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ORIGINAL ARTICLE

A STUDY TO FIND PREVALENCE OF UPPER LIMB PROBLEMS IN MUSICIANS

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ABSTRACT

Introduction: Musicians just like any other occupation are prone to injuries. Every type of work requires certain bodily movements and positions to be used in a repetitive manner. These injuries/disorders then in turn affect the ability of the musician to play his instrument most efficiently. The purpose of this study was to find out prevalence of Upper Limb Problems in Instrumental Subjects using the Disability of Arm, Shoulder and Hand (DASH) questionnaire. **Methodology:** A cross sectional survey was conducted on 100 Subjects from Mumbai, aged 15 to 30 years who were right hand dominant and had a minimum of 3 years of experience playing a musical instrument. Demographic data was collected and the subjects were asked to fill the Disability of Arm, Shoulder and Hand (DASH) questionnaire for the Dominant as well as the Non Dominant Upper Limb. The Data collected was further analyzed. **Result:** The subjects playing Keyboards were mostly affected on dominant side by DASH score with mean value 11.086. Symptoms on the dominant and non dominant sides were 40.23% and 45.95% respectively with functional disability on the dominant side 31.42%. Percussionist were most affected in the psychological aspect with 33.33%, where string players were more affected in Music Module Domain with mean value 14.305. **Conclusion:** The study concluded that the subjects playing Keyboards were mostly affected in most domains of DASH Scale. Percussionist were the most affected in Psychological Domain and the subjects playing Strings were most affected in the Music Module Domain in DASH scale.

Keywords: Musicians; Upper Limb Problems; Disability of Arm, Shoulder and Hand (DASH) scale

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INTRODUCTION

Everybody loves music. Listening to music induces pleasure but making music is a distinct experience in itself. The number of musicians we have now is much more than we ever had before. Being a Musician could be a passion, a hobby or a career. However, musicians just like any other occupation are prone to injuries. Every type of work requires certain bodily movements and positions to be used repetitively. Musculoskeletal occupational disorders result from an interaction between the individual worker, his tools and his environment. In the case of the instrumental musician, his tools are the instruments¹.

Musculoskeletal problems in musician occurs due to the repetition of certain movements, incorrect posture, prolonged practice hours, lifting of heavy instruments, holding the instrument in place for a long time, psychological pressure, etc. Because of these symptoms the musician may not be able to play their instrument effectively. The musician may also have difficulty performing ADLs due to the symptoms. Several researches have been done in the past on different body sites where in a musician could be affected. Each category of instrument uses the upper limb the most, leading to an increase risk of injury. Examples of these could be tendinitis, weakness, stiffness, etc.

According to Zaza et al., the definition of Playing-Related Musculoskeletal Disorders (PMRDS) is Pain and other symptoms that are chronic, beyond your control, and that interfere with the ability to play your instrument at the usual level². According to Lederman et al., With carefully designed treatment, the majority of instrumental musicians can return to full and pain free

playing.³ Correct diagnosis of the problem and physiotherapy techniques to prevent or reduce these symptoms can be given in order for the musician to play his/her instrument in the most optimum way without any hindrance. Hence, the purpose of this study was to find out prevalence of upper-limb problems in musicians.

METHODOLOGY

The Target Population was Instrumental Musicians. A cross sectional survey was conducted on musicians from Mumbai from all categories namely Strings, Keyboards, Brass, Percussions and Woodwind. 100 subjects aged 15 to 30 years who were right hand dominant and had a minimum 3 years experience of playing their instruments were included in the study. The nature and purpose of study was explained and prior consent was obtained from the participants. The demographic data was collected and the subjects were asked to fill the Disability of Arm, Shoulder and Hand (DASH) questionnaire for the Dominant as well as the Non Dominant Upper Limb. The Data collected was further taken for statistical analysis⁴.

RESULT

According to the Data Obtained, most subjects in the sample were Males.

The Instruments played by the subjects in this research were Trumpet (Brass Category), Keyboard, Piano and Harmonium (Keyboards category), Cajon, Djembe, Drums and Tabla (Percussion Category), Bass Guitar, Guitar, Sitar and Violin (Strings category), Flute and Saxophone (Woodwind category)

There were 41 String players, followed by 21 Keyboard players, 21 Percussionists 15

Woodwind players and 2 Brass players. The subjects had between 3-16 years of training. Sitting position was preferred as compared to

Standing. The formula provided in the Disability of Arm, Shoulder and Hand (DASH) questionnaire was used to calculate the scores.

Category	DASH (Dominant Side)	Mean Dash (Dominant Side)	DASH (Non-Dominant Side)	Mean Dash (Non-Dominant Side)
Brass	11.67	5.835	40.18	20.09
Keyboard	255	11.086	443.75	19.293
Percussion	228.33	10.872	348.21	16.381
String	280.83	6.240	500	11.11
Woodwind	37.50	4.17	73.21	8.134
TOTAL	813.33		1405.35	

Table 1. DASH Total Scores

Inference (Table 1) The non-dominant side total score is more than the dominant side. The Keyboards category scored highest followed by percussion, strings, brass, woodwind on the dominant side. Brass was the highest followed by Keyboards, percussions, strings, woodwind on the non-dominant side.

	DOMINANT	DOMINANT	NON-DOMINANT	NON-DOMINANT
Category	Symptoms Score	Percentage	Symptoms Score	Percentage
Brass	13	32.5	13	32.5
Keyboard	169	40.23	193	45.95
Percussion	166	39.52	156	37.14
String	306	37.31	301	36.70
Woodwind	51	17	53	17.66

Table 2.1: DASH Symptoms Score

Inference (Table 2.1) The keyboard category had the highest percentage followed by percussion, strings, brass, woodwind on the dominant as well as the non-dominant side

Category	Pain in the last week %	Pain on any activity %	Tingling %	Weakness %	Stiffness %
Brass	8	12	12	12	8
Keyboard	13.9	13.9	13.14	14.09	13.90
Percussion	12.95	12.9	12.19	11.23	12
String	12.09	12.09	11.51	11.80	11.70
Woodwind	5.6	5.06	4.8	5.86	6.4

Table 2.2: DASH Individual Symptoms Score

Inference (Table 2.2) The keyboards category had the highest percentage followed by percussion, strings, brass, woodwind in pain last week, pain on activity, and stiffness. For Tingling- The keyboards had the highest percentage followed by percussions, brass, strings and woodwind. For Weakness- The keyboards had the highest percentage followed by brass, strings, percussions and woodwind.

	DOMINANT	DOMINANT	NON-DOMINANT	NON-DOMINANT
Category	Function Score	Percentage	Function Score	Percentage
Brass	55	23.91	82	35.65
Keyboard	759	31.42	880	36.43
Percussion	668	27.66	752	31.13
String	1254	26.59	1392	29.52
Woodwind	241	13.97	258	14.95

Table 3: DASH Functional Disability Score

Inference (Table 3)- The keyboard category has the highest percentage followed by percussion, strings, brass, woodwind on the dominant side. Brass was the highest followed by Keyboards, percussions, strings, woodwind on the non-dominant side.

Category	Psychological Aspect Score	Percentage
Brass	6	30
Keyboard	68	32.38
Percussion	70	33.33
String	127	30.97
Woodwind	23	15.33

Table 4: DASH Psychological aspect Score

Inference (Table 4) The percussion category has the highest percentage followed by keyboards, strings, brass and woodwind.

Category	Music Module	Mean Music Module
Brass	18.75	9.375
Keyboard	218.75	9.510
Percussion	293.75	13.988
String	643.75	14.305
Woodwind	75.0	8.3

Table 5: DASH Music Module Score

Inference (Table 5) The strings category has the highest score followed by percussions, keyboards, strings, brass and woodwind.

DISCUSSION

In this study 100 musician playing different musical instrument were taken. The subjects were asked to fill the Disability of Arm, Shoulder and Hand (DASH) questionnaire. The study reveals that the DASH questionnaire scores varied for each instrument category from Dominant to Non-Dominant extremity. Overall the Non Dominant Upper Limb had higher DASH scores compared to the Dominant Upper Limb (Table 1).

The DASH question numbers 24-28 were used to assess the Severity of Symptoms. The questions were based on the symptoms of pain, tingling, weakness and stiffness. On the Dominant as well as the Non-Dominant sides, the subjects playing Keyboards were the most affected. This was followed by the subjects playing Percussions and Strings respectively. The Brass and Woodwind subjects were the least affected on both the sides. Higher the scores, more the intensity of the symptoms experienced. With the Data obtained, it was noticed that each category showed varying symptoms. The analysis was done by comparing the scores of each symptom individually.

The Brass category showed higher symptoms of Pain, Tingling and Weakness. The Keyboardists complained of Pain and Stiffness. The Percussionists had Pain and Tingling while the Woodwind players had the highest scored symptom of Weakness among other symptoms. (Table 2.1 and 2.2) According to a study, musicians due to the competitive work environment felt forced to play despite their symptoms, motivated by a concern for reprisal or dismissal. Despite their symptoms, the professional musicians, therefore, will be

inclined to perform at rehearsals and concerts, and play less when practicing alone, where reducing their effort can aid their recovery without compromising their colleagues.⁵ The stress-inducing movements in playing can be Isotonic or Isometric. Isotonic movements are those in which fast movements are done to obtain sound in the instrument. These create stress on the surrounding tendons and over time can lead to pain due to chronic tendinopathy. e.g. striking the keyboard keys, bowing the violin. Isometric movements are those in which there is prolonged periods of static unstable postures to support the instrument or hold it in place. These result in muscle imbalance, which may further lead to chronic myofascial pain⁶.

The Symptoms in the subjects may have caused difficulty in performing daily functions. This was assessed by DASH question numbers 1-23. This Domain differed based on Dominance. The subjects playing Keyboards were the most affected followed by percussion, strings, brass and woodwind on the dominant side. The subjects playing Brass instruments were most affected followed by Keyboards, percussions, strings and woodwind on the non-dominant side. (Table 3) This suggests that because of the symptoms of pain, tingling, stiffness, weakness, etc. the musician has difficulty performing day to day functions at ease.

According to Rietveld AB et al., Musicians experience upper limb injuries such as impingement syndromes eg. painful arc, supinator syndrome, intersection syndrome. frozen shoulder, tennis elbow, golfers elbow, neuropathies including median and ulnar nerve, trigger finger, hypermobility and focal dystonia.⁷ According to another study done on

Orchestra musicians, The musicians reported changed or impaired way of playing, difficulties in daily activities at home, in leisure time activities and in sleep as common consequences of musculoskeletal symptoms⁵

Psychological aspect was assessed by DASH question numbers 29,30. Q. 29 was based on Sleeping difficulty due to symptoms and Q. 30 was based on feeling less confident or useful because of the symptoms. The subjects playing Percussions seemed to be most affected. It was followed by the Keyboards, though there is only a slight difference between scores of Percussion and Keyboards subjects. This was then followed by the subjects playing Strings, Brass and Woodwinds. (Table 4).

Injuries occur as a result of physical stress which in turn induces psychological stress. Fears of a musician are thoughts of missing notes, not playing correctly, leaving a bad impression, losing their job and ending up in poverty. These thoughts produce physical reactions such as sweating, constricted breathing, tense muscles, which lead to the likeliness of a performance being unsuccessful⁸.

According to a study using the Bergen Insomnia Scale (BIS) musicians had higher prevalence of insomnia symptoms compared to the general population⁹. This shows that Psychological factors also play a great role in musicians. Often musicians fail to find help for curing their injuries and this can lead to the end of one's career, which leads to a downward spiral of anxiety and depression⁸. Challenges faced were related to bad and abusive teachers, entry into a conservatoire, music industry demands, unsupportive environments, comparison and competition

socially, injury, psychological aspects, balancing work and personal life⁷.

To assess the Music Module, DASH Music/Sports module was used. The questions were based on the impact of your arm, shoulder or hand problem on playing the musical instrument. The subjects playing Strings were the most affected followed by Percussions, Keyboards, Brass and Woodwind. However, the subjects playing Keyboards and Brass had a minute difference in scores.

Subjects playing Woodwind instruments was the least affected in this domain as well. This shows that a because of the symptoms, the musician is not able to play his instrument in the usual way or in a way in which the musician would like to. This also results in spending lesser time in playing the instrument. Musculoskeletal symptoms resulted in an impaired way of playing the instrument⁵. According to a study; ability to play to their optimum level was affected due to the symptoms associated¹⁰.

The problems experienced by musicians depend on the physical demands of that particular instrument. Keyboardists play a repertoire of movements that require great amplitude of abduction of the fingers. Techniques of octaves and chords and small hand size were associated with symptoms¹¹. Intersection syndrome is seen in Drummers⁷. Brass players may have the highest risk of developing carpal tunnel syndrome¹². Prolonged static posture is required such as static abduction of the upper-arm in violin and flute.

In these two instruments the left shoulder is adducted resulting in a 'wringing out'-

phenomenon of the rotator-cuff: the poor blood supply of the 'critical zone' in the supraspinatus tendon is further impaired by the squeezing effect of this tendon being stretched over the head of the adducted humerus⁷. The posture of Guitarists and Bassists provoke an extreme flexion of the fretting wrist and fingers that possibly may result in the fretting hand injuries that is the Non-Dominant hand¹³.

Ethical Clearance: Clearance was obtained from the Institutional ethical committee of D.Y. Patil Deemed to be University, School of Physiotherapy, Navi Mumbai.

Conflict of Interest: No conflict of interest to conduct this study.

Source of Fund: It was a Self financed study.

CONCLUSION

This study concludes that the subjects playing Keyboards were the most affected in most domains of DASH scale except Psychological and Music Module Domains, both in the Dominant and Non Dominant side.

This study also concludes that the subjects playing Percussions were the most affected in the Psychological Domain and the subjects playing Strings were most affected in the Music Module Domain of DASH scale.

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