

PREVALENCE AND RISK FACTORS OF WORK-RELATED MUSCULO SKELETAL DISORDERS AMONG TEXTILE DYERS IN KANO METROPOLIS.

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ABSTRACT

Dyeing has a long history in the ancient Kano dated back to 1498, It is an occupation that involves adoption of series of posture and movements which might have impact on body structure, function and general wellbeing. Textile dyeing and processing in the World is a delicate occupation and it involves more than 30% of the active population. The common cause of pain in most occupations is musculoskeletal disorders therefore this study investigated the pattern of musculoskeletal disorders among the textile dyers. The main aim of the study was to investigate the prevalence, pattern and risk factors of work related musculoskeletal disorders by age and working experience among textile dyers in Kano. The research was a cross sectional survey, a letter of Introduction was obtained from the department of physiotherapy, Bayero University Kano, Nigeria and then it was presented to the chairman of the Kano State Dyers Association. Approval letter was obtained from the chairman of the association and the aim of the study was explained to the textile dyers whose participation was voluntary. The questionnaire was self-administered and retrieved later. A sample size of 250 participants was calculated out of which 230 participated, all the 230 participants were males (100%), with a response rate of (92%). The age group with the highest number of complaints of WRMDs were between 31-40 years, with most of them reporting shoulder pain(77%), low back pain (74.8%) and upper back pain (64.8%). Elbow pain accounted for (58.3%), wrist pain (54.8%), neck pain (37.45%), hip and ankle (29.6%), and (27%) respectively. Thumb (26.1%) and knee (20.9%) are the least common sites in the last 12 months. It was found that the common risk factors were having a prolong position (62.6%), over time work(54.8%), awkward posture(40.9%) and repetitive motion(33%). This implies that excessive work for a prolong period of time could lead to development of marked injuries that could be disabling. It can be concluded

that the pattern of work-related musculoskeletal pain occurs moderately among textile dyers within Kano Municipal, shoulder pain being the most prevalent. Awareness campaign on the need for textile dyers to avoid prolong posture when at work should be organised. This should ensure that they take some rest after every hour of work so as to prevent musculoskeletal pain and stress/fatigue.

Keywords: Work Related Musculoskeletal Disorders, Prevalence, Risk, Textile Dyers

INTRODUCTION

Musculoskeletal disorders (MSDs) are injuries or pain in the body joints, ligaments, muscles, nerves, tendons, and structures that support limbs, neck and back (Jensen, 2013). Common work related musculoskeletal disorders (WRMSDs) include forearm tendonitis, tennis elbow, low back pain, ligament sprain, e.t.c. (workers compensation health initiatives, 2004). MSDs are degenerative diseases and inflammatory conditions that causes pain and impair normal activities (Cote *et al.*, 2013). They can affect many different parts of the body including upper and lower back, neck, shoulders and extremities (arms, legs, feet, and hands). (Kuorinka, *et al.*, 1987).

Musculoskeletal disorders can arise from the interaction of physical factors with economic, psychological and social factors. (Gatche *et al.*, 2011). Activities involving heavy loads can result in acute injury, but most occupation related musculoskeletal disorders are from motions that are repetitive, or from maintaining a static position (Barbe *et al.*, 2013). Musculoskeletal disorder are the most frequent health complaint by European, United states and Asian pacific workers. (Hauke *et al.* 2011) and the third leading reason for disability and early retirement in the US (Spriggle *et al.*, 2007). Musculoskeletal disorders are widespread in many occupations, including those with heavy biomechanical load like industry

works and those with lighter loads like office work (Spriggl,*et al.*, 2007).

The working environment may be Hazardous and stressful (Bork 1996; Adigun, *et al* 1999). Work schedule and the design of the working environment can lead to errors and accidents (Nwuga,1990 and Olaogun, 1992). Several occupational injuries exist such as musculoskeletal injuries/disorders, spinal disorders, gas burns, scalds and respiratory complications (Olaogun, 1992). MSDS are among the major occupational hazards facing the working population today, especially among the working class. Fathallah *et.al.*, 2010 reported that adults 80% of the working population, would experience back pain sometimes during their active life because of their nature of work, which requires heavy physical work, awkward posture or prolong periods in one posture (Burdorf, *et al.*, 1997). There has been a number of studies on occupational

injuries among health care providers in various settings (Schwartz,*et al.*, 1993) and among elite female gymnasts (Hayes,*et al.*, 2009).

The result indicate high prevalence of work related injuries. Studies have also shown that MSDs especially low back pain are currently the most common and widespread disorder affecting both the working (Olaogun 1992&Schwartz,*et al.*, 1993) and non- working population(Holder,*et al.*,1997). MSDs cause absenteeism at work and loss of Productivity (Adigun,*etal.*,1999). Evidence has shown that carrying out a task without regard for ergonomics imposes stress of various kinds, which has a detrimental effect on the human anatomy and physiology (Nwuga 1990). Workers with high physical work demands are well documented to be at elevated risk for impaired work ability, musculoskeletal disorders, cardiovascular diseases all causes mortality,

long term sickness absence and early retirement from the labor market. Specifically prolonged standing posture, highly repetitive working with hands lifted to shoulder height or higher, and working with the back twisted or bent forward are physical exposures that have been shown to predict impaired work ability, musculoskeletal disorders and enhance long term sickness absence, therefore, workers in job groups exposed to these physical factors at work are a particular need for health promoting initiatives for preserving or improving their work ability (Laura, *et al.*, 2004). The primary aim in the industrial physiotherapy is to prevent, assess and treat movement dysfunction and physical disability with the overall goal to enhancing human motion and function (Pinkson, 1989).

As observed by Adei and Kunfaa (2007) in their study of cottage tie and dye industries in Ghana, occupational exposure to ergonomic hazard in the dyeing

industries of Mutare were mainly due to lifting weights and uncomfortable posture during working hours. Mirandi (2002) observed that back pain was the main complaint that resulted from awkward work postures. Kano Metropolis being a commercial center and a highly industrialized city in northern Nigeria, the prevalence of occupational hazard cannot be ruled out. Most of the researches (Saidu, *et al.*, 2005) on WRMSDs were carried out on large scale industries not giving much emphasis on local small scale industries which are instrumental to development especially in developing countries. Most of the population working in industries especially those unskilled, undertake activities that involve, lifting, pushing, pulling, carrying, standing, bending and stooping. These activities can create occupational hazards such as MSDs.

Unfortunately, in Nigeria little research has focused on the

field of occupational health especially relating to occupational hazards (WHO 2005; Tiedemann, 2008). Specifically, the nature of safety and health problems associated with dye fabric workers in Kano needs examination as this is an area in which our ignorance exceeds our knowledge. However to what extent does the activities involve affect the dyers has not being investigated signifying lack of empirical data in the area. Consequently work related musculoskeletal disorders among textile dyers should be of great concern to all health care professionals that are concern with the management of musculoskeletal disorders as it might have effects on their health and may also lower their productivity. The study investigates the prevalence and risk factors of work related musculoskeletal disorders among textile dyers in Kano municipal.

METHODOLOGY

The study was a cross sectional survey in which purposive sampling was used to recruit dyers at Kofarmatadying pits in Kano municipal L.G area of Kano state. Only dyers who have working experience of at least 12month duration were **included** while those with a history of trauma, inflammatory and degenerative diseases were **excluded**. Sample size of this study was calculated to be 250.

Data Collection Instrument

The measuring instrument for this study was a modified Nordic questionnaire for the study of musculoskeletal pain by Kourinkoet *al* 1987. The questionnaire is divided into three sections. Section **A** consists of information on Bio-data of the participants e.g age, gender and year of working experience, work status, e.t.c. Section **B** consists of information on musculoskeletal injuries and Section **C** coping strategies. The completion of

the questionnaire was guided by a human body (view from the back) divided into nine regions being the neck, shoulders, upper back, low back, elbows, wrist/hands, hips, thighs, knees and ankles.

Data Collection Procedure

A letter of introduction of the researcher which have details of the study and seeking for permission to participate in the study was obtained from the department of physiotherapy, Bayero University Kano, Nigeria and then it was accompanied with the questionnaire which was presented to the head of the association of dyers at Kofarmata. The participants have a working experience of no less than 12month and an age of 18 years and above. The aim of the study was briefly explained

to the textile dyers whose participation was voluntary, and were asked to sign the consent form. The questionnaire was self-administered to the literate participants and researcher-administered to the non - literate ones, which was filled based on their response.

DATA ANALYSIS

Data was collected and analyzed using SPSS Statistics version 20.0. Data was summarized using descriptive statistics of (mean, standard deviation and frequency of distribution). Association between the prevalence of WRMSDs and each of socio-demographics factors and work setting of textile dyers was analyzed using a chi square. The alpha level was set at 0.05.



Figure 1.0 Participant [redacted]



Figure 2.0 Participant 2



Figure 3.0 Participant 3

RESULTS

A total number of two hundred and thirty(230) textile dyers participated in this study. The findings of this study are described according to socio-demographic factors, pattern of symptoms distribution in relation to different body parts and risk factors

Table 1.0 revealed that the participants recruited were between the ages of 18-above years, all of the participants were males 230(100%), 33 of them are single(14.3%) while 159

were married (69.1%) and only 6 of them (2.6%) were divorced and 32 of them are widowed (13.9%). All participants were full time workers 230(100%). 150(65.2%) reported that dyeing predisposed them to musculoskeletal disorder, while 80(34.8%) does not. Table 2 showed the total number of symptoms/pain reported at different body parts in the last 12 months, shoulder pain had the highest frequency 177(77%), and knee with the lowest frequency 48(20.9%).

The major risk factor of the participant is working in the same position over a long period of time 144(62.6%) and not having enough rest 130(56.5%) contribute to their risk factor moderately while cramped position 147(63.9%) has a minor contribution to their risk and lack of work assistance is irrelevant to their risk factors 133(57.8%)of sustaining musculoskeletal disorders (Table 3).

Table 4 shows that there is a statistical significant

Association between Age and each of upper back (P-value 0.000, $X^2=25.412$), lower back(P-value 0.006, $X^2=10.238$), elbow(P-value 0.000, $X^2 =5.493$), wrist (P-value 0.000, $X^2=40.621$), hip (P-value 0.035, $X^2 =6.726$), and ankle (P-value 0.028, $X^2=7.223$).There is a statistical significant association between working experience and neck pain (P-value 0.000, $X^2 =39.575$),upper back pain (P-value 0.000, $X^2=20.958$), elbow pain (P-value 0.001, $X^2 =13.781$), and thumb pain (P-value 0.004, $X^2 =11.945$) as shown in Table 5.

Table 1 Socio-demographic characteristics of the participants.

Variables	Frequency	Percentage
Age(yrs)		
18-30	53	23.0
31-40	101	43.9
41-above	76	33.0
Sex		
Male	230	100
Female	0	0
Total	230	100
Marital status		
Single	33	14.3
Married	159	69.1
Divorced	6	2.6
Widow	32	13.9
Total	230	100
Work Status		
Full Time	230	100
Part Time	0	0
Total	230	100
Dyeing as factor		
Yes	150	65.2
No	80	34.8
Total	230	100

Table 2.0 Pattern of Musculoskeletal disorders in the last 12 months.

Variables	Frequency(n)		Percentage(%)	
	Yes	No	Yes	No
Neck				
Shoulder	86	144	37.4	62.6
Elbow	177	53	77	
Wrist/hand	134	96	58	23.0
Upper back	126	104	54.8	
Lower back	149	81	64.8	41.7
Hips/thigh	172	58	74.8	
Knees	68	162	29.6	45.2
Ankles	48	182	20.9	
Thumb	62	168	27.0	35.2
	60	170	26.1	
				25.2
				70.4
				79.1
				73.0
				73.9

Table 3.0 frequency and risk factors of musculoskeletal disorders among participants.

Variable	Irrelevant N(%)	In a minor way N(%)	Moderately N(%)	In a major way N(%)
Performing task over & over	34(14.8)	75(32.6)	45(19.6)	76 (33)
Work in awkward posture	44(19.1)	45(12.4)	47(13)	95 (26)
Not enough rest	26 (11.3)	40 (17.4)	130(56.3)	34 (14.8)
Poor handling technique	27(11.7)	40 (17.4)	125 (53.3)	38 (16.5)
Working in same position	23(10)	38(16.5)	25(10.9)	144(62.6)
Twisting the back awkwardly	35(15.2)	66(28.7)	96(41.7)	33(14.3)
Reaching away from the body	114(49.6)	50(21.7)	40(17.4)	26(11.3)
Cramped position	36(15.7)	147(63.9)	32(13.9)	15(6.5)
Working at physical limit	126(55.7)	36(15.7)	37(16.1)	29(12.6)
Unanticipated movement	56(24.3)	50(21.7)	47(20.4)	77(33.5)
Assisting in lifting	45(19.6)	144(62.6)	16(7.0)	25(10.9)
Lifting or transferring load	103(44.8)	70(30.4)	31(13.5)	26(11.3)
Moving heavy products	53(23.0)	27(11.7)	127(53.2)	23(10)
Continue work when injured	118(51.3)	44(19.1)	45(90)	23(10)
Overtime work	36(15.7)	36(15.7)	32(13.9)	126(54.8)
Lack of assistance	133 (57.8)	38 (16.5)	29 (12.6)	30 (13)

Table 4 Association between Age and patterns of musculoskeletal disorders in 12 months

Variable	Age			Total	X ²	P value
	18-30	31-40	>41			
Dyeing as a factor						
Yes	34(22.7%)	71(47.3%)	45(30.0%)	150	2.38	0.304
No	19(23.8%)	30(37.5%)	31(38.8%)	80		
Neck pain 12 months						
Yes	78(20.9%)	36(41.9%)	32(37.2%)	144	1.11	0.571
No	35(24.3%)	65(45.1%)	44(30.6%)	86		
Shoulder pain 12						
Yes	43(24.3%)	76(42.9%)	58(32.8%)	177	0.705	0.703
No	10(18.9%)	25(47.2%)	18(34.0%)	53		
Upper back pain in						
Yes	19(12.8%)	73(49.0%)	57(38.3%)	149	25.412	0.000*
No	34(42.0%)	28(34.6%)	19(23.5%)	81		
Elbow pain in 12						
Yes	24(17.9%)	60(44.8%)	58(37.3%)	134	5.497	0.006*
No	29(30.2%)	41(42.7%)	26(27.1%)	96		
Low back pain in 12						
Yes	42(24.4%)	83(48.3%)	47(27.3%)	172	10.238	0.006*
No	11(19.0%)	18(31.0%)	29(50.0%)	58		
Wrist pain in						
Yes	31(24.5%)	75(59.5%)	20(15.9%)	126	40.621	0.000*
No	22(21.2%)	26(25.0%)	56(53.8%)	104		
Thumb pain in 12						
Yes	18(30.0%)	27(45.0%)	15(25.0%)	60	3.316	0.191
No	35(20.6%)	74(43.5%)	61(35.9%)	170		
Hip pain in 12 months						
Yes	9(13.2%)	30(44.1%)	29(42.6%)	68	6.726	0.035*
No	44(27.2%)	71(43.8%)	47(29.0%)	162		
Knees pain in 12						
Yes	8(16.7%)	23(47.9%)	17(35.4%)	48	1.395	0.498
No	45(24.7%)	78(42.9%)	59(32.4%)	182		
Ankle pain in 12						
Yes	15(24.2%)	19(30.6%)	28(45.2%)	62	7.223	0.028*
No	38(22.6%)	82(48.8%)	48(28.6%)	168		

Table 5 Association between working experience and musculoskeletal disorders

Variables	Working Experience				Total	X ^{2/f}	P value
	0-10	11-20	21-30	31-40			
Neck pain							
Yes	24(27.9%)	53(61.6%)	8(9.3%)	1(1.2%)	86	39.575	0.000*
No	80(55.6%)	31(21.5%)	33(22.9%)	0(0%)	144		
Shoulder							
Yes	74(41.8%)	72(40.7%)	30(16.9%)	1(0.6%)	177	6.565	0.068
No	30(56.6%)	12(22.6%)	11(20.7%)	0(0%)	53		
Upper back							
Yes	53(35.6%)	69(46.8%)	26(17.4%)	1(1.2%)	149	20.958	0.000*
No	51(63.0%)	15(18.5%)	15(18.5%)	0(0%)	81		
Elbow pain							
Yes	64(47.8%)	56(41.8%)	14(10.4%)	0(0%)	134	13.781	0.001*
No	40(41.7%)	28(29.2%)	27(28.2%)	1(1.0%)	96		
Low back							
Yes	84(48.8%)	61(35.5%)	26(15.1%)	1(0.6%)	172	5.395	0.124
No	20(34.5%)	23(34.5%)	15(39%)	0(0%)	58		
Wrist pain							
Yes	64(50.8%)	43(34.1%)	19(15.1%)	0(0%)	126	4.680	0.157
No	40(35.8%)	41(39.3%)	22(21.2%)	1(1.2%)	104		
Thumb pain							
Yes	37(61.7%)	14(23.3%)	8(13.3%)	1(1.7%)	60	11.945	0.004*
No	67(39.4%)	70(41.2%)	33(19.4%)	0(0%)	170		
Hip pain							
Yes	28(41.2%)	29(42.6%)	10(14.7%)	1(1.7%)	68	3.966	0.235
No	76(46.9%)	55(34.0%)	31(19.1%)	0(0%)	162		
Knees pain							
Yes	28(45.8%)	18(37.5%)	8(16.7%)	0(0%)	48	0.514	1.000
No	82(45.1%)	66(36.3%)	33(18.1%)	1(0.5%)	182		
Ankle pain							
Yes	26(41.9%)	24(38.7%)	12(19.4%)	0(0%)	62	0.904	0.866
No	78(46.0%)	60(35.7%)	29(17.3%)	1(0.6%)	168		

DISCUSSION

All the 230 participants in this study were males (100%), with a response rate of (92%), this may be due to the fact that dyeing occupation require a lot of energy and cannot be perform by females, thus making it similar to a Nigerian study conducted by Olaogunet *al.*, 2002 on pattern of musculoskeletal pain in different occupations which also showed that they were all males. In this study, majority of the participants suffered from multiple sites of musculoskeletal pain. The age group with the highest number of complaints of MSDs were between 31-40 years, with most of them reporting shoulder pain (77%), low back pain(74.8%), upper back pain (64.8%) and (elbow pain(58.3%),while wrist pain 126(54.8%), neck pain 84(37.45%)hip and ankle with 68(29.6%) and 62(27%) respectively and thumb 60(26.1%) and knee 48(20.9%) are the least common sites in

the last 12 months. This might be due to the fact that young adult people are very active and tend to overwork themselves with activities and postures that predispose them to develop a number of musculoskeletal disorders. In the finding of this research, it was revealed that the most common risk factors were having a prolong position (62.6%), over time work (54.8%), awkward posture (40.9%) and repetitive motion (33%). This implies that excessive work for a prolong period of time could lead to accumulation of trauma there by causing development of mark injuries.

CONCLUSION

It can be concluded that Shoulder pain is the most prevalent musculoskeletal disorder and the pattern of musculoskeletal pain occurs moderately among textile dyers within Kano metropolis.

RECOMMENDATIONS

Based on the results obtained from this study, the following recommendations were made:

- Awareness campaign on the need for textile dyers to avoid prolong posture when at work should be organized. This should ensure that they take some rest after every hour of work so as to prevent musculoskeletal pain and stress/ fatigue.
- Government should liaise with the engineering companies for a possible restructuring and redesigning of the equipment used to meet with the safer ergonomic needs to improve quality of life and a more productive work.
- Health care professionals like physiotherapists, occupational therapists should work together to develop and implement occupational health programs within the

community so as to prevent musculoskeletal pain.

- Using media (like Television or radio stations), pamphlets or by directly reaching out to teachers, health education and advises like reduction of workload for, optimizing working hours, planning exercises and ergonomic counseling should be ensured for the benefits of the textile dyers.

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