজিওথেরাপিতে এর শিক্ষার্থী। যা, ঢাকা বিশ্ববিদ্যালয়ের মেডিসিন অনুষদের অধিভুক্ত একটি ইনস্টিটিউট। আমার বিএসসি ডিগ্রী সম্পূর্ণ করার জন্য একটি গবেষণা প্রকল্প পরিচালনা করতে হবে, এবং এটি আমার পড়াশুনার একটি অংশ। গবেষণার শিরোনামঃ "তায়কোয়ান্দো খেলোয়াড়দের মধ্যে ক্রীড়া জনিত আঘাতের বিবরন"।

আমি আশা করি সাক্ষাৎকারটি ২০-৩০ মিনিট সময় নেবে। আপনার মনে কোন কিছু জানা দরকার মনে হলে, যেকোন প্রশ্ন করতে পারেন।

আপনার অবগতির জানাচ্ছি যে, এটি সম্পূর্ণ একাডেমিক গবেষণা এবং অন্য কোন উদ্দেশ্যে ব্যবহার করা হবে না। আমি আপনাকে আশ্বাস দিচ্ছি যে, সকল তথ্য গোপনীয় রাখা হবে। এটি একটি স্বেচ্ছাসেবী অংশগ্রহণ । আপনি যেকোন সময় আপনার সম্মতি প্রত্যাহার করে গবেষণা থেকে চলে যেতে পারেন। এছাড়াও, এই প্রশ্নাবলীতে যেকোন প্রশ্নের উত্তর না দেওয়ার অধিকার আপনার আছে।

গবেষণা সম্পর্কে কোন প্রশ্ন থাকলে, আমার সাথে (০১৭৯৪০৩২৯৭৫) অথবা আমার সুপারভাইজার ডাঃ আবুল কাশেম মোহাম্মদ এনামুল হক, প্রিন্সিপল, (এসসিএমএসটি) সাথে যোগাযোগ করতে পারেন।

সাক্ষাৎকার এগিয়ে নেওয়ার জন্য কি আমি আপনার সম্মতি পেতে পারি?

হ্যাঁ……., না……...

অংশগ্রহণকারীর স্বাক্ষর ও তারিখ…….

গবেষকের স্বাক্ষর ও তারিখ…….

সাক্ষীর স্বাক্ষর ও তারিখ…….

তায়কোয়ান্দো খেলোয়াড়দের মধ্যে ক্রীড়া জনিত আঘাতের বিবরন

প্রশ্নপত্র

পর্ব ১-ব্যক্তিগত তথ্য:

ক্রমিক নং	প্রশ্ন
১.১	অংশগ্রহণকারীর নাম:
১.২	ঠিকানা: থানা: জেলা:
১.৩	মোবাইল নাম্বার:

পর্ব ২: সামাজিক-জনসংখ্যা সংক্রান্ত তথ্য

ক্রমিক নং	প্রশ্ন	উত্তর কোড
২.১	বয়স..... (বছর)	/_____/
২.২	লিঙ্গ: [১] পুরুষ [২]মহিলা	/_____/
২.৩	আপনার বসবাসের এলাকা কি ধরনের? [১] শহর [২] আধা শহর [৩] গ্রাম	/_____/
২.৪	আপনার বৈবাহিক অবস্থা কি? [১] বিবাহিত [২] অবিবাহিত [৩] অন্যান্য	/_____/
২.৫	আপনার শিক্ষাগত যোগ্যতা কি? [১] অশিক্ষিত [২]প্রাথমিক [৩]মাধ্যমিক [৪] উচ্চমাধ্যমিক [৫] স্নাতক এবং তার উপরে	/_____/
২.৬	আপনার পারিবারিক আয় কত? .....টাকা/ মাস	/_____/

২.৭	আপনার উচ্চতা কত?……..……সেমি	/_____/
২.৮	আপনার ওজন কত?…….…… কেজি	/_____/

পর্ব ৩- প্রশিক্ষণ এবং অনুশীলন:

ক্রমিক নং	প্রশ্ন	উত্তর কোড
৩.১	প্রতিযোগিতার স্তর: [১] অপেশাদার [২] পেশাদার	/_____/
৩.২	তাইকোওয়ান্দোতে আপনি কোন বেল্ট ব্যবহার করেন? [১] সাদা বেল্ট [২] হলুদ বেল্ট [৩] সবুজ বেল্ট [৪] নীল বেল্ট [৫] লাল বেল্ট [৬] কালো বেল্ট	/_____/
৩.৩	তায়কোয়ান্দো তে আপনার কত বছরের অভিজ্ঞতা? ……বছরের	/_____/
৩.৪	আপনি প্রতি সপ্তাহে কতবার প্রশিক্ষণ বা ম্যাচ খেলেন? ……বার	/_____/
৩.৫	প্রতিটি প্রশিক্ষন বা ম্যাচ সেশনের গড় সময়কাল কত? ……..ঘন্টা	/_____/
৩.৬	আপনি কি আঘাত প্রতিরোধ করার জন্য প্রতিযোগিতা বা প্রশিক্ষণের আগে কোন ব্যায়াম করেন? [১] হ্যা [২] না	/_____/

পর্ব ৪ -আঘাতের ইতিহাস:

ক্রমিক নং	প্রশ্ন	উত্তর কোড
৪.১	তায়কোয়ান্দো অনুশীলন বা প্রতিযোগিতা করার সময় আপনি কি	/_____/

	কখনও আঘাত পেয়েছেন? [১] হ্যাঁ [২]না	
৪.২	যদি হ্যা হয় তাহলে কতবার আঘাত পেয়েছেন? ..... বার	/_____/
৪.৩	অনুগ্রহ করে আপনি যে ধরনের আঘাত পেয়েছেন তা উল্লেখ করুন [১]মচকাইয়া যাওয়া [২] মাংসপেশি টান লাগা [৩] হাড় ভেঙে যাওয়া [৪] জয়েন্ট সরে যাওয়া [৫] আঘাত লাগা [৬] মস্তিষ্কে আঘাত লাগা [৭] কেটে যাওয়া [৮] নাক দিয়ে রক্ত পড়া [৯] অন্যান্য (অনুগ্রহ করে উল্লেখ করুন):	/_____/
৪.৪	আপনার শরীরের কোন অংশে আঘাত পেয়েছিলেন তা উল্লেখ করুন? [১] মাথা [২]ঘাড় [৩] কাধ [৪] বাহু/কনুই [৫] কব্জি/হাত [৬] কোমরে [৭] উরুত [৮] হাঁটুতে [৯] পায়ের পিছনের মাংসপেশি [১০] গোড়ালি/পায়ে [১১] মেরুদণ্ডে [১২] অন্যান্য (অনুগ্রহ করে উল্লেখ করুন):	/_____/

পর্ব ৫ -আঘাতের বিবরণ:

ক্রমিক নং	প্রশ্ন	উত্তর কোড
৫.১	আপনার সাম্প্রতিক আঘাতের কারণ কি ছিল? [১] প্রতিযোগিতা [২] প্রশিক্ষণ [৩] কন্ডিশনিং ব্যায়াম [৪] দুর্ঘটনাজনিত (যেমন, স্লিপ/পতন) [৫] অন্যান্য (অনুগ্রহ করে উল্লেখ করুন):	/_____/

	……	
৫.২	আপনার সাম্প্রতিক আঘাতের কারণে আপনি কতক্ষণ প্রশিক্ষণ বা প্রতিযোগিতা করতে অক্ষম ছিলেন? ..... দিন	/_____/
৫.৩	আপনি কি আপনার সাম্প্রতিক আঘাতের জন্য কোন চিকিৎসা নিয়েছেন?? [১] হ্যাঁ [২]না	/_____/
৫.৪	যদি হ্যাঁ, আপনি কোন ধরনের চিকিৎসা পেশাদারের সাথে পরামর্শ করেছেন? যদি হ্যা হয় তাহলে আপনি কোন চিকিৎসা পেশাদারের পরামর্শ নিয়েছে? [১] অর্থোপেডিক মেডিসিন বিশেষজ্ঞ [২] স্পোর্টস মেডিসিন বিশেষজ্ঞ [৩] ফিজিওথেরাপিস্ট [৪] অন্যান্য (অনুগ্রহ করে উল্লেখ করুন)…….	/_____/

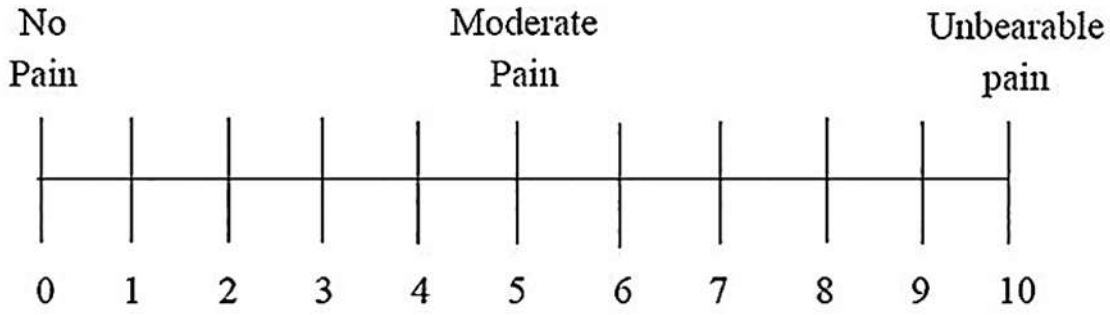
পর্ব ৬ -প্রতিরোধ ও ব্যবস্থাপনা

ক্রমিক নং	প্রশ্ন	উত্তর কোড
৬.১	আপনি কি প্রশিক্ষণ এবং প্রতিযোগিতার সময় কোন প্রতিরক্ষামূলক গিয়ার ব্যবহার করেন? [১] হ্যাঁ [২]না	/_____/
৬.২	যদি হ্যাঁ, অনুগ্রহ করে প্রতিরক্ষামূলক গিয়ারের প্রকার(গুলি) উল্লেখ করুন [১] হেড-গার্ড [২] মাউথগার্ড [৩] চেস্টগার্ড [৪] সিনগার্ড [৫] হাতের গ্র্যাপলিং গ্লাভস [৬] উপরে উল্লেখিত সকল গার্ড	/_____/

৬.৩	আপনি কি প্রশিক্ষণ বা প্রতিযোগিতার আগে একটি নির্দিষ্ট ওয়ার্ম-আপ রুটিন অনুসরণ করেন? [১] সর্বদা [২] মাঝেমধ্যে [৩] কদাচিৎ [৪] কখনই না	/_____/
৬.৪	আপনি কি প্রশিক্ষণ বা প্রতিযোগিতার পরে একটি নির্দিষ্ট কুল-ডাউন রুটিন অনুসরণ করেন? [১] সর্বদা [২] মাঝেমধ্যে [৩] কদাচিৎ [৪] কখনই না	/_____/
৬.৫	আপনি কি তায়কোয়ান্দোতে আঘাত প্রতিরোধের কোন শিক্ষা পেয়েছেন? [১] হ্যাঁ [২]না	/_____/
৬.৬	আপনি কি মনে করেন যে আঘাত প্রতিরোধের ব্যবস্থা আপনার আঘাতের ঝুঁকি হ্রাস করেছে? [১] হ্যাঁ [২]না	/_____/

৭.১ Visual Analogue Scale (VAS) স্কেলে আপনার ব্যথা কতটা গুরুতর ??

0-10 Vas Numeric Pain Distress Scale



SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref : *Date : .....*

24/10/2024

To

Head of department

Bangladesh Taekwondo Federation.

Subject: Permission for data collection.

Dear Sir,

Ethical review board (ERB) of SAIC College of Medical Science and Technology pleased to inform you that Kapil Deb Bain final year B.Sc. in Physiotherapy student of SAIC College of Medical Science and Technology doing a thesis entitled "Epidemiology of Sports Injuries among the Taekwondo Athletes in Dhaka city". He has planned to collect data from the athletes of Bangladesh Taekwondo Federation.

I hope you will be kind enough to permit him to collect data to complete his study successfully and oblige thereby.

Thanking you
Head of ERB
Ethical Review Board
SAIC college of medical science and technology

24.10.24

24.10.24
Zahid Bin Sultan Nahid
Assistant Professror & Head
Physiotherapy Departmen
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216

Dr. Abul Kasem Mohammad Enamul Haque
MBBS, M.Phil(PSM)
Principal
SAIC College of Medial Science and Technology (SCMST)
Mirpur-14, Dhaka.

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref : *Date : .....*

Dhaka,
29th October 2024

To
The General Secretary
Bangladesh Taekwondo Federation
National Sports Council Building,
62/3 Purana Palton
Dhaka – 1000

Subject: Prayer for permission to collect data from the Taekwondo athletes.

Dear sir,
With due respect I would like to inform you that I am a student of B.Sc. in Physiotherapy, 4th year, (Session 2018-2019) at SAIC College of Medical Science and Technology (SCMST). As a part of my course curriculum, I have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is **"Epidemiology of Sports Injuries among the Taekwondo Athletes in Dhaka city- A Descriptive type of Cross-Sectional Study"** and the aim of the study is to find out the common sports injuries among the Taekwondo athletes in the Dhaka city. This is a descriptive type of cross sectional study which is approved by Institutional Review Board (IRB), Ref, SCMST-BPT/IRB/06-23/048 under the supervision of Dr.Abul Kasem Mohammad Enamul Haque, Principal, SCMST. I have chosen the Bangladesh Taekwondo federation as a site of data collection.

So, I pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

Yours Faithfully,

Mahmudul Islam Rana
General Secretary
Bangladesh Taekwondo Federation

এটা কলেজকালের অনুমতি চেয়ে চিঠি।
29.10.24

Kapil Deb Bain
Student of B.Sc. in Physiotherapy
Session: 2018 -2019
DU Reg No: 10455
SAIC College of Medical Science and Technology (SCMST)
Mirpur-14, Dhaka 1216, Bangladesh.

14, Dhaka-1206, Mobile: 01936005804

SCMST-BPT/IRB/..SCMST.-BPT/IRB/06-23/048

To
Kapil Deb Bain
4th Year Student of B.Sc. in Physiotherapy
Session: 2018-2019, Reg No: 10455
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Subject: Approval of the thesis proposal **"Epidemiology of Sports Injuries among the Taekwondo Athletes in Dhaka city - A Descriptive type of Cross-Sectional Study"**

Dear Kapil Deb Bain
Congratulations.
The Institutional Review Board (IRB) of SCMST has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator. The Following documents have been reviewed and approved:

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

The purpose of the study is to determine the find out of common sports injuries among the Taekwondo athletes in the Dhaka city. The study involves face to face interview by using semi-structured questionnaire to **"Epidemiology of Sports Injuries among the Taekwondo Athletes in Dhaka City"** that may take 30 to 40 minutes to fill in the questionnaire and there is no likelihood of any harm to the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 09.00 AM on 28th September 2023 at SCMST.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring during 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,

04.07.24.

Dr. Abul Kasem Mohammad Enamul Haque
Principal, SCMST &Chairman, Institutional Review Board (IRB)
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh