

THE PREVALENCE OF UPPER LIMB PAIN AMONG VEENA PLAYERS: A CROSS-SECTIONAL SURVEY

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ABSTRACT | Background: Instrumental musicians are a special risk group for repetitive motion injuries. Sizable percentages of them develop physical upper limb problems related to playing their instruments. **Objective:** The objective of this study was to investigate the prevalence of Upper Limb pain among Veena players. **Method:** This study was a descriptive cross sectional survey and fifty Veena Players participated in this study from a Music Academy. Trained Veena players aged between 12-50 and players who practice at least 3 times a week were included in the study. The period of pain, types of pain and location of pain were investigated by a self-developed questionnaire. In addition, Visual Analogue Scale (VAS) was also used to record the intensity of pain. **Results:** Descriptive analysis was used to analysis the data. The results showed that most of players had pain on the shoulder; in addition, according to Visual Analogue Scale (VAS) most of the participants have dull aching pain and shooting pain. **Conclusion:** In conclusion, this study's results also show that there is a low prevalence of Upper Limb pain among Veena players. Multiple evidences show that Upper Limb pain is indeed prevalent predominantly among musicians of Western music. At most of the time the pain type is of dull aching and/or shooting pain.

Keyword: Musician's Dystonia, Cumulative Trauma Disorders, Myalgia.

INTRODUCTION

Repetitive strain injury (RSI) are injuries sustained during the prolonged repetitive performance in any work environment that would cause strain and subsequent injuries to the tendon, tendon sheath, muscles, nerves and joints. A form of overuse injury caused by repeating the same motions for hours on an over extended periods of time¹, RSI is often associated with computer keyboard work². RSI has symptoms mainly of pain, stiffness, tenderness, swelling, or paraesthesia in the neck, shoulder, elbow, hand and wrist, or carpal tunnel³.

Prevalence of Upper Limb Pain was reported among musicians. In recent years, medical issues among musicians have increased and have gained much attention as the industry has grown so much over the years⁴. According to Cebria et al.⁵, the most common injury faced by musicians is the 'overuse syndrome'. This term is normally used when the musician suffers from pain from which a diagnosis cannot be made and has been recognized as an occupational over use. Lee et al., (2013) reported that movements that increase the amount of stress on the musicians can be categorized into two groups. First is the isotonic movements whereby a musician does complicate and fast movements to produce sound eg; pianists.

The second group is isometric movements, when a musician is holding the instrument for a long time in an unstable posture, this ultimately causes muscle imbalance and can lead to chronic myofascial stress and later translated into pain. Repetitive strain injury and overuse syndrome were reported among pianists, guitarists and string players which lead to pain, weakness, lack of control, tingling and numbness⁶. In addition, Steinmetzet al (2102) stated that pain and overuse syndromes are shared problems among musician; 80% of professional musician involved with pain in their musculoskeletal system. There are many risk factors for play related musculoskeletal disorder such as gender, age, professional status, instrument type, year experience and joint laxity⁷. According to Potter et al., (1995) the nature of the instrument played could be a cause for medical issues to arise amongst musicians. In a case example, a 22 year old violinist had aching bilateral shoulder pain when he performs. Upon examination, pain is caused by resisted abduction and external rotation⁸.

The Veena is a classical Indian stringed instrument. It bears resemblance to a western lute, but has a smaller, more spherical body and an extra resonator attached to the neck. When playing the Veena, the 'toomba' rests on the player's left knee or thigh, and this helps to support the instrument. The neck rests high on the left upper arm and the resonator rest on the floor, the fingers on the right hand pluck this instrument⁹. One of the factors to increase RSI is poor ergonomic posture. Common complaints among any musicians who suffer from RSI include numbness, tingling sensations and dull aching pain in the upper limbs.

Previous research has investigated the play-related musculoskeletal disorder and Upper Limb Pain among musician such as pianists, guitarists, violin, and string players^{4,6}. However, to our knowledge there have not been enough studies to investigate the rate of musculoskeletal disorder or Upper Limb Pain among Veena players. So, the objective of this study was to find out the prevalence of Upper Limb Pain among Veena players in the Malaysian context.

METHODS

Study Design and Participants

This study was a cross-sectional survey to investigate the prevalence of Upper Limb Pain among Veena Players. This study was conducted in a Music Academy in Kuala Lumpur, Malaysia with a sample size of 50. The participants consisted of both amateur and semi-professional Veena players selected by convenience sampling technique. Trained Veena players aged between 12-50; players who practice at least 3 times a week; who perform at least once in 6 months; who at least have more than 1 year of experience were included in the study. The participants older than 50 years and with a history of musculoskeletal disorders were excluded from the study. All participants signed informed consent form and they were instructed to answer the question. This study was approved by INTI International University Research ethics committee.

Procedure

Questionnaires were given to all participants to answer the questions regarding their experience in Veena playing, location, type and intensity of pain. A self-developed questionnaire and validated by experts from INTI International University was used to measure the location, and type of pain in the Veena player.

The location of pain suffered by the participant differs from one individual to another. It can be clearly seen from the method the instrument is handled, let alone perform. Certain individuals tend to rest on a particular side when they perform causing them to have pain in their shoulders. Otherwise, certain Veena players find it difficult to maintain an upright posture when they are performing or practicing long hours.

Type of pain: In the given questionnaire, the type of pain had a list of different types of pain to choose from; for example, prickling pain, sharp pain and

dull aching pain. Each type of pain was carefully explained to each participant. This was carried so as to avoid confusion to describe the type of pain they really suffered from.

Rate of pain: The rate of pain was investigated via a Visual Analogue Scale (VAS). The said scale, had a rating with illustration, that started from 0, implying no pain at all, right up to 10, implying extreme and unbearable pain¹⁰. Carlsson¹¹ demonstrated that Visual Analogue Scale (VAS) was a reliable instrument for the measurement for the assessment of variation in intensity of pain with high interclass correlation coefficients ICC = 0.99 [95%CI 0.989 to 0.992).

Statistical analysis

The descriptive statistical analyses of the data were executed by SPSS software version 22. The frequencies, percentages, and graphical analysis of the data was displayed.

RESULTS

Among 50 subjects, characteristics of participants for year of age 29.7 ± 10.6 , and year of experience 1.22 ± 58 . 18 subjects have pain when they are playing instruments and 32 subjects were free of pain. According to the results of the questionnaire, 11.1% of those who suffer 6 months experience of pain meanwhile, those with more than 6 months of experience, only 28% have suffered from pain. 17% of the players with 1 year experience have shown to experience pain. 17% from the players with 1 year experience have showed to experience pain. The highest percentage was from those players who had more than 1 year experience at 44%. Table 2 showed the number of subjects that have pain according to year of experience.

Table 1. Subject with pain according to year of experience

6month experience	More than 6month	1 year experience	More than 1 year experience
11.1%	27%	16%	44%

Table 2. Percentage and frequency subject with pain according to year of experience

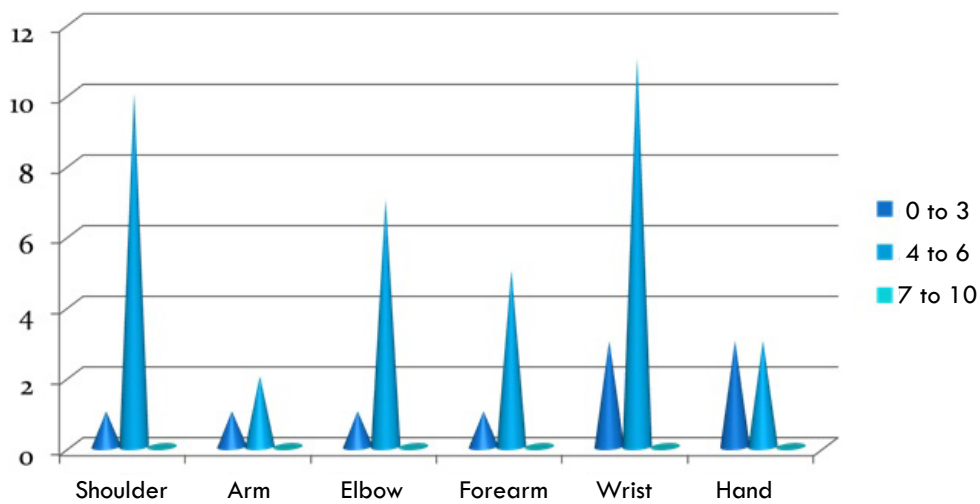
Experience	6 Months	> 6 Months	1 Year	>1 Year
Percentage	11% (2)	28% (5)	17% (3)	44% (8)

Illustrated the main area of complaint were the shoulders at 50%, followed by the remaining areas, elbow, wrist and hand at 27.8% respectively, Table 3.

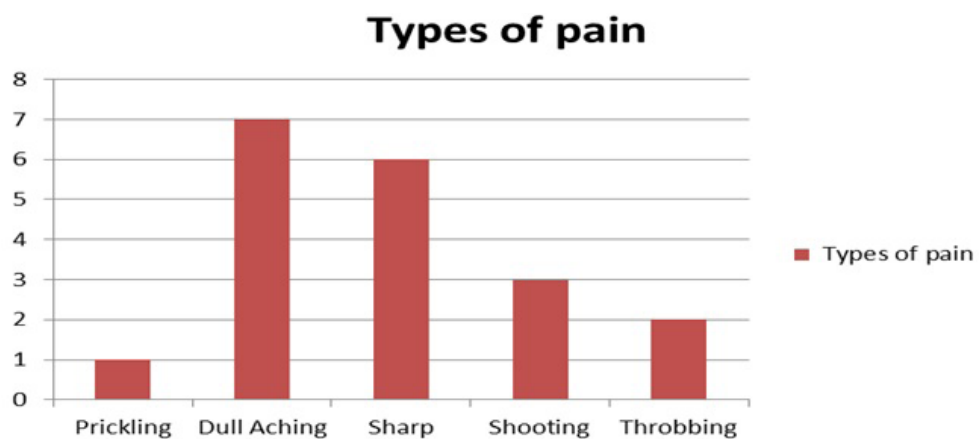
Table 3. Location of pain among subjects, according main area of complain

Location Of Pain	Shoulder	Elbow	Wrist	hand
Percentage	50%	27.8 %	27.8 %	27.8 %

The results, obtained from the VAS scale, illustrate that most subjects have the highest rate of pain in the area of the wrist with results showing 14 Veena players. 11 players have given a score of “4-6” out of 10 while 3 players have rated with “0-3”. This is followed by subjects complaining of pain in the shoulders with a result of 11. For the shoulder region, 10 Veena players have given a total score of “4-6” on the VAS scale while only 1 player scored “0-3”. The lowest rate of pain complained by the participants was the arm with a result of 3 participants. 1 participant scored “0-3” while the other scored “4-6”, Figure 1.



The results showed that most of the subjects have dull aching pain with the results showing 7 Veena players. This is followed by subjects complaining of sharp pain and shooting pain with results of 6 and 3 subjects respectively. The least type of pain complained by subjects was throbbing pain with a result of 2 subjects, Figure 2.



DISCUSSION

The results of this study indicated that some participants reported pain during playing the Veena. Eighteen subjects have pain when while playing instruments and 32 subjects were free of pain. The results of study showed that the main area of complaint were the shoulders and wrist. Studies of Brandfonbrener¹² and Kaufman-Cohen¹³ stated that although classical musicians also complain about secondary or primary shoulder pain, they often reported pain in the hands, wrists and arms in the areas where the greatest muscular exertion occurs while performing. This is mainly because of the starting position of the wrist when playing the Veena as well. In addition, the musicians while playing, generate excessive loads on areas like hand, shoulder and wrist and lead to stress and asymmetric postures¹⁴.

According to Cebria et al (2010), all woodwind players suffered from inflammation in their hands caused by the need to constantly support the instrument while performing⁵.

The RSI and pain in upper extremity might be due to lack of flexibility and loss of muscle strength. Biomechanical and physical environmental risk factors can be the main risk factor of musculoskeletal pain among musicians¹³. Study of Davies and Mangion, reported that environmental risk factors such as rehearsal and concert halls are an indirect impact on the musculoskeletal system¹⁵. The weight of the instrument and holds the instrument or the maintenance of the upper limb in a particular position for a sustained period effect on the musculoskeletal system¹³.

Upper limb pain is also mainly due to the method and posture of Veena playing. When playing the Veena, it is not enough to be able to play the instrument using your hands, it is also vital to be able to balance it on your leg when playing. That too, is not the easiest of tasks which is why it could possibly be the reason why Veena players complain of pain in active parts of the body, such as arms, shoulders, and neck, during playing the Veena. Studies of Patricia et al¹⁶ and leaon et al¹⁴ reported that there is close relationship between musician posture and musculoskeletal disorders; and poor posture

recognized as the main risk factor of discomfort.

In case of types of the pain, the results showed that participants mainly complained of dull aching pain in their right wrist. This is normally caused by the static position of the wrist for balance support when playing as mentioned previously. Study of Lee, H. et al (2013), reported that prolonged maintained of a static posture when it comes to holding in a particular instrument, may cause muscle imbalance⁴. This in turn will eventually progress to chronic myofascial pain. Physical training programs, with a focus on agonist and antagonist muscles, are important to improve the balance with increasing the range of motion, flexibility, and obtain better posture¹⁷.

There are some limitations in this study such as less number of samples and the researcher could not compare between other types of musicians. In addition current research could not measure the spine and lower body pain of musicians. Further research should be carried out to determine other possible causative factors that might cause pain to musicians. Also, more research needs to be done, with focus on treatments by intervention programs, to reduce the level of pain and prevent from more injuries among veena players.

CONCLUSION

In conclusion, this study's results show that there is a low prevalence of upper limb pain among Veena players. Most of pain was experienced in the shoulder and wrist area and dull aching pain, shooting pain, and sharp pain were the common types of pain. Multiple evidences show that upper limbs pain indeed is prevalent in Veena players though are predominantly seen among musicians of Western musical instruments.

COMPETING INTERESTS

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

REFERENCES

1. Borrelli CD. Repetitive Strain Injury–RSI. Digital Mammography: Springer; 2015. p. 195-202.
2. Shariat A, Tamrin S, Mohd B, Arumugam M, Danaee M, Ramasamy R. Prevalence rate of musculoskeletal discomforts based on severity level among office workers. *Acta Medica Bulgarica*. 2016;43(1):54-63. doi: [10.1515/amb-2016-0007](https://doi.org/10.1515/amb-2016-0007)
3. Van Tulder M, Malmivaara A, Koes B. Repetitive strain injury. *The Lancet*. 2007;369(9575):1815-22. doi: [10.1016/S0140-6736\(07\)60820-4](https://doi.org/10.1016/S0140-6736(07)60820-4)
4. Lee H-S, Park HY, Yoon JO, Kim JS, Chun JM, Aminata IW et al. Musicians' medicine: musculoskeletal problems in string players. *Clinics in orthopedic surgery*. 2013;5(3):155-60. doi: [10.4055/cios.2013.5.3.155](https://doi.org/10.4055/cios.2013.5.3.155)
5. Cebriá i Iranzo MÀ, Soriano PP, Camacho CI, Belloch SL, Cortell-Tormo JM. Playing-related musculoskeletal disorders in woodwind, brass and percussion players: a review. 2010;5(1):94-100. doi: [10.4100/jhse.2010.51.10](https://doi.org/10.4100/jhse.2010.51.10)
6. Bragge P, Bialocerkowski A, McMeeken J. A systematic review of prevalence and risk factors associated with playing-related musculoskeletal disorders in pianists. *Occupational Medicine*. 2006;56(1):28-38. doi: [10.1093/occmed/kqi177](https://doi.org/10.1093/occmed/kqi177)
7. Steinmetz A, Möller H, Seidel W, Rigotti T. Playing-related musculoskeletal disorders in music students-associated musculoskeletal signs. *Eur J Phys Rehabil Med*. 2012;48(4):625-33.
8. Potter PJ, Jones IC. Medical problems affecting musicians. *Canadian Family Physician*. 1995;41:2121-2128.
9. Divekar H, Tribhuvan RD. Rudra Veena: an ancient string musical instrument: Discovery Publishing House; 2001.
10. Hawker GA, Mian S, Kendzerska T, French M. Measures of adult pain: Visual analog scale for pain (vas pain), numeric rating scale for pain (nrs pain), mcgill pain questionnaire (mpq), short-form mcgill pain questionnaire (sf-mpq), chronic pain grade scale (cpgs), short form-36 bodily pain scale (sf-36 bps), and measure of intermittent and constant osteoarthritis pain (icoap). *Arthritis care & research*. 2011;63(S11):S240-S52. doi: [10.1002/acr.20543](https://doi.org/10.1002/acr.20543)
11. Carlsson AM. Assessment of chronic pain. I. Aspects of the reliability and validity of the visual analogue scale. *Pain*. 1983;16(1):87-101.
12. Brandfonbrener AG. Musculoskeletal problems of instrumental musicians. *Hand clinics*. 2003;19(2):231-9. doi: [10.1016/S0749-0712\(02\)00100-2](https://doi.org/10.1016/S0749-0712(02)00100-2)
13. Kaufman-Cohen Y, Ratzon N. Correlation between risk factors and musculoskeletal disorders among classical musicians. *Occupational Medicine*. 2011;61(2):90-5. doi: [10.1093/occmed/kqq196](https://doi.org/10.1093/occmed/kqq196)
14. León LRP, Galindo JAR, Prado PLZ. Human Factors in Musicians: Design Proposals. *Procedia Manufacturing*. 2015;3:6124-32. doi: [10.1016/j.promfg.2015.07.765](https://doi.org/10.1016/j.promfg.2015.07.765)
15. Davies J, Mangion S. Predictors of pain and other musculoskeletal symptoms among professional instrumental musicians: elucidating specific effects. *Medical Problems of Performing Artists*. 2002;17(4):155-69.
16. Blanco-Piñeiro P, Díaz-Pereira MP, Martínez A. Musicians, postural quality and musculoskeletal health: A literature's review. *Journal of Bodywork and Movement Therapies*. 2017;21(1):157-72. doi: [10.1016/j.jbmt.2016.06.018](https://doi.org/10.1016/j.jbmt.2016.06.018)
17. Shariat A, Lam ET, Kargarfard M, Tamrin S, Danaee M. The application of a feasible exercise training program in the office setting. *Work*. 2017(Preprint):1-8.