RAPID UPPER LIMB ANALYSIS IN ERGONOMIC RISK FACTORS AMONG PHOTOGRAPHERS

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ABSTRACT

PURPOSE: A typical photographer’s posture is with upper body forward, shoulders rolled in, and neck bent forward with chin extended. When less attention is paid to the physical damage caused by holding a certain position over time causes holding injuries technically called excessive positioning injuries. Swelling and heat in joints, physical stiffness and discomfort, headaches, jaw pain, and chronic neck or low back pain are all signs of excessive positioning injuries. The aim of this study is rapid upper limb analysis in ergonomic risk factors among photographers.

METHODS: A convenient samples of twenty male photographers were taken for this study. Photographers were asked to fill the questionnaire to identify the musculoskeletal disorders during the photo-shoots. It is analysed by rapid upper limb analysis (RULA) and ergonomic risk factors noted. The outcome measure used in this study is RULA (rapid upper limb analysis).

RESULTS: The results shows that high ergonomic risk factors in shoulder and neck region due to awkward positions and repeated strain over the neck and shoulder. Photographers in the current study adopted awkward postures and had high ergonomic risk levels when using their camera.

CONCLUSION: It was found that prolonged occupational hazard and maintaining awkward positions were the main reasons for musculoskeletal disorders among photographers.

KEYWORDS: Camera, Holding Injuries, Musculoskeletal Disorders, Photographers, Over Use, Pain.

INTRODUCTION

A typical photographer’s posture is with upper body forward, shoulders rolled in, and neck bent forward with chin extended. Work-related musculoskeletal disorders (WMSDs) result from the workplace risk factors and are well known by the terms such as cumulative trauma disorders and repetitive strains injuries. Musculoskeletal disorders are the injuries that affect the human body’s movement or musculoskeletal system (muscle, tendon, ligament, nerve, discs, blood vessel). The published scientific reports and papers show that the incidence of musculoskeletal disorders among photographers is much more than in other occupations.

Body posture refers to the position of a person’s body in space, the alignment of body parts in relationship to one another and to the environment at one point in time, and is influenced by each of the body’s joints. Habitual postural patterns are associated with musculoskeletal pain, and improving a maladaptive posture requires postural awareness in order to lead to clinical improvements. Postural control refers to building up posture against gravity and to ensuring that balance is maintained. It enables postural stabilization during voluntary movements and recovery of balance after disturbance. Postural control also constructs a reference frame for proprioception, i.e. the perception of joint angles and muscle tensions, of movement, balance and posture. When less attention is paid to the physical damage caused by holding a certain position over time causes holding injuries technically called excessive positioning injuries. Swelling and heat in joints, physical stiffness and discomfort, headaches, jaw pain, and chronic neck or low back pain are all signs of excessive positioning injuries. The findings of a study showed that camera usage increased the risk of developing musculoskeletal disorders. Such an increase is mediated by ergonomic factors such as standing for prolonged periods, adoption of inadequate or uncomfortable postures, performing certain angles for photograph, carrying heavy lens luggage on the back.
and psychosocial factors. Standing for more than half a day in an awkward position increases the likelihood of having musculoskeletal problems. The aim of this study is rapid upper limb analysis in ergonomic risk factors among photographers and to investigate the prevalence of musculoskeletal symptoms and associated factors in photographers.

**MATERIALS AND METHODS**

The study population comprising of 20 photographers working in South India Film Institute in Chennai at least with 1 year experience were selected with full consent. 20 participants were divided into two groups with 10 participants each.

**Group A :** 10 male wedding photographers

**Group B :** 10 male freelance photographers were taken for this study.

The subjects were selected from convenience sampling methods.

Data were obtained by a data collection form, a workplace observation form and a Rapid Upper Limb Assessment tool to delineate ergonomic risks. Statistical Package was used in the statistical analysis. Attempts were made to balance demographic information, workload, and job descriptions as much as possible across the two groups.

**INCLUSION CRITERIA**

i. Male photographers

ii. Freelance and wedding photographers

iii. Photographers with atleast 1 year of work experience

**EXCLUSION CRITERIA**

i. Trauma related to any fractures or dislocation in upper limb and lower limb.

ii. Wildlife photographers

iii. Recent surgeries of upper limb and lower limb

iv. Deformity and contractures of upper limb and lower limb

v. Auto immune diseases

vi. Who are more than 40 years with chronic musculoskeletal problem (Rheumatoid Arthritis, Osteoarthritis, Fyromyalgia and Tendinitis )

20 male photographers with musculoskeletal disorders are selected based on inclusion and exclusion criteria. Detailed procedure were explained and subjects are assessed for presence of musculoskeletal disorders affecting various body regions. Photographers were asked to fill the questionnaire (CMDQ) on musculoskeletal symptoms and intensity or severity of pain experienced in various body regions. Using a demographic questionnaire, the personal characteristics of the subjects were recorded, including gender, age, height, weight, BMI. Moreover, the RULA (Rapid Upper Limb Assessment) method was used to examine the ergonomic posture of the subjects. RULA examines the number of movements, static muscle work, and force as risk factors. The range of movement for each body part is divided into different sections and each section is numbered based on its deviation from the normal posture. If the body part is deviated from the midline or rotated, the number attributed to the posture increases. Afterwards, the scores of different body parts are combined, and given the muscular activity and the exerted force, a final score is derived which indicates the level of risk of injury.

**RESULTS**

The results shows that high ergonomic risk factors in shoulder and neck region due to awkward positions and repeated strain over the neck and shoulder for wedding photographers in comparison to freelance photographers. The higher rate of musculoskeletal disorders in these body parts is due to sedentary tasks and repetitive works. In many studies, sedentary and repetitive movements are considered as the major risk factor for the incidence of this type of disorders. Photographers in the current study adopted awkward postures and had high ergonomic risk levels when using their camera. It was found that prolonged occupational hazard and maintaining awkward positions were the main reasons for musculoskeletal disorders among photographers. The Socio Demographic data of the participants were shown in table 1. The results for the incidence of musculoskeletal disorders for various body parts have been presented in table 2. The results confirmed that neck shoulder and lower back has the highest effect on Musculo-skeletal problems in wedding photographers.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Groups</th>
<th>Age</th>
<th>Height (cms)</th>
<th>Weight (kgs)</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Wedding Photographers</td>
<td>35.1 ± 1.8</td>
<td>158.61 ± 1.2</td>
<td>65.13 ± 1.1</td>
<td>24.5 ± 0.2</td>
</tr>
<tr>
<td>2.</td>
<td>Freelance Photographers</td>
<td>37.02 ± 2.2</td>
<td>174.21 ± 0.2</td>
<td>80.33 ± 0.5</td>
<td>27.8 ± 3.0</td>
</tr>
</tbody>
</table>

**Table 2: Prevalence of pain with respect to body parts (CMDQ)**
The mean RULA scores and action levels based on the type of work done by both the groups were shown in (Table 3)

### CONCLUSION

Musculoskeletal symptoms, which may occur in any region of the body, are mainly associated with organizational factors, such as type of shift work and frequency of changes in work schedule, rather than with personal factors. Wedding photographers had high ergonomics risks. In these units, “ergonomic risk prevention programme” should be implemented by occupational health teams. The highest prevalence for the musculoskeletal symptoms for wedding photographers were in the legs, lower back, neck and shoulder.

### DISCUSSION

The study investigated the incidence of musculoskeletal disorders and ergonomic risk factors among photographers of South India film institute in Chennai. The study shows there is a high rate of musculoskeletal disorders in some body parts such as low back, neck, and shoulders in wedding photographers. The higher rate of musculoskeletal disorders in these body parts is due to sedentary tasks and repetitive works in wedding photographers as they have a higher work load during cultural occasions like weddings. Sedentary and repetitive movements are considered as the major risk factor for the incidence of this type of disorders. The results indicated that the region mostly associated with musculoskeletal disorders is the Neck, Shoulder and lower back are commonly affected. The results shows that 57.6% of neck, 44% of shoulder, 40.2% of Back, 30.1% of lower legs were affected musculoskeletal disorders in wedding photographer. On comparing both groups wedding photographers are mostly affected than freelance photographers. The results reporting the high RULA grand score of risk factors in the work place for wedding photographers mean value holding the camera 9.2, Hanging the camera in the neck 8.4 and carrying the bag 7.0. The level of significance was considered at P ≤ 0.05. The results of t-test between wedding photographers and Freelance photographers, showed there was significant difference in the final score RULA (P = 0.001).

The highest prevalence for the musculoskeletal symptoms of the photographers was in the legs, lower back, neck and shoulder.

### LIMITATIONS AND RECOMMENDATIONS

This is a small sample study. Only descriptive and survey method were used and no ergonomic intervention is given. High frequency of pain and high risk levels, according to the RULA method, suggest inappropriate and incorrect ergonomic postural habits existing among photographers. This study suggests an intervention program about work related musculoskeletal disorders that focuses on ergonomic considerations and regular exercises that can be effective in reducing such disorders.

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### ETHICAL CONSIDERATION
This single case study was approved by Research committee and Institutional Review board in the college University and study start-up at Saveetha Medical College. Great care will be taken to fully explain the study to the patient before fully inform consent is taken

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CONFLICT OF INTEREST

There are no conflicts of interest to declare.

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