Prevalence Of Wrist, Neck And Shoulder Pain Symptoms Among Ironing Workers In Occupational Laundry Shop

Article *in* International Journal of Scientific & Technology Research · November 2019

CITATIONS
4

READS
1,506

3 authors:

Vijay Anand M
Kongu Engineering College
3 PUBLICATIONS **10** CITATIONS
SEE PROFILE

M. Bhuvanesh Kumar
Kongu Engineering College
31 PUBLICATIONS **892** CITATIONS
SEE PROFILE

Murugan P C
Kongu Engineering College
50 PUBLICATIONS **367** CITATIONS
SEE PROFILE

Prevalence Of Wrist, Neck And Shoulder Pain Symptoms Among Ironing Workers In Occupational Laundry Shop

Vijay Anand M, Vijayakumar K C K, Murugan P C*, Bhuvanesh Kumar M

Abstract: Ergonomic plays an important role in human comfort, which provides better relationship among human, machine and working environments. Work related musculoskeletal disorders are the impairments of bodily structures such as muscles, joints, tendons, ligaments, nerves and bones, caused or aggravated primarily by work itself or by the work environment. This study investigates the physical factors and demographic factors which influence the occurrence of work related musculoskeletal disorder (WMSD) among ironing workers in laundry shop. There is an infinite number of population of laundry shops exists in Erode city. The sample size is identified using simple random sampling. The survey is to be approached among 300 occupational ironing workers in laundry shops. A questionnaire is prepared based on the Nordic questionnaire. Questionnaire includes work related questions such as personal, occupational and health aspects. The interview based surveying has been carried out among the workers. The study determines the Musculoskeletal Disorder (MSD) symptoms reported from the survey. The study investigates that the occurrence of Musculoskeletal Disorder among the respondents seems to be common. The prevalence of neck pain (89.33%) is comparatively higher than the wrist/hand pain (81.33%) and shoulder pain (73%) during the repetitive ironing tasks. The MSD symptoms are common among both male and female workers. A proper preventive and corrective measure has to be suggested for the obtaining results in order to improve the discomfort among the occupational ironing workers in occupational laundry shop.

Index Terms: Ironing workers, Shoulder Pain, Ergonomics, Musculoskeletal disorder symptoms, Neck pain, Occupational ironing, SPSS

1. INTRODUCTION

The Work related musculoskeletal Disorder in major problem of the ironing workers in occupational laundry shop [1]. The postural risk negatively effect on their work, where people involved in ironing of clothes in a high amount of quantity in laundry shops. This study of occupational risk factors among ironing workers need to be assessed in terms of the gender, age, height of the person, weight of the person, quantity of the clothes, working time per day and type of the ironing box[2, 3]. The people do this as a business in the form of small-scale occupational industry or as a cottage industry [4]. The work related musculoskeletal are associated with factors are Awkward postures, repetitiveness of work , force of the movements, poor design and working environments, time duration of the work, quantity of the clothes.

The multifactorial risk factors that contributes work related musculoskeletal disorders among workers all over the world is characterized by WHO (World Health Organization). These asymmetric body posture and the developing chronic work related musculoskeletal disorder causes muscle contraction on ligaments, muscles, tendons and bones that leads to severe pain in shoulder, knee, lower back pain (LBP), neck, wrist and hand pain[5]. Apart from these factors, the individual and personal factors like gender, age, food habit, unhealthy habit, weight and height of the worker will also contribute to physiological and psychological stresses [6, 7]. The objective of the present study in identifying the occurrence of work related musculoskeletal disorder among occupational ironing workers in laundry shops.

- *Vijayanand M is currently working as Assistant Professor, Department of Mechanical Engineering, Kongu Engineering College, Erode, India, Email: vijayanand2783@gmail.com*
- *Vijayakumar K C K is currently working as Professor, Vivekanandha College of Engineering for Women, Tiruchengodu, Namakkal, India, Email: vijikck@gmail.com*
- *Murugan P C (*Corresponding Author) is currently working as Assistant Professor, Department of Mechanical Engineering, Kongu Engineering College, Erode, India, Email: pcmurugan@ymail.com*
- *Bhuvanesh Kumar M is currently working as Assistant Professor, Department of Mechanical Engineering, Kongu Engineering College, Erode, India, Email: bhuvanesh.mech@kongu.ac.in*

2 STUDY POPULATION SELECTION

The study mainly focuses on the occupational ironing workers in various laundry shops (either in home or in sheds) situated, where the total population of ironing workers are infinite amount of population. Therefore, we have chosen 300 workers by the simple random method in various locations. Table 1 shows the occupational ironing carried out in a laundry shop by the 300 occupational ironing workers, where male (79.7%) and female (20.3). The selection criterion of workers is based on the workers performing task for a prolonged period for an average of 5 days in a week.

2.1 Questionnaire Survey for the Population

The work related musculoskeletal injuries and symptoms among the ironing workers from various laundry shops were measured using the Standardized Nordic Questionnaire. The Standardized Nordic Questionnaire is explained by the interviewer to the workers in their local language. The questionnaire consists of personal factors like age, gender, height & weight of the worker, working time period, type of shop, experience in work and personal habits.[8, 9] Occupational and health information's like quantity of clothes/day, rest breaks, personal satisfaction, working environment, design of working environment, physiological and psychological stresses.

2.2 Statistical Approach

The population responses were collected and analyzed by the SPSS 20 statistical tool and to describe the study variables the descriptive statistical factors such as percentages, frequencies and significance were used. The group of experimental parameters comparing the independent variables and work related musculoskeletal disorder were analyzed by chi-square

test.

Table-1. Demographic characteristics of ironing workers

Factors	Category	No. of Respondence (300)	Percentage (100%)
Age	Male	239	79.7
	Female	61	20.3
Age of the person	20-30	75	25
	31-40	66	22
	41-50	108	36
	>50	51	17
Height of the person	4'0"-4'5"	5	1.7
	4'6"-4'11"	38	12.7
	5'0"-5'5"	88	29.3
	5'6"-5'11"	148	49.3
	>5'11"	21	21
Weight of the person	< = 50	44	14.7
	51-70	201	67.0
	71-90	53	17.7
	>100	2	0.7
Working hours per day	1-3	5	1.7
	4-6	30	10.0
	7-8	216	72.0
	>8	49	16.3
Years of working	<1	26	8.7
	1-2	12	4.0
	3-4	74	24.7
	5-9	50	16.7
	>10	138	46.0
Type of shop	Mobile	29	9.7
	Stationary	271	90.3
Clothes ironed per day	<100	65	21.7
	101-200	140	46.7
	201-300	10	3.3
	>300	85	28.3
Type of iron box	Coal	176	58.7
	Electrical	35	11.7
	Steam	89	29.7

3 RESULTS AND DISCUSSION

Table 1 describes the demographic characteristics of ironing workers in laundry shops. The total number of population is 300 .The 300 participants were first classified based on gender i.e. male and female, where the male participant is around 79.7% (N = 239) and female participant were around 20.3% (N = 61). Out of 300 participants more than 80% of participants were facing the musculoskeletal problems. The total number of participant is 300 and out of the total participants around 80 % - 85 % of participants were suffering from any one of the musculoskeletal disorder problem. The 89.33% participants have the neck pain, which is the most frequent pain symptom among the total male and female respondents. The neck is then followed by the hand / wrist pain (81.33%), shoulder pain (73%). Almost 99.99% of people work in standing posture in the occupational ironing sectors. Among all other parameters the most significant parameters are neck pain, hand wrist pain, shoulder pain. These symptoms of pain occurs in at least any one of the participantIn this study the author first identifies the symptoms of pain in various locations of the workers based on the gender (male and female). The number of male participants was around 239 (79.7%) and the number of female participants was 61 (20.3%) as shown in Table 1. The major and the most common significant symptoms of pain occurred in both male and female participants are neck pain, shoulder pain, hand/ wrist pain shown in Table 2. Among the various pain symptoms the major affecting pain symptoms are neck pain 268 (89.33%), hand/wrist pain 244(81.33%) and shoulder pain 219(73%). These major pain symptoms are considers as dependent variables. The pain in various parts of body is compared using bar chart which is shown in figure 2. The dependent variables (neck pain, hand/wrist pain, shoulder pain) were compared with the independent variable like of gender, age, height of the person, weight of the person, working hours per day, quantity of clothes ironed per day, weight of the iron box, experience of the person and type of iron box are considered. The independent variables are compared with the dependent variables and they are analyzed using crosstabs. The result of the crosstabs analysis is given in Table 3. In the crosstabs analysis, since the variables like age of the person and experience of the person are not significant to the symptoms of pains like elbow pain, lower back pain and knee pain and hence these variable are excluded from the analysis. The most significant factors ($P<0.01$) that cause neck pain are height of the person, weight of the person, quantity of the clothes, weight of the iron box and type of iron box, which possess the 99% confidence level. The working time is also a significant factor ($P<0.05$) which is a confidence level of 95 %, the factors where the significance value $P > 0.05$ are the working hrs. Per day. These variables are not influencing the neck pain.

Table-2. Predominance of Pain in various parts of body (Gender based)

Frequency of Pain (n) %						
Pain Location	n (300)	Male		Female		Significance
		n(239)	%	n(61)	%	
Neck pain	268	207	77.24	61	22.76	0.000
Shoulder pain	219	188	85.84	31	14.15	0.000
Wrist/hand pain	244	204	83.61	40	16.40	0.012

Table-3. Analysis of independent factor and MSD pain

Factors (n)	Neck pain			Wrist/Hand pain			Shoulder pain		
	n	%	p	n	%	p	N	%	P
Height of person									
4.0-4.5 (5)	5	100	0.00***	5	100	0.00***	5	100	0.00***
4.6-4.11 (38)	38	100		21	55.26		26	68.42	
5.0-5.5 (88)	80	90.9		61	69.31		52	59.09	
5.6-5.11 (148)	131	88.5		132	89.18		121	81.75	
>5.11 (21)	268	66.6		15	71.4		15	71.42	
Weight of person									
<=50 (44)	29	65.9	0.00***	30	68.1	0.244*	30	75	0.459*
51-70 (201)	185	92		155	77.1		146	72.6	
71-90 (53)	52	98.1		47	88.7		41	77.35	
>100 (2)	2	100		2	100		2	100	
Working hrs/day									
1-3 (5)	5	100	0.28*	5	100	0.00***	5	100	0.00***
4-6 (30)	30	100		30	100		28	93.33	
7-8 (216)	187	86.5		170	78.7		161	74.53	
>8 (49)	46	93.9		29	59.2		25	51.02	
Qty. of clothes ironed/day									
<=100 (65)	64	98.5	0.00***	47	72.3	0.00***	50	76.92	0.00***
101-200 (140)	140	100		121	86.5		111	79.28	
201-300(10)	7	70		8	80		8	80	
>300(85)	57	67.1		58	68.2		50	58.82	
Weight of iron box									
<=3 (2)	2	100	0.00***	2	100	0.00***	2	100	0.00***
3-3.5 (5)	5	100		5	100		0	0	
3.5-4 (7)	7	100		1	14.3		0	0	
4-4.5 (96)	65	67.7		67	69.8		63	65.62	
>=5 (190)	189	99.4		159	83.6		154	81.05	
Type of iron box									
Coal (176)	175	99.4	0.00***	162	92	0.00***	152	86.36	0.00***
Electrical (35)	35	100		12	34.3		10	28.57	
Steam(89)	58	65.2		60	67.4		57	64.04	
* Not significant – P > 0.05, ** Confidence level – P <0.05, *** Confidence level – 99 %, P < 0.01									

The occupational work injuries seem to be the most common problem among Indian workers. In Indian the people are not aware of the health hazards caused due to repetitive work. In this study, it is obvious that the male and female ironing workers who involved in ironing of clothes face many work related disorders during ironing under different postures. The Table 1 niceties the dates about the ironing workers like gender, age, height of the person, weight of the person, working time, quantity of clothes ironed / day and much more occupational information's.[10] The repeated working postures may lead to the musculoskeletal disorder among the ironing workers. In India most of the ironing workers in a standing posture continuously at the time of ironing work. The activity like stretching, bending and lifting of iron box is the most frequent motion among ironing personnel in laundry shop. These frequent and repetitive motions results in muscular exhaustion. The results substantiated by the SPSS results is depicted in Table 3, which point out the symptoms among the defendants has been persuaded by the work sector, in an related manner, by the gender, age and also by the other personal factors [11]. These factors are not only considered for the analysis but also the hazardous work injuries and disorder signs were also considered. The work concert and surroundings significantly contributes due to muscles, tendons and others disorders are considered to work related.[12] The occurrence of the work related musculoskeletal disorder is common in most of the manual working environments. In this study both the male and female workers were considered. Here in this ironing work both the male and female workers were exposed to the common discomfort parameters like neck pain, hand/wrist pain and shoulder pain.[13] These symptoms of pain is due to improper table height, weight and height of the person, iron box weight and working hours and quantity of the clothes as shown in Table 3. These symptoms are predominant among constructional workers, plantation workers, hospital staffs, sports players and much more.[14-16] the prevalence of the symptoms shows a pronounced effect for female compared to male worker, as the latter are stronger. Improper postures lead to neck pain, had/wrist pain and shoulder pain, this pain is due to improper design of work table, weight of the iron box. Occurrence of neck back pain is due to the over bending and stretching.[17, 18, 19] In order to avoid shoulder and hand/wrist pain the table height is placed appropriate to the height of the person, which in turn minimizes over stretching and bending. It is advised that the workers should take appropriate rest breaks in between their process of ironing. At least 5-10 minutes of rest after each 45min. should be taken by the workers who perform continuous and repetitive work which is recommended by the Applied Occupational and Environmental Hygiene.

4 CONCLUSION

The result of this study recommends that the comfort of the working activity of the occupational ironing workers in laundry shops can be improved by adjusting the height of the table in-line with the height of the workers and the simultaneous admissible weight reduction of iron box should be used for ironing. Workers who are exposed to repetitive work should take rest breaks often in between their work. It is suggested to have stretching exercises, proper standing posture in order to reduce the musculoskeletal pain at the time of work, in addition to this it is advised to avoid or to minimize consumption of alcohol and tobacco.

ACKNOWLEDGMENT

The authors would like to thank the iron workers for their cordial support towards carrying out the work successfully.

REFERENCES

[1] D. T. Atia, F. H. Abdelazeim, and H. Radwan, "Impact of Work-Related Musculoskeletal Disorders on Egyptian Pediatric Physical Therapists: One-Year Follow-Up Study," Trends in Applied Sciences Research, vol. 10, pp. 175-182, 2015.

[2] A. Choobineh, H. Daneshmandi, and S. H. Tabatabaee, "The Prevalence Rate of Work-Related Musculoskeletal Disorders among Iranian Female Workers," Women's Health Bulletin, vol. 2, 2015.

[3] S. Mirmohammadi and J. Yazdani-Charati, "Prevalence of Work-related Musculoskeletal Disorders and Associated Risk Factors among Nurses in a Public Hospital," Iranian Journal of Health Sciences, vol. 2, pp. 55-61, 2014.

[4] J. Park, "Work-related musculoskeletal disorders among occupational therapists in Korea," Journal of Physical Therapy Science, vol. 27, pp. 3627-3629, 2015.

[5] J. Davis and S. Gallagher, "Physiological demand on firefighters crawling during a search exercise," International Journal of Industrial Ergonomics, vol. 44, pp. 821-826, 2014.

[6] H.-Y. K. Cheng, C.-Y. Cheng, and Y.-Y. Ju, "Work-related musculoskeletal disorders and ergonomic risk factors in early intervention educators," Applied ergonomics, vol. 44, pp. 134-141, 2013.

[7] S. Niu, "Ergonomics and occupational safety and health: An ILO perspective," Applied ergonomics, vol. 41, pp. 744-753, 2010.

[8] R. K. Raanaas and D. Anderson, "A questionnaire survey of Norwegian taxi drivers' musculoskeletal health, and work-related risk factors," International Journal of Industrial Ergonomics, vol. 38, pp. 280-290, 2008.

[9] A. Werth and K. Babski-Reeves, "Effects of portable computing devices on posture, muscle activation levels and efficiency," Applied ergonomics, vol. 45, pp. 1603-1609, 2014.

[10] A. Kierklo, A. Kobus, M. g. Jaworska, and B. o. Botuliński, "Work-related muculoskeletal disorders among dentists-a questionnaire survey," Annals of Agricultural and Environmental Medicine, vol. 18, 2011.

[11] E. Hanna, E. Bell, D. King, and R. Woodruff, "Climate change and Australian agriculture: a review of the threats facing rural communities and the health policy landscape," Asia-Pacific Journal of Public Health, p. 1010539510391459, 2011.

[12] H. Gul, B. Umar, and M. Shabbir, "Work Related Musculoskeletal Problems among Professionals of Physical Therapy in Hospitals of Lahore, a city of Punjab, Pakistan," Journal of Riphah College of Rehabilitaion Sciences, vol. 2, pp. 8-11, 2014.

[13] I. Mavis, A. A. Rahman, and S. B. H. M. Tamrin, "Occupational Hazards and Work Environment Management among Osh Certified and Uncertified Automotive Parts Manufacturing Industry Workers," Middle-East Journal of Scientific Research, vol. 23,

pp. 160-164, 2015.

[14] L. Lu, S. G. CHEN, S. C. TANG, W. Sheng, L. H. HE, Z. H. GUO, et al., "How Work Organization Affects the Prevalence of WMSDs: A Case-control Study," Biomedical and Environmental Sciences, vol. 28, pp. 627-633, 2015.

[15] H. C. Nogueira, A. C. P. Diniz, D. F. Barbieri, R. S. Padula, R. L. Carregaro, and A. B. de Oliveira, "Musculoskeletal disorders and psychosocial risk factors among workers of the aircraft maintenance industry," Work-Journal of Prevention Assessment and Rehabilitation, vol. 41, p. 4801, 2012.

[16] J. Oakman, W. Macdonald, and Y. Wells, "Developing a comprehensive approach to risk management of musculoskeletal disorders in non-nursing health care sector employees," Applied ergonomics, vol. 45, pp. 1634-1640, 2014.

[17] M. M. Robertson, Y.-H. Huang, M. J. O'Neill, and L. M. Schleifer, "Flexible workspace design and ergonomics training: Impacts on the psychosocial work environment, musculoskeletal health, and work effectiveness among knowledge workers," Applied Ergonomics, vol. 39, pp. 482-494, 2008.

[18] M. M. Robertson, V. M. Ciriello, and A. M. Garabet, "Office ergonomics training and a sit-stand workstation: Effects on musculoskeletal and visual symptoms and performance of office workers," Applied ergonomics, vol. 44, pp. 73-85, 2013.

[19] M. Vijay Anand, K. C. K. Vijayakumar, T. Mohanraj, "Evaluation of Shoulder Pain Among the Workers Involved in Ironing Process Using Surface Electromyography", Journal of Medical Imaging and Health Informatics, vol. 10, pp. 86-92 (7). DOI: https://doi.org/10.1166/jmihi.2020.2846.