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Prevalence of musculoskeletal disorders in sales person of departmental store

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Abstract

To maintain good health of the sales person and to improve their work efficiency, this study will be helpful to check the work related musculoskeletal disorder in sales person of departmental store. 100 sales person with mean age of female $29 \pm$ and male $27 \pm$. Sales person were assessed individually by the therapist by REBA Scale. The result showed that salesperson were categorized according to what stores they were working (i.e Cosmetic Department, Clothes department and Shoe Department). Salesperson of Cosmetic department with sample size 50 had areas which were at a risk to develop into musculoskeletal disorder was Neck (55%) Trunk (30%), Arm (10%), Legs (5%). Salesperson of Clothes department with sample size 40 had areas which were at a risk to develop a musculoskeletal disorder were Trunk (60%), Arm (20%), Legs (20%), Neck (5%). Salesperson of Shoe department with sample size of 10 had areas which were at a risk to develop a musculoskeletal disorder at Trunk (50%), Leg (30%), Arm (15%), Neck (5%).

Keywords: sales person, musculoskeletal disorder, REBA scale

1. Introduction

Prevalence is defined as the ratio of the number of occurrences of a disease or a event to the number of units at risk in the population ^[1]. In contrast to many occupational diseases that have their origin in exposure to particular hazardous agents, most musculoskeletal disorders are characterized as multifactorial ^[2]. These types of injuries of the soft tissues are referred to by many names, including work related musculoskeletal disorders, repetitive strain injuries, repetitive motion injuries and cumulative trauma disorders ^[4]. Musculoskeletal disorders are injuries that affect the human body's movement or musculoskeletal system (i.e muscle, tendons, nerves, disc, blood vessels etc). Salesperson have to work for long hours and include activities like lifting, carrying objects, overhead activities, repeated activities, etc which lead to musculoskeletal pain ^[3]. Salespersons in the departmental stores are at an increased risk of developing the musculoskeletal symptoms due to exposure to various physical works ^[5]. Work related diseases can be caused by adverse work conditions and can be exacerbated by workplace exposures which can impair their work capacity ^[12]. Physical risk factors at work includes apply of force, high repetition and awkward working postures ^[2]. A risk factor is any source or situation which has a potential to cause injury or can lead to the development of a disorder ^[11]. The variety and complexity of the factors that contribute to the appearance of these disorders explains the difficulties often encountered, to determine the best suited ergonomic intervention to be accomplished in a given workplace, to control them ^[6]. The physical risk factors are a subset of work related risk factors including the environment and biomechanical risk factors, such as posture, force, repetition, direct external pressure (Stress per contact) ^[7]. Another risk factor that affects all risk factors is duration ^[12]. Muscle disorder-Physical work requirements and individual factors determine muscle force and length characteristics as a function of time, which in turn determines muscle energy requirements. Muscle energy requirements in turn can lead to fatigue, which then can lead to muscle disorders ^[8]. Tendon Injuries- Tendons related to tensile forces from muscle contractions and shearing forces from adjacent anatomic surfaces (Example- bones and ligaments). Tendon responses can be mechanical (Elastic and viscous deformation and yielding) and physiological (Include the triggering of nerve receptors, healing, and adaptation) ^[8].

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2. Materials and Methodology

2.1 Subjects

The subjects were recruited by simple random sampling method. Total number of subjects were 100 and the age groups ranged between 20-40 years of age. Subjects were free from any medical condition, recent injuries, trauma, deformities, disability, neurological condition. The sales

person who work in the department store for more than 8 hrs and has work experience since 1 year were included in the study. Sales person who were managers or supervisors were excluded.

2.2 Instrument

Rapid entire body assessment scale. (REBA)

ERGONOMICS PLUS REBA Employee Assessment Worksheet

Task Name: _____ Date: _____

A. Neck, Trunk and Leg Analysis

Step 1: Locate Neck Position
 +1 = 0-20°
 +2 = 20-45°
 +3 = 45-90°
 Neck Score: _____

Step 1a: Adjust...
 If neck is twisted: +1
 If neck is side bending: +1

Step 2: Locate Trunk Position
 +1 = 0-15°
 +2 = 15-30°
 +3 = 30-45°
 +4 = 45-90°
 Trunk Score: _____

Step 2a: Adjust...
 If trunk is twisted: +1
 If trunk is side bending: +1

Step 3: Legs
 +1 = 0-45°
 +2 = 45-90°
 Adjust: 0-45°
 Add +1
 Add +2
 Leg Score: _____

Step 4: Look-up Posture Score in Table A
 Using values from steps 1-3 above, locate score in Table A

Step 5: Add Force/Load Score
 If load < 11 lbs.: +0
 If load 11 to 22 lbs.: +1
 If load > 22 lbs.: +2
 Adjust: if shock or rapid build-up of force: Add +1
 Force / Load Score: _____

Step 6: Score A, Find Row in Table C
 Add values from steps 4 & 5 to obtain Score A, find row in Table C

Scoring
 1 = Negligible Risk
 2-3 = Low Risk, Change may be needed.
 4-7 = Medium Risk, Further Investigate, Change Soon.
 8-10 = High Risk, Investigate and Implement Change
 11+ = Very High Risk, Implement Change

Scores

Table A: Neck

		Neck											
		1				2				3			
LRP		1	2	3	4	1	2	3	4	1	2	3	4
Trunk	1	1	2	3	4	1	2	3	4	3	3	3	4
2	2	3	4	5	6	3	4	5	6	4	5	6	7
3	2	4	5	6	7	4	5	6	7	5	6	7	8
4	3	5	6	7	8	5	6	7	8	6	7	8	9
5	4	6	7	8	9	6	7	8	9	7	8	9	9

Table B: Lower Arm

		Lower Arm					
		1			2		
Wrist		1	2	3	1	2	3
Upper Arm	1	1	2	2	1	2	3
2	2	1	2	3	2	3	4
3	3	3	4	5	4	5	5
4	4	4	5	6	5	6	7
5	5	5	6	7	6	7	8
6	6	6	7	8	7	8	9
7	7	7	8	9	8	9	9
8	8	8	9	10	9	10	10
9	9	9	10	10	10	11	11
10	10	10	10	11	11	11	12
11	11	11	11	12	12	12	12
12	12	12	12	12	12	12	12

Table C: Score A

		Score B											
		1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	1	2	2	3	4	5	6	7	7	7
2	1	2	3	3	4	4	5	6	6	7	7	8	
3	2	3	3	4	5	6	7	8	8	9	9	9	
4	3	4	4	4	5	6	7	8	9	9	9	9	
5	4	4	4	5	6	7	8	9	9	9	9	9	
6	5	5	5	6	7	8	9	10	10	10	10	10	
7	6	6	6	7	8	9	10	10	10	10	10	10	
8	7	7	7	8	9	10	10	10	10	10	10	10	
9	8	8	8	9	10	10	10	10	10	10	10	10	
10	9	9	9	10	10	10	10	10	10	10	10	10	
11	10	10	10	10	10	10	10	10	10	10	10	10	
12	11	11	11	11	11	11	11	11	11	11	11	11	
13	12	12	12	12	12	12	12	12	12	12	12	12	

B. Arm and Wrist Analysis

Step 7: Locate Upper Arm Position
 +1 = 0-20°
 +2 = 20-45°
 +3 = 45-90°
 +4 = 90-180°
 Upper Arm Score: _____

Step 7a: Adjust...
 If shoulder is raised: +1
 If upper arm is abducted: +1
 If arm is supported or person is leaning: -1

Step 8: Locate Lower Arm Position
 +1 = 0-45°
 +2 = 45-90°
 Lower Arm Score: _____

Step 9: Locate Wrist Position
 +1 = 0-15°
 +2 = 15-30°
 Wrist Score: _____

Step 9a: Adjust...
 If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B
 Using values from steps 7-9 above, locate score in Table B

Step 11: Add Coupling Score
 Well fitting Handle and mid range power grip: **good**: +0
 Acceptable but not ideal hand hold or coupling acceptable with another body part: **fair**: +1
 Hand hold not acceptable but possible: **poor**: +2
 No handles, awkward, unsafe with any body part: **Unacceptable**: +3

Step 12: Score B, Find Column in Table C
 Add values from steps 10 & 11 to obtain Score B, find column in Table C and match with Score A in row from step 6 to obtain Table C Score.

Step 13: Activity Score
 +1 = 1 or more body parts are held for longer than 3 minute (static)
 +1 = Repeated small range actions (more than 4x per minute)
 +1 = Action causes rapid large range changes in postures or unstable base

Table C score + Activity score = REBA score

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 based on Technical note: Rapid Entire Body Assessment (REBA), Hignett, McAtamney, Applied Ergonomics 31 (2000) 201-208

Fig 1: REBA employee assessment worksheet

2.3 Procedure

1. Ethical clearance was taken from the college and permission was taken from the departmental store committee for the study
2. Consent form was taken from the person who was getting examined
3. They were explained about how they can develop musculoskeletal disorder because of their work
4. Demographic data and evaluation will be filled
5. Duration of working hours and employment
6. All sales person were assessed by REBA scale individually by the therapist

3. Result

In this study there were 100 sales person chosen by simple random sampling method for examination out of which 70 were female and 30 were male which seen pie chart-1. The mean age for females was 29 ± and for males it was 27 ±. It showed by REBA scale that sales person in general with awkward posture, forceful exertion, performing various type

of movement/action, repetitive motions, working since many years and working for longer duration of hours were at High risk of 66%, Moderate risk of 26% and Low risk of 8% for developing musculoskeletal disorders depicts in pie chart-2. The salesperson were categorized according to what stores they were working (i.e Cosmetic Department, Clothes department and Shoe Department). The salesperson of the Cosmetic department with sample size of 50 had areas which were at a HIGH risk to develop a musculoskeletal disorder was Neck (55%) and Trunk (30%), Moderate risk was Arm (10%), Legs (5%) were at LOW risk. The salesperson of the Clothes department with sample size 40 had areas which were at a HIGH risk to develop a musculoskeletal disorder was Back (60%), Moderate risk was Arm (20%) and Legs (20%), Neck (5%) were at LOW risk. The salesperson of the Shoe department with sample size 10 had areas which were at a HIGH risk to develop a musculoskeletal disorder was Back (50%) and Leg (30%), Moderate risk is Arm (15%), Neck (5%) was at LOW risk, the entire information is shown in table-1.

3.1 Illustration

3.1.A: Pie Chart-1

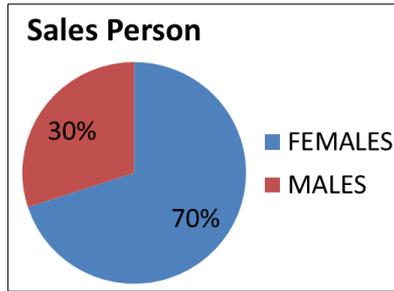


Chart 1: Percentage of females and males salesperson

Inference: This pie chart describes about the distribution of sales person which shows that 70% were female sales person and 30% were male sales person

3.1. B: Pie Chart-2

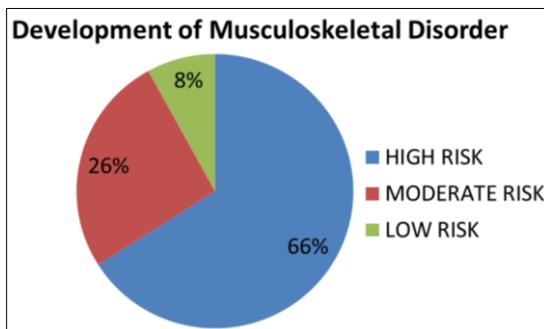


Chart 2: Distribution of development of musculoskeletal disorder

Inference: This chart shows the distribution development of musculoskeletal disorder which are categorized as High Risk (66%), Moderate Risk (26%) and Low risk (8%).

3.1. C

Table 1: Area of affection which might develop into musculoskeletal disorder in Cosmetic Department Store, Clothes Department and Shoe Department

Area of affection by Reba Scale	Cosmetic Department (%)	Clothes Department (%)	Shoe Department (%)
Neck	55%	10%	5%
Trunk	30%	50%	10%
Arm	10%	20%	15%
Leg	5%	20%	30%

4. Discussion

High demands in the work were significantly associated with development of musculoskeletal disorder [10]. Due to increase in the physical load and repetitive work the sales person are at high risk of developing musculoskeletal disorders [9]. The results of REBA analysis showed that most of the work was done in poor working posture. In this survey of 100 sales person were recruited by simple random sampling method, 70% of the population was female and 30% were male. The cause of incidence of high risk might be due to upper limb and trunk working maximum time to perform activities such as lifting and transferring, prolonged standing, frequent twisting and bending [11]. The area

affected maximum due to work in cosmetic department was neck which might be because of their constant forward bending of neck for showing the customers various feature of the product and applying it, this requires performing the action repetitive number of times for prolong duration of time which might be causing fatigue or straining of the muscles resulting in discomfort and pain in that region and also resulting in awkward posture. Back pain might be due to prolong static postures, awkward posture for longer duration due to insufficient breaks time, repetitive movements or working for prolong hours, continuously forward bending activity which might be causing repetitive motion injuries leading to discomfort and pain. The area affected moderate was arm this might be due constantly aligning the new products from one place to another, removing the products from higher shelf racks to display it to the customer this continuous action of the sales person which might be causing fatigue of the entire muscles resulting in discomfort in the arm. Legs are at low risk this might be due to minimum involvement of the lower limbs in performing activities such as lifting, pushing, bending, transferring activities, squatting to remove products from various heights of the shelf. The area affected maximum due to work in clothes department was Back pain might be due to prolong static postures, awkward posture for longer duration due to insufficient breaks time, repetitive movements or working for prolong hours, continuously forward bending activity which might be causing repetitive motion injuries leading to discomfort and pain. The moderate was legs and arm might be due to involvement of the lower limbs in performing activities such as lifting, pushing, bending, transferring activities, squatting to remove products from various heights of the shelf. The low risk was neck might be due to working in awkward posture resulting in strain over neck muscle causing fatigue. The area affected maximum due to work in shoe department store was Back and Legs might be due to performing activities such as lifting, pushing, bending, transferring activities, squatting to remove products from various heights of the shelf's and back might be due to standing for prolong hours and continuously forward bending activity which might be causing repetitive strain injuries. The areas to develop moderate risk factor was arm which might be because of constantly aligning the new products from one place to another .removing the products from higher shelf racks to display it to the customer this continuous action of the sales person which might be causing fatigue of the entire muscles resulting in discomfort in the arm.

5. Conclusion

Sales person of Cosmetic Department are exposed to High Risk of developing musculoskeletal disorder in Neck and Back Area, Moderate Risk in ARM Area and Low Risk in Knee area. Sales person of Clothes Department are exposed to High Risk of developing musculoskeletal disorder in Back Area, Moderate Risk in ARM and LEG Area and Low Risk in NECK Area. Sales person of Shoe Department are exposed to High Risk of developing musculoskeletal disorder in Leg and Back Area, Moderate Risk in ARM Area and Low Risk in Neck Area.

6. References

1. Park K. Park's textbook of preventive and social medicine. 23rd edition, 2012, 61.

2. David GC. Ergonomic methods for assessing exposure to risk factors for work-related musculoskeletal disorders. *Occupational environ Med.* 2005; 55:190-199.
3. Rutvik Shyamal Purani *et al.* Prevalence of low back pain in salespersons and its association with ergonomic risk factors in Ahmedabad, Gujarat. (year-2016) *Medical Journal of D.Y patil Vidyapeth.*
4. Devereux JJ *et al.* Epidemiological study to investigate potential interaction between physical and psychosocial factors at work that may increase the risk of symptoms of musculoskeletal disorder of the neck and upper limb. *Occupational environ Med.* 2002; 59:269-277.
5. Karhu O, Kansu P, Kuorinka I. Correcting working postures in industry: a practical method for analysis. *Appl Ergon.* 1977; 8:199-201.
6. Hignett S, Mc Atamney L. Rapid Entire Body Assessment (REBA). *Appl Ergon.* 2000; 31:201-205.
7. Mohammad Khandan *et al.* Assessing Exposure to Risk Factors for Work-related Musculoskeletal Disorders Using ART method in a Manufacturing Company, 2017, 260.
8. Armstrong T, Buckle P, Fine L *et al.* A conceptual model for work-related neck and upper limb musculoskeletal disorders *Scand J Work Environ Health.* 1993; 19:73-84.
9. Balogh I, Ørbæk P, Ohlsson K, Nordander C, Unge J, Winkel J. Self-assessed and directly measured occupational physical activities-influence of musculoskeletal complaints, age and gender. *Appl Ergon.* 2004; 35:49-56.
10. Spielholz P, Silverstein B, Morgan M, Checkoway H, Kaufman J. Comparison of self-report video observation and direct measurement methods for upper extremity musculoskeletal risk factors. *Ergonomics* 2001; 44:588-613.
11. Fallentin N, Juul-Kristensen B, Mikkelsen S, Andersen J, Bonde J, Frost P *et al.* Physical exposure assessment in monotonous repetitive work- the PRIM study. *Sci and J Work Environ Health.* 2001; 27:21-29.
12. Li G, Buckle P. Evaluating Change in Exposure to Risk for Musculoskeletal Disorders-A Practical Tool. Suffolk: HSE Books, 1999, CRR251.