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A Study on Injury Issues & Body Mass Index (BMI) of Female Karate Players in South 24 Parganas, West Bengal

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Abstract: *The aim of this paper was to focus on injury issues among female karate players and how these issues are related with their age and body mass index (BMI). The study was done on twenty-six female players in the Baruipur and Subhash gram areas in South 24 Parganas in West Bengal. The stratified random sampling procedure was applied for the selection of the sample group.A prospective recording of the injuries resulting from Data on their demographic characteristics (Age and Weight), BMI were recorded by standard methods. A self -made questionnaire was used for survey on health issues. Results indicate ankle injury and bone injuries were most common along with the anxiety issue. Their age was found positively correlated with BMI value. However, the correlation of BMI with injuries and anxiety was positive but not statistically significant. This study is a novel attempt of its kind as no similar work on the population of female karate players in West Bengal was found in literature. The findings could improve the awareness of the players and coaches about the chances of injury during the sport practise.*

Keywords: *Body Mass Index, Injury Issues, Female Karate Players, Cardiorespiratory Fitness, Ankle Sprain & Bone* Injury.

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Introduction

According to the theory of combat sports, martial arts are historical, based on traditional cultures of hand-to-hand fight and handling weapon associated with elements of metaphysics. The humanistic theory of martial arts provides theoretical perspective for this issue. On the other side, combat sports are group of activities which essence of competition consists in direct combat of two opposing athletes, and can also be defined as contact sports where athletes use different types of techniques to fight like striking, grappling, or weapon-related techniques following specific rules. Karate is a Japanese martial art that uses striking techniques with hands, feet, elbows, and knees, as well as blocking and

grappling. It was practice to develop physical and mental discipline. This combat sport was originated from Okinawa, an island in south Japan by the master Gihin Funakoshi. The World Karate Federation (WKF), the largest international governing body of sport karate. There are 198 member countries in this association. This karate organization is also recognized by the International Olympic Committee. Traditionally, karate is practiced as an art (budō), self-defence or as a combat sport. It emphasises on self-development (budō). Modern Japanese style training also emphasizes the psychological elements incorporated into a proper *kokoro*(attitude) such as perseverance, fearlessness, virtue, and leadership skills. Sport karate places emphasis on exercise and competition. Karate is one of the most popular and practiced martial art in India as a means of physical development and self-defense strategy at recent time. However, participants are often found to experience some number of injuries while practicing difficult techniques of this martial art.

As a martial art, karate may be perceived as carrying a high risk of injury as the aim is to strike the opponent. In karate, athletes have a higher incidence of lower extremity injuries. Ankle Sprain, fracture and joint injuries related to the foot and hand are very common injuries in karate players. A lot of players also suffer mental anxiety before and during the match. Despite many studies across the world, there is handful studies reported in West Bengal and one/two studies in Indian context till date regarding injury of karate players. Most of the earlier studies have been done on male players and similar studies on their female counter parts specially in West Bengal is unavailable. However, there is an anticipation, that the construction of the female body may affect female athletes suffer a lot of injuries. Nowadays, woman athletes play more contact sports, and suffer many issues. It has been noted that issues related to ankle sprain, bone injury and mental anxiety are not been studied systematically in the context of West Bengal. The present study attempts to explore the injury and other health related issues in female karate players in the district of 24 Parganas (S).

Research Objectives:

1. To observe ankle sprain, bone injury of female karate player of South 24 Parganas , West Bengal
2. To know the obesity status of female karate player of South 24 Parganas , West Bengal
3. To measure cardiorespiratory fitness of the female karate players of South 24 Parganas , West Bengal
4. To assess the level of anxiety value of female karate players of South 24 Parganas , West Bengal

Research Questions

1. What is the status of ankle sprain, bone injury of female karate player of South 24 Parganas , West Bengal ?
2. What is the obesity status of female karate player of South 24 Parganas , West Bengal ?
3. What is the status of cardiorespiratory fitness of the female karate players of South 24 Parganas, West Bengal?
4. What is the status of level of anxiety value of female karate players of South 24 Parganas , West Bengal ?

Research Hypothesis

$H_0$1- Ankle Sprain & Bone Injury have no impact on female karate player of South 24 Parganas , West Bengal

$H_0$2 - Obesity status has no impact on female karate player of South 24 Parganas , West Bengal

$H_0$3 - Cardiorespiratory fitness has no impact on the female karate players of South 24 Parganas , West Bengal

$H_0$4 - Level Of Anxiety has no impact on female karate players of South 24 Parganas , West Bengal

Review of Literature:

To observe ankle sprain, bone injury of female karate player of South 24 Parganas , West Bengal

Halabchi F., Ziaee V., Lotfian S. (2007), have done a prospective recording on the injuries of 1019 athletes. 186 injuries are recorded from a total of 1139 bouts involving 1019 athletes. The most common Injuries were in the head and neck followed by the lower limb, upper limb, and trunk. Punches were found to be associated more with injuries than kicks. The most common injuries consisted of muscle strain and contusion, joint dislocation, and fractures. As a combat sport, its aims to injure the opponent. **Vahid Z.; Montazer S.; Sara L.; Mahdi A. (2015)**, performed a cross-sectional study in Iran clubs during training at Tehran. It consisted of the incidence and type of injury of karate athletes aged below 30years. The rate of injury was more common in athletes with weight less than 70 kg and lower sport experience. The commonest locations for injury were head and neck followed by trunk, lower and upper limb, respectively. Severe injury was uncommon in this study and similar to other Iranian studies head and neck had the most injuries.

To know the obesity status of female karate player of South 24 Parganas , West Bengal

Laura P., Dariusz M., Natalia G. (2019), conducted a questionnaire based survey among 61 elite karate kyokushin athletes competing in Polish and European tournament. Most common injuries were found contusions and joint injuries related to the left foot and right hand. It is reported, hands and feet are the most vulnerable part susceptible to injuries from karate kyokushin fighters. Most of athletes are willing to use protection of central parts and striking surfaces. **Pijeko L., Gloc D., Ryngier P. (2014)**, evaluated the traumatic injuries among athletes participating in XXXIX Polish Karate Kyokushin Championships. The questionnaire survey was conducted among 41 karate kyokushin athletes. Karate kyokushin athletes suffered a total of 472 different types of injuries. Most common injuries were noticed, contusions and joint injuries related to the left foot, right hand. Women karate athletes were mostly suffering from contusions and joint injuries. Striking surfaces of hand and feet joints are the most vulnerable parts to the trauma.

To measure cardiorespiratory fitness of the female karate players of South 24 Parganas , West Bengal

Noserpour H., Mirjani M. (2019), investigated the etiology of ankle injury and its prevalence among the Iranian professional karate players. The study was done on390 karate kumite players who attended a competition for the national team selection. It has been shown that 86% of subjects had a history of ankle injury, and most of them occurred during the competition. The most important reason for ankle injury was reported as sudden rotation of the foot and kicking the opponent. In most cases, subjects had self treatment and did not visit a physician. Due to athletes' lack of follow-up for treatment and rehabilitation in most injuries, there is a possibility of re-injury to the ankle.

To assess the level of anxiety value of female karate players of South 24 Parganas , West Bengal

Singh J. (2022), studied the personality trait and anxiety level of fifty amateur karate players. The findings of the study indicated that karate players significantly less extrovert than other Players.

Methodology:

The survey was done on young female karate players of age group 9 to 26 years who were practicing in four reputed Karate clubs in Baruipur and Subhas gram areas of South24Parganas, WestBengal.

Sampling: The stratified random sampling technique has been applied for the selection of karate players.There were all togethertwenty six players participated in the study.All players reside in the district of South 24 Parganas, West Bengal.

Materials Used:

- ✓ Measuring Tape
- ✓ Weighing Machine
- ✓ 16.25inchesstool
- ✓ Stopwatch
- ✓ Metronome
- ✓ Self -made questionnaire for data collection.

Study Design: The study was done on fifty karate players of age group 9-26 in four karate club in Baruipur and Subhas gram areas of South 24 Parganas. The present study was conducted by taking verbal consent of the participant players and the authority of the karate club. The entire study was done in 3 phases. The first phase was focused on the collection of data of the physical and physiological parameters like height, weight, resting heart rate etc. In the second phase, the after-exercise heart rate was collected. In the third phase, a self-made questionnaire including 15 various issues related questions was asked.

Inclusion Criteria:

- ✓ Regular karate players were included into this study.
- ✓ Karate players without any present injury were taken for the study.
- ✓ Female karate players were included.

Exclusion Criteria:

- ✓ Male karate players were not included.
- ✓ Karate players without proper practice and training had been excluded for the study.
- ✓ Players more than 26 years were excluded.

Test Methods:

- ➢ Basic information such as name, age was taken from the karate players and then basic physiological parameters were taken like height, weight etc.
- ➢ Height & Weight measurement: The subject was asked to stand straight on the ground and look forward. Then with a measuring tape the height of the subject was taken from ground to the vertex of the head.
- ➢ For measuring weight, the subject was asked to step on a weight measuring machine. Theywere asked to stand still and look forward. The reading was noted from the weighing machine.
- ➢ Body height and body weight was measures by using measuring tape and weighing machine and then BMI (Body Mass Index) was calculated by using the following equations:
- ➢ BMI = Weight in Kilograms/ (Height in meters)^2 (WHO, Physical status, 1995)
- ➢ VO2max Measurement: The cardiorespiratory fitness or aerobic fitness was measured in terms of maximum oxygen consumption. It was evaluated by Queen's College step test (QCT) which comprised of stepping up and down on a stool of 16.25 inches height.
- ➢ After measuring height and weight, the subject was asked to sit comfortably and was taken the 15 seconds recovery heart rate from carotid artery and then the subject was asked to step up and down on the 16.25 inches stool at the rate of 22 steps per minute. The subject was instructed to follow the step using metronome. After completion of time, the heart beats were counted from carotid arteryfor 15 seconds from 5-20 seconds of recovery and it was converted into heart rate in beats per minute by multiplying 4. The following equation was used to compute the VO2max:
- ➢ VO2max (mL/kg/min) = 65.81 – [0.1847 × heart rate (bpm)] (McArdle et al., 1972)
- ➢ Survey on Various Issues: A self-made close ended questionnaire was prepared with the issues related to injury, financial help, infrastructural support and media coverage of the sport. A three-point Likert scale with the response options like many times, few occasions & never with the respective weightage 5, 3, & 1 was applied for scoring based on response of the players.
- ➢ **Statistical Analysis:** All the data were subjected to quantitative analysis. The relationship among certain variables were evaluated by applying Pearson correlation (r) at the 0.05 level of significance.

Result: This section deals with the findings of the entire study.

Table 1 shows the basic details such as name, age, sex, height, and weight of the players. Mostly all those players belong to 9 to 26 years of age group.

Table-1: Basic Details of Players

Sl.No.	***Age***	***Sex***	***Height(cm)***	***Weight(kg)***
1	9	F	146	48.05
2	10	F	131	26.65
3	11	F	150.1	40.95
4	11	F	142.5	35.7
5	11	F	149.5	42.15
6	12	F	152.2	59.45
7	13	F	145	41.65
8	13	F	156	58.8
9	13	F	147	45.55
10	14	F	144	64
11	14	F	151.5	50.9
12	14	F	153.5	52.2
13	14	F	145	45.1
14	14	F	165.2	68.35
15	15	F	157	53.5
16	15	F	142	47.3
17	16	F	153	46.25
18	16	F	140.2	45.25
19	16	F	160	46.15
20	17	F	140.9	51.7
21	18	F	158.2	69.25
22	18	F	162	48.3
23	19	F	154	71.35
24	21	F	160.6	43.55
25	23	F	140.4	72.2
26	26	F	144	55.65

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Age	26	393	15.11538	15.86615		
Height(cm)	26	3890.8	149.6462	67.20978		
Weight(kg)	26	1329.95	51.15192	126.0283		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	252185	2	126092.5	1809.038	3.45E-64	3.118642
Within Groups	5227.606	75	69.70141			
Total	257412.6	77				

Table 2 shows Body Mass Index (BMI) and Maximum Oxygen Uptake capacity (VO2max) of the players.

Table-2: Physiological Parameters of Players

SL. NO.	BMI (Body Mass Index) (Kg/m^2)	VO2 Max (Maximum Oxygen Uptake)
1	22.54	36.258
2	15.52	43.646
3	18.17	39.2132
4	17.58	43.646
5	18.85	37.7356
6	25.66	38.4744
7	19.8	39.2132
8	24.16	36.258
9	21.07	39.952
10	30.86	36.258
11	22.17	39.952
12	22.15	36.258
13	21.45	39.2132
14	25.04	37.7356
15	21.7	34.0416
16	23.45	39.952
17	19.75	41.4296
18	22.44	39.952
19	18.02	26.6536
20	23.28	37.7356
21	27.66	39.952
22	18.4	42.1684
23	30.08	40.6908
24	15.8	44.3848
25	34.62	37.7356
26	26.83	41.4296

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
BMI (Body Mass Index)(Kg/m2)	26	587.05	22.57885	21.83208		
VO2 Max(Maximum Oxygen Uptake)	26	1009.939	38.8438	12.58673		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	3439.133	1	3439.133	199.8403	4.26E-19	4.03431
Within Groups	860.4704	50	17.20941			
Total	4299.604	51				

Table 3 depicts the response wise score of female karate players, where the maximum obtained score was 35 and minimum obtained score was 23.

Table-3: Representation of scores of Issues Related to Female Karate Players

Sl.No.	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**	**Q13**	**Q14**	**Q15**	**Obtained *SCORE***	**MAX. SCORE**
1	1	1	1	1	1	1	1	1	1	1	1	5	5	5	1	27	75
2	3	1	1	1	1	1	1	1	1	1	1	5	5	5	1	29	75
3	3	3	1	1	3	1	1	1	1	1	1	5	3	5	3	33	75
4	1	1	1	1	1	1	1	1	1	1	1	5	5	5	3	29	75
5	1	3	1	1	1	3	1	1	1	1	1	1	5	5	3	29	75
6	1	1	1	1	1	3	1	1	1	1	1	1	3	5	1	23	75
7	1	1	1	1	1	1	1	1	1	1	1	5	5	5	3	29	75
8	3	3	1	1	1	1	1	1	1	1	1	5	5	5	1	31	75
9	3	1	1	1	3	3	1	1	1	1	1	1	5	5	1	29	75
10	3	3	1	1	5	1	1	1	1	1	1	1	3	5	1	29	75
11	1	3	1	1	3	3	1	1	1	1	1	1	5	5	3	31	75
12	1	1	1	1	1	1	1	1	1	1	1	5	3	5	3	27	75
13	1	1	1	1	3	3	3	1	1	1	1	1	3	5	1	27	75
14	1	3	1	1	3	1	1	1	1	1	1	1	5	5	3	29	75
15	1	3	1	1	3	3	1	1	1	1	1	1	5	5	5	33	75
16	3	1	1	1	1	1	1	1	1	1	1	3	3	5	1	25	75
17	1	1	1	1	3	3	1	1	1	1	1	1	3	3	3	25	75
18	1	1	1	1	3	1	1	1	1	1	1	1	5	5	1	25	75
19	3	1	1	1	5	3	3	1	1	1	1	5	3	5	1	35	75
20	1	1	1	1	3	5	1	1	1	1	1	1	3	5	3	29	75
21	1	1	1	1	3	1	1	1	1	1	1	1	5	5	3	27	75
22	1	1	1	1	1	1	1	1	1	1	1	1	5	5	1	23	75
23	5	1	1	1	1	1	1	1	1	1	1	3	3	5	3	29	75
24	3	1	1	1	3	3	3	1	1	1	1	1	5	5	1	31	75
25	3	3	1	1	3	3	1	1	1	1	1	1	5	5	5	35	75
26	1	1	1	1	1	1	1	1	1	1	1	3	3	5	3	27	75
															SUM	746	1950

Max. possibility score of issues	1950
Sum of obtained scores by the female karate players	746
Percentage of issues occurrences in female karate players (%)	38.2564

Table 4 depicts the most occurring injury and anxiety issues of the players.

Table 4: Representation of Most Occurring Issues in Karate Players

Sl.No.	**Ankle Sprain Score**	**Bone Injury Score**	**Mental Anxiety Score**
1	1	1	1
2	3	1	1
3	3	3	3
4	1	1	3
5	1	3	3
6	1	1	1
7	1	1	3
8	3	3	1
9	3	1	1
10	3	3	1

11	1	3	3
12	1	1	3
13	1	1	1
14	1	3	3
15	1	3	5
16	3	1	1
17	1	1	3
18	1	1	1
19	3	1	1
20	1	1	3
21	1	1	3
22	1	1	1
23	5	1	3
24	3	1	1
25	3	3	5
26	1	1	3
SUM	48	42	58
Mean	1.84	1.61	2.23
Median	1	1	3
Standard Deviation	1.15	0.94	1.27
Percentage (%)	36.92	32.30	44.61

B. Result on Relationship Study:

There is a positive correlation of age with body mass index (BMI). The correlation value of age with BMI is 0.439 and the degree of freedom (df) is 24. The correlation of age with BMI significant at 0.05 level. So, there is a significant correlation between age and BMI ($p<0.05$). The positive correlation of most occurring issues that is ankle sprain, bone injury, and mental anxiety disorder with age was calculated. However, none of them were statistically significant at $p>0.05$ level. The positive correlation of BMI with issues like ankle sprain, bone injury and mental anxiety was found. However, none of them were statistically significant.

Table-5: Correlation of Age with Body Mass Index (BMI)

Sl.No.	***Age***	**BMI (Body Mass Index)**
1	9	22.54
2	10	15.52
3	11	18.17
4	11	17.58
5	11	18.85
6	12	25.66
7	13	19.8
8	13	24.16
9	13	21.07
10	14	30.86
11	14	22.17
12	14	22.15
13	14	21.45

14	14	25.04
15	15	21.7
16	15	23.45
17	16	19.75
18	16	22.44
19	16	18.02
20	17	23.28
21	18	27.66
22	18	18.4
23	19	30.08
24	21	15.8
25	23	34.62
26	26	26.83

Table – 6 Summary Output

Regression Statistics	
Multiple R	0.970724
R Square	0.942305
Adjusted R Square	0.902305
Standard Error	5.643541
Observations	26

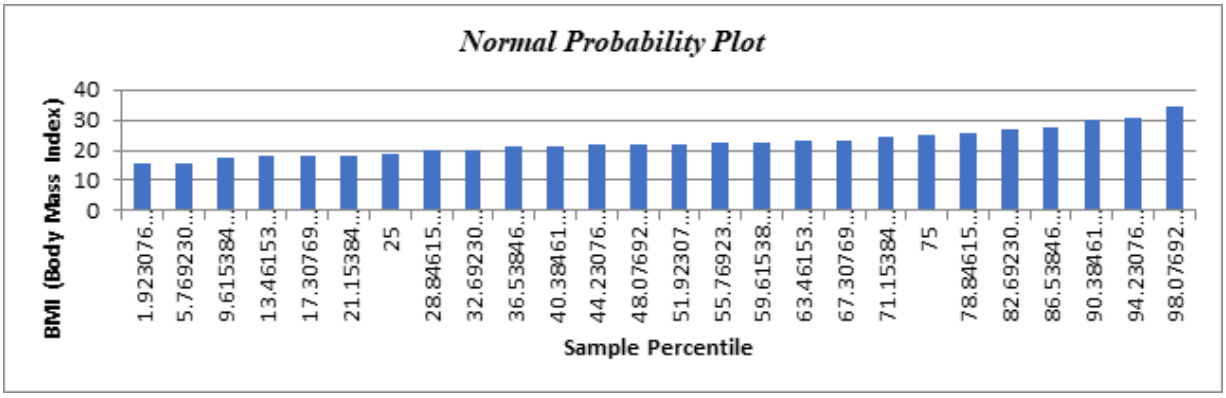
Table – 7 Anova Analysis

ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	13004.47	13004.47	408.3095	1.42E-16			
Residual	25	796.2387	31.84955					
Total	26	13800.71						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Age	1.432533	0.070894	20.20667	5.31E-17	1.286524	1.578542	1.286524	1.578542

Table – 8 Residual Output & Probability Output

RESIDUAL OUTPUT				**PROBABILITY OUTPUT**	
Observation	*Predicted BMI (Body Mass Index)*	*Residuals*	*Standard Residuals*	*Percentile*	*BMI (Body Mass Index)*
1	12.89279	9.647205	1.743278	1.923077	15.52
2	14.32533	1.194673	0.215881	5.769231	15.8
3	15.75786	2.41214	0.435881	9.615385	17.58
4	15.75786	1.82214	0.329266	13.46154	18.02
5	15.75786	3.09214	0.558758	17.30769	18.17

6	17.19039	8.469607	1.530482	21.15385	18.4
7	18.62293	1.177074	0.212701	25	18.85
8	18.62293	5.537074	1.000565	28.84615	19.75
9	18.62293	2.447074	0.442193	32.69231	19.8
10	20.05546	10.80454	1.952412	36.53846	21.07
11	20.05546	2.114542	0.382104	40.38462	21.45
12	20.05546	2.094542	0.37849	44.23077	21.7
13	20.05546	1.394542	0.251998	48.07692	22.15
14	20.05546	4.984542	0.900721	51.92308	22.17
15	21.48799	0.212009	0.038311	55.76923	22.44
16	21.48799	1.962009	0.354541	59.61538	22.54
17	22.92052	-3.17052	-0.57292	63.46154	23.28
18	22.92052	-0.48052	-0.08683	67.30769	23.45
19	22.92052	-4.90052	-0.88554	71.15385	24.16
20	24.35306	-1.07306	-0.1939	75	25.04
21	25.78559	1.874411	0.338711	78.84615	25.66
22	25.78559	-7.38559	-1.3346	82.69231	26.83
23	27.21812	2.861878	0.51715	86.53846	27.66
24	30.08319	-14.2832	-2.58101	90.38462	30.08
25	32.94825	1.671747	0.302089	94.23077	30.86
26	37.24585	-10.4159	-1.88217	98.07692	34.62



TABL- 9 t-Test: Paired Two Sample for Means

	BMI (Body Mass Index)	*Age*
Mean	22.57885	15.11538
Variance	21.83208	15.86615
Observations	26	26
Pearson Correlation	0.439454	
Hypothesized Mean Difference	0	
df	25	
t Stat	8.238082	
P(T<=t) one-tail	6.85E-09	
t Critical one-tail	1.708141	
P(T<=t) two-tail	1.37E-08	
t Critical two-tail	2.059539	

The probability of obtaining the sample result is Null Hypothesis were true (the p value) is based on two considerations: relationship strength and sample size. Reasonable judgments about whether a sample relationship is statistically significant can often be made by quickly considering these two factors. Statistical significance is not the same as relationship strength or importance. In this research, the P-value is less than the α, there should be a REJECTION of the null hypothesis in favour of the alternate hypothesis on Body Mass Index, Injury Issues, Female Karate Players, Cardiorespiratory Fitness, Ankle Sprain & Bone Injury of female karate player of South 24 Parganas, West Bengal.

Discussion:

The subject of the study was girls aged 9 – 26 years. The value of body mass index (BMI) was used to classify everyone as underweight (<18.5), normal healthy weight (18.5-24.9), over weight (25 – 29.9) and obese (≥30) [WHO, Physical status, 1995]. Out of 26 subjects, 46.15% had normal BMI. The body mass index distribution in this study was varied, the underweight, overweight, and obese group percentage were 23.07%, 19.23%, and 11.53% respectively. The study showed that there was a significant positive correlation between age and body mass index (BMI). Previous study showed age was significantly associated with BMI. Age is responsible for obesity. Older respondents are likely to be obese or overweight [Hossain A. et al., 2022].

Table – 9 Correlation Table Of The Null Hypothesis In Favour Of The Alternate Hypothesis On Body Mass Index , Injury Issues , Female Karate Players , Cardiorespiratory Fitness , Ankle Sprain & Bone Injury Of Female Karate Player Of South 24 Parganas , West Bengal.

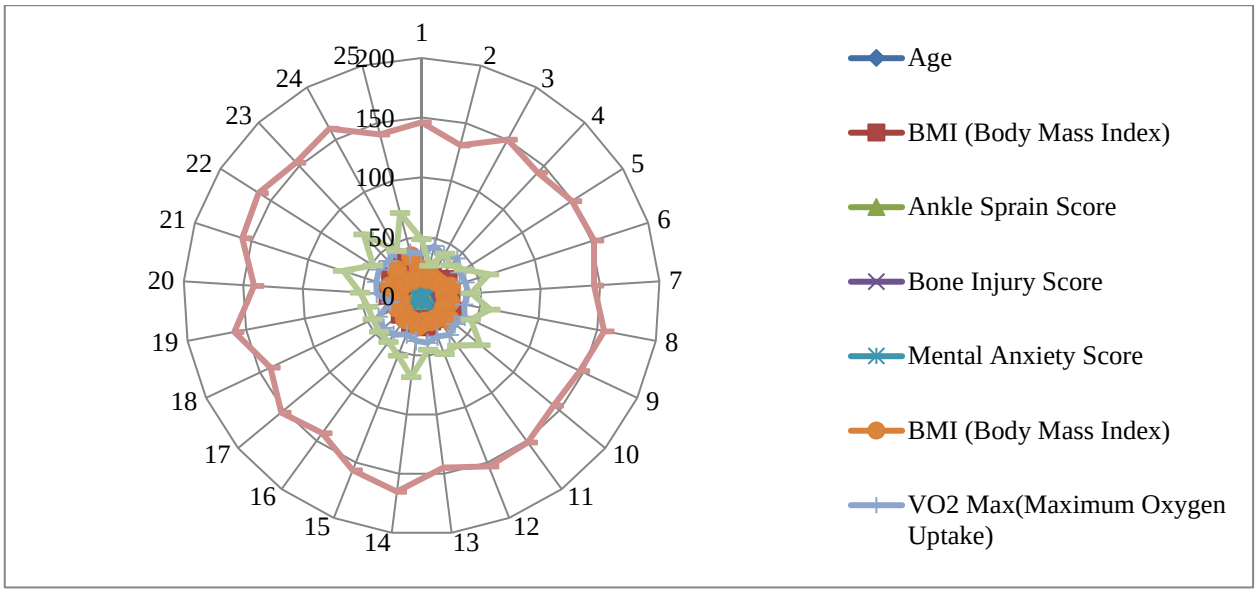
	Age	*BMI (Body Mass Index)*	*Ankle Sprain Score*	*Bone Injury Score*	*Mental Anxiety Score*	*BMI (Body Mass Index)*	*VO2 Max(Maximum Oxygen Uptake)*	*Height (cm)*	*Weight (kg)*
Age	1								
BMI (Body Mass Index)	0.462167	1							
Ankle Sprain Score	0.09328	0.201474	1						
Bone Injury Score	-0.17862	0.273937	0.072044	1					
Mental Anxiety Score	0.240985	0.311203	-0.22859	0.395247	1				
BMI (Body Mass Index)	0.421107	-0.20625	-0.25294	-0.22693	-0.1071	1			
VO2 Max(Maximum Oxygen Uptake)	0.066266	0.089987	0.251233	0.345256	0.16501	-0.19957	1		
Height(cm)	0.24	0.222995	0.105303	-0.1973	0.120262	-0.04246	-0.25337	1	

	0416								
Weight(kg)	0.51 1889	-0.09008	-0.18611	-0.2853	-0.01918	0.89439	-0.26507	0.3923 4	1

According to the survey, the most common issues are ankle sprain, bone injury and mental anxiety. The issues of individual with their age below 14 years old 52.38%, and above 14 years old 47.6%. As per the study, it has been stated that the most occurring issues such as ankle sprain, bone injury and the level of anxiety are independent to age. Experience also increases with age. In this study, there was no such particular age when the issues occurred and the experience of athletes have no such impact on those issues. Similar study showed that the experience of athletes had no impact on injury incident [Vahid Z. et al., 2005]. Some studies have shown more injury in karate with more experiences [Halabchi F. et al., 2007]. A few studies showed injury incidents decreases with more experience which is because of the ability of the players in blocking opponent's strikes and settling in an attacking position [Stricevic MV et al., 1983].

This current study has shown that most of the players suffered from ankle sprain (37%). Similar studies showed 86% of subjects had a history of ankle injury. The most important reason for ankle injury was sudden rotation of the foot and kicking the opponent [Naserpour H., Mirjani M., 2019]. Current study stated that ankle sprain in karate players is not dependent to BMI.

Bone injury is also a most common injury in karate (32%). Similar studies showed most common injuries were joint injuries related to the left foot and right hand [Laura P., Dariusz M., Natalia G., 2019], [PijekoL., Gloc D., Ryngier P., 2014]. In this current study, bone injury occurred mostly in normal weight category and most of the injury happened due to punches and kicks. Very few bone injuries happened due to fall in the ground by the opponent. Current study stated that bone injury in karate players is not dependent to BMI.



In this current study, many players suffered from mental anxiety (44%), and also stated that the level of anxiety is independent to BMI. In this study, the occurrence of anxiety level in karate players did not happen in any particular weight category, players suffered anxiety during training or practice in all weight category. Similar studies showed anxiety level was not significantly associated with BMI. Being overweight or obese does not lead to anxiety [Hossain A. et al., 2022].

Conclusion:

According to the survey, limb injury such as ankle sprain, bone injury (in major cases foot and hand region) and the level of anxiety in players during and before the match are very common. Age is significantly associated with BMI because aging is responsible for obesity. There are no such impact of age and experience on issues. Ankle sprain, bone injury and the level of anxiety is not associated with BMI.

To find some preventive measures from injuries further research is recommended. More studies also needed to evaluate the effect of protective equipment use on the rate of injuries in karate competitions and practice. In addition, athletes and coaches should increase the awareness of injury prevention using safety guard and proper warm-up as well as execution of rules during practice and competition.

Future Scope of Study:

There are many future aspects of the study on the effect of body mass index related to the injuries. This study was limited by the sample size and therefore comprehensive more study plan will be developed to evaluate the injuries in female karate players.

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