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Prevalence of musculoskeletal pain in taekwondo club students

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Abstract
Introduction: Taekwondo is a traditional Korean martial art currently practiced in over 206 countries around the world. Taekwondo is a martial art with over 80 million practitioners worldwide. Taekwondo training prevents or positively improves obesity, dyslipidaemia, diabetes, hypertension, cerebrovascular, and cardiovascular diseases in adults and the elderly. Taekwondo is a popular martial art that involves a range of physical activities, including high-impact kicking, punching, and blocking techniques. Understanding the prevalence of musculoskeletal pain in Taekwondo club students is essential for developing strategies to prevent and manage these issues effectively. However, there is limited data on this specific population. For Taekwondo students, the prevalence of musculoskeletal pain may be affected by factors such as the frequency and duration of training, the level of experience, and the intensity of competitions. Therefore, this study aims to investigate the prevalence of musculoskeletal pain among Taekwondo club students and identify the most common areas affected. This information can help in developing effective prevention and management strategies, such as modifying training programs or implementing injury prevention protocols, to ensure the health and well-being of Taekwondo athletes.
Aim & Objective: To find out prevalence of musculoskeletal pain in taekwondo club students using Nordic Body Map questionnaire.
Methods: We conducted prevalence study among 332 taekwondo club students. We collected data from the field as per inclusion criteria. We used Nordic Body Map Questionnaire and Microsoft excel for data entry.
Conclusion: From this study we can conclude that right leg (i.e. 78.30%), right ankle (i.e. 75.28%), left ankle (i.e. 56.61%), right foot (i.e. 54.50%), left foot (i.e. 52.39%), left leg (i.e. 50.59%), left knee (i.e. 48.77%), and right knee (i.e. 46.67%) are most commonly affected due to musculoskeletal pain in the taekwondo club students.

Keywords: Taekwondo, nordic body map questionnaire, musculoskeletal pain, high impact kicking, korean martial art

Introduction

Taekwondo is a traditional Korean martial art currently practiced in over 206 countries around the world [4].

Taekwondo is a martial art with over 80 million practitioners worldwide [3]. Taekwondo is one of the most popular and practiced martial arts in India. As it is literally translated from the Korean, Tae means “to kick” or “to strike with the foot,” Kwon means “fist” or “to strike with the hand,” and Do means “discipline” or “art.” Taken together, Tae Kwon Do means “the art of kicking and punching”—“the art of unarmed combat” [1].

Martial arts are antique forms of combat often used for different fighting styles. TAEKWONDO emphasize blows using the feet and fists [5].

Taekwondo a combat sport characterized by its emphasis on dynamic kicking techniques delivered from a mobile stance.

Taekwondo (TKD) is a well-known traditional form of martial art, It is a very energetic, quick sport involving both men & women.

(TKD) is a full contact sport where players are called to strike their opponents using kicks with full force within the sports rules.

(TKD) was established as an OLYMPIC GAME in 2000, its reputation & popularity has increased rapidly & participation of athletes from all age groups has developed rapidly.

Taekwondo has now been includes in schools as physical fitness purpose.

Kids of age group 8yr and more are all included in this sport. So the chances of getting musculoskeletal pain has been increased.

Competitors are matched by their age, rank, weight & fight three 2-minute bouts per match [3].

Taekwondo as an exercise has positive effects on the psychological and physiological areas for the growth and development of children and adolescents [6, 7, 8, 9, 10].

Taekwondo training prevents or positively improves obesity, dyslipidemia, diabetes, hypertension, cerebrovascular, and cardiovascular diseases in adults and the elderly [6, 7, 8, 9, 10].

In addition, it is expected to improve various physical strengths, including aerobic capacity, muscle strength, muscular endurance, flexibility, speed, and agility through the physiological effects of Taekwondo practice [6, 11, 12, 13].

Taekwondo is a popular martial art that involves a range of physical activities, including high-impact kicking, punching, and blocking techniques. While it has many health benefits, such as improving flexibility, strength, and coordination, it can also put a significant strain on the musculoskeletal system, leading to the development of pain and injuries.

Understanding the prevalence of musculoskeletal pain in Taekwondo club students is essential for developing strategies to prevent and manage these issues effectively. However, there is limited data on this specific population.

MSD’s are the most common occupational injuries that can lead to decrease productivity, impose direct and indirect costs on society and decrease the efficiency of athletes and players. Studies on musculoskeletal pain in athletes have shown a wide range of prevalence rates depending on the sport, training intensity, and age of the athlete. For Taekwondo students, the prevalence of musculoskeletal pain may be affected by factors such as the frequency and

duration of training, the level of experience, and the intensity of competitions.

Therefore, this study aims to investigate the prevalence of musculoskeletal pain among Taekwondo club students and identify the most common areas affected. This information can help in developing effective prevention and management strategies, such as modifying training programs or implementing injury prevention protocols, to ensure the health and well-being of Taekwondo athletes.

Need of Study

- Taekwondo is a form of martial art which includes the kicking and punching techniques.
- Taekwondo is an upcoming martial art or a sport which is now a days included in fundamental education and in schools.
- Taekwondo involves varied types of powerful kicking techniques where the use of leg is prominent which leads to different musculoskeletal pain in young students and players.
- There are chances of increased musculoskeletal pain or injuries to the beginners and players
- There are any studies focusing on musculoskeletal pain in taekwondo players.
- Hence the purpose of this study is to find the prevalence of musculoskeletal pain in taekwondo club students.

AIM

"To determine the prevalence of musculoskeletal pain in taekwondo club students."

Objectives

To find out prevalence of musculoskeletal pain in taekwondo club students using Nordic Body Map questionnaire.

Review of Literature

1. In their study "Injuries in Korean Elite Taekwondo Athletes: A Prospective Study." states that Korean elite Taekwondo athletes were frequently exposed to injuries, and youth athletes sustained a higher rate of injuries than adult athletes during practice. However, the proportion of sustained severe injuries was higher in adult athletes than in youth athletes. Moreover, female athletes were more likely to experience an injury than male athletes during practice. Finally, future prospective cohort studies including elite and amateur Taekwondo athletes should rely on data from the ISS and injury prevention programs to provide evidence-based information on risk factors of Taekwondo-related injuries that can be used to adjust the rules for athlete protection.

[Son B, Cho YJ, Jeong HS, Lee SY]

2. In their study "Prevalence rate of chronic overuse pain in taekwondo athletes." states that The prevalence of COP is high among sport poomsae taekwondo athletes. Competitors who are female, have a history of injury, and train for extended hours were more likely to experience COP. To identify other potential risk factors of COP in sport poomsae taekwondo, more research is needed to build upon the findings.

[Koh JO. (2017)]

3. In their study "Prevalence of musculoskeletal injuries in young taekwondo athletes" States that : The prevalence of injuries was found to be 48%; mainly located in knee (54.16%) followed by foot and ankle (50%) and shoulder (39.58%). Most of the injuries occurred in training session than competition.

[Dr. Nivedita Pingale, Dr. James Ghagare (2017)]

4. This study provided considerable evidence that the Turkish version of the NMQ has appropriate psychometric properties, including good test-retest reliability, internal consistency and construct validity. It can be used for screening and epidemiological investigations of musculoskeletal symptoms. Implications for Rehabilitation The Nordic Musculoskeletal Questionnaire (NMQ) can be used for the screening of musculoskeletal problems. The NMQ allows comparison of musculoskeletal problems in different body regions in epidemiological studies with large numbers of participants. The Turkish version of the NMQ can be used for rehabilitation due to its appropriate psychometric properties, including good test-retest reliability, internal consistency and construct validity.

[Kahraman T, Genç A, Göz E. (2016)]

5. In their study "Determination of Musculoskeletal Disorders (MSDs) complaints level with Nordic Body Map (NBM)" states that, This study will discuss the level of complaints of Musculoskeletal Disorders (MSDs) with Nordic Body Map (NBM), where the method used is NBM questionnaire, with characteristics data of 15 workers from factors related to MSDs complaints on tailors. The results showed that body parts subjected to subjective complaints of Musculoskeletal Disorders (MSDs) were 93% waist, 87% ass, 87% lower neck, 80% left shoulder, 80% back, and 80% wrist.

[Sofyan, D. K.]

Methodology

- Study Design – Prevalence study
- Sample Size – 332
- Sampling Method – Purposive Sampling.
- Study Population – Taekwondo Club Students
- Study Setting – Academies of taekwondo in and around Pune, Maharashtra.
- Study Duration – 6 Months

Materials

- Consent form
- Nordic Body Map Questionnaire
- Pen
- Paper

Study Criteria

Inclusion Criteria

- Taekwondo students who are willing to participate.
- Age: 8-16 yrs.
- Both Males & Females.
- Not involved in any other activity or sports.

Exclusion Criteria

- History of injuries to the lower limb in recent times
- Recent fracture in lower limb
- History of lower limb surgery
- Non- cooperative participants.

Outcome Measures

Nordic Body Map [14]

- Reliability- (ICC – 0.90) [15, 16]

Procedure

- The study will begin with a presentation of a synopsis to an ethical committee of P.E.S. Modern College of Physiotherapy and after approval of the committee
- The purpose of the study will be explained to subjects and informed consent was obtained from all the participants.
- Total Seventy participants will be selected on the basis of inclusion and exclusion criteria.
- Various Taekwondo club students will be approached in and around Pune.
- Participants were given the questionnaire which they have to fill with the help of their masters and physiotherapists.
- The data will be collected and analysed.

Data Analysis

The Data that fulfilled the inclusion criteria was exported to excel sheet and was further analysed. Mean and standard deviation of the data was also assessed to check the descriptive statistics for the variables.

Total 332 participants were recorded for study.

Out of this 332 participants, 202(61%) were males and 130 (31%) were female participants out of this 332 participants, 157(47.29 %) are from age group 8 to 10 years, 122(36.74%) are from the age group 11 to 13 and 53 (16 %) are from the age group 14 to 16.

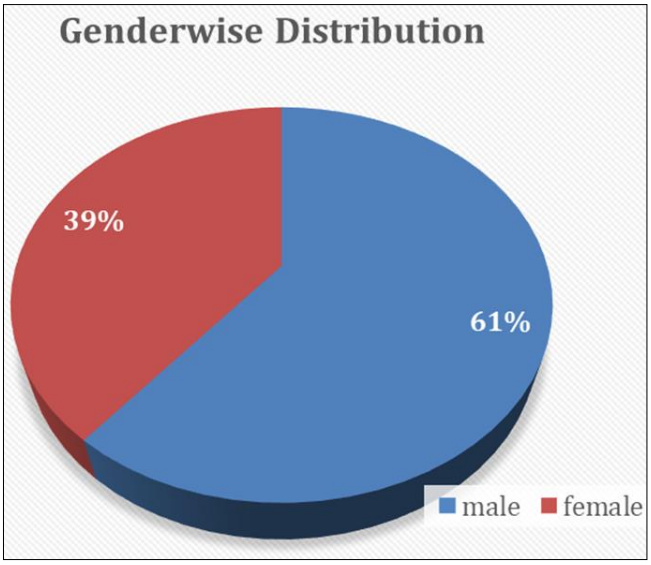
Results

Total 332 Participants of age group 8-16 years volunteered to participate in the study and have completed the survey.

Gender wise distribution of subjects in the study

Table 1: Demographic Data

Gender wise distribution	Male	Female
No. of Participants	202	130

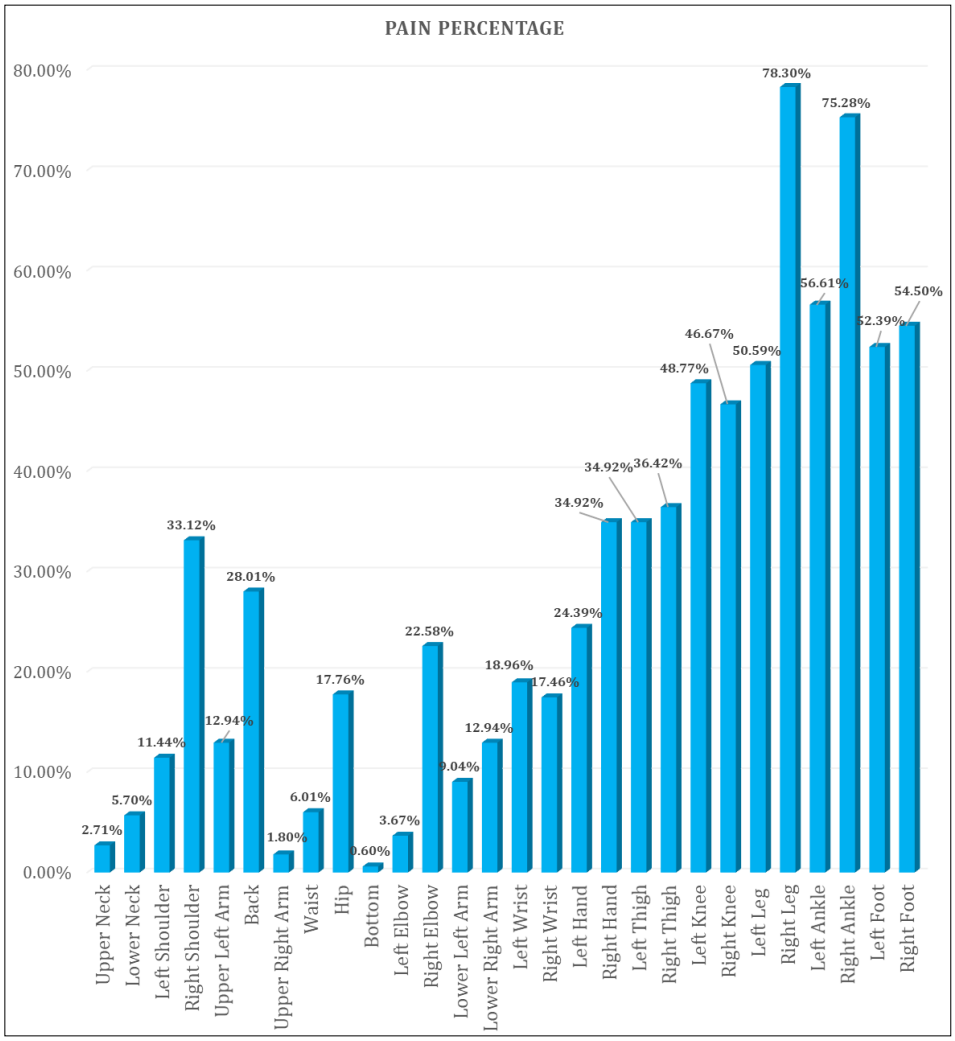


Graph 1: Demographic Data

Table 2: Prevalence of Musculoskeletal pain in taekwondo club students

Scoring/Prevalence	1	2	3	4	Total Pain Percentage
Upper Neck	97.29%	2.41%	0.30%	0.00%	2.71%
Lower Neck	94.27%	3.00%	2.40%	0%	5.70%
Left Shoulder	88.55%	6.32%	5.12%	0.00%	11.44%
Right Shoulder	66.86%	15.36%	15.66%	2.10%	33.12%
Upper Left Arm	87.04%	6.62%	6.32%	0.00%	12.94%
Back	71.98%	17.77%	10.24%	0.00%	28.01%
Upper Right Arm	98.19%	0.60%	1.20%	0.00%	1.80%
Waist	93.97%	4.81%	1.20%	0.00%	6.01%
Hip	82.22%	15.36%	2.40%	0.00%	17.76%
Bottom	99.39%	0.60%	0.00%	0.00%	0.60%
Left Elbow	96.38%	3.67%	0.00%	0.00%	3.67%
Right Elbow	77.4%	17.16%	5.12%	0.30%	22.58%
Lower Left Arm	90.96%	7.53%	1.20%	0.31%	9.04%
Lower Right Arm	87.04%	10.54%	2.40%	0.00%	12.94%
Left Wrist	81.02%	17.46%	1.50%	0.00%	18.96%
Right Wrist	82.53%	7.83%	6.62%	3%	17.46%
Left Hand	75.6%	16.56%	7.83%	0.00%	24.39%
Right Hand	65.06%	23.19%	9.63%	2.10%	34.92%
Left Thigh	65.06%	19.57%	12.95%	2.40%	34.92%
Right Thigh	63.55%	22.28%	12.34%	1.80%	36.42%

Left Knee	51.2%	27.40%	14.75%	6.62%	48.77%
Right Knee	53.31%	25.00%	19.27%	2.40%	46.67%
Left Leg	49.39%	29.21%	15.06%	6.32%	50.59%
Right Leg	21.68%	31.92%	33.73%	12.65%	78.30%
Left Ankle	43.37%	33.43%	17.16%	6.02%	56.61%
Right Ankle	24.69%	19.57%	43.37%	12.34%	75.28%
Left Foot	47.59%	29.51%	16.26%	6.62%	52.39%
Right Foot	57.53%	29.81%	12.65%	12.04%	54.50%



Graph 2: Prevalence of Musculoskeletal pain in taekwondo club students

Discussion

Taekwondo is a Korean martial art that involves a variety of physical movements, including kicks, punches, and blocks. Taekwondo club students may experience musculoskeletal pain [1].

The aim of this study was to evaluate the Prevalence of musculoskeletal pain in taekwondo club students from in and around Pune (Maharashtra).

This study showed a high prevalence of musculoskeletal pain in both knees, Both Legs, Both Ankles, Both Foot, Right shoulder among these taekwondo club students.

Musculoskeletal pain is defined as acute or chronic pain that affects and have pain in muscles, bones, tendons, ligaments, nerves. Injury and overuse is the main cause of pain.

Musculoskeletal pain is described as an injury or dysfunction that commonly involves the supporting structures of the body as well as the nerves, muscles, bones and cartilages. They are collectively caused by repetitive movements or kicking and punching techniques.

Musculoskeletal pain is a common issue that affects individuals engaged in various physical activities, including sports. Taekwondo is a martial art that involves a combination of kicking, punching, and other high-impact movements, which can place a considerable strain on the musculoskeletal system. Therefore, it is important to examine the prevalence of musculoskeletal pain in taekwondo club students to understand the extent of this problem.

Taekwondo hand strikes are performed as a close distance alternative to kicks.

Hand strikes make up a fist and various surfaces of the hand may be engaged as the striking surface depending on which area of the opponent's body which is being targeted.

Hand positions in various strikes includes the fore fist, flying punch, fingertips, thumb, palm, eagle strike etc.

The most common of all pain injuries was muscle injury (strain, contusion) (58.6%), in the foot and fingers (18.9%).

The attack technique (28.8%) was the most prevalent injury mechanism [5].

The upper extremities tend to get injured more often in judo, head and face in karate, and lower extremities in taekwondo. Activities engaged in at the time of injury included performing a kick, while punching in karate, and performing a roundhouse kick in taekwondo [18].

Results of the study showed that there is a high prevalence of musculoskeletal pain in right leg (i.e. 78.30%), right ankle (i.e. 75.28%), left ankle (i.e. 56.61%), right foot (i.e. 54.50%), left foot(i.e. 52.39%), left leg (i.e. 50.59%), left knee (i.e. 48.77%), and right knee (i.e. 46.67%)

This was found to be prevalent due to the repetitive movements of various kicking techniques.

A study conducted by Kim *et al*. (2017) found that 57% of taekwondo athletes reported experiencing musculoskeletal pain in the previous six months, with the knee being the most commonly affected area [19].

Another study by Kim *et al*. (2018) reported similar findings, with 56.8% of taekwondo athletes experiencing musculoskeletal pain [20].

These studies suggest that musculoskeletal pain is a common issue among taekwondo athletes, including club students. However, it is important to note that the prevalence of musculoskeletal pain can vary depending on various factors such as age, gender, level of training, and the duration and intensity of training.

Furthermore, the type and frequency of training can also influence the prevalence of musculoskeletal pain. For example, a study by Kofotolis *et al*. (2018) found that taekwondo athletes who participated in more training sessions per week had a higher prevalence of musculoskeletal pain than those who trained less frequently [21].

In conclusion, musculoskeletal pain is a common issue among taekwondo club students, with the right leg (i.e. 78.30%), right ankle(i.e. 75.28%), left ankle (i.e. 56.61%), right foot (i.e. 54.50%), left foot(i.e. 52.39%), left leg (i.e. 50.59%), left knee (i.e. 48.77%), and right knee are the most commonly affected areas. However, the prevalence of musculoskeletal pain can vary depending on various factors such as age, gender, level of training, and the duration and intensity of training. Therefore, it is important to take these factors into account when designing injury prevention strategies for taekwondo athletes.

Conclusion

From this study we can conclude that right leg (i.e. 78.30%), right ankle(i.e. 75.28%), left ankle (i.e. 56.61%), right foot (i.e. 54.50%), left foot(i.e. 52.39%), left leg (i.e. 50.59%), left knee (i.e. 48.77%), and right knee (i.e. 46.67%) are most commonly affected due to musculoskeletal pain in the taekwondo club students.

Limitations

- The sample size of the present study was limited.
- **Self-reported pain:** The prevalence of musculoskeletal pain may be based on self-reported pain, which can be subjective and may not accurately reflect the actual prevalence of pain. Additionally, students may not report all instances of pain or may have difficulty accurately describing the location or severity of their pain.
- **Lack of a control group:** Without a comparison group of non-taekwondo students, it may be difficult to determine whether the prevalence of musculoskeletal pain is higher or lower in taekwondo club students compared to the general population.
- **Cross-sectional design:** A cross-sectional study design, which measures the prevalence of musculoskeletal pain at a single point in time, may not capture changes in pain over time or the impact of taekwondo training on the development or resolution of musculoskeletal pain.

Future Scope

- Further study should expand the sample size of taekwondo students.
- This study can be done in other age groups
- Future studies could examine the effectiveness of different interventions, such as strength training or stretching programs, in reducing the risk of musculoskeletal pain in taekwondo club students. This could help to identify strategies for preventing pain and reducing the impact of pain on training and performance.
- Future studies could examine the impact of individual differences, such as fitness level, training intensity, and experience with taekwondo, on the prevalence of musculoskeletal pain. This could help to identify subgroups of taekwondo club students who are at higher risk for pain and to develop targeted interventions for these groups.

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