

Prevalence of Musculoskeletal Disorders in Xerox Copy Shop Vendors

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Abstract: ***Background:** Xerography or photocopying is an evolved technology that has been playing a crucial role at workplace in simplifying the jobs but coming with its own drawbacks and poor effects on the health of Xerox copy shop vendors. Operating the Xerox copy machine and lifting, changing the piles of papers or books requires the vendor to perform continuous neck, arm and hand movements in standing position for long durations. Also pulling - pushing, forward bending and lifting movements are required to fulfill the job demands. The vendors experience pain at various areas while performing these activities. Repetitive movements and adapted postures while working may lead to bad posture which may further increase pain in various areas. **Purpose:** To find out prevalence of musculoskeletal disorders in Xerox copy shop vendors. **Method:** The observational study consists of 100 participants, chosen according to inclusion and exclusion criteria were asked to fill the Nordic Musculoskeletal Questionnaire answering in YES/NO. **Results:** The results showed that among 100 participants, 65% prevalence of musculoskeletal disorders is found in Xerox copy shop vendors. Highest prevalence was found in lower back 45.75% followed by ankle/feet 45.50% and neck 38.50%. **Conclusion:** The study concludes that there is 65% prevalence of musculoskeletal disorders in Xerox copy shop vendors.*

Keywords: Xerox copy shop vendors, Xerography, Musculoskeletal Disorders, Photocopiers

1. Introduction

Xerox machines are widely used in the business, education, and government sectors. Usually, they are placed indoor, the area being commercial such as nearby a Government Office, courts, schools and colleges. The shop vendors are bound to work in small, confined shops for longer durations with heavy workload of Xeroxing legal documents, large books of college students, office documents, etc. Over the years, Xerox machines have been important and mandatory equipment at offices, schools, bookstores, etc.

The work load of Xerox copy vendors have been increasing with the development. Their job demands long standing hours with continuous hand, neck and arm movement for Xeroxing the huge piles of papers. A research study suggests that exposure to Xerox machine affects the health by causing various health hazards and indoor pollution.⁽³⁾

On extensive review of literature, there is lack of data available on prevalence of musculoskeletal disorders in Xerox copy shop vendors.

Since very few researches have been done on Xerox copy shop vendors, this study will focus on the prevalence of musculoskeletal disorders using the Nordic musculoskeletal questionnaire.

2. Need of Study

Xerography has become a common practice and continuously in demand. Xerox copy shop vendors have to constantly work in a confined indoor environment. Their job includes long standing hours to fulfill the demand of work, and includes continuous neck, hand and arm movements. Hence, early detection of musculoskeletal pain in this

population is important. On extensive review of literature, there is lack of data available on prevalence of musculoskeletal disorders in Xerox copy shop vendors. Therefore, the aim of the study is to find out the prevalence of musculoskeletal disorders in Xerox copy Shop Vendors.

Aim

To find out the prevalence of Musculoskeletal Disorders in Xerox copy shop vendors by using Nordic Musculoskeletal Questionnaire.

Objective

To assess the prevalence of Musculoskeletal Disorders in Xerox copy shop vendors.

3. Methodology

Study design: Observational

Sampling method: Purposive

Study setting: Xerox shop vendors in Pune

Sample size: 100

Study duration: 6 months

Study material: Pen & Notepad

Study area: PCMC, Pune.

Scales: Nordic Musculoskeletal Questionnaire

Inclusion Criteria

Xerox copy shop vendors, males aged between 18 – 40 years nearby colleges, offices and law courtshaving minimum 1 year work experience with 6 - 8 working hours, at least 5 days a week.

Exclusion Criteria

Previous musculoskeletal disorders or deformities of neck, arms, legs. Congenital disorders, metabolic, diseases, neuromuscular disorders and any other systemic illness.

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Individuals involved in any other kind of heavy work duties e. g. laborers.

Outcome Measure

Nordic Musculoskeletal Questionnaire

Procedure

Ethical approval was taken from the ethical committee. Subjects were chosen on the basis of inclusion and exclusion criteria by purposive sampling. Informed consent was taken and Nordic musculoskeletal evaluation was done. Scoring for each area of pain and percentage calculation was done. Statistical data analysis was done.

4. Data Analysis

Total 100 Xerox Copy Shop Vendors have participated in the study.

Nordic Musculoskeletal Questionnaire was used. Total 65% of pain frequency in participants was found.

Q.1 Have you at any time during the last 12 months had trouble (ache, pain, discomfort, numbness) ?

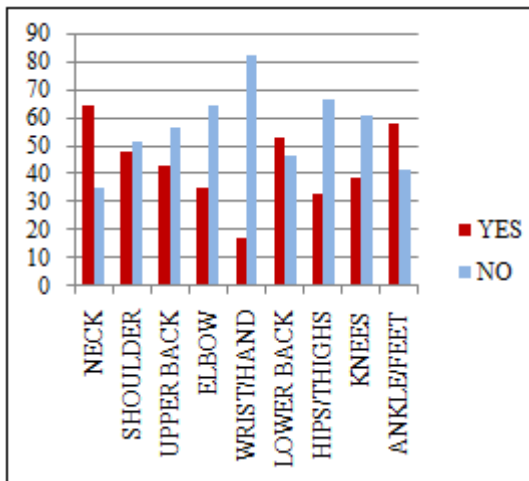


Figure 1

Q.2 During the last 12 months have you been prevented from carrying out normal activity?

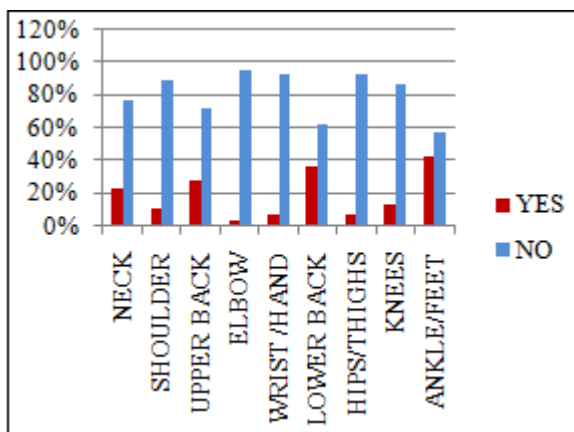


Figure 2

Q.3 During the last 12 months have you seen physician for this condition?

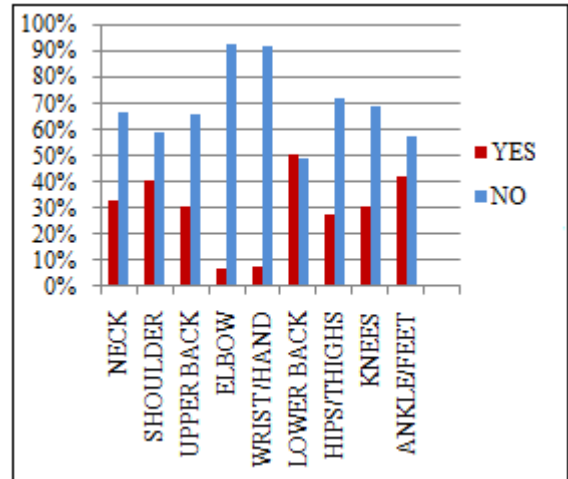


Figure 3

Q.4 During the last 7 days have you had trouble in?

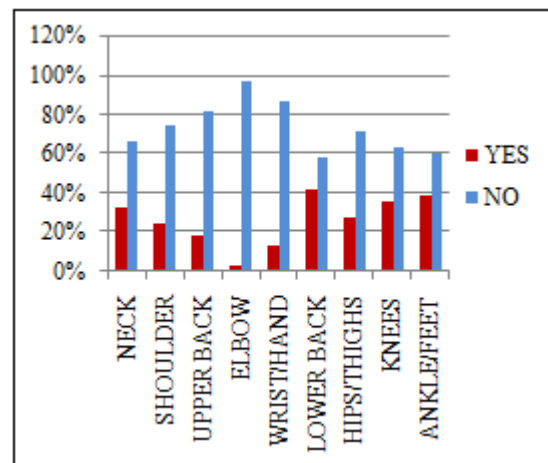


Figure 4

5. Results and Interpretation

Area Of Pain	Percentage
Neck	33%
Shoulder	41%
Upper Back	31%
Elbow	7%
Wrist /Hand	8%
Lower Back	51%
Hips/Thighs	28%
Knees	31%
Ankle/Feet	42%

- Total 100 males participated in the survey.
- Total pain frequency found was 65%.
- **Fig (01)** explains total percentage of participants experiencing trouble (ache, pain, discomfort, numbness) in the various components in past 12 months which is as follows:

Area of Pain	Percentage
Neck	65%
Shoulder	48%
Upper Back	43%
Elbow	35%
Wrist/Hand	17%
Lower Back	53%
Hips/Thighs	33%
Knees	39%
Ankle/Feet	58%

	Average Percentage of Pain
Neck	38.50%
Shoulders	31.25%
Upper Back	30%
Elbows	12.25%
Wrist/ Hands	11.25%
Lower Back	45.75%
Hips/ Thighs	24%
Knees	29.75%
Ankles/ Feet	45.50%

- Fig (02) explains total percentage of participants that have been prevented from carrying out normal activity during the last 12 months which is as follows:

Area of Pain	Percentage
Neck	23%
Shoulder	11%
Upper Back	28%
Elbow	4%
Wrist /Hand	7%
Lower Back	37%
Hips/Thighs	7%
Knees	13%
Ankle/Feet	43%

- Fig (03) explains total percentage of participants that have seen physician for any condition in last 12 months which is as follows:

Area of Pain	Percentage
Neck	33%
Shoulder	25%
Upper Back	18%
Elbow	3%
Wrist/Hand	13%
Lower Back	42%
Hips/Thighs	28%
Knees	36%
Ankle/Feet	39%

- Fig (04) explains total percentage of participants experiencing any trouble during last 7 days which is as follows:
- Fig (05) explains average percentage of area wise pain.

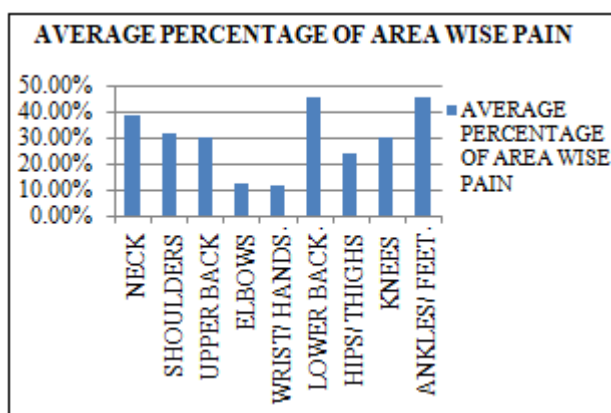


Figure 5

6. Discussion

As per the study which we conducted on 100 Xerox copy shop vendors of different age groups in PCMC area, it was observed that majority of our participants worked in small shops with confined areas where most of the space was occupied by huge Xerox copy machines, a chair/stool to sit, wall mounted shelves and a counter, with a very less space to move. Vendors in the selected area of the study i. e. law courts, schools and colleges, had excessive workload of Xeroxing heavy piles of documents and books that would demand long working hours with very little break time. Bilateral arm flexion and extension, scapular elevation, depression, adduction, abduction movements and neck flexion movements in combination with one another were required to fulfill the job demands. All these movements were corresponding to increased loads on the musculoskeletal structures.

Results obtained from our study showed that there is 65% of total pain prevalence in the participants. Considering individual components, highest percentage of pain prevalence was in the lower back (47.75%), followed by ankles/feet (47.50%) and neck (38.50%). These three components were majorly affected in combination along with pain in other components as well.

Work of Xerox copy shop vendors included lifting piles of books or documents and placing them on the surface of Xerox feeder tray. Then, the actions of opening and closing the lid of heavy Xerox feeder tray were mainly brought about by the glenohumeral and scapulothoracic motions (anterior/posterior tilting and internal/ external rotation). These repetitive actions lead to high tensile forces acting on shoulder and scapular stabilizers. (24) This may lead to overuse and inflammation of these muscles, which can give rise to pain. Later this pain can cause inhibition of scapular muscles leading them into gradual weakness and this cycle of overuse, inflammation, pain and weakness may continue. This can be the reason of getting 43% pain in the upper back area.

The job also demanded frequent lifting and changing of the cartridge trays that required forward flexion of the neck and forward bending of the spine. According to literature, these actions cause tension and compression on the structures of spine. In forward flexion, the anterior portion of disc, anterior ligaments and muscles are prone to compressive force whereas the posterior structures i. e. the posterior longitudinal ligament and muscles are stretched. (25) These repetitive spinal movements along with increasing compression, tensile and shear forces can be the reason of

highest percentage of prevalence of pain i. e.47.75% in the lower back area followed by 38.50% in the neck area.

The design of machine was such that the Xerox document feeder tray was at abdomen level which required the person to stand for prolonged durations and operate in constrained positions. Standing in long durations led to excessive and uneven weight loading in the feet contributing as one of the pain causing factors resulting in 47.50% pain prevalence.

Hence from our study it was found that Xerox copy shop vendors get exposed to various stresses over their musculoskeletal system due to their work demands which if not prevented or treated on time can lead to severe pain and loss of function.

7. Conclusion

The results of the study showed that 65% prevalence of musculoskeletal disorders is found in the Xerox copy shop vendors. Most of them have pain in at least 1 - 2 components.

It can be concluded that on an average, the prevalence of musculoskeletal disorders is highest in lower back 45.75% followed by the ankle/feet 45.50% and neck (38.50%).

8. Limitations of Study

- Observational study design.
- Study limited to only PCMC area.

9. Clinical Implications and Future Scope

- Occupational health hazards, awareness and prevention strategies can be taught to the vendors.
- Appropriate changes in the work station such as mounting shelves at shoulder level, and use of resting stand for Xerox feeder tray lid, high stools / chairs to sit and operate the machine can be done to prevent excesses load on the musculoskeletal structures.
- Ergonomic changes such as posture correction, increased frequency of breaks, muscle stretching will help preventing pain.
- Muscle imbalance exercises of neck, arm, feet, core and back muscles can be taught to prevent musculoskeletal disorders.

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