

Risk Prediction associated with Symptoms of Carpal Tunnel Syndrome in Picking hand among Guitarist

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Abstract: Introduction: Awkward postures of guitarist such as working with the joints near their end range of motion; uneven loading and static muscle activity increase the biomechanics stress on the muscles and the surrounding joint. Carpal tunnel syndrome often results from physical job activities that involve using tools and hand-held vibrating equipment's. This study aimed to predict risk associated with symptoms of carpal tunnel syndrome in picking hand of guitarist. Materials and Method: 100 participants of both gender with age range of 15-35 years from various music academy with experience of more than one year in playing guitar were assessed using the Boston Carpal Tunnel Questionnaire. Results: Mild to moderate risk predicted in picking hand among guitarists on basis of symptom severity and functional status. Conclusion: Proper warm up and cool down exercise, stretches and ergonomic advice must be tackled among the risk population to prevent carpal tunnel syndrome among guitarists in picking hand.

Keywords: Boston Carpal Tunnel Questionnaire (BCTQ), Carpal Tunnel Syndrome (CTS), Guitarist, Musculoskeletal discomfort , Picking hand

I. INTRODUCTION

Compression Neuropathy which precipitates compressive force over the median nerve in tunnel at wrist is known as Carpal Tunnel Syndrome. It is caused because of raised pressing factor. Carpal tunnel is a fibrous-osseous canal formed between three carpal bones (scaphoid, trapezoid and hamate) and the transverse carpal ligament [1,2]. Carpal tunnel syndrome has an incidence rate of 0.5-5.1 per 1000. Weakness of hand grip including hand or arm pain and numbness are equivalent. Carpal tunnel syndrome occurs with powerful and monotonous exercises [3]. At the point when hands and fingers are utilized in powerful activity, the type of the carpal tunnel is twisted by outside force that diminishes the level of carpal canal and winds up in the ascent of Carpal Tunnel Pressure [4]. Carpal Tunnel syndrome frequently have snugness of the lumbrical muscles that raise opposition into expansion, forestalling the DIP joints and PIP joints from tough flexion and reduced grip deficit [6]. Carpal tunnel syndrome (CTS) symptoms include multiple awakenings in night time due to hand pain and numbness. Compression on the nerve foremost to sensory symptoms such as paresthesia, numbness and pain, motor symptoms such as stiffness, clumsiness and weakness of the hands [14]. Factors that cause the development of Carpal Tunnel Syndrome are, repetitive wrist movements, vigorous contractions in a tendon, a downward-bending (flexed) wrist movement or bending up (extension), hand movement while working (pinching motion), mechanical pressure on the median nerve [9]. Owing to play the stringed instruments needs redundant utilization of muscle usually with helpless stance of gliding joint associated with inflated risk of musculoskeletal disorder. Playing Related Musculoskeletal Discomfort is described as agony, fragility, absence of control , pricking or different manifestations that impede the capacity to play [17]. A total of 89.2% prevalence of musculoskeletal complaints among musicians was noted by **Kok et al** [15]. About 41.8% of playing-related pain was noted among guitar players by **John et al** [16]. This study aimed to predict the risk associated with symptoms of carpal tunnel syndrome in picking hand among guitarists. Early appraisal of the risk of guitarists may help in creating awareness about the disease and may also help in preventing the evolution of risk factors with help of early intervention

II. MATERIALS AND METHODS

An observational study with convenient sampling method was conducted among the guitarist in and around Chennai. Prior to the study, Departmental Ethical committee approval was obtained. **Participants:** This study surveyed guitarist of (N=100) age group between 15 and 35 who were volunteering to participate and professional guitarist with experience of one year and above and being open to communicate excluding those who had Musculoskeletal pathologies, Recent injuries and fracture in wrist and hand , Peripheral nerve lesion and Recent surgery in wrist or hand . The survey instrument used in this study was similar to the Instrument used in other published studies enquires about Symptom severity and Functional status

III. PROCEDURE

The study got approval by the Institutional Ethical Committee .The subjects were preferred dependent on the inclusion and exclusion criteria. The motive rationale and complete strategy of the study has been clearly explained and 'Informed consent' were acquired from the subjects. The demographic data were conjointly collected from the subjects enquiring about age, gender , duration of playing guitar per day , year of experience in playing guitar, type of guitar style often used for playing and any previous injury or surgery done in wrist .A Set of Questionnaire concerning carpal tunnel syndrome "Boston Carpal Tunnel Questionnaire" was given to the subjects consisting of 2 scales which in cooperates, Symptom severity scale and Functional status scale was completed under supervision. The Boston carpal tunnel questionnaire (BCTQ) symptom severity scale consists of 11 questions which evaluates the symptom. Each domain of question consist of severity scores level and scored ranging from 1-no symptom to 5-very severe symptom. Scores are aggregated and categorized into 5 group: No symptoms, Mild, Moderate, Severe and Very Severe symptoms. The Boston carpal tunnel questionnaire (BCTQ) Functional status scale consist of 8 questions .the subjects were asked to provide score on basis of functional daily activity . Each domain of question consist of 5 degree of difficulty level and scored ranging from

1-no difficulty to 5-very severe degree of difficulty . Scores are aggregated and categorized into 5 group: No difficulty, Mild, Moderate, Severe and Very Severe difficulty. The higher the score indicates the higher level of risk of each subject. Validation is done in the previous studies and the reliability is 0.91 for symptom severity scale and 0.93 for functional status scale. After accomplishment of the procedure the participants were presented with practice, knowledge of warm up exercise of wrist and proper positioning of picking hand. It is an endeavor to promote awareness on risk of Carpal tunnel syndrome, as an appreciation of participation

IV. RESULTS

The data was collected and tabulated .Statistical analysis of the study was determined using SPSS version 20. 100 Guitar players as a subject participated in the study among which 93% of subjects were male and 9% were female.

According to Table 1, the demographic characteristics of guitarists are tabulated, age group distribution of participants were maximum from the age group of 21-26 (33%), 23% of age group 16-20, 22% of age group 26-30 and 31-35 and only 2% were from age group 15-16. According to the experience of guitar playing 79% were experienced, 12% of subjects had moderate experience and 11% had novice experience in playing. According to the duration of playing guitar 37% are of less than 1 hour, 41% are of 1-3 hours duration of playing and 22% were playing guitar more than 3 hours per day. In accordance with the type of guitar used 67% were acoustic guitar users, 32% were electric guitar users and only 1 % were bass guitar user.

SYMPTOM SEVERITY

The prediction of risk among respondents based on the symptom severity are represented in Table 2.

Graph 1 represents the overall prediction of risk level of individuals, in which no symptom (34%), mild symptom (52%) and moderate symptom (10%).The severe and very severe level of symptom were found to be null on symptom severity.

FUNCTIONAL STATUS

The prediction of risk among respondents based on the functional activity status are represented in Table 3.

Graph 2 represents the overall prediction of difficulty level in doing functional activities among individuals, in which without difficulty (61%), mild difficulty (28%), moderate difficulty (9%), severe difficulty (4%) and very severe level of difficulty were found to be null on functional status.

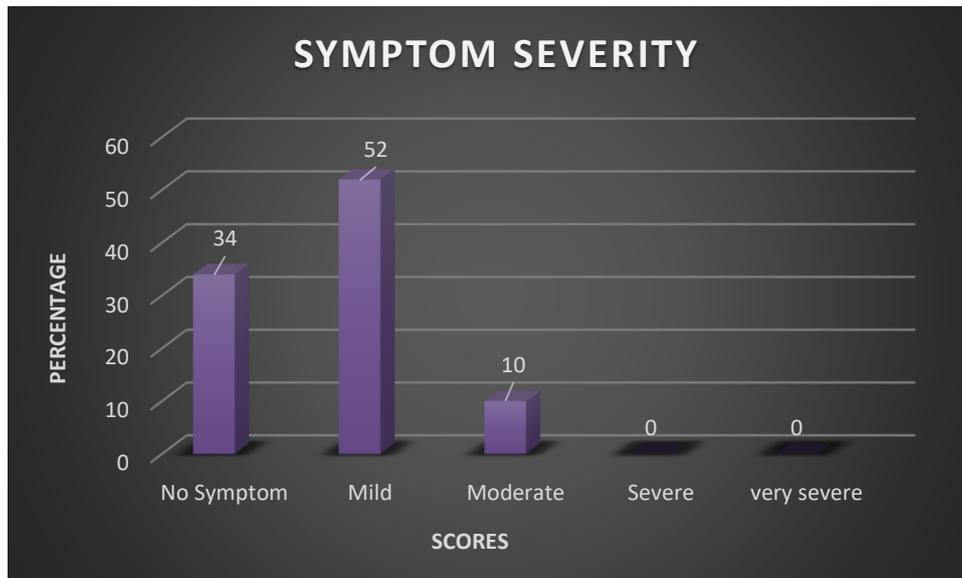
	Range	Frequency	Percentage %
No of guitar users		100	100.0%
Age distribution	15-16	2	2.0%
	16-20	23	23.0%
	21-26	33	32.0%
	26-30	22	22.0%
	31-35	22	22.0%
Gender distribution	Male	93	91.0%
	Female	9	9.0%
Experience of playing	Novice	11	11.0%
	Moderate	12	12.0%
	Experienced	79	77.0%
Duration of playing guitar	Less than 1 hours	38	37.0%
	1-3 hours	42	41.0%
	More than 3 hours	22	22.0%
Type of guitar	Acoustic guitar	68	67.0%
	Electric guitar	33	32.0%

	Bass guitar	1	1.0%
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TABLE 1 - DEMOGRAPHIC DATA

TABLE 2 - PREDICTION OF RISK LEVEL OF CARPAL TUNNEL SYNDROME ON BASIS OF SYMPTOM SEVERITY

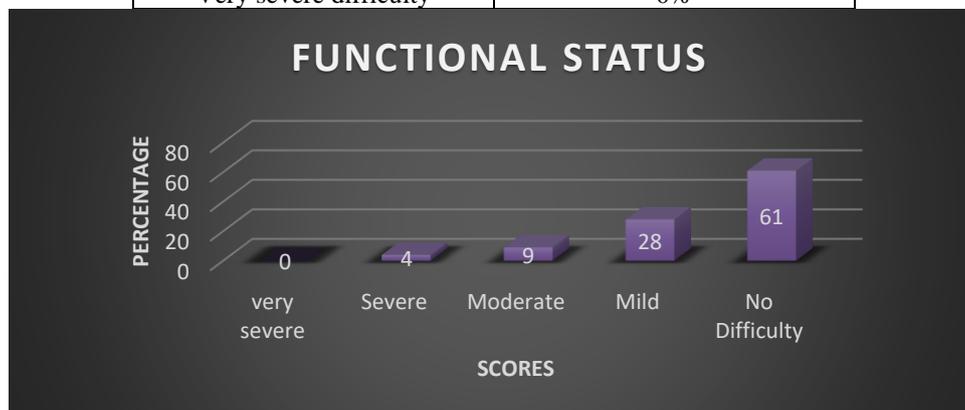
Domain	Percentage
No Symptom	34.0%
Mild Symptom	52.0%
Moderate Symptom	10.0%
Severe Symptom	0.0%
Very Severe Symptom	0.0%



GRAPH 1 - PREDICTION OF RISK LEVEL OF CARPAL TUNNEL SYNDROME ON BASIS OF SYMPTOM SEVERITY

TABLE 3 - PREDICTION OF RISK LEVEL OF CARPAL TUNNEL SYNDROMME ON BASIS OF FUNCTIONAL STATUS

Difficulty Level	Percentage
No difficulty	61.0%
Mild difficulty	28.0%
Moderate difficulty	9.0%
Severe difficulty	4.0%
Very severe difficulty	0%



GRAPH 2 - PREDICTION OF RISK LEVEL OF CARPAL TUNNEL SYNDROME ON BASIS OF FUNCTIONAL STATUS

V. DISCUSSION

Musical overall performance usually complements a wealthy area for both cognitive and motor skills. Ample research has been done on carpal tunnel syndrome and musculoskeletal problems faced by different population such as computer game players, software professionals, jewellery workers and smartphone users. Guitarist performs many rapid, repetitive movements for a prolonged duration. They are at risk since they are exposed to vibration to multiple body parts such as the shoulder, elbow, wrist and hand. Repetitive strain, immoderate force, awkward position vibration bring about overuse syndrome identified in musicians imparting with non-particular signs and ache that can't be associated with structural changes on imaging research to particular conditions. While playing some guitarist experience pain and discomfort, but usually tend to ignore which leads to overuse injuries such as nerve entrapments. Contralateral activation of muscle is additionally obvious in repetitive tasks or tasks that require off-kilter stances. With an Intention of predicting the risk of carpal tunnel syndrome among guitarists subjects were selected and their risk of symptoms and functional activities was recorded. It is a self-assessment to evaluate the risk of symptom manifestations in Carpal Tunnel Syndrome patients. It was found to be used to measure the Carpal Tunnel Syndrome severity. Previous studies has examined the symptoms among patients and workers. It is a legitimate and dependable evaluation device for measuring symptom severity. Carpal Tunnel Syndrome. Out of 100 participants, 52% of participants had mild symptom and 10% of moderate symptom. According to functional activities, difficulty level 28% of participants had mild difficulty, 9% of participants had moderate difficulty and 4% of participants had severe difficulty. Generally, the prevention play a crucial function within side the musicians'. The objective of the study was to predict the risk associated with the symptoms of carpal tunnel syndrome. After the completion of study as the part of gratitude towards participation ergonomic advice as well as some wrist posture, stretches and exercise was taught to the guitarist to prevent the further occurrence of symptoms associated with carpal tunnel syndrome. Playing related discomfort among guitarists can be minimized by guiding them with proper body mechanics and the importance of rest break during playing. Correct positioning of wrist with often flexibility and strengthening programs can continue their recreational activity

Conclusion

Repetitive motion of wrist and hand play a major role in inhibiting carpal tunnel syndrome among the guitarists. The predicted risk level of carpal tunnel syndrome in pricking hand was found to be 52% subjects fell under the Mild risk of symptoms and 28 % subjects under the Mild difficulty of functional status after the assessment. Consequently, care should be taken alongside proper posture of the wrist maintained while playing and certain intervals between playing times can further prevent such injuries and functional difficulties.

So, this study concludes that with proper warm up and cool down exercise and stretches the risk population can be amended to no risk population. Anthropometric measurements of hand and Body mass index (BMI) were not considered in the study.

Future Study can be done with larger sample size. Predict risk level of carpal tunnel syndrome of musicians playing different string instruments and can be focused on the Fretting hand of guitarist by correlating the risk level of carpal tunnel syndrome in fret hand and pick hand

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