

PREVALENCE OF PLAYING RELATED MUSCULOSKELETAL DISORDER AMONG AMATEUR DISTINCT INSTRUMENT PLAYERS

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ABSTRACT

BACKGROUND: Music is an essential ingredient of any entertainment; Music plays a key role in connecting audiences' expectation with reality. Work related musculoskeletal disorder is most common among workers because of their repetitive strain, abnormal posture, and prolonged working time. To most of the public musician is a fun safe job but the hidden truth prevails that musicians are also exposed to musculoskeletal disorder.

AIM & OBJECTIVE: The main objective of the study was to analyze the regions of pain associated with different instrument players

METHODOLOGY: It is a cross sectional study, 150 samples were selected according to the inclusion and exclusion criteria. The participant's demographic data, playing habits were reported. Then the region of pain was analyzed using Nordic questionnaire.

RESULTS & CONCLUSION: This study concludes the distinct instrument players report pain, but in narrowing down piano and string players significantly report higher percentage of pain. This study also concludes that music tutors should educate the students about proper and improper posture

KEYWORDS: ERGONOMICS, AMATEUR MUSICIANS, PLAYING RELATED MUSCULOSKELETAL DISORDER, AWARENESS

INTRODUCTION

Music is an essential ingredient of any entertainment; Music plays a key role in connecting audience's expectation with reality. A musician is one, who brings life to music through art of his playing. The history of music still remains unclear, but there is evidence that states the origin of music from the Xia dynasty and the Indus valley civilization. The music of literate civilizations—ancient music was present in the major Chinese, Egyptian, Greek, Indian, Persian, Mesopotamian, and Middle Eastern societies.

To create successful entertaining event musicians plays an imperative role in spreading fragrance of joy by absorbing the woes. Work related musculoskeletal disorder is most common among workers because of their repetitive strain, abnormal posture and prolonged working time. Like other occupations, musicians are also pushed down to musculoskeletal disorder which is commonly termed as playing related musculoskeletal disorder^{1,2}. **Silver et al 2015** defined that musician is a very demanding job and most of the musicians are exposed to playing related musculoskeletal disorder¹⁷.

To most of public musician is a fun safe job but the hidden truth prevails that musicians are also exposed to musculoskeletal disorders. The prevalence rate of playing - related musculoskeletal disorder among musicians is about 73.4% to 87.7%³. **Silva et al 2015 defined pain prevalence among musician is between 29% to 90%**¹⁷. Lee H S examined the various positions and movements of the upper extremities which cause pain in musicians: 1) basic postures for holding instruments, 2) movements of left upper extremity: fingering, forearm posture, high position and vibrato, 3) movements of right upper extremity: bowing, bow angles, pizzicato and other bowing techniques. These isotonic and isometric movements can lead to musculoskeletal problems in musicians¹⁸.

The common symptoms of playing related musculoskeletal disorder are pain, numbness, tingling or other symptoms that interfere ability to play, but narrowing down the most common symptom reported among musician is pain. A recent systematic review in musicians concluded that the lifetime prevalence of pain affecting the playing capacity was as high as 85%⁵. In 1920s, Kurt Singer first systematically described symptoms of musicians 'vocational diseases and their treatment (Singer and Lakond 1932; Harman 1993)⁶. Currently, musician medicine is dedicated to the prevention, diagnosis and therapy of health problems which may arise or have arisen as a result of making music or which have an effect on making music (Spahn et al. 2011)⁷.

The root cause for playing related musculoskeletal disorders is due to the nature of musical practice, repetitive motion combined with abnormal posture, lack of warm up and cool down exercise, inappropriate size of an instrument in relation to hand dimensions, anxiety, depression. Overuse syndrome, lack of rest during rehearsal, personal habits such as smoking, alcohol, drugs, playing techniques, awkward static or dynamic posture, repetitive movement, Unhealthy habits, the lack of ergonomics, years of experience, previous trauma and individual adaptation to the instrument. Psychological factors such as anxiety and stage fright influence PRMD Fishbein et al. 1988 In clinical practice, musculoskeletal and mental problems, especially performance anxiety, are very common amongst professional musicians²⁰. Light, temperature in the rehearsal and concert room also influence PRMD.

The instruments are structured into distinct types based on the type and sound they produced, the harmonica consists of a piano, an electronic keyboard. The stringed instrument is a set of a group which subsists of sound produced by strings such as guitar, violin, sitar, cello etc. On parallel, percussion instrument comes under the

category of rhythm production such as manual drums electric drums, tabla, etc. The wind instrument consists of flute, trumpet, saxophone etc. In examining, the playing related musculoskeletal disorder is almost unavoidable because each category of instruments has its unique level of pain in the different region according to the type, repetitive motion, overuse syndrome, abnormal posture etc.

Playing related musculoskeletal disorder is a most common among amateur musician, because now days due to multi students with one teacher results in lack of supervisions for proper use of body posture⁸ and a sudden increase in practice time before grade exams. Musicians should pay attention to any degree of pain condition in their hands that affects playing because the symptoms might be the first sign of developing playing related musculoskeletal disorder. Some of the playing related musculoskeletal disorders were severe enough to threaten and even end musician career and some players even developed physical handicaps that impact all aspects of musician.

Most commonly music is learnt by children's off late; there are many studies which still illustrates the survey of playing related musculoskeletal disorder in distinct geographical regions. The prime objective of this study precedes in focusing over amateur players who start their passion, due to lack of proper ergonomical understanding they are unknowingly pushed into zone of musculoskeletal disorder which significantly impacts their performance and ends their career. This study promotes the awareness of playing related musculoskeletal disorder among students so that children who start their passion can be given awareness ergonomically at an early stage, on parallel this study also promotes the knowledge among educators to incorporate the term PRMD as a part in their music pedagogical program.

METHODOLOGY

It is a cross sectional study conducted among students learning music in tertiary institutions and freelance learners in the Vellore community. The Research Paper is ethically approved by the SRM institute of ethical committee. Totally 150 participants of both gender, age groups between 12-20 years, with a minimum 1 year of playing experience, on parallel those who practice minimum of 30 mins per day were recruited for the study. The participants with any recent injury, fracture, of neurological disorder were excluded from the study. The participants were randomly grouped based on the instrument they play.

The participant's were explained in detail about the need and procedure of the study then an informed consent was obtained. The participants demographic data and playing habits was recorded, then Nordic musculoskeletal disorder questionnaire was used to quantify the region of pain. The Nordic questionnaire subsist of 9 shaded body regions, which also consist of 2 items to quantify the region of pain in last 12 months, 2 items to quantify the region

of pain in last 7 days and 2 items to quantify the interference of pain in daily activities in last 12 months. The collected data were statistically analyzed using SPSS software.

TABLE I

PREVALENCE OF MUSCULOSKELETAL DISORDER IN LAST 12 MONTHS

Have You Had in Last 12 Months		Piano (%)	Electronic keyboard (%)	Guitar (%)	Violin (%)	Pad (%)	Drums (%)	Tabla (%)	Flute (%)
Neck	Yes	40	20	100	100	40	60	25	80
	No	60	80	0	0	60	40	75	20
Shoulders	Yes	50	50	100	100	100	100	100	100
	No	50	50	0	0	0	0	0	0
Upper Back	Yes	90	80	90	80	60	50	100	60
	No	10	20	10	20	40	50	0	40
Elbows	Yes	60	90	70	80	30	60	25	80
	No	40	10	30	20	70	40	75	20
Wrist	Yes	100	60	80	70	80	90	75	40
	No	0	40	20	30	20	10	25	60
Lower Back	Yes	100	100	100	100	100	100	100	50
	No	0	0	0	0	0	0	0	50
Hips / Thighs	Yes	20	50	20	50	60	0	100	20
	No	80	50	80	50	40	100	0	80
Knees	Yes	60	10	10	10	0	50	25	20
	No	40	90	90	90	100	50	75	80
Ankle	Yes	70	50	0	0	70	70	100	10
	No	30	50	100	100	30	30	0	90

BAR DIAGRAM I

PREVALENCE OF MUSCULOSKELETAL DISORDER IN LAST 12 MONTHS

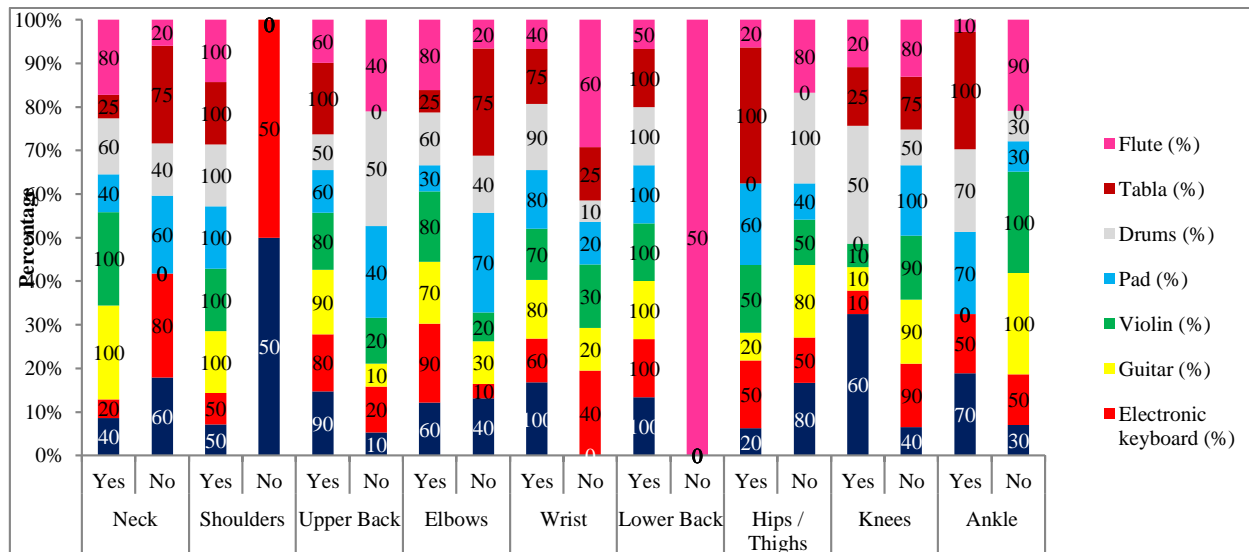


TABLE II

PREVALENCE OF MUSCULOSKELETAL DISORDER IN LAST 7 DAYS

Have You Had in Last days		Piano (%)	Electronic keyboard (%)	Guitar (%)	Violin (%)	Pad (%)	Drums (%)	Tabla (%)	Flute (%)
Neck	Yes	40	20	100	100	40	60	25	80
	No	60	80	0	0	60	40	75	20
Shoulders	Yes	50	50	100	100	100	100	100	100
	No	50	50	0	0	0	0	0	0
Upper Back	Yes	90	80	90	80	60	50	100	60
	No	10	20	10	20	40	50	0	40
Elbows	Yes	60	90	70	80	30	60	25	80
	No	40	10	30	20	70	40	75	20
Wrist	Yes	100	60	80	70	80	90	75	40
	No	0	40	20	30	20	10	25	60
Lower Back	Yes	100	100	100	100	100	100	100	50
	No	0	0	0	0	0	0	0	50
Hips / Thighs	Yes	20	50	20	50	60	0	100	20
	No	80	50	80	50	40	100	0	80
Knees	Yes	60	10	10	10	0	50	25	20
	No	40	90	90	90	100	50	75	80
Ankle	Yes	70	50	0	0	70	70	100	10
	No	30	50	100	100	30	30	0	90

BAR DIAGRAM II

PREVALENCE OF MUSCULOSKELETAL DISORDER IN LAST 7 DAYS

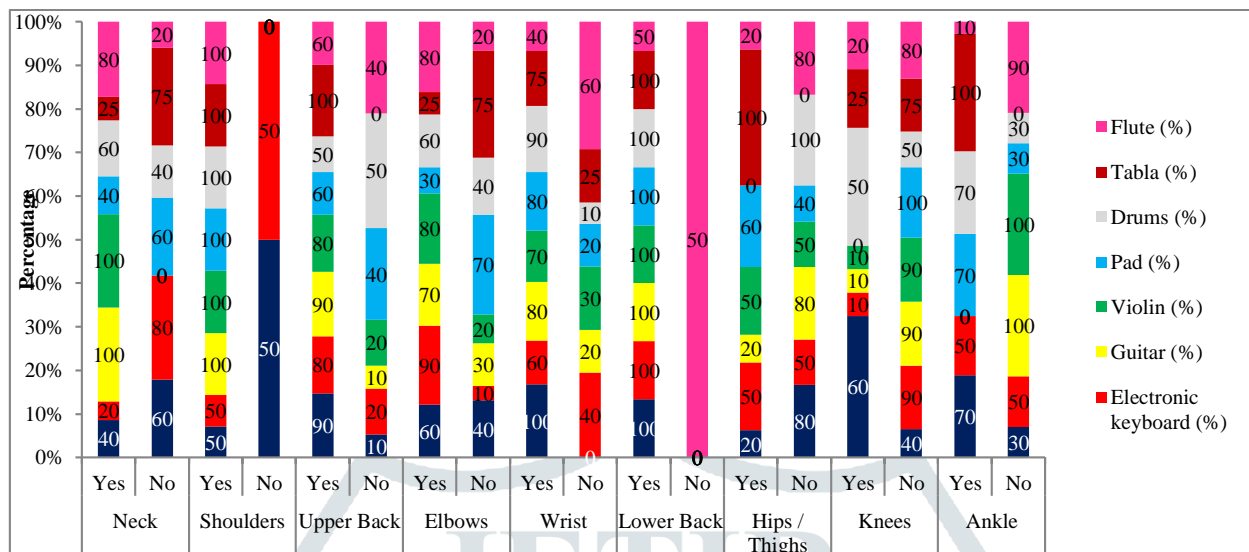


TABLE III

PREVALENCE OF PREVENTED DOING WORK IN LAST 12 MONTHS

Prevented From Doing Work In Last 12 Months		Piano (%)	Electronic keyboard (%)	Guitar (%)	Violin (%)	Pad (%)	Drums (%)	Tabla (%)	Flute (%)
Neck	Yes	0	0	0	0	0	0	0	0
	No	100	100	100	100	100	100	100	100
Shoulders	Yes	0	0	0	0	0	0	0	0
	No	100	100	100	100	100	100	100	100
Upper Back	Yes	0	0	0	0	0	0	0	0
	No	100	100	100	100	100	100	100	100
Elbows	Yes	0	0	0	0	0	0	0	0
	No	100	100	100	100	100	100	100	100
Wrist	Yes	0	0	0	0	0	0	0	0
	No	100	100	100	100	100	100	100	100
Lower Back	Yes	0	0	0	0	0	0	0	0
	No	100	100	100	100	100	100	100	100
Hips / Thighs	Yes	0	0	0	0	0	0	0	0
	No	100	100	100	100	100	100	100	100
Knees	Yes	0	0	0	0	0	0	0	0
	No	100	100	100	100	100	100	100	100
Ankle	Yes	0	0	0	0	0	0	0	0
	No	100	100	100	100	100	100	100	100

BAR DIAGRAM III

PREVALENCE OF PREVENTED DOING WORK IN LAST 12 MONTHS

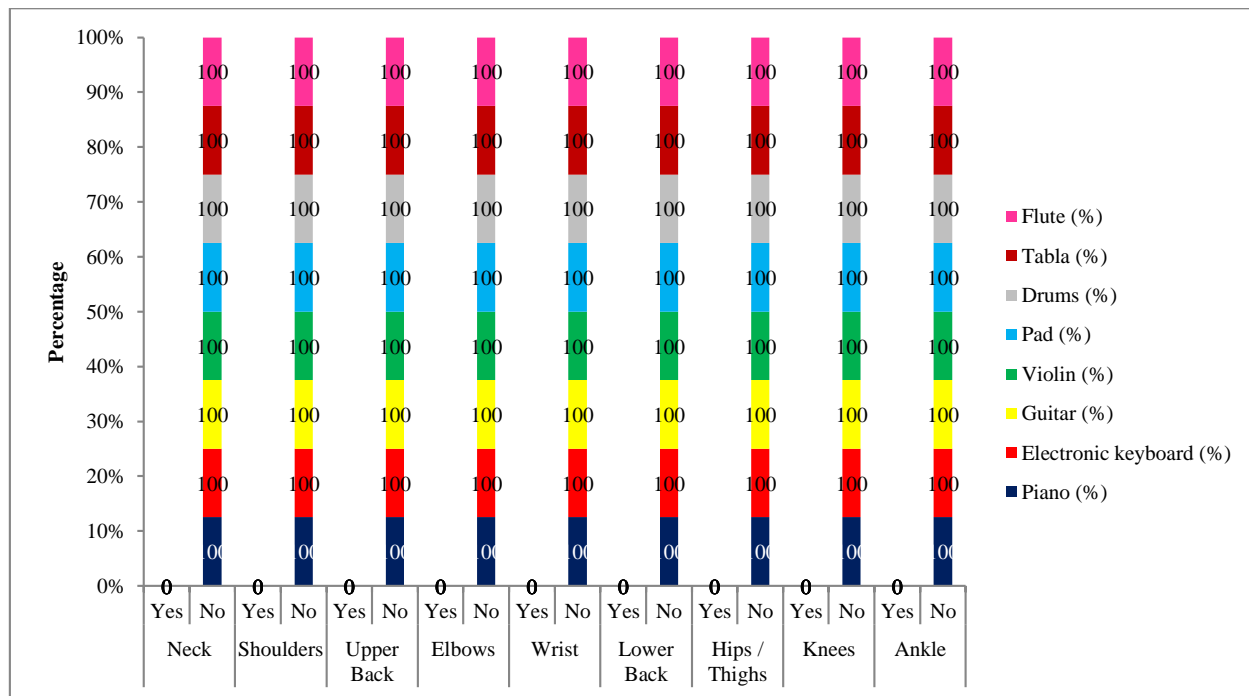


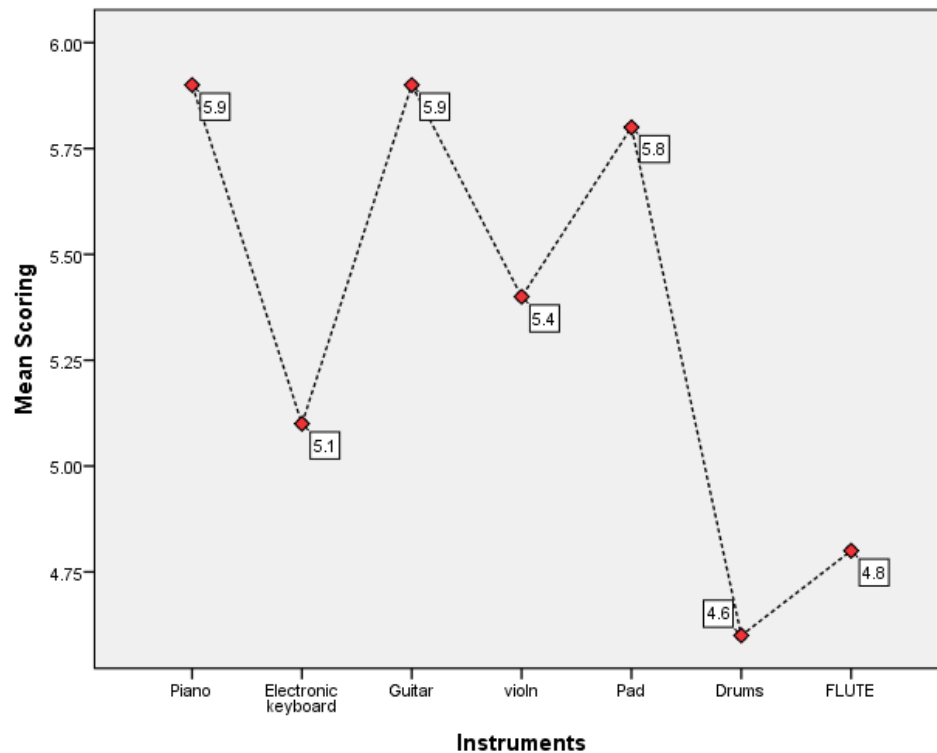
TABLE IV

PREVALENCE OF MUSCULOSKELETAL DISORDER IN DISTINCT INSTRUMENT PLAYERS

Instruments	Mean	Std. Deviation	95% Confidence Interval for Mean		Min	Max	F – Value (P – Value)
			Lower Bound	Upper Bound			
Piano	5.90	1.370	4.92	6.88	4	8	1.149 (0.345) NS
Electronic keyboard	5.10	.738	4.57	5.63	4	6	
Guitar	5.90	.994	5.19	6.61	4	7	
Violin	5.40	1.350	4.43	6.37	3	7	
Pad	5.80	1.317	4.86	6.74	4	8	
Drums	4.60	1.647	3.42	5.78	2	7	
Flute	4.80	2.821	2.78	6.82	0	9	
Total	5.36	1.597	4.98	5.74	0	9	

GRAPH I

PREVALENCE OF MUSCULOSKELETAL DISORDER IN DISTINCT INSTRUMENT PLAYERS



RESULTS & DISCUSSION

The art of music is being exhibited by the musician. The musicians are structured as freelance players, orchestra players, Group band players, tutors etc. The playing related musculoskeletal disorder is being drastically reported in recent years because of high physical and psychological demands. In accordance with physical demands repetitive movements, high arms abduction angles, forced, unnatural, asymmetrical body postures etc.

Secondly, they face numerous psychosocial demands that can possibly become sources of their stress – public exposure and the risk of being judged (resulting in performance anxiety), rivalry, mistakes impossible to correct when playing live, they need to practice systematically, remember the notes and concentrate for long hours, little influence on the general perception of the music played with the orchestra/band. Musculoskeletal symptoms are most common such as minor intensity of pain, burning sensation; muscle fatigue which may also extends up to chronic pain and significantly decreases their performance.

The main objective of the study was to conduct a survey among amateur musicians of distinct instruments, to analyze the region of pain associated with particular instrument. A cross sectional study of sample size 150 amateur players were selected according to the inclusion and exclusion criteria. The participants demographic data and playing habits were recorded, then Nordic questionnaire was used to analyze the region of pain.

The results of the study states that ,piano players reported 100% of pain over lower back and wrist , 90 % of pain in upper back, 70 % of pain in ankle, 60% of pain in knees and elbows, 50 % of pain in shoulders and 20 % of pain in hips and thighs. The electronic keyboard players stated about 100 % of pain in lower back, 90 % of pain elbows , 80 % of pain lower back, 60 % of pain in wrist, 50 % of pain in hips thighs, ankles and shoulders, 20 % of pain in neck and 10 % of pain in ankles.

The stringed instrument such as guitar players reported 100 % of pain in neck, shoulders and lower back, 90 % of pain in upper back, 80 % of pain in wrist , 70 % of pain in elbows, 20 % of pain in hips and thighs and 10 % of pain in knees, on parallel the violin players also reported 100 % of pain in neck, shoulders and lower back, 80 % of pain in elbow and lower back, 70 % of pain in wrist, 50 % of pain in hips and thighs and 10% of pain in knees.

The electric drum pad players reported 100 % of pain in shoulders and lower back, 80 % of pain in wrist, 70 % of pain in ankles, 60 % of pain in hips and thighs, in additional 60 % of pain is also reported in upper back, 30 % of pain in elbows. The manual drums player recorded 100 % of pain in shoulders and lower back, 90 % of pain in wrist, 70 % of pain in ankle, 50 % of pain in knees and upper back. Table players reported 100 % of pain in shoulders, lower back and ankle, 75% of pain in wrist, 25 % of pain in neck, elbow and knees.

The wind instrument such as flute players reported 100 % of pain in shoulders,80 % of pain in neck and shoulders, 60% of pain in upper back, 50 % of pain in lower back, 40 % of pain in wrist, 20 % of pain in hips thighs and knees, 10 % of pain in ankles. Though the players had symptoms of pain on parallel there was no interference of daily activities.

To analyze the higher percentage of pain in comparing between distinct instrument players, the percentage of yes reported by the players was taken as predominant value and sum of yes were made as an average in which it reveals, the maximum percentage of pain was reported among piano and guitar players with an average mean value of 5.90, the electronic percussion players holds the second position with an average mean value of 5.80, as it descends the violin players stands in third place with an average mean value of 5.40, on parallel the electronic keyboard players stands in fourth place with an average mean value of 5.10, the least reported pain was reported among flute and drums players with an average mean value of 4.80 and 4.60. The results of this study goes in accordance with results obtained by Lederman R and Cohen Y which defines that string instruments are reported significantly higher percentage of playing related musculoskeletal disorder among musicians^{11,12}. On parallel Paarup H defined that wood wind instrument players are least prone to playing related musculoskeletal disorder¹³.

The results of this study illustrates that constant and repetitive improper positioning of movements, overuse syndrome, inappropriate age, lack of warm and cool down exercise, stretches, may cause strain of muscles which further proceeds to playing related musculoskeletal disorder. Research also shows that instruments imposing asymmetric postures e.g. violin, viola, flute, and others also contribute to the assuming of unhealthy postures by the musician¹⁴. Performing music over an instrument demands repetitive, awkward postures while playing and postural stress from prolonged sitting or standing and transporting instruments, music stands.¹⁵. There are also studies which defines relying on type of instrument, the musician has to attain an uneven posture (e.g. – violin, viola, flute, guitar) and even posture (e.g. – piano) and can play with persistently elevated upper limbs (e.g. – violin, flute) or not (e.g. – drums, piano)¹⁶. In relation with this previously we have also conducted a survey study in the year (2019-2020) which illustrated the significance of pain in wrist and fingers among amateur piano players in different positioning which stated children's seem to be adopted to abnormal posture which makes them ease at present moment but prolonged usage, further leads to increase in intensity of pain and as consequence terminates the musical passion of children⁸.

The children's in current era are focused toward extracurricular activities, on parallel the playing related musculoskeletal disorder is also being substantially increasing. The end point of this study portrays that importance of prmd which initially sustains as pain. Musician are also one who spend their time efficiently in practicing like athletes in order to fulfill the needs of their audience which conveys that musicians are also injured like athletes. Many amateur, professional musician loss their career because of undiagnosed problems and to be more clear, many musicians who started their career seemed to be quitted in between but still their passion towards music remains in vain. The physiotherapist are still focused over the other systematic problems and injuries, whereas the musicians are not yet counted into their pedagogical part of research., this study points out the prevalence rate of prmd in particular community in India, further a study with larger sample size has to be conducted in many geographical part of India in bringing out consequence of the term PRMD from mystery to known and let children's dream may not be shattered down by it.

CONCLUSION

This study concludes that distinct instrument players report pain, but in narrowing down piano and string players significantly report a higher percentage of pain. In the current scenario parents out of their interest and ego clash in a sense of preparing their children to compete with other children, they create peer pressure on them without understanding their level of maturity, this is also one factor which indirectly cause playing related musculoskeletal disorder. This study also concludes that music tutors should educate their students about correct positioning; playing habits, warm up and cool down exercises, the significance of prmd, specific age. Specific dimensions of the instrument in relation with and can significantly minimize the playing related musculoskeletal disorder.

CONFLICT OF INTEREST- NIL

SOURCE OF FUNDING-SELF FUNDING

ETHICAL CLEARANCE- INSTITUTIONAL ETHICAL COMMITTEE

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