

Prevalence of Injury Pattern among Karate Players in Delhi-National Capital Region- A Cross-sectional Survey

SAJJAN PAL¹, JOGINDER YADAV², SHEETAL KALRA³, BIJENDER SINDHU⁴

ABSTRACT

Introduction: With increasing participation in karate over the past 20 years, many injuries are reported in karate sports. Although many articles and studies regarding injuries in Karate have been published till now, there is lack of studies in the Indian context, to specifically evaluate and document the injury patterns in karate players.

Aim: To identify the prevalence, onset of injury, mechanism, and pattern of injury in aspiring national and international level karate players.

Materials and Methods: This cross-sectional study was conducted on the karate players of Delhi NCR (National Capital Region) during December 2018 to February 2019. The survey was conducted on 204 karate players (132 male and 72 female karate players). Data was obtained by one on one methods of the interview using a self administered and close ended questionnaire in various karate academies. Karate players included were in the age group between 15-25 years and aspiring for national and international level with a minimum of 2 years

of experience of playing. Recreational and novice players were excluded from the study. Data was analysed by using Statistical Package for Social Sciences version 20 (SPSS).

Results: Out of 204 karate players, 84 (41.2%) karate players were found to be injured at the time of the study and 90 (44.12%) players had injuries in the past 24 months. According to the location of the injury, head and face constituted the most injured body part (28.58%) followed by lower limb and upper limb. The onset of injury was found to be sudden in 57.15% of injuries and gradual in 35.71% of injuries and 65.48% injuries occurred due to direct contact mechanism due to punches and kicks.

Conclusion: The current study revealed that karate was associated with a high injury rate. In karate the head and face were found to be injured the most followed by the lower limb and upper limb. More epidemiological studies are needed to understand mechanism or location of injuries during training and compare them to those injuries which are sustained in competition only.

Keywords: Athlete, Combat sport, Incidence, Injury rate, Martial art

INTRODUCTION

Competitions and participation in karate has evolved and grown rapidly over the past 15-20 years [1,2]. Combat sports can be defined as contact sports where athletes use different types of techniques to fight like striking, grappling, or weapon-related techniques under specific rules [3]. Karate is one of the form of striking style in combat sport [4]. The literal meaning of word karate is "empty hands" which means freedom to use hands without using weapons against an opponent [5]. Karate originated in Okinawa, an island south of Japan by the master Gihin Funakoshi [6]. The World Karate Federation (WKF) formed by 120 countries in 1993, is the international karate organisation recognised by the International Olympic Committee (IOC) [7].

There are many benefits of practicing karate as it improves psychological health by promoting relaxation, self-esteem, balance, development of the discipline, strength and mind-body coordination [8,9]. Participation in the sport like karate or any sport is not without risk, and injuries can be an adverse outcome [4].

Previous evidence reported that there is an intermediate risk (120 injuries per 1,000 athlete exposures) of injury in karate [6]. The head and neck are the most frequently injured anatomical region in boxing (84%), karate (74%), mixed martial arts (64%), and kickboxing (55%) whereas the lower limb and upper limb are the most frequently involved anatomical regions in Taekwondo (51%) and judo (47%) [6]. Currently, in karate competition, most of the injuries reported are contusion (47%) which is followed by epistaxis (20%), and then lacerations (10%) [1]. Punch blow, kick blow, and fall to the ground are the causes of injury in karate players [10]. Predictors for injuries are age,

Body Mass Index (BMI), gender variances, style, and training duration [11].

The safety of karate players at the national and international levels in sports is of growing concern nowadays [12]. Despite many studies across the world, there are few studies reported in the Indian context [13] till date regarding injury in Indian karate players [14,15], as most of the studies reported orofacial injuries in karate players [16-19]. Therefore, it is necessary to examine the types and mechanisms of injuries resulting from performing karate, and their locations in detail. The information shall be useful for deciding how to cope with injuries and prevent participants from these injuries. The present study aimed to identify the pattern of injury in karate players of Delhi-NCR region.

MATERIALS AND METHODS

This was a cross-sectional survey conducted in the various karate academies of Delhi- National Capital Region {Sai Karate Academy (Gurugram), XMA Academy (Dwarka, New Delhi) and Shito Ryu Seiko Karate Do India (Dwarka, New Delhi)}. The study was conducted from December 2018 to February 2019. The sample size was calculated by G Power software version, 3.1. The effect size was calculated at 0.35 and power at .80. The sample size estimated was 204. The study was approved by the Ethical Committee of Faculty of Physiotherapy, SGT University, Gurugram under the ethical approval letter number SGTU/FOP/2018/171.

Inclusion Criteria

Karate players of age group 15-25 years, both male and female with a minimum age of playing two years, aspiring national and international level, practicing for more than three days per week

were included in this survey. This particular age group of players was selected because most of the players at this age group practice for national and international tournaments.

Exclusion Criteria

Novice and recreational players who practice less than three days per week were excluded.

Data Collection

The present study included 204 karate players. The questionnaire was self administered and close ended, in English language. A pilot study was conducted to measure reliability and validity but its results and subjects were not included in the present study. The questionnaire had good content and face validity as well as satisfactory reliability with Cronbach's alpha value was 0.71. Opinion of 5 experts/researchers working on research related to Karate was taken to establish validity of the questionnaire. It contained information like demographic details and thirty questions with four domains. Data was obtained by one on one method of the interview using a pre-tested questionnaire. The 4 domains of the questionnaire were as follows:

1. Personal data (age, gender, duration of practice)
2. Karate practice (discipline practiced and competition level)
3. Training volume (hours per week training)
4. Injury profiles (incidence, mechanism, onset and location of injury).

The questionnaire was distributed to participants who regularly practiced karate in the studied karate academies. While data collection, the purpose of the study was explicitly explained to all the participants and they were asked whether they would like to take part in the research. Subjects were directed to a separate room where two instructors were present to clarify any doubts and given minutes to fill the questionnaire and return it. The fact that any response to the questionnaire items would be confidential in all circumstances was also explained to the participants.

STATISTICAL ANALYSIS

The data were entered into the MS Excel and was analysed by using the SPSS software version 20.0 and descriptive statistics have been calculated.

RESULTS

This study was conducted on 204 Karate players (mean age 19.34). According to gender distribution, there were 132 (64.70%) male Karate players. The participants were divided into two age groups: 15-20 years and 21-25 years and data of training volume and Karate practice shown in the [Table/Fig-1].

In total 84 (41.2%) karate players were found to be injured presently (i.e., at the time of data collection) while 90 (44.12%) players had been injured in the past 24 months [Table/Fig-2].

Characteristics	Number of players (N=204)	Percentage (%)
Gender distribution		
Male	132	64.70
Female	72	35.3
Age (in years)		
15-20	129	63.24
21-25	75	36.76
Discipline practice		
Kata discipline	32	15.68
Kumite discipline	172	84.32
Competition level		
State level	11	5.4
National level	163	79.9
International level	30	14.7

Volume of practice		
7-10 hours/week	60	29.41
11-20 hours/week	84	41.2
21-30 hours/week	60	29.41
Total	204	100

[Table/Fig-1]: Data related to gender, age distribution, practice and training volume.

Injury status		
Presently injured players	Number	Percentage (%)
No	120	58.8
Yes	84	41.2
Past injury status (in past 24 months)		
No	114	55.88
Yes	90	44.12
Total	204	100

[Table/Fig-2]: Present and past injury status (Prevalence of injury).

Total 57.15% of injuries were found to be sudden in onset and 35.71% was gradual and remaining was not specific in nature. The mechanism of injury in karate players had found to be occurred mostly by direct contact (65.48%). The most common causes of direct contact injuries were found to be punches and kicks [Table/Fig-3].

Injury profile	Number of players	Percentage (%)
Onset of injury		
Sudden	48	57.15
Gradual	30	35.71
Not specific	6	7.14
Mechanism of injury		
Contact	55	65.48
Non-contact	29	34.52
Total	84	100

[Table/Fig-3]: Onset and mechanism of injury (in injured players at the time of study).

It was observed that, in present as well as past, the most common location of injury were head and face. Some injuries were also recorded on the abdomen and genitals (in males) [Table/Fig-4].

Body parts	Present injury (%) n=84	Past injury % (within 24 months) n=90
Foot	10 (11.90%)	12 (13.33%)
Ankle	18 (21.43%)	15 (16.67%)
Knee	11 (13.09%)	13 (14.44%)
Hip	1 (1.2%)	2 (2.22%)
Buttocks	2 (2.38%)	-
Genitals and groin	2 (2.38%)	3 (3.33%)
Abdomen	4 (4.76%)	5 (5.56%)
Hand	5 (5.95%)	6 (6.67%)
Wrist	-	-
Elbow	-	2 (2.22%)
Shoulder	4 (4.76%)	5 (5.56%)
Upper back	3 (3.57%)	2 (2.22%)
Head and face	24 (28.58%)	25 (27.78%)
Total	84 (100%)	90 (100%)

[Table/Fig-4]: Injury distribution according to body parts on the present and past injury status.

DISCUSSION

Previous studies on incidence of karate injuries reported 0.31 and 0.09 per match [7, 20]. The present study was conducted on 204 karate players and it was found that 84 (41.2%) karate players were injured presently (i.e., at the time of data collection) and 90 (44.12%) found to be injured in past 24 months. The risk of injury appears to be

intermediate in striking styles like karate, with injury incidence rates of around 120 injuries per 1,000 athlete-exposures [4]. Similarly, a study was done among Iranian Shotokan karate female players in which 186 injuries were recorded from a total of 1139 bouts involving 1019 athletes, therefore there were 0.163 injury per bout and 183 injuries per 1000 athletes [21]. A cross-sectional study in southern India reported least prevalence (0.6%, n=161) of injuries in karate players (age group 18 to 30 years) among thirteen types of sports [22].

Present study reported mechanism of injury as sudden in onset (57.15%). This finding was supported by a study [11] which reported that the majority of injuries in martial arts were acute or sudden in onset. It has been also found in the present study that majority of injuries occurred on the head and face i.e., 24 (28.58%) due to contact injuries and reason being was punches. A previous study was conducted on school students reported 30.3% (n=335) of which 0.9% (three players) were trauma to the oro-dental region [16]. A similar study in Indian context also reported the prevalence of oro-facial injuries to be 39.1% in contact athletes and 25.3% in noncontact athletes [17]. Similarly, another study by Solanki N et al., reported prevalence of sports-related oro-facial injuries in contact and non contact sports to be 26.65% in National Capital Region, India [18]. Furthermore, another study found that the head and face were injury locations in karate for most of the injuries (51.3-90.9%) and also found that upper extremities get injured more in judo, the head and face in karate and the lower extremities were found to be injured in taekwondo. The most common cause of injury was punching in karate [11]. Mechanism of the injury during kicking was found through being kicked (26.9%), falling (20.8%), and kicking (18.0%) [23].

A previous study reported knee pain in karate student of age 15 to 25 years [15]. The present study reported that injuries were common on ankle (21.43%), knee (13.09%), and foot (11.90%) in the lower limb. After head and face injuries, lower limb injuries occurred mostly in karate players. There were previous studies that reported 45% [24] and 46.2% [25] of total injuries in lower extremities in young karate athletes during practice. Furthermore, knee injuries were found to be common in martial arts (judo, karate and taekwondo) players of northern India [26].

Limitation(s)

The limitation was that this study based on the injuries regarding regular training. It had not included data and injuries from competitions and tournaments.

CONCLUSION(S)

Karate is associated with a high prevalence of injuries. Mostly, head and neck injuries are found followed by lower and upper limb. Further Epidemiological studies are needed to understand injury pattern during training and compare them to those injuries which are sustained in competition only, specifically in Indian context. Analytical studies are also needed to evaluate suggested preventive measures based on associated risk factors for injuries. More studies also needed to compare the effect of protective equipment implementation on the rate of injuries in karate competitions and practice.

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PARTICULARS OF CONTRIBUTORS:

- Assistant Professor, Faculty of Physiotherapy, SGT University, Gurugram, Haryana, India.
- Professor, Faculty of Physiotherapy, SGT University, Gurugram, Haryana, India.
- Associate Professor, School of Physiotherapy, DIPSER, Delhi, India.
- Assistant Professor, Faculty of Physiotherapy, SGT University, Gurugram, Haryana, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Sajjan Pal,
Near Chandu Bhudera, Gurugram, Haryana, India.
E-mail: palsajjan14@gmail.com

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