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## Prevalence of neck, shoulder and low back pain among school students in Reethapuram, Kanyakumari district

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### Abstract

**Background:** In India most of the children with age of 4-18 years old attend school except weekends and public holidays and they spent at least 6-7 hours daily in school. This study investigates the prevalence of neck, shoulder and low back pain among secondary school students in Reethapuram, Kanyakumari District.

**Method:** A cross sectional study was administered to 100 secondary school students in Reethapuram, Kanyakumari District using a standardized Nordiac questionnaire which seeks information on the prevalence of neck, shoulder and low back pain.

**Results:** Total respondents consist of 42 males and 58 females in between 13 years to 17 years old. The highest prevalence of musculoskeletal pain was neck pain (66%), followed by shoulder pain (60%) and low back pain (22%). 31 male students (31%, OR: 0.45) and 35 female students (35%, OR: 0.54) were affected by neck pain.

**Conclusion:** Results show that musculoskeletal pain is a common increasing problem in adolescents especially girls, suggesting more problems in the young adults of the future. Besides, females have greater health and body consciousness than males. Thus, they tend to complaint more than males.

**Keywords:** Adolescents, awareness, prevalence, upper extremities, Nordiac questionnaire

### Introduction

Musculoskeletal diseases are a major public health problem <sup>[1]</sup>. Musculoskeletal pain is a known result of repetitive strain, overuse and work-related musculoskeletal disorders. Musculoskeletal pain from overuse affects 33% of adults and accounts for 29% of lost workdays due to illness <sup>[2]</sup>.

Musculoskeletal Disorders (MSD) are injuries and disorders that affect the human body movement due to the involvement of musculoskeletal system (muscles, tendons, ligaments, nerves, discs, blood vessels, etc). MSD occurs when an individual exposed to MSD risk factors, he or she begins to fatigue. When fatigue outruns their body's recovery system, that individual develops a musculoskeletal imbalance. Overtime, as the musculoskeletal imbalance persists, a MSD develops <sup>[3]</sup>.

Neck pain results from abnormalities in the soft tissues such as muscles, ligaments and nerves as well as in bones and joints of the spine. The most common causes of neck pain are soft-tissue abnormalities due to injury or prolonged wear and tear. In some people, neck problems may be the source of pain in the upper back, shoulders, or arms <sup>[4]</sup>.

Musculoskeletal complaints, such as low back pain, among school-age students are believed to be from multiple causal factors <sup>[5]</sup>.

Ergonomic risk factors controlling with the use of ergonomic risk assessment tools can be used to manage and reduce the incidence of upper extremity musculoskeletal disorders in only early stage <sup>[6]</sup>.

Ergonomics is a science that focuses on the comfort of the workstation and all of its physiological aspects to the human <sup>[7]</sup>.

The school environment is not a safe for them, injuries as well as illness results. Among them, is musculoskeletal disorder (MSD) arising from the school's unsafe environment. In this country, ergonomics issues among school children have not been widely addressed and documented compared to other issues such as air, water pollution, food safety and other physical hazards in school <sup>[8]</sup>.

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## Materials and Methods

### Study design and location

A cross sectional study was carried out during a period of two months among 100 secondary school students in Reethapuram, Kanyakumari district. The Nordiac questionnaire was distributed with the consent form assuring confidentiality and approval of participants to take part in this research.

### Sampling

The sampling method for this research study was non-probability convenient sampling. One hundred students were selected from few schools. Participants were selected using convenient sampling method. A small introduction about Musculoskeletal Disorders (MSD) and the survey study was conducted before providing the questionnaire. The questionnaires then were distributed to each of the students. Informed consent from each study participants before they filled up the questionnaire was obtained. Participants were then requested to fill up the questionnaire in 20 minutes and the questionnaires were collected on the same day to ensure the confidentiality. The inclusion criteria for the study are Secondary school students, age between 13 to 17 years old and both gender (male and female). The exclusion for the study is any recent injury or history of fracture, deformity, recent falls and recent surgery.

### Data collection

This survey is conducted on secondary school students in Reethapuram, kanyakumari district. An informed consent form and questionnaire was given to each Participant randomly. The participants will be given 20 minutes to fill up the questionnaire. The completed questionnaire has been collected and analysed. After the following week, awareness was given through a pamphlet to each class at secondary schools. One hundred sample of questionnaire were given randomly. Each student was given informed consent form and an instruction describing the procedures of the study and objectives. Questionnaire was given and filled by the students. A modified Nordic questionnaire was used in this study. The questionnaire consists of three parts. The first part (section A) of the questionnaire was on the respondent's demographic factors which included age, gender, height and weight. The second part (section B) modified Nordic questionnaire was used to assess the neck, shoulder and back pain.

### Statistical tool

The results were analyzed through frequency counts percentage and odds ratio. Every answer in each questions were calculated using odds ratio formula to find out the total percentage.

## Results and Discussion

This study shows among the 100 school students consist of 42 males and 58 females in between 13 years to 17 years old. The highest prevalence of musculoskeletal pain was neck pain (66%), followed by shoulder pain (60%) and low back pain (22%). Out of 100 school students, 31 male students (31%, OR:2.70) were affected by neck pain and 11 students (11%) were not affected by neck pain. Meanwhile, 35 female students (35%, OR: 1.518) were affected by neck pain and 23 female students (23%) were not affected by neck pain. Furthermore, highest prevalence of school students have been hospitalized were back pain (22.7%, OR: 0.294), followed by

neck pain (7.6%, OR: 0.081) and shoulder pain (3.3%, OR: 0.034). The results show that the prevalence of musculoskeletal pain was highest frequency is 1-7days which is for neck pain (43.75%, OR: 0.77), for shoulder (39.84%, OR: 0.661) and for low back pain (21.88%, OR: 0.28) during last 12 months. In addition, highest prevalence of musculoskeletal pain caused to reduce work activity during last 12 months were shoulder pain which achieved (66.6%, OR: 1.941), followed by neck pain (59.1%, OR: 1.44) and low back pain were (13.6%, OR: 0.157). Therefore, the highest prevalence of consulted physician during last 12 months were obtained by neck pain (45.5%, OR: 0.835), followed by shoulder pain (33.3%, OR: 0.499) and low back pain (31.8%, OR: 0.466). Thus, it has shown that females have been more consulted to physician during last 12 months which was 32% higher than males.

## Discussion

This study shows that musculoskeletal problems are particularly common in school students who are involved in various activities. The high prevalence of musculoskeletal problems among school students is thought to be due to participation of daily activities and researches suggest that low back pain has a significant effect on school students<sup>[16]</sup>.

The prevalence of musculoskeletal disorder according to gender and age showed that neck pain has the highest prevalence that affected school students followed by shoulder pain and lower back pain. It was found that neck pain as significantly influenced by satisfaction with backrest shape and the desk height<sup>[17]</sup>. High prevalence of neck pain suggested that there was a high level of neck flexion as well as static and awkward posture during sitting for prolonged period of time<sup>[18]</sup>. Sitting may be strongest factor that influenced musculoskeletal problem among school children. However the occurrence of musculoskeletal problem may also contributed by the way schoolbags are carried which induced the forward leaning of head and trunk<sup>[19]</sup>.

Based on this study, shoulder pain was mostly affected among school students compared to low back pain. Therefore, these finding shows that female were mostly affected than male in neck, shoulder and low back pain for work activity. This could be due to gender differences as the physical and physiological characteristics of males are different. Males and females differ in their muscle potency as females tend to have lower muscle strength than, particularly in the upper limb musculature<sup>[20]</sup>.

This study found that, the highest prevalence of school students have been hospitalized were for neck and low back pain compared to shoulder pain. These findings is supported by relationship between back pain and school bag weight whereas, the findings in this study were inconclusive. There was, however, a significant relationship between having a medium weight school bag and upper back pain<sup>[21, 22, 23]</sup>.

It is concluded that there was positive associations between children's musculoskeletal pain and both physical and psychological variables. Unsuitable school furniture may contribute to the onset of pain and those children with psychological difficulties may go on to develop more long term and serious pain. Children are also more likely to report pain if there is a family history of such pain.

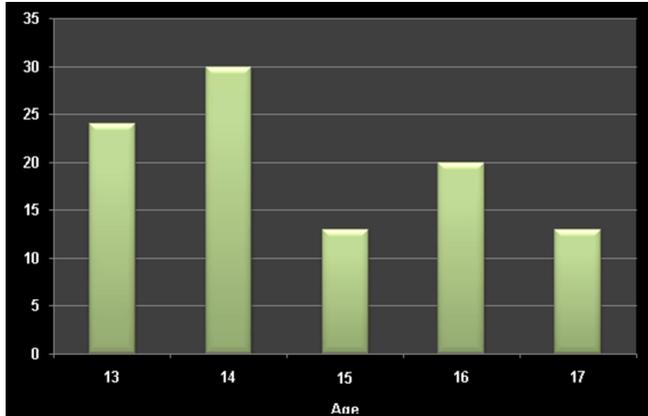
## Table and figures

The data were analyzed in two sections demographic data of the participants and Prevalence of Neck, Shoulder and Low Back Pain.

**Demography of study sample (N=100)**

**Table 1:** Table above shows demographic data of respondents

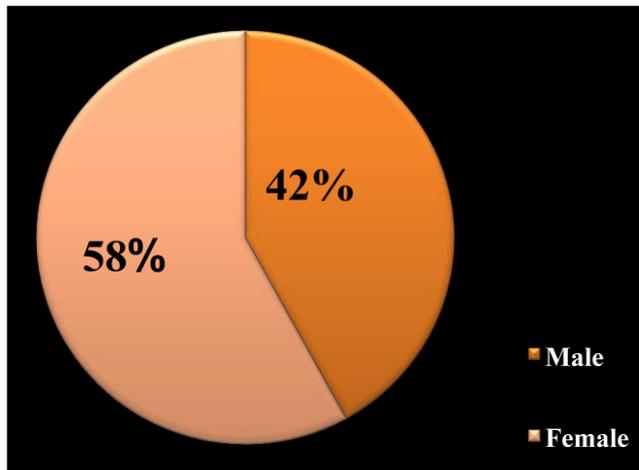
Age	Frequency(N)	Percentage (%)
13	24	24
14	30	30
15	13	13
16	20	20
17	13	13



**Fig 1:** Bar Chart shows age group of the respondents

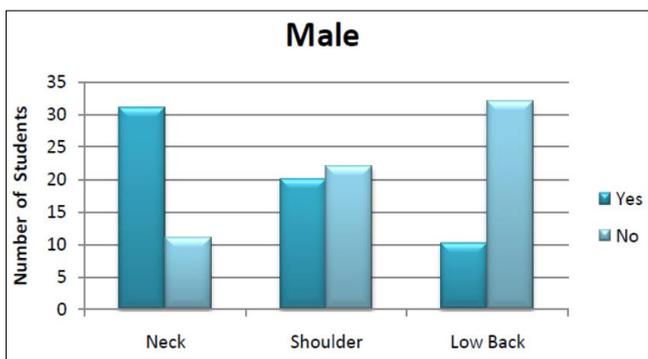
**Table 2:** Table above shows Gender of respondents

Gender	
Male	42
Female	58

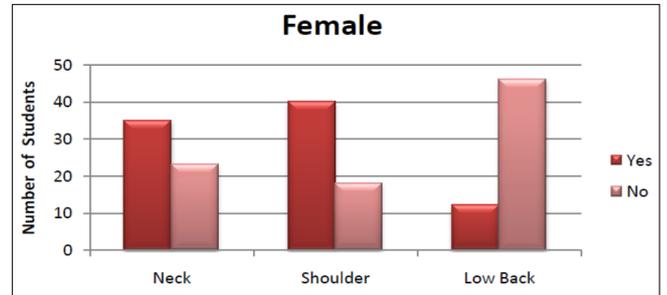


**Fig 2:** Pie chart shows the percentage of gender.

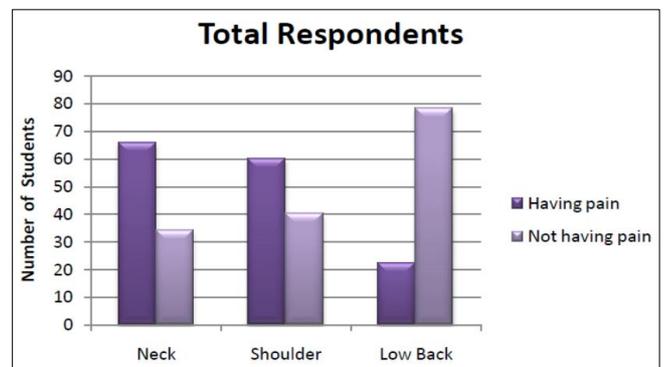
**Prevalence of having Neck, Shoulder and Low Back Pain**



**Fig 3:** Graph shows amount of male respondents with and without neck, shoulder and low back pain.



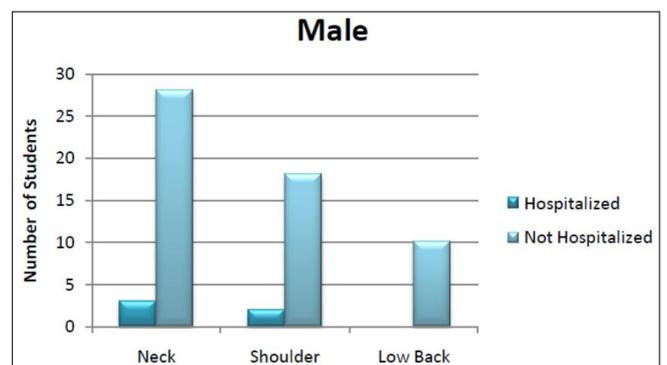
**Fig 4:** Graph shows amount of female respondents with and without neck, shoulder and low back pain.



**Fig 5:** Graph shows amount of total respondents having and not having neck, shoulder and low back pain.

Figure 5 shows that total respondent with and without neck, shoulder and low back pain. The highest prevalence of musculoskeletal pain was neck pain (66%), followed by shoulder pain (60%) and low back pain (22%). Figure 3 shows 31 male students (31%, OR: 2.70) were affected by neck pain and 11 students (11%) were not affected by neck pain. Figure 4 shows 35 female students (35%, OR: 1.518) were affected by neck pain and 23 female students (23%) were not affected by neck pain.

**Prevalence of respondents been hospitalized due to Neck, Shoulder and Low Back Pain**



**Fig 6:** Graph shows male respondents who have and never been hospitalized due to neck, shoulder and low back pain

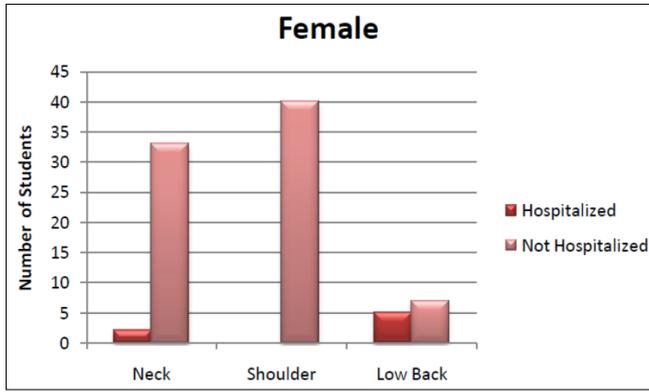


Fig 7: Graph shows female respondents who have and never been hospitalized due to neck, shoulder and low back pain.

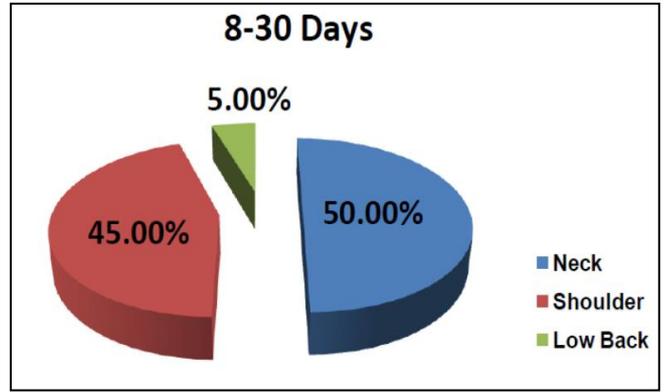


Fig 11: Pie chart shows the percentage of respondents experiencing neck, shoulder and low back pain during last 12 months for 8-30 days.

**Prevalence of Neck, Shoulder and Low Back Pain reported during the last 12 months**

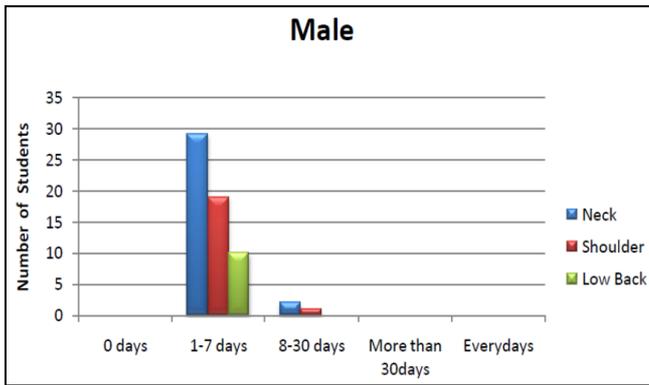


Fig 8: Graph shows total time length that male respondents had neck, shoulder and low back pain during the last 12 months.

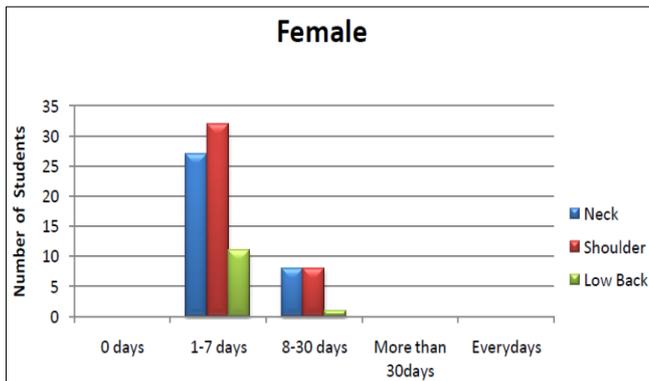


Fig 9: Graph shows total time length that female respondents had neck, shoulder and low back pain during the last 12 months

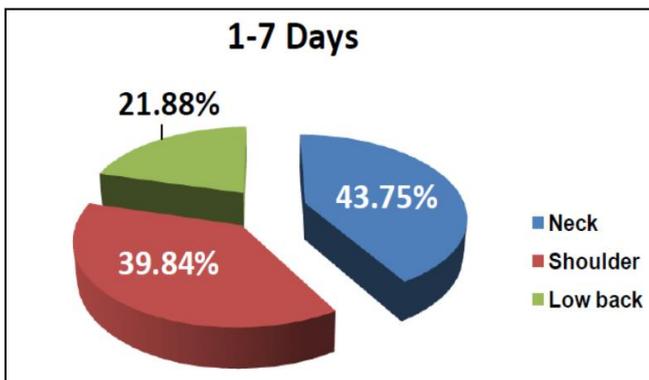


Fig 10: Pie chart shows the percentage of respondents experiencing neck, shoulder and low back pain during last 12 months for 1-7 days.

The highest frequency of neck, shoulder and low back pain that has been reported during last 12 months is 1-7 days followed by 8-30days. From 1 to 7 days, neck pain has highest value of 43.75%, OR: 0.77 and low back pain with lowest value of 21.88%, OR: 0.28.

**Prevalence of Neck, Shoulder and Low Back Pain caused to reduce work activity during last 12 months**

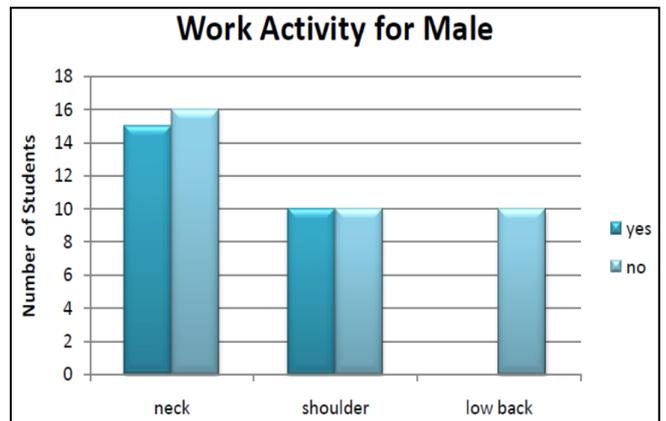


Fig 12: Graph shows male respondents who had reduced in work activity due to neck, shoulder and low back pain during last 12 months

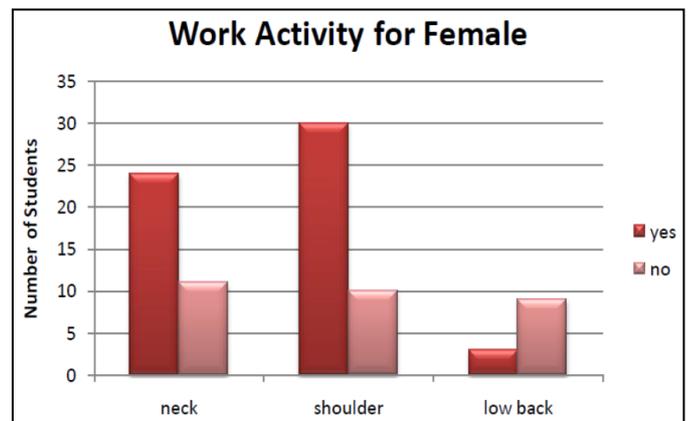
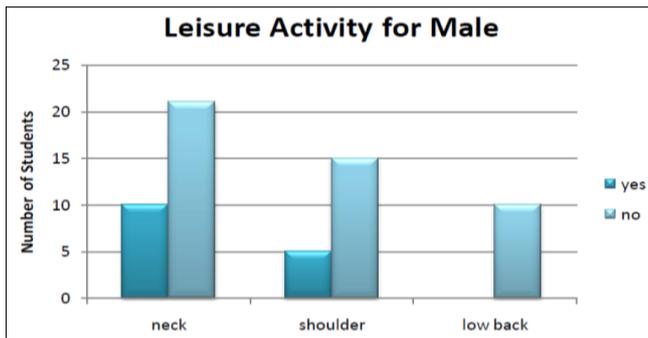
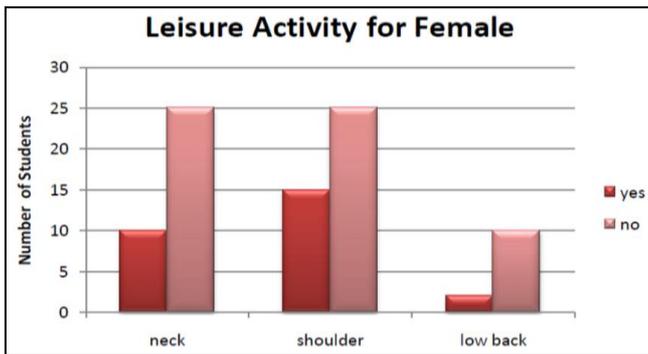


Fig 13: Graph shows female respondents who had reduced in work activity due to neck, shoulder and low back pain during last 12 months

**Prevalence of Neck, Shoulder and Low Back Pain caused to reduce leisure activity during last 12 months**

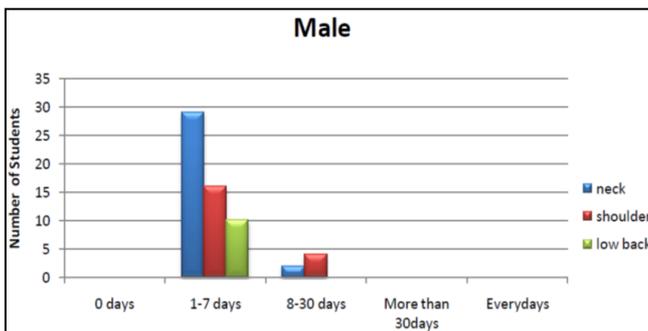


**Fig 14:** Graph shows male respondents who had reduced in leisure activity due to neck, shoulder and low back pain during last 12 months

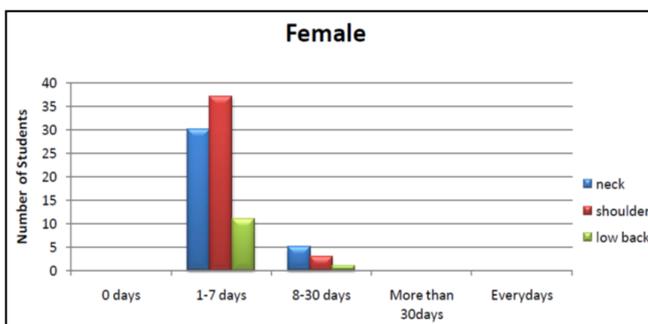


**Fig 15:** Graph shows female respondents who had reduced in leisure activity due to neck, shoulder and low back pain during last 12 months

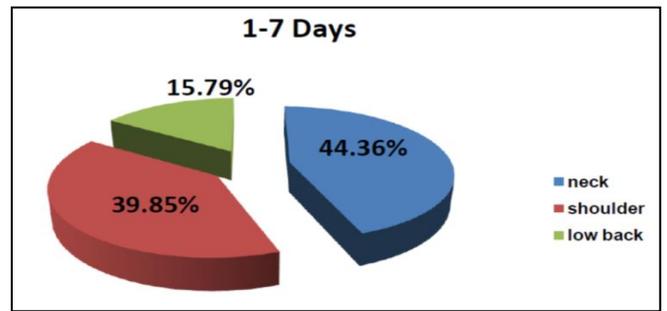
**Prevalence of Neck, Shoulder and Low Back Pain that prevented from doing normal work during last 12 months**



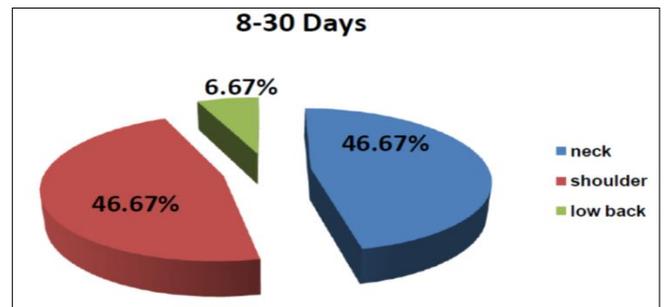
**Fig 16:** Graph shows total time length that prevented doing normal work by male respondents due to neck, shoulder and low back pain during the last 12 months



**Fig 17:** Graph shows total time length that prevented doing normal work by female respondents due to neck, shoulder and low back pain during the last 12 months

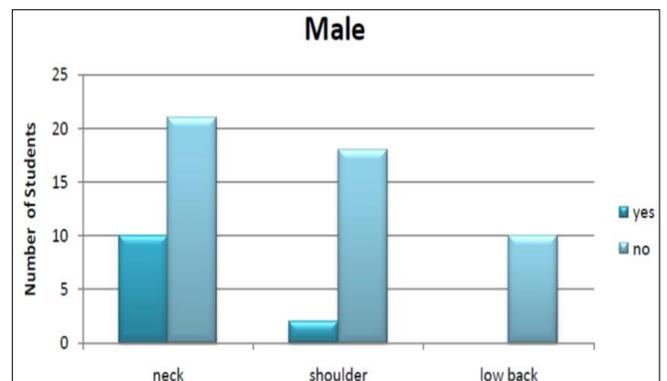


**Fig 18:** Pie chart shows the percentage of respondents prevented doing normal work due to neck, shoulder and low back pain during last 12 months for 1-7 days.

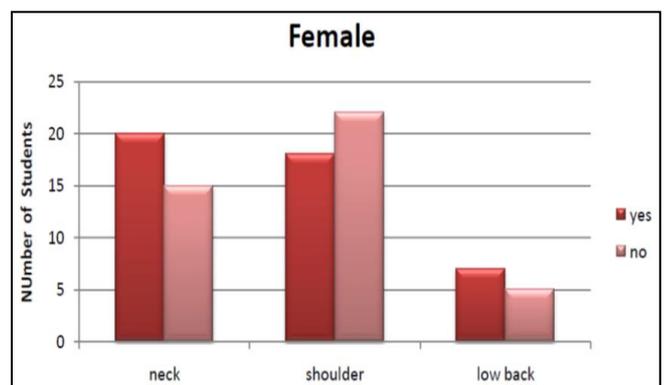


**Fig 19:** Pie chart shows the percentage of respondents prevented doing normal work due to neck, shoulder and low back pain during last 12 months for 8-30 days.

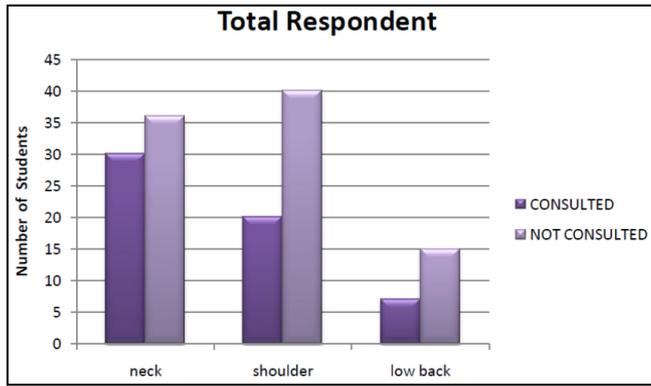
**Prevalence of respondents been consulted by Physicians due to Neck, Shoulder and Low Back Pain during last 12 months**



**Fig 20:** Graph shows male respondents who have and never been consulted by physicians due to neck, shoulder and low back pain during last 12 month

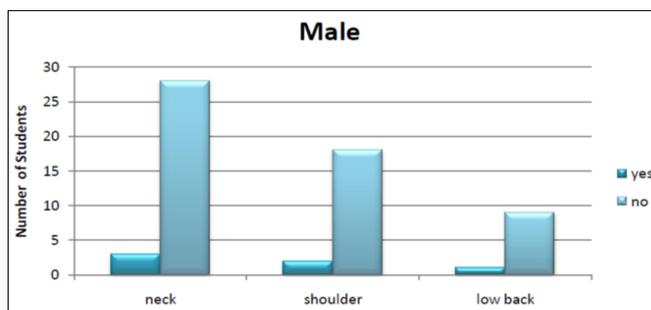


**Fig 21:** Graph shows female respondents who have and never been consulted by physicians due to neck, shoulder and low back pain during last 12 month

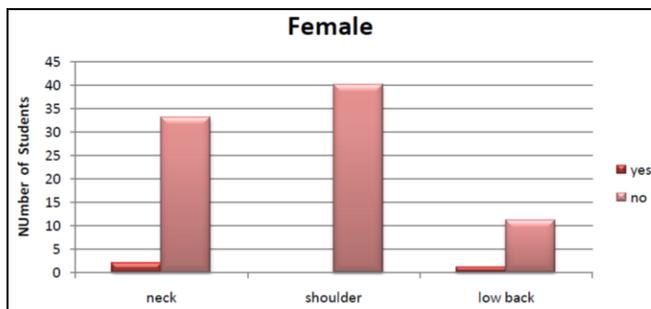


**Fig 22:** Graph shows total respondents who have and never been consulted by physicians due to neck, shoulder and low back pain during last 12 month

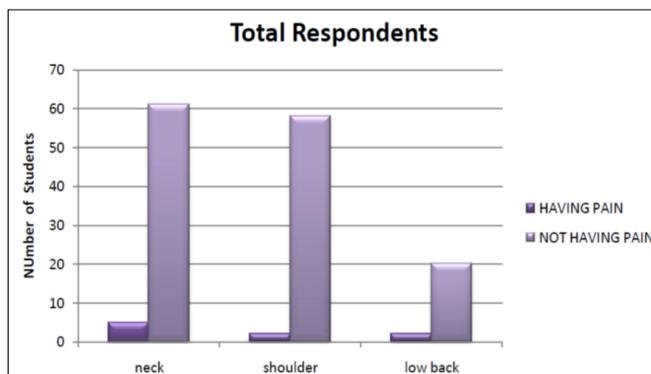
**Prevalence of having Neck, Shoulder and Low Back Pain during last 7 days**



**Fig 23:** Graph shows amount of male respondents with and without neck, shoulder and low back pain during last 7 days



**Fig 24:** Graph shows amount of female respondents with and without neck, shoulder and low back pain during last 7 day



**Fig 25:** Graph shows total respondents with and without neck, shoulder and low back pain during last 7 days

**Conclusion**

This study describes the prevalence of the musculoskeletal problems among secondary school students. The prevalence

of neck pain was highest among school students, followed by shoulder pain and low back pain. Musculoskeletal discomforts noted in this survey were in accordance with most of the literature findings. It is believed to be multi factorial in origin, the carriage and manipulating of heavy loads of school bag is signally a suspected factor. As a result, it may represent an overlooked daily physical stress for secondary students and they tried to reduce these episodes of pain from occurring by bringing lesser loads. This study shows that musculoskeletal pain was more common in females than males. 38% of girls and 26% of boys suffered from disturbing neck and shoulder symptoms. Our results show that neck and shoulder pain is a common and increasing problem in adolescents and psychosocial factors especially girls, suggesting more problems in the young adults of the future. Besides, female also have greater health and body consciousness than males. Thus, they tend to complaint more than males and frequently more to consult a doctor or physicians while having musculoskeletal pain. Statistics shown that females have achieved 32% higher than males in consulting to physician during last 12 months.

**Limitation of study**

The limitation of the study is the sample size. In addition it is a self-reported study, and possible that the respondents might have given vague answers or exaggerated their musculoskeletal problems. This study is limited only to prevalence of neck, shoulder and low back pain perhaps in future it should cover up its associated risk factors. The study duration was not sufficient enough and could not cover up both primary and secondary school in Kanyakumari district. The number of respondents should have in large numbers to reflect more accurate and efficient findings.

**Recommendation**

The recommendation is that, more knowledge about the etiologic factors associated with neck, shoulder and low back pain symptoms in adolescent may result in preventive programs with potential for reducing morbidity and musculoskeletal symptoms in adulthood. Parents, teachers and clinician should co-operate to give education programme to the school students regarding musculoskeletal problems and its risk factors. Therefore, they should have a medical team in every primary and secondary schools to identify, treat the hazards and adverse impacts of arising non-ergonomics school environment.

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