Research article

Prevalence of sacroiliac joint dysfunction in college students

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ABSTRACT

Introduction and Aim: Sacroiliac (SI) joint is considered as one of the pain generators in students. Sacroiliac joint dysfunction is one of the common sources of low back pain, and many times the SI joint dysfunction mis-lead as the lumbar problem. Students who sit for longer duration cause stress in the sacroiliac joint. So, this study intended to investigate the prevalence and the contributing risk factors amongst students' population with work-related musculoskeletal problems and also to identify the percentage of SI joint involvement in them.

Materials and Methods: The study was conducted with 590 students from a private paramedical college, involving full time college students, with age group of 17-27 years, no recent falls or those not on current medications related to any musculoskeletal problems, and students without any congenital problems. Evaluation was done using Nordic musculoskeletal questionnaire along with a self-developed demographic questionnaire. The involved students were assessed using questionnaire and sacroiliac joint tests to identify the SI Joint dysfunction. Provocation tests included i) Sacroiliac joint distraction test, ii) SI Compression test iii) Thigh thrust test iv) Faber's test and v) Gaenslen's Test. Inference considered was presence of pain in more than 3 test indicates Sacroiliac joint involvement. On completion of assessment, a thank you card was given to all the volunteer students participated in the study. The collected data was filled and analyzed.

Results: The study results showed that students with lower back pain also had complaints of neck pain. It was also noted that about 30% of the individuals were positive to the sacroiliac joint tests, among them 93 participants complained of low back pain.

Conclusion: This study concluded that 61% of individuals were suffering with musculoskeletal disorders in the selected population. Around 30% of the low back pain participants complained of sacroiliac joint dysfunctions.

Keywords: Sacroiliac joint dysfunction; nordic musculoskeletal questionnaire; low back pain; SI joint provocation tests; work related musculoskeletal disorders.

INTRODUCTION

Work related musculoskeletal disorders (WRMSD) are generally categorized as a non-communicable disease and are best described as disorder sustained by the workers in the muscles, bones, ligaments, nerves as a result of prolonged exposure (1). It is the most common preventable health issues faced by the working population and it associates with more absenteeism or disability than any other disease (2). WRMSD not only affect the individual's ability to work and function in daily life but also exert an economic impact on the workplaces health system and the community (3).

WRMSD are characterized as multifactorial. It may occur due to sudden exertion like lifting heavy weights or it can occur because of repetitive motions, vibrations or awkward postures (4). The workload and disability with regard to occupation has been studied in the literatures (5). There was a strong relationship between the incidence of the WRMSD and the working conditions, particularly the physical

risk factors associated with jobs (6). In India WRMSD is becoming one of the major occupational health problems and it has been estimated to about 40% of all cost of treatment (7).

Sacroiliac (SI) joint is becoming one of the common sources for the low back pain syndrome in general population. SI joint is the link between the lower extremities and the spine. It was estimated about 15–30% of people with low back pain having sacroiliac joint as the origin (8). Studies found that it is one of the biggest contributors for low back pain syndromes regardless of age, sex or occupational factors (9). Women are affected than men about 4 times on average (10).

Sitting for longer duration would cause increase stress in the ligaments and muscles around the sacrum, there is an increase amount of pressure inside the discal regions in the lower lumbar region, this pronounced low back pain. Students who tend to sit for a longer duration in the classes would also face similar problems. There is a poor adaptation of spine on the poorly designed chairs in the schools and

colleges (11). Health care students such as physiotherapist, nurses, physician assistants, lab technicians, dialysis technicians, etc. has to do hospital postings, does repetitive work, lifting heavy patients or objects which may lead to various musculoskeletal injuries (11, 12). In addition to that, students have to sit and attend classes for longer duration in college; sitting awkwardly for continuous period of time may result in WRMSD (13).

Many studies have identified that SI joint dysfunctions are the major reasons for the lower back pain, but often it is misdiagnosed and the management also not appropriately given (14). There is lack of literature support on SI joint involvement on low back pain and there are no good studies available in this area. Therefore, this study aimed to identify the prevalence of contributing risk factors among students with work-related musculoskeletal problems and to identify the percentage of SI joint involvement in students.

METHODOLOGY

A cross sectional study was conducted in a health care institute in Coimbatore. Institutional ethical approval was obtained prior to the beginning of the study. 800 students volunteered to participate in the study from a pool of 1800 students, around 590 students were enrolled in the study after the consideration of selection criteria: students with the age group of 17–27 years, full time college students, students without recent falls or those not on current medications related to any musculoskeletal problems, students without any congenital problems. Once they enrolled in the study, a brief introduction about the study was given to all the participants and asked the individuals to answer consciously.

Nordic musculoskeletal questionnaire was attached along with a self-developed questionnaire which consisted of demographic data. Nordic questionnaire possesses high validity, and it is the commonly used questionnaire in identifying the musculoskeletal injuries.

Every day Twenty (20) volunteers were called for an appointment and a questionnaire was given to them. A clear instruction was given to all the participants prior to the distribution of the questionnaire. All the questions were in English. Once the questionnaires were completed, all the participants were involved in the SI joint tests to identify the SI Joint dysfunction.

Provocation tests include

- i) SI distraction test,
- ii) SI Compression test
- iii) Thigh thrust test
- iv) Faber's test and
- v) Gaenslen's Test.

Students Pain present in more than 3 test indicates SI joint involvement. The test was done by an expert

physiotherapist 15 years of experience in musculoskeletal physiotherapy. Consent was obtained from all the participants both orally and in written format. Once assessment was completed, a thank you card was given to all the volunteers. All the collected data were filled and taken for the analysis.

RESULTS

Demographical representation of the students is tabulated in table I. The mean age group of participants was 21.80 in which male students were with age group of 21.37 years and female students with age of 22.11 years. The Gender difference showed that there were 347 female students and 243 male students in the cluster of 590 students.

Table 1: Demographic details of the participants

Serial No.	Characteristics	Percentage
1.	Age	
	17-19 years	186 (31%)
	20-22 years	159 (27%)
	23-25 years	140 (24%)
	26-27years	105 (18%)
2.	Gender	
	Male	243 (41%)
	Female	347 (59%)
3.	Food Habits	
	Vegetarian	142 (24%)
	Eggetarian	122 (21%)
	Non -Vegetarian	326 (55%)
4.	Other habits	
	Smoking	
	Yes	185 (31%)
	No	405 (69%)
	Alcoholism	
	Yes	155 (26%)
	No	435 (74%)
	Tobacco/ Cool lip	
	Yes	130 (22%)
	No	460 (78%)
5.	Physical activity	
	Less than 30 mins	342 (58%)
	30-60 mins	144 (24%)
	More than 60 mins	104 (18%)

Table 2 represents the musculoskeletal dysfunctions in cluster of students, there were about 230 students with no recent pain which is about 39% and the students with musculoskeletal problems were 360 which is about 61%. Most of the students complained of neck pain followed by low back pain.

This is due to prolong use of mobile phones, computers, improper positioning, prolong sitting in the class hours, long standing doing the clinical postings and repetitive tasks.

Table 2: Musculoskeletal problems in students

S. N	Regions	No. of participants	Percentage
1.	No MSK Problems	230	39%
2.	Neck	122	21%
3.	Lower back	93	16%
4.	Shoulder	43	7%
5.	Knee	33	5%
6.	Wrist & Hand	22	4%
7.	Ankle	16	3%
8.	Knee	11	2%
9.	Elbow	9	1%
10.	Others	11	2%

Table 3 shows the management choices of the students, when they had symptoms of musculoskeletal issues. Most of the students visited general physicians; second choice was taking self-medications or drugs recommended by peers, and the rest being Physiotherapy, Ayurveda and Yoga.

Table 3: Management choices by the participants

S. N	Management options	No. of participants	Percentage
1.	Medical	135	23%
2.	Pharmacology	108	18%
3.	Physiotherapy	83	14%
4.	Ayurveda	64	11%
5.	Yoga	29	5%
6.	Rest	91	15%
7.	Self-Management	46	8%
8.	Others	34	6%

30% of the individuals were positive to the SI joint tests, among them 93 participants had complains of low back pain (table 4). This shows that SI dysfunction is one of the common causes of low back pain.

Table 4: SI joint symptoms in students with low back pain

S. N	Musculoskeletal problems	No of participants	Percentage
1.	Low back pain	93	16%
2.	SI Joint dysfunctions	27	30%

DISCUSSION

Work related musculoskeletal disorders, which are induced or aggravated by work circumstances (15). Students are indeed more prone to get WRMSD, due to the adaptation of the poor seating position in the classroom, long standing posture while in hospital duty and traveling in awkward posture. Sitting for extended duration in a poorly designed chair results in lower back pain. Most of the tables in the colleges, universities and schools are made of either wood or steel which does not hold good back support, or it is not designed for individual needs. Every student should adjust them self to sit on it. Poorly designed

chairs cause increased pressure in the intervertebral discs which would result in neck or back complaints (16).

Adaptation of prolonged static positions causes severe pain in addition repetitive awkward movements that results in aggravation of these symptoms (17). Initially the pain would be milder and vague; sometimes it rapidly aggravates and becomes noticeable. Neck pain ranked first in the study which was similar to the previous studies conducted by researchers. Few points identified for the neck pain are prolonged use of mobile phones, sitting or sleeping in awkward postures, repetitive work and studying in poor setup cause neck pain (18,19).

Low back disorders are one of the commonest musculoskeletal disorders which are become distressing, it becomes worsen when handled poorly or managed inappropriately. Working as health care professional student requires repetitive bending, frequent lifting and twisting activities in addition to the longstanding postures would result in low back pain (20). Most of the students adapted forward head posture or slouch postures which might cause the muscles, tendons, ligaments and discs to compress and cause pain and discomfort around the lower back region (21).

Dysfunctions in the SI joint would precipitate the pain in the lower back. SI joint dysfunctions may occur because of poor biomechanics or fall or trauma (22). Provocative test would help to identify the SI joint dysfunctions (23). This study identified that about 30% of the low back pain individuals had shown SI joint problems. Obtaining a static and long-term sitting posture regardless of time for rest which can lead to increased muscle tension in the back muscles, and it predispose to muscle fatigue and pain. Poor body mechanics, ill fit chairs, long class hours which lead to increased incidence of WRMSD (13).

Recently sitting is now identified as the major cause of lower back pain, while sitting the body positions affect the magnitude of the loads in the lumbar spine and there is heavy passing through it (24). Researchers identified that there is an increase in the pressure on the intradiscal area while sitting than standing. Studies also identified that there is a strong relationship between sitting duration and pain (25).

In this study, out of 93 low back pain students assessed, 27 students were affected by SI joint dysfunction giving an incidence of 30%. These results confirm that lower back was more affected in students, and the prevalence of SI joint dysfunction was 30% in students with low back pain. Study has few limitations in which the study survey was done in a single setting, whereas the multiple setting participants would have richer ideas about the WRMSD, Ergonomic factors or the education was

not considered. This study focused on all the musculoskeletal disorders rather than focusing only on the SI joint. Further study needs a larger sample and a wide range of participants which would give a better result in the SI joint dysfunctions.

CONCLUSION

This study identified that there is a strong relationship between low back pain and the sacroiliac dysfunctions. It was identified that 30% of participants with low back pain was found to have SI joint dysfunctions. Thus, this study concluded that SI joint dysfunction is one of the prevalent conditions in the student's community.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

REFERENCES

1. Choobineh, A., Rajaeefard A., Neghab M. Association between perceived demands and musculoskeletal disorders among hospital nurses of Shiraz University of Medical Sciences: A questionnaire survey. *Int J Occup Saf Ergon*. 2006; 12(4): 409-416.
2. Punnett, L., Wegman, D. H. Work-related musculoskeletal disorders: the epidemiologic evidence and the debate. *J Electromyogr Kinesiol*. 2004; 14 :13-23.
3. McCaughey, D., Kimmel, A., Savage, G., Lukas, T., Walsh, E., Halbesleben, J. Antecedents to workplace injury in the health care industry: A synthesis of the literature. *Health Care Manage Rev*. 2016; 41(1): 42-55.
4. Sahni, R. K., Kaur, A., Grewal. S. Prevalence of musculoskeletal disorder among male palestrato. *J Nov Physiother Phys Rehabil*. 2019; 6(2): 015-019.
5. Buckle, P. W., Devereux, J. The nature of work-related neck and upper limb musculoskeletal disorder. 2002; (33): 207-217.
6. Smith, D. R., Wei, N., Ishitake, T., Wang, R. S. Musculoskeletal disorders among Chinese medical students. *Kurume Med J*. 2005; 52: 139-146.
7. Batham, C., Yasobant, S. A risk assessment study on work-related musculoskeletal disorders among dentists in Bhopal, India. *Indian J Dent Res*. 2016; 27: 236-241.
8. Rashbaum, R. F., Ohnmeiss, D. D., Lindley, E. M., Kitchel, S. H., Patel, V. V. Sacroiliac joint pain and its treatment. *Clin Spine Surg.* 2016; 29(2): 42-48.
9. Siahaan, M. T. Y., Hartoyo, V. Sacroiliac joint pain: a study of predisposing factors in an Indonesian hospital. *The Open Pain Journal*. 2019; 12: 1-5.
10. Cohen, S. P., Chen, Y., Neufeld, N. J. Sacroiliac joint pain: a comprehensive review of epidemiology, diagnosis and treatment. *Expert Rev Neurother*. 2013; 13(1): 99-116.
11. Caroline, M., Vinod, S., Arun, B. Prevalence of various musculoskeletal disorders in childcare workers in day care settings. *Int J Physiother Res*. 2014; 2(4): 599-603.
12. Elsayed, A. A., Work-related musculoskeletal disorders among nursing students during clinical training. *American Journal of Nursing Research*. 2019; 7(6): 952-957.
13. Ansari, S., Rezapoor, M., Hematgar, M. A., Ghazi, A. S., Varmazyar, S. Musculoskeletal disorders and its related risk factors among students of Qazvin University of Medical Sciences. *J Hum Environ Health Promot*. 2017; 2(3): 161-167.
14. Sembrano, J. N., Polly, D. W. Jr. How often is low back pain not coming from the back? *Spine (Phila Pa 1976)*. 2009; 34(1): E27-E32.
15. Pradeep, J. R. Back pain amongst dentistry students at the University of Western Cape. *University of the Western Cape*. 2008: 1-3.
16. Azim, F., Khalid, S., Yamen, F., Shamsi, I. I., Khanzada, S., Kumar, R., *et al.*, The prevalence of musculoskeletal disorders among madrassa teachers and students- a cross sectional study. *International Journal of Physiotherapy*, 2015; 3(1): 100-105.
17. Korkmaz, N. C., Cavlak, U, Telci, E. A., Universities, P., Tedavi, F., Yuksekokulu, R., *et al.*, Musculoskeletal pain, associated risk factors and coping strategies in schoolteachers. *Scientific research & essay*. 2011; (6): 649-657.
18. Algarni, A. D., Al-Saran, Y., Al-Moawi, A., Bin Dous, A., Al-Ahaideb, A., Kachanathu, S. J. The prevalence of and factors associated with neck, shoulder, and low-back pains among medical students at University Hospitals in Central Saudi Arabia. *Pain Research and Treatment*. 2017. 1235706.
19. Kanchanomai, S., Janwantanakul, P., Pensri, P., Jiamjarasrangsri, W. Risk factors for the onset and persistence of neck pain in undergraduate students: 1-year prospective cohort study. *BMC Public Health*. 2011; 11: 566.
20. Maria, T., Andrianna, K., Evdokia, B., Elias, T. Work related musculoskeletal disorders among female and male nursing personnel in Greece. *WJRR*. 2017; 3(1): 08-15.
21. Dianat, I., Karimi, M. A., Hashemi, A. A., Bahrampour, S. Classroom furniture and anthropometric characteristics of Iranian high school students: proposed dimensions based on anthropometric data. *J Appl Ergon*. 2013; 44(1): 101-108.
22. Barros, G., McGrath, L., Gelfenbeyn, M. Sacroiliac joint dysfunction in patients with low back pain. *Fed Pract*. 2019; 36(8): 370-375.
23. Laslett, M., Aprill, C. N., McDonald, B., Young, S. B. Diagnosis of sacroiliac joint pain: validity of individual provocation tests and composites of tests. *Man Ther*. 2005; 10(3): 207-218.
24. Lis, A. M., Black, K. M., Korn, H., Nordin, M. Association between sitting and occupational LBP. *Eur Spine J*. 2007; 16(2): 283-298.
25. Van Deursen, L. L., Patijn, J., Brouwer, R., van Erven-Sommers, J. R., Vortman, B. J. Sitting and low back pain: the positive effect of rotatory dynamic stimuli during prolonged sitting. *Eur Spine J*. 1999;8: 187-193.