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Work related Musculoskeletal Complain among the Cutting and Finishing Operators at a Readymade Garments Factory in Bangladesh

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ABSTRACT

Background: Work related musculoskeletal Disorders (WMSDs) are one of the most vulnerable physical complications that require medical attention. Cutting and finishing workers has stannous activities in their job and they generally serves overtime; thus prone to WMSDs. The objective of this study was to explore the work related musculoskeletal complain among the cutting and finishing operators in readymade garments (RMG) factory. Methodology: A descriptive cross-sectional research design was employed to study the WMSD complains among readymade garments workers in the Delta Composite Knitting Industries Limited. The study was conducted from January 2015 to December 2017. Study population comprised of male and female who had at least 1 years of working experience in RMG sector and only the cutting and finishing operators in that garments factory. Result: The mean age of the respondent was 29 years (SD=±6.5), male were prominent in percent (84%), maximum participants were from rural area (73.3%), most of them were SSC passed (40%) and at least have primary education (23.3%), LBP a common problem (36%), most them had moderate pain (51%), recurrent attack of pain common in 1 to 5 times among (66.67%) participants, for the treatment of their pain maximum time received medication (72%), there working hour lies between 11 to 14 hours (71%). Most preferred posture was standing (50.7%). Result shows cutting operators (56%) are more vulnerable rather than swing operators. Statistical significant found in Job experience (P=.000), Age (P=.000), daily working hours with overtime (P=.000) and posture (P=.000) with pain and discomfort experienced by participants; a linear relation among age, musculoskeletal pain or discomfort, duration of work and work experience with statistical significance (<0.05). This findings suggests highly significance (<0.01) relation of variables that represents the aged worker having more experience in job and working overtime has a greater complaint of musculoskeletal pain and discomfort. The result also

elicited that, majority of the workers with musculoskeletal pain and discomfort maintained a sustained posture for longer duration during their work time. Conclusion: Our study reveals that cutting operators are more vulnerable to LBP than finishing operators. This study could help the general population, government as well as stakeholders about the health risk and their possible measure. Reducing the work strain and providing a supportive workplace environment will have a prerequisite for productive outcome.

Key words: Musculoskeletal Complain, Cutting and Finishing Operators, Readymade Garments, Bangladesh

INTRODUCTION

MSDs are the leading cause of years lived with disability (YLDs) amongst them LBP ranked highest in (YLDs) and sixth in Disability-adjusted life-years (DALYs) in Global burden of disease (2010) [1, 2]. Bangladesh a rapidly developing country [3,4,5,6] where textile, food, pharmaceuticals, tea industry kept a great deal to develop economic milestone amongst them Ready-made garments (RMG) achieve highest national and international currency by exporting their garments product from the past three decades [7]. According to the report on RMG industry of Bangladesh in the fiscal year 1983-84, there were only 134 factories where 0.04 million people get their job opportunity but in 2013-14 established more than 4000 garment factories where 4.0 million people get opportunity to work among them more than 3.20 million (80%) were women. As a developing country it is a blessing for rural economically poverty stricken women folk as it is opened a new door to engage themselves into the economic activities of Bangladesh. It is being established the women empowerment in Bangladesh [8]. Though this garments being popular day by day and create more job opportunity through country wide but its health effects increasing day by day due to lengths of working hours, age, gender, ethnicity, low quality of life, cigarette smoking, economic condition, food habit, nutrition which create bad impact on musculoskeletal system [9]. According to the-Work-Place-Safety and Health-Council (WSHC), Occupational disease (OD) is defined as- "Any disease contracted as a result of an exposure to risk factors arising from work activity. These risk factors are arising from aching pain, numbness and limitation of musculoskeletal system [10]. Globally, work related musculoskeletal disorders (WMSDs) estimate for around 40% of the total compensated cost of occupation related disease due to rapid movement, awkward or prolong standing posture, forceful exertion etc [11]. Researcher found most prominent and highly prevalent musculoskeletal symptoms that found among garments and textile industry worker were neck, shoulder and back problem [12]. RMG is placing the second place for Job facilities for many unskilled laborers coming from rural areas seeking work. Without prior knowledge many labors handled heavy loads which are monotonous, continuous and prolonged. Without proper protective equipment and inappropriate ergonomic provision makes their health vulnerable. The aim of this study was to determine the WMSDs, risk factor among RMG workers and find out the association and correlation with pain among different predefine variables in Bangladesh

MATERIALS AND METHODS

Study design, study site and setting

A descriptive cross-sectional research design was employed to study the work related musculoskeletal complain among readymade garments worker. Medium-sized factories named The Delta Composite Knitting Industries Limited (250−1,000 workers) that had operated for at least five years prior to the study and that focused this study to conduct. According to the Government of Bangladesh database, there are a total of 4,809 RMG factories in eight divisions of Bangladesh [13] of which 1,961 are in Dhaka division. So it was intended to choose the Delta Composite Knitting Industries Limited, Zarun (South), Kashimpur, Konabari, Dhaka divisional RMG factory for our study site.

Study period

The study was conducted from January 2015 to December 2017.

Study population

Study population comprised of male and female who had at least 1 years of working experience in RMG sector and only the cutting and finishing operators in garments factory.

Sample size

Sample size was calculated according to WHO Guideline [14]. To determine the representative sample size, the formula: n = Z2P(1-P)/d2 was used. With 5% precision level, and 95% confidence interval (CI), our sample size was 232 RMG workers. But due to some technical and HR policy problem of The Delta Composite Knitting Industries Limited we collect 150 samples from RMG factory.

Inclusion and exclusion criteria

The selection criteria were >18 years age of the respondents; had at least 1 years of continuous work experience in RMG sector, and only cutting and finishing operators. The exclusion criteria were women with pregnancy, people with

disabilities and subjects who had recent major accident or major surgery in any part of the body which could produce pain as acute inflammatory reaction.

Data collection tool and procedure of data collection

A mixed type close ended question was used for data collection. After getting consent from the participants, a questionnaire was used to identify the musculoskeletal complain among the cutting and finishing operators. Face to face interview was conducted to collect the data. According to the understanding level of the participant, sometimes the questions were described in the native language, so that the participants can understand the questions perfectly and answer accurately. All data were collected by the study conductor themselves.

Data analysis

Analysis was carried out using the IBM Statistical Package for Social Sciences (SPSS) Version 22 [15] and Microsoft Office Excel version 2013 was used to decorate the graph and pie charts. All the continuous variables were presented as mean and categorical data as percentage.

Ethical consideration

Ethical approval was obtained from the Ethical Review Committee of the Centre for the rehabilitation of the paralysed (CRP), Bangladesh. The necessary permission was taken from the executive director of The Delta Composite Knitting Industries Limited. Written informed consent was obtained from each participant. The participants were informed clearly that their information would be kept confidential. The study conductor assured the participants that the study would not be harmful to them. It was explained that there might not a direct benefit from the study for the participants but in the future garments worker might get benefit from it. Interviews were conducted at a time and place, inside the factory premises, which was convenient to the participants. The participants were also assured that their comments will not affect their job.

RESULTS

Table -1 Demographic profile of RMG participants (n=150).

Traits	Number	Percentage
Gender		
Male	126	84.0
Female	24	16.0
Living area		
Rural	110	73.3
Urban	40	26.7
Age group		
18- 25 years	56	37.3
26-32 years	56	37.3
33-39 years	24	16.0
40-46 years	14	9.3
Education		
Primary	35	23.3
SSC	60	40.0
HSC	39	26.0
Honor's	8	5.3
Masters	1	.7
Others	7	4.7
Working hours per day		
8 hours	26	17.3
10 hours	17	11.3
11 hours	30	20.0
12 hours	29	19.3
13 hours	18	12.0
14 hours	30	20.0

Among 150 participants male were prominent in percent (84%), maximum participants were from rural 110 (73.3%), mean age of the respondent was 29 years (SD=±6.5), most of them were SSC passed (40%) and at least have primary education (23.3%), working hour lies between 11 to 14 hours maximum participants (71%) (Table 1).

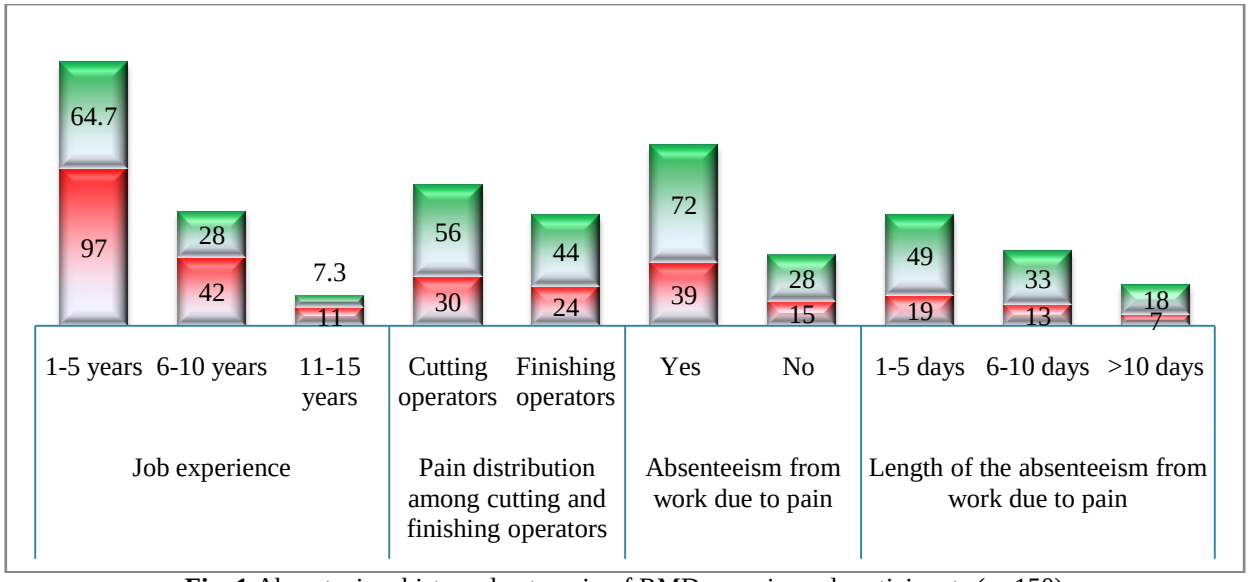

Fig. 1 Absenteeism history due to pain of RMD experienced participants (n=150)

Most of them have 1 to 5 years job experience (64.7%), pain distribution maximum among cutting operators (56%), Absenteeism due to pain found (72%), length of absenteeism from work due to pain 1 to 5 days (49%) (Figure 1)

Table -2 Distribution of respondents according to pain, posture, treatment and prognosis of RMD participants (n=150)

Traits	Number (n)	Percentage (%)
Low Back Pain		
Yes	54	36.0
No	96	64.0
Most preferred posture during work		
Sitting	47	31.3
Standing	76	50.7
Bending	27	18.0
Severity of pain		
Mild pain (1-4)	23	15.3
Moderate pain (5-7)	28	18.7
Sever pain (8-10)	3	2.0
None	96	64.0
Recurrent attack of pain		
1-5 times	36	24.0
6-10 times	16	10.7
11-15 times	2	1.3
None	96	64.0
Treatment received by participant due to pain		
Medication	39	26.0
Physiotherapy	2	1.3
Others	13	8.7
None	96	64.0
Prognosis		
Improved	36	24.0
Unchanged	15	10.0
Worse	3	2.0
None	96	64.0

Table 2 shows that LBP a common problem that have experienced by (36%) participants, recurrent attack of pain more common in 1 to 5 times among (66.67%) participants, for the treatment of their pain most of the time received medication (72%), most them had moderate pain (51%), most preferred posture was standing (50.7%) (Table 2).

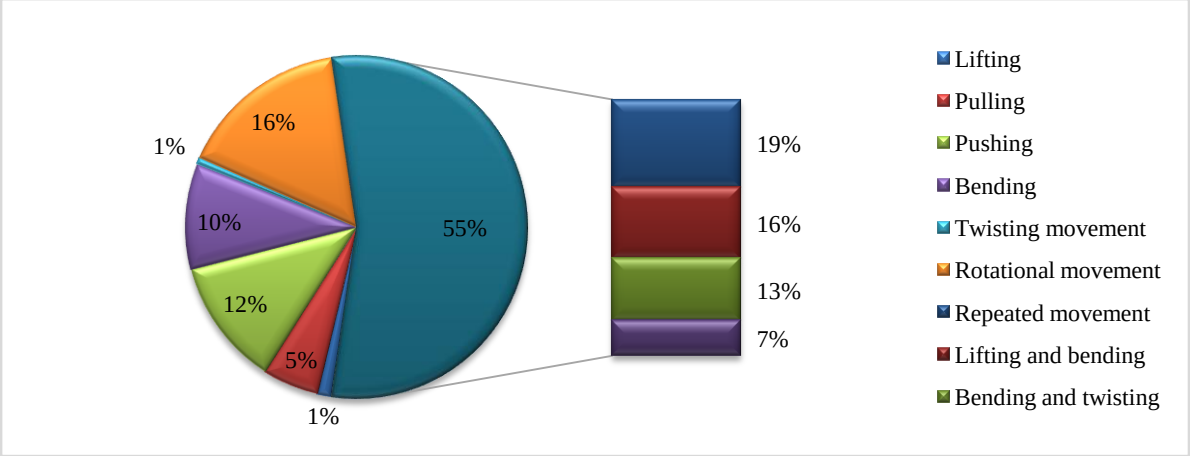

Fig. 2 Repeated activity that perform of RMG participants (n=150)

Among 150 participants 54 cases have the problem with low back pain. Among them about 2 (1.3%) cases perform lifting activity, 8 (5.3%) cases perform pulling activity, 18 (12%) cases perform pushing activity, 15 (10%) cases perform bending activity, 1 (0.7%) cases perform twisting movement activity, 24 (16%) cases perform rotation movement, 28 (18.7%) cases perform repeated movement activity, 23 (15.3%) cases perform lifting and bending activity, 20 (13.3%) cases perform bending and twisting movement activity, 11 (7.3%) cases perform pulling and pushing activity (Figure 2).

Table -3 Distribution of the respondents Association between variable factors with Pain and Discomfort Experienced by RMG participants (n=150)

Variable	**Pain and Discomfort Experienced by participants**		**P value**
	Yes	**No**	
Job experience			
1-5 years	23 (42.6%)	74 (77.1%)	.000
6-10 years	22 (40.7%)	20 (20.8%)	
11-15 years	9 (16.7%)	2 (2.1%)	
Age			
18-25 years	8 (14.8%)	48 (50.0%)	.000
26-32 years	20 (37.0%)	36 (37.5%)	
33-39 years	18 (33.3%)	6 (6.3%)	
40-46 years	8 (14.8%)	6 (6.3%)	
Daily working hours with overtime			
8 hours	0	26 (27.1%)	.000
10 hours	7 (13.0%)	10 (10.4%)	
11 hours	10 (18.5%)	20 (20.8%)	
12 hours	10 (18.5%)	19 (19.8%)	
13 hours	12 (22.2%)	6 (6.3%)	
14 hours	15 (27.8%)	15 (15.6%)	
Type of activity perform by participants			
Lifting	2 (3.7%)	0	.158
Pulling	2 (3.7%)	6 (6.3%)	
Pushing	4 (7.4%)	14 (14.6%)	
Bending	9 (16.7%)	6 (6.3%)	
Twisting movement	0	1 (1.0%)	
Rotation movement	6 (11.1%)	18 (18.8%)	
Repeated movement	9 (16.7%)	19 (19.8%)	
Lifting and bending	11 (20.4%)	12 (12.5%)	
Bending and twisting movement	8 (14.8%)	12 (12.5%)	
Pulling and pushing	3 (5.6%)	8 (8.3%)	
Posture maintain during work			
Sitting	10 (18.5%)	37 (38.5%)	.000
Standing	21 (38.9%)	55 (57.3%)	
Bending	23 (42.6%)	4 (4.2%)	

*Significant level set at (p = 0.01) level

(Table 3) presents the variables associated with pain and discomfort in the different body region by job experience, age, daily working hours with overtime, and posture. Statistically significant relationship was found between WMSDs in job experienced (p=.000), age (p = 0.000), daily working hours with overtime (p = 0.000), and posture (p = 0.000) but type of activity perform by participants (p = 0.158) shown not statistically significant.

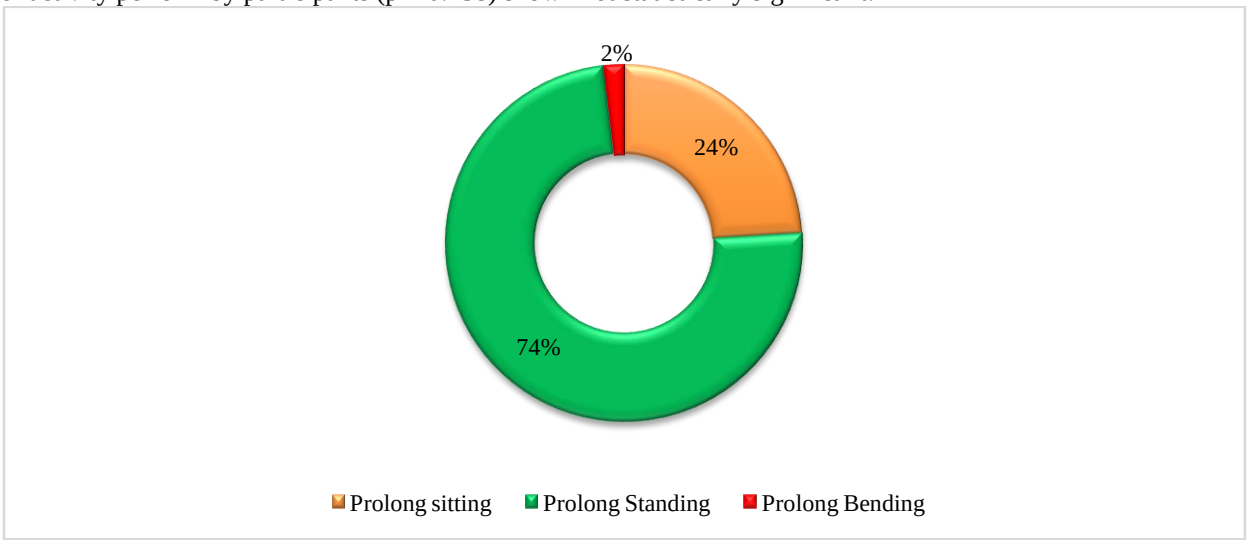

Fig. 3 Factor that makes symptoms worse

Among the 150 participants 54 cases found having problem, 13 cases reported that symptoms became worse during prolong sitting (24%), 40 cases reported that symptoms became worse during prolong standing (74%) and 1 cases reported that symptoms became worse during prolong bending (2%) (Figure 3)

Table -4 Correlation with age, job experience, working hour, type of activity and most preferred posture of RMD participants (n=150)

Correlations							
		Age	Job experience group	Working hour per day with over time	experience Pain or discomfort	Type of activity perform	Most preferred posture during work
Age	Pearson Correlation	1	0.534**	0.058	-0.400**	0.045	0.157
	Sig. (2-tailed)		0.000	0.479	0.000	0.585	0.055
	N	150	150	150	150	150	150
Job experience group	Pearson Correlation	0.534**	1	0.072	-0.377**	0.135	0.039
	Sig. (2-tailed)	0.000		0.384	0.000	0.100	0.634
	N	150	150	150	150	150	150
Working hours per day with overtime	Pearson Correlation	0.058	0.072	1	-0.351**	0.101	0.174*
	Sig. (2-tailed)	0.479	0.384		0.000	0.218	0.033
	N	150	150	150	150	150	150
Experience pain or discomfort	Pearson Correlation	-0.400**	-0.377**	-0.351**	1	-0.004	-0.407**
	Sig. (2-tailed)	0.000	0.000	0.000		0.964	0.000
	N	150	150	150	150	150	150
Type of activity perform	Pearson Correlation	0.045	0.135	0.101	-0.004	1	0.007
	Sig. (2-tailed)	0.585	0.100	0.218	0.964		0.930
	N	150	150	150	150	150	150
Most of the time maintained posture during work	Pearson Correlation	0.157	0.039	0.174*	-0.407**	0.007	1
	Sig. (2-tailed)	0.055	0.634	0.033	0.000	0.930	
	N	150	150	150	150	150	150

* Correlation is significant at the 0.01 level (2-tailed).

** Correlation is significant at the 0.05 level (2-tailed).

The study found a linear relation among age, musculoskeletal pain or discomfort, duration of work and work experience with statistical significance (<0.05). This findings suggests highly significance (<0.01) relation of variables that represents the aged worker having more experience in job and working overtime has a greater complaint of musculoskeletal pain and discomfort. The result also elicited that, majority of the workers with musculoskeletal pain and discomfort maintained a sustained posture for longer duration during their work time (Table 4).

DISCUSSION

We found very limited evidence that published in Bangladesh concerning WMSDs of RMG workers. Interestingly, lions portion among the participants were male around 84%. Most of them were from rural area (73.3%), our study depicts that major portion of the participants were relatively second decade of life and experienced than other Bangladeshi studies [16, 17] due to our inclusion criteria. We found higher rate of secondary level of education (40%) and at least have primary level of education (23.3%) as compared with Labor Force Survey of Bangladesh (40.4%) [18]. Maximum RMG are overtime paid so our study found their working hour from 11 to 14 which is (71%) (Table 1). According to inclusion criteria job experience was major in 1 to 5 years (64.7%), pain distribution was higher among cutting operators (56%), absenteeism due to pain found (72%), length of absenteeism from work due to pain 1 to 5 days (49%) (Figure 1). Diaz-Ledezma et al. [19] focused on patients with acute LBP who had significantly longer sick leave than the rest of the population were patients with an episode of work absenteeism because of LBP in the previous year (14% longer sick leave than patients without that history), manual workers (35% longer than no manual workers). Our study shows LBP is a prevalent and common problem that have experienced by (36%) participants, recurrent attack of pain more common in 1 to 5 times among (66.67%) participants, for the treatment of their pain most of the time received medication (72%) and physiotherapy was very little (4%), most them had moderate pain (51%), there preferred posture was standing (50.7%) (Table 2). Hanney et al. [20] state that 70% cases were suffer recurrent attack of low back pain between 1-6 times and 30% cases were suffer recurrent attack of low back pain between 7-15 times. In Nigeria participant's health seeking behaviour most of them prefer self-medication 31.4% and herbal 17.8% [21].This is in concordance with a research by Chan et al. [22] who reported the prevalence back pain 26%, Hague et al. [23] state that 30% of workers in the European Union (EU) reported problems with back pain, worldwide estimates of lifetime prevalence of LBP vary from 50 to 84%.Somewhat different result found in an Indian study where lower back 41.03% and neck 64.10%, but another study of India, where they found the most common sites affected in neck 32.1%, knee 28.7% and low back (26.6%) [24, 25]. Common activity that perform by RMG participants that are lifting activity 2 (1.3%), 8 (5.3%) perform pulling activity, 18 (12%) perform pushing activity, 15 (10%) perform bending activity, 1 (0.7%) perform twisting movement activity, 24 (16%) perform rotation movement, 28 (18.7%) perform repeated movement activity, 23 (15.3%) perform lifting and bending activity, 20 (13.3%) perform bending and twisting movement activity, 11 (7.3%) perform pulling and pushing activity (Figure 2). Another study showed that Malaysian sewing operators had repetitive tasks awkward static posture, awkward grips and hand movement pulling, lifting, pushing, in India 65.8% of the workers were working in those sections which involved prolonged hours of standing [26, 25]. (Table 3) presents the variables associated with pain and discomfort in the different body region by job experience, age, daily working hours with overtime, and posture. Statistically significant relationship was found between WMSDs in job experienced (p=.000), age (p = 0.000), daily working hours with overtime (p = 0.000), and posture (p = 0.000) but type of activity perform by participants (p = 0.158) shown not statistically significant. Among 150 participants 54 participants' symptoms worse during prolong sitting (24%), during prolong standing (74%) and during prolong bending (2%) (Figure 3). Compared with a Cambodian study sewing machine worker prolong sitting and non-sewing operator worked 10 to 12 hours per days and repeated or forceful motion [27]. Our study shows a linear relation among age, musculoskeletal pain or discomfort, duration of work and work experience with statistical significance (<0.05). This findings suggests highly significance (<0.01) relation of variables that represents the aged worker having more experience in job and working overtime has a greater complaint of musculoskeletal pain and discomfort. The result also elicited that, majority of the workers with musculoskeletal pain and discomfort maintained a sustained posture for longer duration during their work time (Table 4). Tiwari et al. [28] mentioned that duration of job experience 10 years were found to be significantly associated with development of low back pain among cotton textile workers.

CONCLUSION

Garments worker livelihood and benefitted by the garment factory but their misery of low back pain, other musculoskeletal problems are alarming concerns for garment factory. The work related musculoskeletal problem is the most common problem among the garment factory workers as documented in our studies. Cutting operators rather thanfinishing operators are suffering a lot with LBP.

LIMITATION OF THE STUDY

It will be more preferable if random sampling technique chosen rather than the convenient sampling for further research in order to enabling the power of generalization the results. In the present study only musculoskeletal problems was taken into account excluding other common health problems among garment workers like- nutritional status, depression, anxiety, visual and respiratory problems.

RELEVANCE OF THE STUDY

Health related musculoskeletal problems at workplace are one of the major concerns among garment workers. Though this study is a preliminary step but this type of study evidence has scarcity in our country.

RECOMMENDATIONS

Work related musculoskeletal Disorders (WMSDs) are one of the most vulnerable serious complications that frequently need medical attention. As it is major health concern so work station safety, ergonomic change, and periodic health check-up can improve the quality service and decrease absenteeism. So for further study investigator strongly recommended to include every garments factory in Bangladesh and so the results would be generalized in wider population.

DECLARATION

Competing interests: The authors declare that they do not have any conflict of interest. The Delta Composite Knitting Industries Limited has no role in the design of this study, analysis, and interpretation of data and writing the manuscript.

AUTHOR CONTRIBUTIONS

Conceptualization: Md. Obaidul Haque, S. M. Iftekhar Alam, Md. Shahoriar Ahmed.
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Visualization: Md. Shahoriar Ahmed.
Writing ± original draft: Md. Shahoriar Ahmed.
Writing ± review & editing: Akhlasur Rahman, Sulakshna Shyama Biswas, Mayesa Nujhat, Shujaiat Gani, K M Amran Hossain, Md. Shahoriar Ahmed.

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REFERENCE

[1]. Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C, Ezzati M, Shibuya K, Salomon JA, Abdalla S, Aboyans V, Abraham J. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. The lancet. 2012; 15; 380(9859): 2163-96.

[2]. Hoy D, March L, Brooks P, Blyth F, Woolf A, Bain C et al. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. Annals of the Rheumatic Diseases. 2014; 73(6):968-974.

[3]. Quadir MM, Sen K, Sultana MR, Ahmed MS, Taoheed F, Andalib A, Arafat S. Demography, diagnosis and complications of spinal cord injury patients in a rehabilitation center of Bangladesh. Int J Neurorehabilitation. 2017; 4(1):e244. Doi: 10.4172/2376-0281.1000244

[4]. Arafat S, Ahmed S, Ahmed F, Zaman S, Andalib A. Depression in Spinal Cord Injury Patients: a Cross-sectional Observation with PHQ-9 in a Rehabilitation Center of Bangladesh. Journal of Behavioral Health. 2017; 6(4):1-4.

[5]. Rahman ZM, Alam SM, Goni MS, Ahmed F, Tawhid AK, Ahmed MS. Demographic Profile of Spinal Cord Injury Patients Admitted in a Rehabilitation Centre: An Observational Study from Bangladesh. Journal of Medical Research and Innovation. 2018; 1:e000111.

[6]. MS A. Consequences and Outcome of Spinal Cord injury Occurred by Bull Attack: A 10 Years Observation from Bangladesh. J Spine. 2018; 07(04): 3–8. Doi: 10.4172/2165-7939.1000419. Available from: https://www.omicsonline.org/peer-reviewed/consequences-and-outcome-of-spinal-cord-injury-occurred-by-bull-attack-a-10-years-observation-from-bangladesh-105116.html

[7]. Farhana K, Syduzzaman M, Munir MS. Present Status of Workers in Ready-Made Garments Industries in Bangladesh. European Scientific Journal, ESJ. 2015; 30;11(7).
[8]. Uddin M, Tangem S. A Study on the Relationship between Working Environment and Labor Unrest in Ready-Made Garment (RMG) Industry of Bangladesh. 2015; 4(9).
[9].]McBeth J, Jones K. Epidemiology of chronic musculoskeletal pain. Best Practice & Research Clinical Rheumatology. 2007; 21(3):403-425.
[10]. Workplace Safety and Health Guidelines [Internet]. Wshc.sg. 2018 [cited 6 December 2018]. Available from: https://www.wshc.sg/files/wshc/upload/cms/file/2014/WSH_Guidelines_Occupational_Diseases%281%29.pdf.
[11]. Niu S. Ergonomics and occupational safety and health: An ILO perspective. Applied Ergonomics. 2010; 41(6):744-753.
[12]. Hague J, Oxborrow L, McAtamney L. Musculoskeletal disorders and work organisation in the European clothing industry. Brussels: European Trade Union Technical Bureau for Health and Safety; 2001. Available from: https://www.etui.org/content/download/4975/49972/file/MSD_clothing_industry.pdf.
[13]. Ministry of Labour and Employment. 2014-2015. Department of Inspection for Factories and Establishments, Government of the People's Republic of Bangladesh. 2015. Available from: http://database.dife.gov.bd/factories
[14]. Lwanga SK, Lemeshow S. Sample size determination in health studies: a practical manual. 1991: Geneva: World Health Organization; 1991. (Page 2; Estimating a population proportion with specified relative precision). Available from: http://apps.who.int/iris/bitstream/handle/10665/40062/9241544058_%28p1-p22%29.pdf?sequence=1&isAllowed=y
[15]. Arbuckle JL. IBM SPSS Amos 22 user's guide. Crawfordville, FL: Amos Development Corporation. 2013.
[16]. Sarder MB, Imrhan SN, Mandahawi N. Ergonomic workplace evaluation of an Asian garment-factory. Journal of human ergology. 2006; 35(1/2):45-51.
[17]. Jahan N, Das M, Mondal R, Paul S, Saha T, Akhtar R, et al. Prevalence of Musculoskeletal Disorders among the Bangladeshi Garments Workers. SMU Medical Journal. 2015; 2(1):102-13.
[18]. Bangladesh Bureau of Statistics and International Labour Organization, Labour Force Survey (LFS) Bangladesh 2013. 2015, Bangladesh Bureau of Statistics (BBS), International Labour Organization (ILO).
[19]. Diaz-Ledezma C, Urrutia J, Romeo J, Chelen A, González-Wilhelm L, Lavarello C. Factors associated with variability in length of sick leave because of acute low back pain in Chile. The Spine Journal. 2009;9(12):1010-5.
[20]. Hanney WJ, Kolber MJ, Beekhuizen KS. Implications for physical activity in the population with low back pain. American journal of lifestyle medicine. 2009; 3(1):63-70.
[21]. Akinpelu, Oyewole, Odole, Ogunbamowo. Work-related musculoskeletal pain and health-seeking behavior among Nigerian sewing machine operators: Tropical Journal of medical Research. 2016; 19(2):152-154. Doi: 10.4103/1119-0388.185446
[22]. Chan J, Janowitz I, Lashuay N, Stern A, Fong K, Harrison R. Preventing musculoskeletal disorders in garment workers: preliminary results regarding ergonomics risk factors and proposed interventions among sewing machine operators in the San Francisco Bay Area. Applied occupational and environmental hygiene. 2002; 17(4):247-53.
[23]. Hague J, Oxborrow L, McAtamney L. Musculoskeletal disorders and work organisation in the European clothing industry. TUTB; 2001.
[24]. Saha TK, Dasgupta A, Butt A, Chattopadhyay O. Health status of workers engaged in the small-scale garment industry: How healthy are they?. Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine. 2010; 35(1):179. Doi: 10.4103/0970- 0218.62584
[25]. Ravichandran SP, Shah PB, Lakshminarayanan K, Ravichandran AP. Musculoskeletal problems among workers in a garment industry, at Tirupur, Tamil Nadu. Indian Journal of Community Health. 2016; 30; 28(3):269-74.
[26]. R Nawawi, BM Deros, DDI Daruis, ARamli, RM Zein and LH Joseph. Effects of payment method on work control, work risk and workrelated musculoskeletal health among sewing machine operators: Journal of Mechanical Engineering and Sciences: 2015; 9:1705-1713. Doi: 10.15282/jmes.9.2015.16.0164
[27]. Leap Van, Naesinee Chaiear, Chat Sumananont and Chheng Kannarath. Prevalence of musculoskeletal symptoms among garment workers in Kandal province: Cambodia Journal of Occupational Health: 2016; 58(1):107–117. Doi: 10.1539/joh.15- 0100-FS.
[28]. Rajnarayan R Tiwari, Mrinalini C. Pathak SPZ. Low Back Pain among Textile Workers. Indian J Occup Environ Med. 2003;7(1):27–9.