ORIGINAL RESEARCH PAPER

Medical Science

PREVALENCE OF CUMULATIVE TRAUMA DISORDERS IN SCULPTORS OF KUMARTULI,WEST BENGAL

KEY WORDS: Cross-sectional study, Cumulative trauma disorder, Sculptor, Symptoms

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ABSTRACT

BACKGROUND: Cumulative trauma disorders (CTDs), or repetitive stress injuries (RSIs), affect the upper extremities of many workers as they routinely perform their job.

OBJECTIVE: The purpose of this study was to investigate the prevalence of cumulative trauma disorder among sculptors of Kumartuli,Westbengal.

STUDY DESIGN: Cross-sectional study

METHODS: 100 respondents were identified and one way ANOVA was used to determine the relationship between the variables. A purposely designed questionnaire was devised by the principal author to address the aim of the study.

RESULTS: The percentage of symptoms found in sculptors of Kumartuli were pain(64%), fatique(27%), stiffness (5%),none(4%).The percentage of area of symptoms found were back(31%), shoulder(19%), hand(16%),neck (11%),knee(10%),wrist(8%),none(5%).

Significant relationship was found between:-

- years of work and areas of symptoms of sculptors
- years of work and symptoms of sculptors
- age and areas of symptoms of sculptors
- age and symptoms of sculptors
- height and areas of symptoms of sculptors
- weight and areas of symptoms of sculptors
- weight and symptoms of sculptors

CONCLUSION: The prevalence of CTD in sculptors of Kumartuli,Westbengal is high.

INTRODUCTION

Cumulative trauma disorder (CTD) is a common clinical condition in which discomfort, disability, or persistent pain occurs in the joints, muscles, tendons, and other soft tissues regardless of the presence of physical symptoms.(1) Cumulative trauma disorders (CTDs) affect the upper extremities of many workers as they routinely perform their jobs(2).Sculptures are mode of work and income for many people in Bengal. It is the art of carving, modeling, welding or otherwise producing figurative work of art in three dimensions. In Kumartuli area, the sculptors specially use fibre glasses, thermocol, polymers, soil for forming idols and sculptures. Their work requires prolonged standing, carrying heavy objects, repeated movements, sitting in awkward positions, gross and fine motor skills which causes CTDs. The objectives of the study are to determine the prevalence of CTDs among sculptors of Kumartuli,West Bengal and to determine the work related risk factors among sculptors of Kumartuli,West Bengal.

METHOD:

This study targeted on the sculptors in Kumartuli, Westbengal.Questionnaires were given to 100 sculptors in kumartuli. A purposely designed questionnaire was devised by the principal author to address the aims of the study. Its development involved discussions with colleagues and students. The questionnaire included both open-ended and closed questions and consisted of an introduction giving a brief overview of the proposed study and general questions.The total study period was 1 month in which 100 respondants were assessed using the self made questionnaire.Both male and female respondants with age range 20-80 years and who were willing to participate in the survey was included in the study.The sculptors who went through recent injuries of upper extremities were excluded from the study.Written consent was obtained from each subjects for the study.The study was approved by the ethical committee of National Institute for Locomotor Disabilities (Divyangjan).Statistical analysis was done using Statistical package SPSS version 21. Descriptive data of each variable i.eage,height,weight,working years and hours of work were summarized as mean±SD.

RESULTS

The mean and standard deviation for the variables age,height,weight,working years and hours of work are 48.29(12.728), 168.67(13.262), 65.36(7.794), 33.96(15.478), 12.8(1.75) consecutively. The percentage of symptoms found in sculptures of kumartuli are pain(64%), fatique(27%), stiffness(5%),none(4%)**(Fig1)**.The percentage of area of symptoms found are back(31%), shoulder(19%), hand(16%), neck(11%),knee(10%),wrist(8%),none(5%)**(Fig2)**.

The descriptive statistics of the variances having significant relationship are :-

Years of work and symptoms-Pain(32.92±15.89), Fatique(36.79±10.41),Stiffness(55±.000) None(10±.000). Years of work and areas of symptoms-Neck(41.07±8.45), shoulder(46.39±2.30),hand(48.33± 4.88),back (30.72±16.99), knee(23.00±7.37), wrist(16.38±.506), none(10.00±.000).Age of the sculptors and areas of symptoms-Neck(51.07±8.45)Shoulder(57.89±1.81) Hand(58.33±4.88) Back(48.40±13.71) Knee(40.00±8.43) Wrist(36.69±5.76) None(22.00±.000).Age of the sculptors and symptoms- Pain(49.26±12.30), Fatique (47.86±8.37), Stiffness(65.00±.000), None(22±.000).Weight of the sculptors and the areas of symptoms-Neck(58.57±4.97), Shoulder(63.50±1.54), Hand(66.67±2.44), Back(68.04±6.74), Knee(68±6.32), Wrist(74.38±.506), None(45±.000).Height of the sculptors and the areas of the symptoms-Neck (170.91±12.79),Shoulder(164.76±12.91), Hand (174.75±6.48), Back(168.98±13.34), Knee(166.12±17.67), Wrist(161.78±14.64),None(179.83±.000).

After performing ONE WAY ANOVA it was found that there was insignificant relationship between

- hours of work and areas of symptoms of sculptors
- hours of work and symptoms of sculptors
- height and symptoms of sculptors **(Table-1)**

Significant relationship was found between
- years of work and areas of symptoms of sculptors
- years of work and symptoms of sculptors
- age and areas of symptoms of sculptors
- age and symptoms of sculptors
- height and areas of symptoms of sculptors
- weight and areas of symptoms of sculptors
- weight and symptoms of sculptors **(Table-1)**

DISCUSSION

Kumortuli para (area) in Bengal is famous for being the birthplace for casting iconic gods and goddesses. The artists of this talent-rich hub along the banks of the Hooghly river have been mesmerising the world with their art form. Most artisans are old, some in their third generation of sculpting(3). The colony of potters it was found that almost 400 sculptors etching through clay brought from the nearby river ganges to create some fascinating idols of hindu god and goddesses(4). The most important cause of CTD is repetitive movement and in-fact multiplication of duration and intensity of activities. Since duration and intensity of work by the sculptors were more so there is prevalence of CTD in them. According to **Fry (1987)** other important factors that predispose to CTDs are genetic and working techniques(5). Another risk factor is age. In the present study there was significant relationship between age of sculptors and symptoms/areas of symptom of sculptors. According to **Shahram Sadeghi et al 2004,** the prevalence of CTD among Iranian instrumentalist was abnormally high which accords with my result showing prevalence of CTD in sculptors of kumartuli West Bengal as both require fine hand movement (6). **Barbara A Silverstein et al 1996** stated that Awkward postures (wrist deviation, flexion, hyperextension, and finger pinching) are risk factors for hand wrist CTDs (ctd d2).Sculptors require to use awkward postures and excessive use of wrist and fingers for completing the idol so prevalence of CTD is high in sculptors (7). In the present study it was found that the percentage of area of symptoms found are back (31%), shoulder (19%), hand (16%), neck (11%), knee (10%), wrist (8%), which is due to the awkward posture of squatting, squat to stand, stair climbing, trunk bending, shoulder movements, elbow movements, wrist movements, and finger movements and where usually the pain predominates.

Somnath Gangopadhyay et al 2003 conducted a study on upper extremity cumulative trauma disorder in different unorganized sectors of West Bengal, India where he found that the working conditions of the unorganized sector was such that they have to work in a congested work place and in a restricted area. They work under very poor illumination and are usually exposed to a high noise level around 80-90 dB in daytime because most of the work areas are situated near the roadside. Most of the working groups experienced a high ambient temperature and high humidity level in summer season with a radiant heat level of 40 degree. In India the unorganized sectors are not bound to follow the Governmental rules and regulations, and they work according to the job demands and more work give them opportunity to earn more. It was clearly revealed by S Gangopadhyay that workers of unorganized sectors suffered from discomfort in different body parts which leads to cumulative trauma disorders (8). Sculpting is also an unorganized sector where all these above conditions are found which may lead to CTD.

Charu Eapen et al 2010 studied the prevalence of CTD in Cell phone users and found out that the complaint in the distal part of the upper extremity was more when compared with the proximal part of the extremity. This could be because they used the phone for messaging and hence more stress on the hand, fingers, and thumb were detected. But sculptors repetitively and awkwardly use their back and shoulder more than hand,neck,wrist and knee due to which proximal part of the extremity is more effected than distal extremity(9).

Study Limitations

- The sculptors had difficulty to give time as they were busy with their schedule
- Non standardized subjective questionnaire was used
- Male sculptors predominated due to which gender related studies couldnot be done

Future recommendations

- Studies using standardized tool in sculptors could be done
- Study of Predominance of CTD in males and females among sculptors could be done

CONCLUSION

The prevalence of CTDs in sculptors of Kumartuli, West Bengal is very high.

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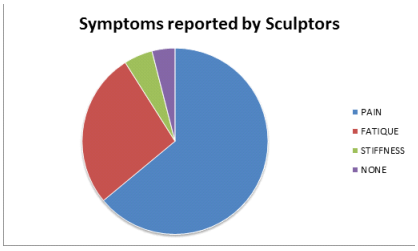

Fig 1. Symptoms reported by sculptors

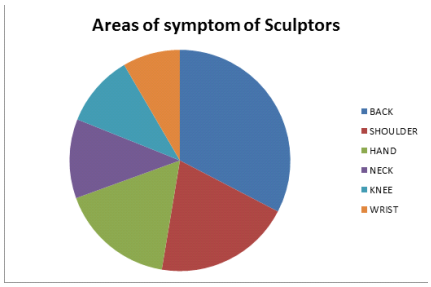

Fig 2 Areas of symptom of sculptors

Table-1(ONEWAY ANOVA)

HOURS OF WORK AND AREAS OF SYMPTOMS OF SCULPTORS					
	SUM OF SQUARES	Df	MEAN SQUARE	F	SIG
BETWEEN GROUPS	31.06	6	5.177	1.751	.118
WITHIN GROUPS	274.93	93	2.956	---	---
TOTAL	306.00	99	---	---	---
HOURS OF WORK AND SYMPTOMS OF SCULPTORS					
BETWEEN GROUPS	25.128	3	8.376	2.863	0.41
WITHIN GROUPS	280.87	96	2.926	---	---
TOTAL	306.00	99	---	---	---
YEARS OF WORK AND AREAS OF SYMPTOMS OF SCULPTORS					

BETWEEN GROUPS	14937.183	6	2489.531	26.368	.000
WITHIN GROUPS	8780.65	93	94.416	---	---
TOTAL	23717.840	99	---	---	---
YEARS OF WORK AND SYMPTOMS OF SCULPTORS					
BETWEEN GROUPS	5374.529	3	1791.510	9.376	.000
WITHIN GROUPS	18343.311	96	191.076		
TOTAL	23717.840	99			
AGE AND AREAS OF SYMPTOMS OF SCULPTORS					
BETWEEN GROUPS	9171.78	6	1528.63	20.697	.000
WITHIN GROUPS	6868.609	93	73.858	---	---
TOTAL	16040.590	99	---	---	---
AGE AND SYMPTOMS OF SCULPTORS					
BETWEEN GROUPS	4915.290	3	1638.43	14.138	.000
WITHIN GROUPS	11125.300	96	115.889	---	---
TOTAL	16040.590	99		---	---
HEIGHT AND AREAS OF SYMPTOMS OF SCULPTORS					
BETWEEN GROUPS	2207.745	6	367.95	2.251	.045
WITHIN GROUPS	15205.443	93	163.49	---	---
TOTAL	17413.188	99	---	---	---
HEIGHT AND SYMPTOMS OF SCULPTORS					
BETWEEN GROUPS	662.487	3	220.829	1.266	.291
WITHIN GROUPS	16750.702	96	174.486	---	---
TOTAL	17413.188	99	---	---	---
WEIGHT AND AREAS OF SYMPTOMS OF SCULPTORS					
BETWEEN GROUPS	4113.741	6	685.624	33.537	.000
WITHIN GROUPS	1901.299	96	20.444	---	---
TOTAL	6015.040	99	---	---	---
WEIGHT AND SYMPTOMS OF SCULPTORS					
BETWEEN GROUPS	2536.941	3	845.647	23.341	.000
WITHIN GROUPS	3478.099	96	36.230	---	---
TOTAL	6015.040	99	---	---	---

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