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Developing a Regression Model for Psychological Factors Predictor of Sports Injuries

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Abstract

Review of the literature shows that information concerning psychological risk factors for sports injuries is incomplete and partly contradictory .The methodology for studies designed to investigate psychological risk factors as predictor of sports injuries. The purpose of this study was to access if psychological factors play a role in the injury rates of different games athlete. The study examined the personality factors: (Anger, Mental Toughness, competition anxiety, fear of injury, and aggression) and their effects on injury rates. For accomplish the study total 60 injured players were selected as sample. The past one year injuries were analyzed through a self-structured scale. The age of the sample were ranged from 18 to 40. This study was not a particular game based. So, the data were collected from athletes of different games to know the common factor associated with sports injuries. To developing a regression model regression and multiple correlations was used as statistical tool. The level of significance was set at 0.05.

Key Words: Sports Injury, Anger, Mental Toughness, Competition Anxiety, Fear of Injury.

1. Introduction:

Sports participation is assumed to be beneficial to health. Inevitably, injury is a potential outcome of participation and an important public health problem. Incidence and distribution of sports related injuries vary based on sport affiliation, participation level, gender and player position. Young athletes are vulnerable to different injuries than adults, which includes injuries to cartilage, apophasis and growth plates.

Sports-related injuries are highly pervasive, especially for competitive level high-school and collegiate athletes. It is estimated that over 23 million sport-related injuries occur each year, and that that number is climbing (American Sports Data, 2002). Furthermore, sport-related injuries rate second highest, after home and leisure accidents, as sources of injuries (Dekker et. al., 2000). Experiencing an injury in one's sport can have devastating consequences, both physically and psychologically, and can lead to both short-term and long-term difficulties for the athlete. Due to the impact injury can have on athletes, it is important that we understand various factors that can contribute to one's susceptibility, in an effort to protect against injury as much as possible.

Previous research has attempted to identify a number of factors that are related to injury rates, including physical, environmental, and psychological factors. This study aims to expand on prior research by examining a number of psychological factors related to injury for male and female athletes across a number of sports. Specially this research will look at one's personality factors such as anger, mental toughness, competition anxiety, fear of injury and aggression in order to examine the relationship between these various personality factors, and susceptibility to injury.

Competition Anxiety as a Factor:

Trait anxiety is one of a number of personality factors that have been examined with regard to its association with injury. Individuals who have high trait anxiety are predisposed to injury (Maddison & Prapavessis, 2005). Some research has found no relationship between trait anxiety and injury (Kerr & Minden, 1988, Lysens et al., 1986). For example, in a study by Kerr & Minden (1988), researchers examined 41 elite female gymnasts from the top two skill levels in Canada. They ranged in age from 11 to 19 years and consisted of contenders for Olympic and World Championship teams, as well as individuals who were members of the junior team. Levels of trait anxiety were examined, using the Spielberger Trait Anxiety Inventory; researchers found no significant relationship between trait anxiety and injury.

Anger as a Factor:

Anger is a personality factor that has received little attention with regard to sport-related injury. Trait anger refers to a relatively stable construct of proneness to anger. Individuals with high levels of trait anger are likely to experience longer periods of anger states, as well as increased frequency and intensity of anger (Deffenbacher, 1992, Spielberger, 1999). Anger is also associated with more physical antagonism and less adaptive behavior (Deffenbacher, Oetting, Thwaites, et al., 1996; Deffenbacher, Oetting, Lynch, & Morris, 1996; Spielberger, 1999; Tafrate, Kassinove, & Dundin, 2002).

Mental Toughness as a Factor:

Mental Toughness has been shown in past research to play a role in predicting injury rates in collegiate and adolescent athletes. Mental toughness is an inner focus to rise above adversity when facing challenges. Some athletes have such a sense of commitment to succeed, that little else is important. Mental toughness is an important psychological attribute when determining if an athlete will be successful in sport (Madrigal et al., 2012). There is a possibility that the higher the athlete's mental toughness, the lower their injury rates. If we can correctly identify which athletes are more prone to injury, then perhaps we can mediate and bring down injury rates.

2. Materials & Methods:

2.1 Selection of the Subjects:

For accomplish the study total 60 players were selected through random sampling technique of various sports disciplines. The age of the subjects were ranged from 18 to 40 years. The data was gathered from the subjects belonged to Maharishi Dayanand University, Rohtak (Haryana), Indira Gandhi Institute of Physical Education & Sports Science, B-Block Vikas Puri, New Delhi. The level of competition the subjects was state, national and international level respectively.

2.2 Selection of the Variable:

After review the past research following personality traits were selected as psychological variable. A survey instrument was utilized; consisting seven parts.

- ***Part 1. Demographic information*** consisting of age, height, weight, gender, playing experience, participation level.
- ***Part-2. Sports injury graph***, a self-structured scale was used to measure the frequency of injuries, type of injuries and degree of pain.
- ***Part-3. Anger Scale, 10*** questions about people have used to describe themselves that how they generally feel.
- ***Part-4. Mental Toughness Scale (MTS) -*** *The* 11 questions about how a player feels when they compete in sports. The questions are tied to feelings such as arrogance, patience and performance. Respondents answer on a 5 point Likert scale from Strongly Disagree to Strongly Agree
- ***Part-5. Sports Injury Worry Scale (SIWS)***- the 21 questions about how a players feels towards risk of injuries occur.
- ***Part-6. Sport Competition Anxiety Test (SCAT)-*** the 15 questions about how a person feels when they compete in sports answered by circling the following answer choices: Hardly Ever, Sometimes, Often
- ***Part-7. Aggression Scale (Buss & Perry, 1992)-*** the 29 question consisting physical aggression, verbal aggression, anger and hostility was used for this study.

2.3 Statistical Technique:

For analysis the obtained results and to predict the factor related to sports injury multiple regression was used, multiple correlation was used to determine the relationship among factors. SPSS version 20.0 was used to calculate and analysis the obtained data. The level of significance was set at 0.05.

3. Results of the Study:

Table. 1 Descriptive Statistics

Factors	Mean	Std. Deviation	N
1. INJURY FREQUENCY	12.4000	2.64365	60
2. ANGER	15.8000	3.39280	60
3. MENTAL TOUGHNESS SCALE	41.4000	2.79682	60
4. SPORTS INJURY WORRY SCALE	79.5500	5.37200	60
5. SPORT COMPETITION ANXIETY TEST	32.6000	3.97772	60
6. AGGRESSION	75.6000	10.36232	60

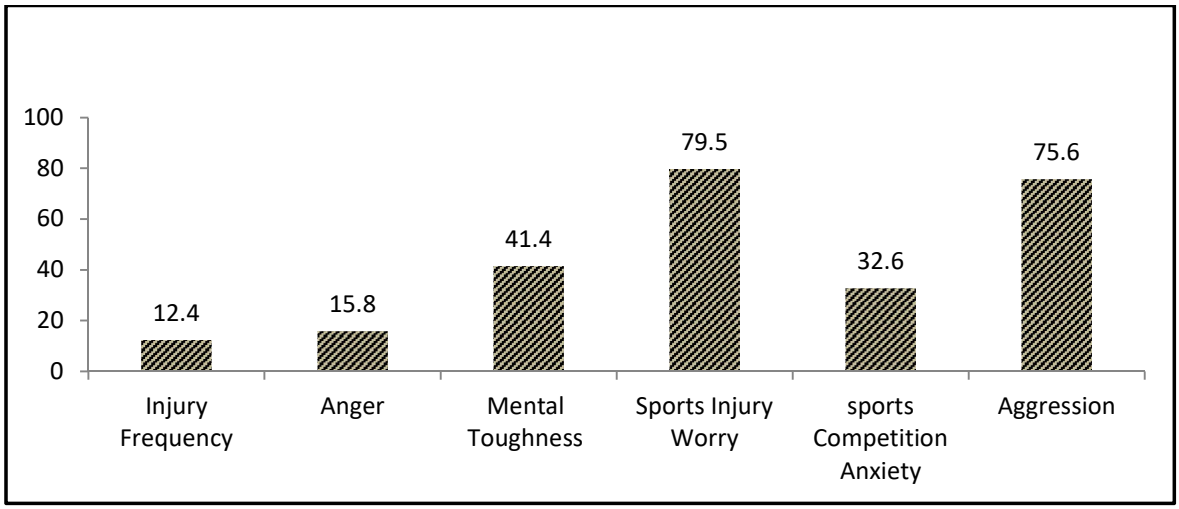

Figure- 1 Graphical presentation of Mean Score of Corresponded Factors

Table No. 1 shows the descriptive statistics of dependent and independent factors. The following table reflects the score of mean and standard deviation of all variables. The mean score of injury frequency is12.4±2.64, for anger is 15.8±3.39, for mental toughness is 41.4±2.79, for sports injury worry is79.5±5.37, for sports competition anxiety is 32.6±3.97 and for aggression is 75.6±10.36 respectively.

Table No.2 Pearson Multiple correlations

		Injury frequency	**Anger**	**Mental toughness**	**Sports injury worry**	**Sports competition anxiety**	**Aggression**
Pearson correlation	Injury frequency		.846	-.490	.941	.867	.589
	Anger	.846		-.482	.814	.866	.825
	Mental toughness	-.490	-.482		-.515	-.284	-.117
	Sports injury worry	.941	.814	-.515		.778	.605
	Sports competition anxiety	.867	.866	-.284	.778		.834
	Aggression	.589	.825	-.117	.605	.834	
Sig. (1-tailed)	Injury frequency	.	.001	.075	.000	.001	.037
	Anger	.001	.	.079	.002	.001	.002
	Mental toughness	.075	.079	.	.064	.214	.374
	Sports injury worry	.000	.002	.064	.	.004	.032
	Sports competition anxiety	.001	.001	.214	.004	.	.001
	Aggression	.037	.002	.374	.032	.001	.

In Table No.2, correlation matrix including significance level (p-value) for each of the correlation coefficient at 0.05 has been shown. As per the obtained results sports injury worry has highly correlated with dependent factor with score of .941 than sports competition anxiety has shown highly relationship with the score of .867 on the other hand the score of angle evident positively relationship towards dependent factor (injury frequency) with the score of .846 respectively.

Table.3 Model Summary

Model	R	R Square	Adjusted R Square
1	.991[a]	.982	.961
2	**.990[b]**	**.980**	**.965**
3	.984[c]	.969	.954

a. predictor: (constant), aggression, mental toughness scale, sports injury worry scale, sports competition anxiety, anger
b. predictors: (constant), aggression, sports injury worry scale, sport competition anxiety test, anger
c. predictors: (constant), aggression, sports injury worry scale, sport competition anxiety test
d. dependent variable: injury frequency

Table No.3 show three regression models. In the second model, the value of the adjusted R^2 is .965 which is maximum and, therefore second model shall be used to develop the regression model for the psychological factors predictor of sports injuries. In the second model included variables were aggression, sports injury worry scale, sports competition anxiety test and anger respectively. It means the variables which include in second variable have significant variation on the dependent variable.

Table No.4 ANNOVA

Model		**Sum of Squares**	**Mean Square**	**F**	**Sig.**
1	Regression	61.796	12.359	44.792	.001
	Residual	1.104	.276		
	Total	62.900			
2	**Regression**	**61.672**	**15.418**	**62.771**	**.000**
	Residual	**1.228**	**.246**		
	Total	62.900			
3	Regression	60.951	20.317	62.549	.000
	Residual	1.949	.325		
	Total	62.900			

a. predictor: (constant), aggression, mental toughness scale, sports injury worry scale, sports competition anxiety, anger
b. predictors: (constant), aggression, sports injury worry scale, sport competition anxiety test, anger
c. predictors: (constant), aggression, sports injury worry scale, sport competition anxiety test
d. dependent variable: injury frequency

In Table No. 4, F-values for all the models have been shown. Since F-value for the second model was quit high and highly significant, it may be concluded that the model selected is highly efficient. It means the independent variables included in 2nd model have significant variation of dependent variable

4. Conclusions:

After analysis the obtained results it has been concluded that out of the three models 2nd model is highly efficient for developing regression model for psychological factor predictor of sports injuries. Aggression, sports injury worry, sports competition anxiety and anger were the factor included in 2nd model. It means that identified factors have significant effects on dependent factor (injury frequency). On the basis of obtained results it can be said that a sports person who have high aggression, injury worry, sports competition anxiety and anger prone to be injured.

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