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Musculoskeletal Risk Levels and Discomforts In Garment Factory Workers-An Observational Study

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ABSTRACT

According to WHO, over 1000 million people worldwide are employed in small scale industries. Garment Industry of India is one among these industries. Asian garment factories reported most incidences of back, neck and shoulder disorders due to working with constrained postures, poorly designed workstations and non-ergonomic tools. This study is intended to find the musculoskeletal risk levels and discomforts among the garment factory workers so that we can develop alternate approaches like posture awareness and avoid further musculoskeletal problems. Observational study conducted in a garment factory, Belagavi. Static and dynamic working posture and its risk for musculoskeletal disorder was observed in 150 workers of Next Fashion Apparels, Belagavi, Karnataka. Data analysis was done using SPSS version 16.0. Descriptive statistics including mean and standard deviation were used to analyse the data. ANOVA was used to compare means of all group. RUBA score was higher in printing section followed by the stitching section. No pain was significant. The study concluded that Garment factory workers of Next fashion apparels factory had a medium risk of musculoskeletal symptoms and disorder. No pain was significant as the years of working of the workers were less as compared to the previous studies. Authors in the future can consider this study for reference of years of work as here the same is less as compared to other studies.

Keywords: Garment factory, musculoskeletal disorder, REBA, Belagavi.

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INTRODUCTION

Occupational Health and Safety proposed that every working human being in the country has safe and healthy working environment so that human resources are preserved. This purpose is achieved in most of the developed countries but still have to go in satisfying this objective.¹

According to WHO, over 1000 million people worldwide are employed in small scale industries, garment Industry of India is one among these industries. Many are run by private sectors, providing employment for both men and women mainly those from below average socioeconomic population.²

Garment industry is one of the most important strategic industries which constitutes about 7% of total world's industrial production and 8.3% of the total trade in industrial matters. World's total labor force in garment industry account for more than 14%. It brings most of the Nation's foreign currency as it is an important factor of production.³

Globally WRMSD's account for around 40% of the total compensated cost if occupational diseases and injuries and the symptoms are caused by excessive fast and repetitive activity, forceful exertion, concentration, awkward posture, prolonged stationary postures and vibration. Asian garment factories reported most incidences of back, neck and shoulder disorder due to working with constrained postures, poorly designed workstations and non-ergonomic tools.^{4,5} Hague et. Al. in a literature review indicated that many consistent studies showed high prevalence of musculoskeletal symptoms in garment and textile industry, the neck, shoulder and back regions most affected.⁶

Garment industry comprises of different sections i.e. cutting, sewing, printing, finishing, packing and administration. Sewing machine workers among garment factory workers were more prone for WRMSD's and reason for long term sick leave, and disability pensions in the world. United states of Bureau of Labor Statistics Annual Survey of occupational injuries and illness ranked sewing machine workers of clothing industry offering the upper body musculoskeletal disorders.⁷ A study indicate that garment manufacturing workers had neurological, respiratory and musculoskeletal problems.⁸ A study reported that years of service was significantly associated with elbow , wrist, shoulder and neck disorders among garment factory workers.⁹⁻¹¹

Ergonomic principles should be applied in the work tasks and equipment used otherwise, workers may have exposure to undue stress, awkward posture, forceful exertion, repetitive motion and heavy lifting.¹²

Mujumdar conducted a study which showed that illnesses and diseases are widespread among the garment workers. Most of the industry workers , after a certain period of time abandon the profession and go on for other suitable and comfortable work.¹The Organization of Health

and safety established rules for industrial workings but it did not apply in some industries like garment industry and therefore raising interest in solving the occupational diseases. Jana P. conducted a study, concluded, recognition of ergonomic risk factors is the first step in preventing further disorders and improving worker protection.^{12,13}

Few studies are being done in India on Work related musculoskeletal risk levels among garment factory workers. Rapid Upper Body Assessment and Musculoskeletal discomfort Form is used individually in ergonomic studies of different industries of India. As per best of our knowledge these two scales together have not being used among garment factory workers in India till date. Therefore, this study is intended to find the musculoskeletal risk levels and discomforts among the garment factory workers by using REBA scale and Musculoskeletal discomfort questionnaire, so that we can develop alternate approaches like posture awareness and avoid further musculoskeletal problems.

MATERIALS AND METHOD

An observational study design was conducted on 150 subjects through non- probability sampling design for a period of 6 months. Both male and female workers willing to participate, from Next Fashion Apparels Factory, Autonagar, Belagavi, were included for the study. Subjects with malignancy and subject's commenced working since six months or less were excluded for the study.

OUTCOME MEASURES:

Rapid Entire Body Assessment (REBA)

Hignett and McAtamney (2000) proposed REBA in the UK as a requirement observed within the range of postural analysis tools, specifically with sensitivity to the type of changeable working positions found in health care and other service industries. It's a quick and easy measure to assess the risks of WRMSD's. It divides the body into section, coded independently, according to movement planes. It offers a scoring system for muscle activity throughout the entire body, stagnantly, dynamically, fast changing or in an unsteady way. There are 5 level of actions to indicate the obtained scores (Stanton et.al (2004) and Hashim et. al. (2012).

Musculoskeletal Discomfort Form (Based on Nordic Questionnaire (Kourinka et. al. 1987))

The form was designed by the Institutes of Occupational Health in the Nordik countries, developed from a project funded by the Nordic Council of Ministers. The questionnaires consist of structured, forced binary or multiple choice questions which can be self-administered or in interviews.

PROCEDURE:

Ethical clearance was obtained from the Institute of Ethical Board. Participants were included according to inclusion and exclusion criteria. Workers were recruited from Next fashion apparels factory, informed about the aims and procedure of the study. Interested workers signed the written consent, to be considered a study subject. Therapist observed the working posture of the participant and by the use of REBA score, musculoskeletal risk levels were interpreted. Face to face interview were carried out using musculoskeletal discomfort form to know the prevalence of specific body part pain in garment factory workers.

RESULTS AND DISCUSSION

The present study was done to find out the risk levels and discomforts in garment factory workers. Total of 150 participants were observed where females were more in number as compared to males.(Table 1, Table 2). Maximum workers in the factory were between the age group of 21 to 40 (Table 3, Table 4). Duration and hours of work showed significance with the problems associated with garment factory workers.(Table 5, Table 6). Comparison of REBA score with different sections of factory showed printing section to have higher score than the stitching section.(Table 7). Musculoskeletal discomfort form showed “No Pain” significant in shoulder, elbow, wrist/hand, low back and ankles.(Table 8, Table 9, Table 10).

Table 1: Distribution of four types of workers (Cutting, Sewing, Printing and Finishing) by gender.

Gender	Cutting	Sewing	Printing	Finishing	Total
Male	7	1	6	18	32
Female	17	69	10	22	118
Total	24	70	16	40	150

Table 2: Percentage Distribution of four types of workers (Cutting, Sewing, Printing and Finishing) by gender.

Gender	Cutting	Sewing	Printing	Finishing	Total
Male	29.17	1.43	37.50	45.00	21.33
Female	70.83	98.57	62.50	55.00	78.67
Total	100.00	100.00	100.00	100.00	100

Table 3: Distribution of four types of workers (Cutting, Sewing, Printing and Finishing) by age groups

Age groups	Cutting	Sewing	Printing	Finishing	Total
<=20yrs	2	14	2	4	22
21-30yrs	20	22	5	14	61
31-40yrs	2	29	8	11	50
41+yrs	0	5	1	11	17
Total	24	70	16	40	150
Mean age	24.92	30.59	31.31	33.68	30.58
SD	3.19	7.89	6.95	8.37	7.83

Table 4: Comparison of four types of workers (Cutting, Sewing, Printing and Finishing) with respect to mean age and BMI scores by one way ANOVA

Workers	Age in yrs. Mean \pm SD	BMI Mean \pm SD
Cutting	24.92 \pm 3.19	21.14 \pm 3.91
Sewing	30.59 \pm 7.89	21.57 \pm 3.22
Printing	31.31 \pm 6.95	21.53 \pm 3.18
Finishing	33.68 \pm 8.37	22.27 \pm 3.54
Total	30.58 \pm 7.83	21.68 \pm 3.41
F-value	7.0826	0.6261
P-value	0.0002*	0.5993

*p<0.05

Table 5: Comparison of four types of workers (Cutting, Sewing, Printing and Finishing) with respect to mean Duration of job in yrs. and Hours of work by one way ANOVA

Workers	Duration of Job Mean \pm SD	Hours of work Mean \pm SD
Cutting	0.34 \pm 1.07	42.00 \pm 0.00
Sewing	2.03 \pm 2.26	42.00 \pm 0.00
Printing	2.95 \pm 2.92	42.00 \pm 0.00
Finishing	2.17 \pm 3.26	50.95 \pm 1.69
Total	1.90 \pm 2.59	44.39 \pm 4.06
F-value	4.2553	1021.9014
P-value	0.0065*	0.0001*

*p<0.05

Table 6: Comparison of four types of workers (Cutting, Sewing, Printing and Finishing) with respect to REBA scores by one way ANOVA

Sources of variation	Degrees of freedom	Sum of squares	Mean sum of squares	F-value	p-value
Between types of workers	3	120.36	40.12	11.048	0.0001*
Within types of workers	146	530.18	3.63		
Total	149	650.54			

*p<0.05

Table 7: Pair wise comparison of four types of workers (Cutting, Sewing, Printing and Finishing) with respect to REBA scores by Tukeys multiple posthoc procedures

Workers	Cutting	Sewing	Printing	Finishing
Mean	5.38	5.37	7.81	4.58
SD	1.61	2.15	2.29	1.36
Cutting	-			
Sewing	P=0.9999	-		
Printing	P=0.0005	P=0.0001*	-	
Finishing	P=0.3639	P=0.1503	P=0.0001*	-

*p<0.05

Table 8: Comparison of four types of workers (Cutting, Sewing, Printing and Finishing) with respect to status of musculoskeletal discomfort: A: have you at any time during the last 12 months had trouble (ache, discomfort, numbness)

MSK Discomfort	Cutting	Sewing	Printing	Finishing	Total	Chi-square	p-value
Neck							
No	24	61	16	35	136	5.6190	0.1320
Yes	0	9	0	5	14		
Shoulder							
No	21	68	16	30	135	15.913	0.0010*
Yes	3	2	0	10	15		
Elbow							
No	24	70	16	37	147	8.4180	0.0380*
Yes	0	0	0	3	3		
Wrist hand							
No	21	70	16	28	135	27.500	0.0001*
Yes	3	0	0	12	15		
Upper back							
No	21	69	16	38	144	6.4920	0.0900
Yes	3	1	0	2	6		
Lower back							
No	21	54	16	25	116	11.127	0.0111*
Yes	3	16	0	15	34		
One/both hip thigh							
No	24	62	14	32	132	5.7220	0.1260
Yes	0	8	2	8	18		
One or both knees							
No	18	52	13	38	121	7.5950	0.0550
Yes	6	18	3	2	29		
One or both ankle							
No	24	56	11	35	126	8.5380	0.0360*
Yes	0	14	5	5	24		
Total	24	70	16	40	150		

*p<0.05

Table 9: Comparison of four types of workers (Cutting, Sewing, Printing and Finishing) with respect to yes for A i.e. B: have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?

MSK discomfort	Cutting	Sewing	Printing	Finishing	Total	%
Neck						
No	0	4	0	0	4	28.57
Yes	0	5	0	5	10	71.43
Shoulder	24					
No	0	2	3	8	13	56.52
Yes	3	2	0	5	10	43.48
Elbows						
No	0	0	0	3	3	100.00
Yes	0	0	0	0	0	0.00

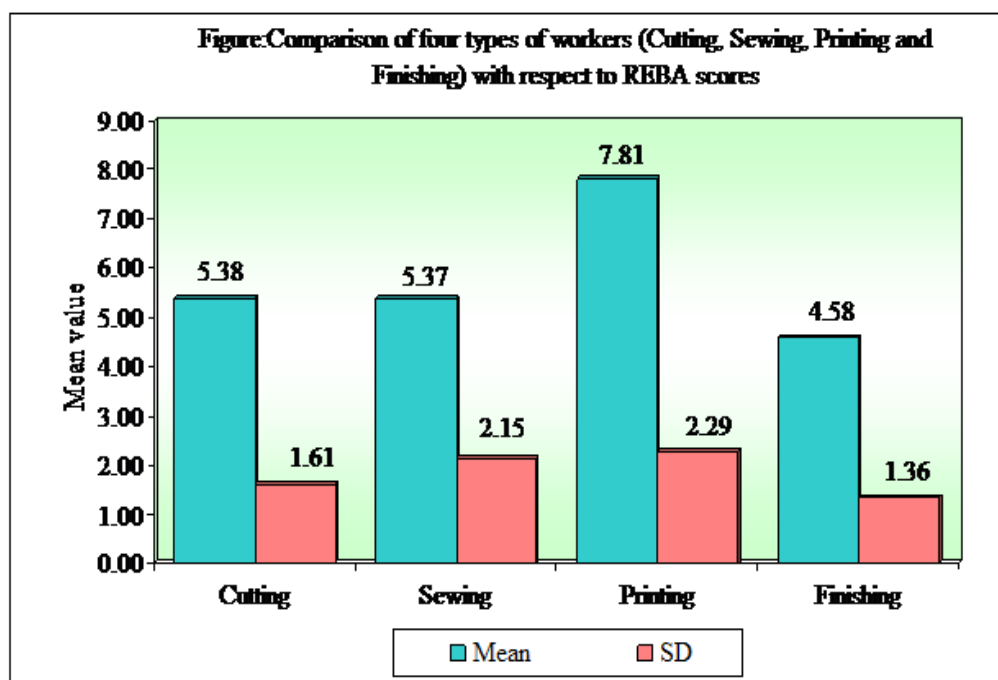
Wrist/hands						
No	0	0	0	3	3	20.00
Yes	3	0	0	9	12	80.00
Upper back						
No	0	0	0	2	2	33.33
Yes	3	1	0	0	4	66.67
Lower back						
No	3	4	0	6	13	38.24
Yes	0	12	0	9	21	61.76
One/both hips/thighs						
No	0	0	2	6	8	44.44
Yes	0	8	0	2	10	55.56
One or both knees						
No	4	5	3	2	14	48.28
Yes	2	13	0	0	15	51.72
One or both ankles						
No	0	1	3	2	6	25.00
Yes	0	13	2	3	18	75.00

*p<0.05

Table 10: Comparison of four types of workers (Cutting, Sewing, Printing and Finishing) with respect to yes for status of musculoskeletal discomfort for A i.e. C: have you had trouble at any time the last 7 days?

MSk discomfort	Cutting	Sewing	Printing	Finishing	Total	%
Neck						
No	0	4	0	0	4	28.57
Yes	0	5	0	5	10	71.43
Shoulder						
No	0	2	1	4	7	30.43
Yes	3	2	2	9	16	69.57
Elbows						
No	0	0	0	0	0	0.00
Yes	0	0	0	3	3	100
Wrist/hands						
No	3	0	0	0	3	20.00
Yes	0	0	0	12	12	80.00
Upper back						
No	0	0	0	0	0	0.00
Yes	3	1	0	2	6	100
Lower back						
No	0	7	0	4	11	32.35
Yes	3	9	0	11	23	67.65
One/both hips/thighs						
No	0	7	0	4	11	61.11
Yes	0	1	2	4	7	38.89
One or both knees						
No	1	10	0	0	11	37.93
Yes	5	8	3	2	18	62.07
One or both ankles						
No	0	8	0	1	9	37.50

Yes	0	6	5	4	15	62.50
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Graph 1. Comparison of four types of workers with respect to REBA score.

DISCUSSION:

The present study was intended to observe the musculoskeletal symptoms and further risks for musculoskeletal disorders in the workers of different sections of the garment factory, where it was observed that workers were at medium risk for musculoskeletal disorders. In the present study, age group of 21-30 years was common, especially in the sewing section. A study done by Wakjira who conducted a study on 422 sewing operators, had 306 sewing workers above 30 years, they showed 40% and 37.7% of self-reported elbow/forearm and hand/wrist Ms Disorder's respectively³. A survey done in Sweden on Musculoskeletal disorders in female workers of garment factory, had a mean age group of 24.2 years, showed high prevalence of musculoskeletal disorders¹⁴. An ergonomic workplace evaluation done by MD B.Sardar in an Asian garment factory, workers were of a mean age group of 27 years.¹⁵ As age in most of the previous studies is nearly same that of the present study, but study showed no significant pain. In the present study "No Pain" was significant in almost all the parts of the body. A study done in garment manufacturing units of Jaipur, all sections showed significant pain in at least one of the body part. This may be due to high age group (61%) of 40-50 years.¹ It has been shown that age and obesity are the major risk factors for developing musculoskeletal disorders.(Yelin, Trupin and Sebesta, 1999:778)The other factor for these results can be the years/ duration of job. Study done in Tamil Nadu, all 3 sections i.e. cutting, sewing and finishing showed musculoskeletal problems.² This may be due to 10 or/and more

than 10 years of job experience in the same field. Study done by UjukBerberoghe on garment factory workers showed musculoskeletal symptoms where the mean employment period was 11.11 ± 6.07 . The study also showed association of age of workers with the higher RULA.¹⁶ In the present study mean years of working was maximum of 3 years hence no pain was significant. Present study included 78.67% of female workers. Chavalitsahulchai observed musculoskeletal disorders in 5 different industries of Thailand showed high prevalence of MSD in female workers.¹⁴ Study done by LyndallStrazdins to find out the reason for increased risk of MSD in women's, said that, females have an additional work of parenting and house work hence mostly cut back on their physical health and relaxation¹⁷. A study done by Hootman to observe gender differences in work related physical and psychological risk factors, as such showed no relevant gender differences in most of the risk factors, if did find a difference, men were at higher risk than women. As per the laboratory studies if men and women do the same task, women tend to perform the task differently. 10.7 and 7.0 years was the mean working years of men and women respectively.¹⁸ As said in a study done by D. Rajeshkar, sewing/ stitching work is mostly given to the females ,labor work, cutting , printing, finishing is given to males¹⁸, but in this study as noticed, females in all the sections are more in number than in males.High prevalence of work related musculoskeletal disorders had been noticed in manual labors, uneasy postures, repetations and vibrations, static work, and poor psychological and social conditions.¹⁹ Risk of developing hand or arm MSD's in both high demand/high-control and high demand/ low- control job categories was largely increased. (Gerr et.al. 2013). Punnett et.al. found significantly increased pain ratios in shoulder, wrist, hand as well as CTS symptoms among garment workers performing stitching and finishing¹⁹. In the present study, stiching section was at medium risk for back pain as workers seated on hard heightened chairs without backrest. Study done by Rena Mehta, majority showed Musculoskeletal complaints in sewing section. In the present study, printing section showed higher REBA score than other sections of the garment factory¹. This may be due to firstly the standing position and secondly due to upper limb movements above the shoulder level.

CONCLUSION:

The study concluded that Garment factory workers of Next fashion apparels factory had a medium risk of musculoskeletal symptoms and disorder. No pain was significant as the years of working of the workers were less as compared to the previous studies. Wrong posture and altered working pattern can be prevented so that no pain and further MSD's occur. The primary prevention can be done by the workers themselves by being conscious with their posture. Secondly, switching between the sections should be done so that no worker does the

same monotonous job. Diagrams of stretching and relaxation exercises should be stuck on the walls as workers in between the work can do the same. Hence, according to the obtained REBA score i.e. in-between 4 to 7; soon change in the working posture should be taken into consideration.

FUTURE SCOPE:

Authors in the future can consider this study for reference of years of work as here the same is less as compared to other studies.

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