ORIGINAL ARTICLE

Common Musculoskeletal Disorders in an Underserviced Area of Aseer Region, Saudi Arabia

[1]**Khalid A Alahmari**, PhD, PT; [2]**Irshad Ahmad**, PhD, PT; [3]**Ravi Shankar Reddy**, PhD, PT; [4]**S. Paul Silvian**, PhD, PT; [5]**Mohammad Mahtab Alam**, PhD; [6]**Venkata Nagaraj Kakaraparthi**, MPT, PT

ABSTRACT

Objective: To identify the common musculoskeletal disorders (MSD) present in the sample population of Aseer Region, Saudi Arabia. **Methods:** The data for this cross sectional study was collected from 112 respondents who visited the community service medical camp organized by King Khalid University. **Results:** Knee pain was found to be the most common musculoskeletal disorder present in the region. Low back pain, shoulder pain and neck pain are among the other reported pain. The study also analyzes the relation between demographical profiles of respondents and its relation to MSD. **Conclusions:** A correlation analysis proves that body mass index (BMI) and duration of pain is negatively correlated to musculoskeletal pain.

Keywords: Musculoskeletal disorders: knee pain: body mass index (BMI): duration of pain

INTRODUCTION

Musculoskeletal disorders (MSD) is a very common term in today's world.[1] Be that in health care sector, ergonomics, industry and management, services sector it is a term very commonly used by researchers, professionals and managers. The common usage does not make it an obsolete term, rather it has many implications. The importance of studying MSD would exist as long as human beings prevail, because, musculoskeletal disorders are any common problems associated with excessive work load, uniform work performance, time pressures, insufficient control of the job related movement and even social support.[1]

[1]Assistant Professor, Dept .of Medical Rehabilitation Sciences, College of Applied Medical Sciences, King Khalid University, Abha, Kingdom of Saudi Arabia
[2]Lecturer, Department of Medical Rehabilitation Sciences, College of Applied Medical Sciences, King Khalid University, Abha, K.S.A.
[3]Assistant Professor, Dept. of Medical Rehabilitation Sciences, College of Applied Medical Sciences, King Khalid University, Abha, K.S.A.
[4]Assistant Professor, Dept. of Medical Rehabilitation Sciences, College of Applied Medical Sciences, King Khalid University, Abha, K.S.A.
[5]Assistant Professor, Dept. of Medical Rehabilitation Sciences, College of Applied Medical Sciences, King Khalid University, Abha, K.S.A.
[6]Lecturer, Department of Medical Rehabilitation Sciences, College of Applied Medical Sciences, *King Khalid University, Abha,* K.S.A.

Correspondence should be addressed to:
Dr. Khalid A. Alahmari
Department of Medical Rehabilitation Sciences,
College of Applied Medical Sciences
King Khalid University, Abha, KSA
Email:alahmarirt@gmail.com,
Phone: 0546555402 / +966 - 0172418592;
Fax: 966 172417744

Musculoskeletal disorders can cause pain with impaired disability and may range from acute to chronic in nature and are antecedents of occupational hazards, general health of the patient, awkward postures. Research has also found evidences for personal factors such as age, height, weight and gender to be major predictors of MSD.[2] World health organization (WHO) recognized that the occurrence of these conditions increases with age, lack of physical activity and obesity.[3]

A study by Ontario Health Survey concluded that musculoskeletal disorders has major repercussions, for example, 40% of all chronic conditions in elderly population are found to be a result of MSD. 54% of the adult population may have long term disability, and 24% have restricted activity due to continuous cumulative trauma and MSD.[4]

Studies conducted in Canada, USA, and Western Europe have found that musculoskeletal disorders cause physical disabilities in approximately 4–5% of the adult population.[5] Studies also report that commonly reported MSD problems are back pain, neck pain, ankle/foot pain, knee pain, hip pain, shoulder pain, hand/wrist pain and also elbow pain.[6]

The Global Burden of Disease Study 2010 (GBD 2010) which is a collaborative project of nearly 500 researchers in 50 countries led by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington has found that in Saudi Arabia, the major causes for disability are musculoskeletal disorders, along with life style diseases, anemia, depression and anxiety disorders.[7] This study also provides understanding that Saudi Arabian population has low back pain and neck pain as a result of MSD's. The risk factors associated with MSD's in Saudi Arabia according to studies are high body mass index, excessive weight, improper diet, high fasting plasma glucose and lack of physical inactivity.[6]

Studies in the Middle East has reported that low back pain as well as non-specific pain in the bones and other joints in the population are mainly because of vitamin D deficiency and less exposure to the sun light.[8] Most studies on MSDs in Saudi Arabia are limited to office, health care professionals, service sector, or manufacturing industries, but have lesser number of studies pertaining to local population.[9] This study tries to unravel the common MSDs among common population, covering a wide range of years from 10 years to 80 years of age and weight spectrum of 40 kg to 100 kg.

This study is conducted in Aseer region, Saudi Arabia, where there is a dearth of studies and MSD's in the area has not been reported till date. This region is a rural region when compared to other parts of the Kingdom. The objective of this study is to identify the common musculoskeletal disorders present among normal people in this region.

Rationale for the study

A thorough literature scan about MSD's elucidate that almost all of these studies are related to occupational health and work related musculo-skeletal disorders.[9,10,11,13,15] There are very less number of studies pertaining to normal population[12,14] and thus this study would act as a major contribution to literature. This is a community based study, therefore this study would provide better insights about MSD present in the population in Aseer region. The dearth of literature in the area also makes this study important and pertinent.

Research Questions:

1. The research tries to find out "what are the common MSD's prevailing among people of Aseer region.
2. Is there a significant relation between MSD with regard to demographic factors like age, BMI, as well as duration of pain?

Hypothesis proposed:

There is no significant relation between age, BMI, duration of pain and musculoskeletal disorders

METHODOLOGY

The study design which is used is a single cross sectional study, the data collected as part of a community consientization program, a noble cause undertaken every year by King Khalid University. The study was approved by the research committee of College of Applied Medical Sciences, King Khalid University, Abha, Kingdom of Saudi Arabia.

The sampling technique used is non probability sampling, specifically purposive sampling, due to the fact that the data could be collected during the medical camp organized, where local people would come for free medical care from Physiotherapists. Given the time and logistical constraints purposive sampling provides opportunity to select sample according to specific characteristics. 450 subjects visited the camp. From these only 112 patients who met the criteria of MSD pain were selected for the study. The duration of the study was for a week.

Inclusion criteria for the study was that if the subjects had experienced any musculoskeletal discomfort in any of the body parts which prevented them from performing normal activity during the past 12 months. Pain, if persistent for over 7 days were considered for the study. Patients who had undergone major surgeries, recent fractures/ dislocations, acute sprains/strains and congenital abnormalities and deformities were excluded from the study.

The patients were also asked to tick on the major pain areas with the help of a body chart for example: neck, shoulder, upper back, elbow, low back, wrist/hands, hip/thighs, knees, and ankles/feet.

After explaining the need and purpose of the study, a duly signed consent form was obtained from each participant. Patients were then given clear-cut instruction for responding to the questions asked; there was no further assistance or prompting provided.

RESULTS

After a test of normality using Shapiro Wilk test in SPSS 22, it was found that the data obtained is not normally distributed. This might be the case for data when purposive sampling is used; therefore non parametric analyses are used to test the hypothesis. Age BMI and weight of the respondents are provided in frequency distribution. Table 1 and 2 shows that the Shapiro Wilk test is significant and therefore the data (both independent and dependent variables) is not normally distributed.

Table 3 provides a consolidated frequency distribution and percentage analysis of all demographic profiles of the respondents. For the purpose of simplification, age, weight and BMI are categorized into nominal data in this table. It is evident that 42.9% of respondents fall in the middle adulthood, ranging from 30-60 years of age. For this classification we have used Ericson's classification of adulthood[16] as reference. About 18.8% of the respondents fall in late adulthood (60 years and above). There are 11.6% of respondents in the adolescent stage (15-20 years of age). BMI classification is adapted from WHO classification. Though the there is a growing debate on whether there are possible needs for developing different BMI cut-off points for different ethnic groups due to the increasing evidence that the associations between BMI, percentage of body fat, and body fat distribution differ across populations[17], this study uses the same criteria for BMI calculation (Weight/ Height in meter^2)

Table 1: Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Age	.100	112	.008	.964	112	.004
a. Lilliefors Significance Correction						

Table 2: Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Area/ Joint of Pain	.317	112	.0001	.764	112	.001
a. Lilliefors Significance Correction						

It is seen from Table 3, that 72 out of the 112 respondents (64.3%) are in the normal body mass index criteria. There are only 34 respondents in the overweight, obese category.

This might be the peculiarity of rural area. Body weight of the respondents is also taken, since most of the respondents fall in the normal body mass criteria; this is used in further analysis to compensate for any reduced variance in BMI. Also, there is mixed results about the effect of BMI in MSD, some showing high correlations and other studies prove that there is no relation between the two. Weight in kilogram shows a pretty good distribution, nearly 40.2% in the 60-70 kg category. 20.5% of respondents are in the 50-60 kg range. 21.4% are in the 70-80 categories.

Table 3: Consolidated Table of Frequencies of Age, BMI and Weight of Respondents

Age		BMI		Weight	
Adulthood	*Frequency (%)*	*Classifica-tions*	*Freq. (%)*	*In Kg*	*Freq. (%)*
Pre Adult	13 (11.6%)	Underweight	6 (5.4%)	40-50 Kg	6 (5.4%)
Young Adult	17 (15.2%)	Normal Weight	72 (64.3%)	50-60 Kg	23 (20.5%)
Adult	13 (11.6%)	Over weight	26 (23.2%)	60-70 Kg	45 (40.2%)
Middle Adult	48 (42.9%)	Class I obesity	7 (6.3%)	70-80 Kg	24 (21.4%)
Late Adult	21 (18.8%)	Class II Obesity	1 (0.9%)	80-90 Kg	7 (6.3%)
				90- 00 Kg	7 (6.3%)
Total	112		112		112

Table 4 provides an in-depth understanding to the types of musculoskeletal disorders prevailing in the respondent population. Almost 53.6% of the respondents reported that they have knee pain. Followed by Low back pain and shoulder pain, each with 11.6% of respondents. 10.7% of the respondents complained of neck pain. And 8% came to the medical camp with ankle pain and 4.5% of patients came for treatment for finger pain. Knee pain is the most common MSD present among people in Aseer region.

In order to test the hypothesis "There is no significant relation between age, BMI, body weight, duration of pain and musculoskeletal disorders" a Spearman's correlation analysis is used. This bivariate correlation can be used when the assumptions of linear correlation is violated, as well as when the data is not normally distributed. Spearman's correlation coefficients and p values are provided in table 5. And it is seen from the table that body pain areas as highly correlated with BMI and duration of pain. Table 6 provides a descriptive understanding of the BMI, pain duration and associated pain areas. It is evident from the table that respondents with normal body BMI complain more about knee pain (36 out of 112) and also has complaints about back pain as well as shoulder pain as well. Likewise respondents who fall in overweight and Class I obese category also have complaints about knee pain. Underweight category respondents have reported ankle pain and knee pain. Table 7 provides a comparison of duration of pain with MSD, and it is seen that nearly 30 respondents have knee pain for less than a year, and 15 of the respondents has had it for more than 1 year. Low back pain is also found to be persistent for over two years as reported by the respondents. Most of the shoulder pain is persistent for the past two years.

Table 4: Frequency Distribution of the Most Common MSD in the Study Population

Type of Pain	Frequency (%)
Knee Pain	60 (53.6%)
Neck Pain	12 (10.7%)
Shoulder Pain	13 (11.6%)
Low Back Pain	13 (11.6%)
Ankle Pain	9 (8.0%)
Finger	5 (4.5%)
Total	**112**

Table 5: Hypothesis Testing Using Correlation

			Age	BMI	Body Wt.	Dura-tion of Symp-toms
Spearman's rho	Area/ Joint of Pain	Correlation Coefficient	-.054	-.187*	-.147	-.258**
		Sig. (2-tailed)	.575	.049	.122	.006
		N	112	112	112	112

Table 6: Comparison of MSD Pain with BMI

		Area of MSD Pain						Total
		Knee Pain	Neck Pain	Shoulder Pain	Low Back Pain	Ankle Pain	Finger Pain	
BMI	Underweight	2	1	0	0	3	0	6
	Normal Weight	36	9	9	10	4	4	72
	Over weight	14	2	4	3	2	1	26
	Class I obesity	7	0	0	0	0	0	7
	Class II Obesity	1	0	0	0	0	0	1
Total		60	12	13	13	9	5	112

Table – 7: Comparison of MSD with Pain Duration

		Area of MSD Pain						Total
		Knee Pain	Neck Pain	Shoulder Pain	Low Back Pain	Ankle Pain	Finger Pain	
Duration in Years	0 - 1 Years	30	7	7	6	9	4	63
	1 - 2 Years	15	4	6	3	0	0	28
	2 - 3 Years	8	1	0	4	0	1	14
	3 - 4 Years	7	0	0	0	0	0	7
Total		60	12	13	13	9	5	112

DISCUSSION

Various epidemiological studies have demonstrated that specific risk factors that may cause musculoskeletal complaints and most of these studies concentrate on occupational health, societal pressure and work related risk factors. This study shows that BMI and duration of pain has significant relation to MSD. The self reported common MSD in Aseer region is Knee pain. There are patients complaining of low back pain, shoulder pain as well as neck pain in this region.

Knee osteoarthritis can be considered the eighth most important global cause of disability in men and the fourth most important in women and is a very important MSD prevailing today[18, 19]. Studies have proven that there is Low bone mineral density (BMD), which is a public health issue in Saudi Arabia.[20] In terms of individual factors, age, a high BMI were associated with persistence of knee pain.[21] Reviews have highlighted a relationship between the knee pain and occupational factors, generally physical workload and more particularly kneeling and lifting weights.[22] Low back pain, shoulder pain and neck pain are also reported by the patients.

In the correlation analysis, BMI and duration of pain is shown to have low, but negative correlation with MSD pain. The study proves that when BMI increases MSD reduces. This is quite contrary to the popular results of MSD and risk factors. One study has proved that association between BMI and both overall musculoskeletal symptoms and lower extremity symptoms differed between employees with low and high physical workload. According to previous findings, obesity exerts protection against osteoporosis.[23] There is a research finding that workers with high BMI are not at higher risk for developing back symptoms than workers with a normal BMI is in line with a prospective cohort study among health care workers.[24] Researchers argue that for MSD, physical workload as a risk factor itself is more important than BMI. Based on these results, it is possible that for employees with high BMI and high physical workload, muscle mass around the knee joint is protective for the development of MSD, thus showing a negative correlation between the MSD pain and BMI.[25]

Likewise, duration of pain is found to have a negative correlation with MSD pain. The reason would be that with high muscle load and long durations of pain, fatigue will force the patients to take a rest. With lower loads the level of fatigue is not so evident and the patient can spend too long a time the same posture. Especially for employees, in cabins of modern offices, they can easily spend too long a period in the same posture, without any clear indications of fatigue.[26]

It is seen that most normal BMI respondents have reported knee pain, which might be pointers towards their exercise levels. Saudi men are very keen on playing football. They have to walk and climb mountains in Aseer region. These might be indications of why knee pain prevails among them.

Conclusion, Limitations and Suggestions for future research

This study is one of a kind, since it has provided much understanding to the significant demographic profiles of respondents that can be correlated with MSD. It also

provides a better understanding about the most common MSD prevailing among respondents of Aseer region. The study also provides better understanding about the relation between BMI and duration of pain and musculoskeletal disorder.

There are some limitations of the study that the sample size is low, occupational characteristics were not taken in to consideration. The subjects were only males.

Future study should aim to find the prevalence of common musculoskeletal symptoms in Aseer region so that the common causes and the prevention strategies can be implemented to do so.

REFERENCES

1. Bongers PM, de Winter CR, Kompier MA, Hildebrandt VH. Psychosocial factors at work and musculoskeletal disease. Scandinavian journal of work, environment & health 1993; 297-312.
2. Armstrong TJ, Buckle P, Fine LJ, et al. A conceptual model for work-related neck and upper-limb musculoskeletal disorders. Scandinavian Journal of work, environment & health 1993; 73-84.
3. Woolf AD, Pfleger B. Burden of major musculoskeletal conditions. Bulletin of the World Health Organization. 2003; 81(9): 646-656.
4. Badley EM, Rasooly I, Webster GK. Relative importance of musculoskeletal disorders as a cause of chronic health problems, disability, and health care utilization: findings from the 1990 Ontario Health Survey. The Journal of rheumatology. 1994; 21(3):505-514.
5. Reynolds D, Chambers L, Badley E, et al. Physical disability among Canadians reporting musculoskeletal diseases. The Journal of rheumatology. 1992; 19(7):1020-1030.
6. Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. The Lancet. 2013; 380(9859):2095-2128.
7. GDB Report (2010) http://www.healthdata.org/sites/default/files/files/country_profiles/GBD/ihme_gbd_country_ report_saudi_arabia.pdf
8. Lotfi A, Abdel-Nasser AM, Hamdy A, Omran AA, El-Rehany MA. Hypovitaminosis D in female patients with chronic low back pain. Clinical rheumatology. 2007; 26(11): 1895-1901.
9. Ahmad Alghadir and Shahnawaz Anwer. Prevalence of Musculoskeletal Pain in Construction Workers in Saudi Arabia. The Scientific World Journal, 2015; http://dx.doi.org/10.1155/2015/529873.
10. Einas Al-Eisa, Syamala Buragadda, Afaf A.M. Shaheen, Amal Ibrahim and Ganeswara Rao Melam, Work Related Musculoskeletal Disorders: Causes, Prevalence and Response Among Egyptian and Saudi Physical Therapists, Middle-East Journal of Scientific Research, 2012; 12 (4): 523-529.
11. Isabelle C.N. Devreux 1 , Bahjat Al-Awa 2 , Khaled Mamdouh 1, Enas Elsayed. Relation of Work-related Musculoskeletal Disorders and Over-commitment of Rehabilitation Staff in Saudi Arabia, Life Science Journal 2012; 9(3), 781-785.
12. AlJohara M AlQuaiz**,** Ambreen Kazi**,** Salwa Tayel**,** Shaffi Ahamed Shaikh**,** Abdullah Al-Sharif**,** Saleh Othman**,** Fawzia Habib**,** Mona Fouda and Riad Sulaimani**.** Prevalence and factors associated with low bone mineral density in Saudi women: a community based survey, BMC Musculoskeletal Disorders 2014; 15**:** 5.
13. Alghadir A, Zafar H, Iqbal ZA.: Work-related musculoskeletal disorders among dental professionals in Saudi Arabia. J Phys Ther Sci, 2015; 27: 1107–1112
14. Alshami A. M. Physical and psychological aspects of low back pain among Saudi patients: A case control study. Saudi J Med Med Sci, 2014; 2: 24-29
15. Salameh Al Dajah and Abdalhamed Al Daghdi. Prevalence And Risk Factors Of Low Back Pain Among Nurses In Sudayr Region. European Scientific Journal November 2013 edition vol.9, No.33, 198- 205.
16. Erikson, Erik H.. Childhood and Society. New York, NY: W. W. Norton & Company. 1993; p. 242
17. WHO. Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee. WHO Technical Report Series 854. Geneva: World Health Organization, 1995.
18. Podsiadlo D, Richardson S. The timed "Up & Go": a test of basic functional mobility for frail elderly persons. J Am Geriatr Soc. 1991; 39(2):142-148
19. Ahmad Alghadir, Shahnawaz Anwer* and Jean-Michel Brismée. The reliability and minimal detectable change of Timed Up and Go test in individuals with grade 1 – 3 knee osteoarthritis, BMC Musculoskeletal Disorders 2015; 16: 174.
20. AlJohara M AlQuaiz, Ambreen Kazi, Salwa Tayel, Shaffi Ahamed Shaikh, Abdullah Al-Sharif, Saleh Othman, Fawzia Habib, Mona Fouda and Riad Sulaimani. Prevalence and factors associated with low bone mineral density in Saudi women: a community based survey. BMC Musculoskeletal Disorders 2014; 15:5
21. Eriksen J, Ekholm O, Sjøgren P, Rasmussen NK: Development of and recovery from long-term pain.

A 6-year follow-up study of a cross-section of the adult Danish population**.** Pain 2004; 108**:**154-162
22. Fransen M, Agaliotis M, Bridgett L, Mackey MG: Hip and knee pain: role of occupational factors. Best Pract Res Clin Rheumatol 2011; 25**:**81-101
23. Ribot C, Tremollieres F, Pouilles JM, et al., Obesity and postmenopausal bone loss: the influence of obesity on vertebral density and bone turnover in postmenopausal women, Bone 1988; 8: 327–331.
24. Jensen JN, Holtermann A, Clausen T, Mortensen OS, Carneiro IG, Andersen LL: The greatest risk for low-back pain among newly educated female health care workers; body weight or physical work load? BMC Musculoskelet Disord 2012; 13**:**87
25. OSHA Europe.Available at osha.europa.eu/en/publications/e-facts/efact01, 2001.
26. Laura Viester; Evert ALM Verhagen; Karen M Oude Hengel; Lando LJ Koppes; Allard J van der Beek; Paulien M Bongers. The Relation Between Body Mass Index and Musculoskeletal Symptoms in the Working Population, BMC Musculoskelet Disord. 2013; 14: 238.