Prevalence of Upper Limb Dysfunction in Fashion Designer Students Using Fades Chairs

Rabia Majeed¹, Momina Tariq¹, Tayyaba Irfan¹, Aqsa Noreen¹, Waneezah Malik¹, Noor-ul-ain-Fatima¹

Abstract

**Background**: Fashion design students face an increased risk of upper limb dysfunction due to prolonged sitting, notably exacerbated by the lack of arm and backrests in specialized chairs like the Fades chair. This study aimed to determine the prevalence of upper limb dysfunction among fashion design students using Fades chairs.

**Methodology**: A cross-sectional study was conducted in Lahore, Pakistan, from April to July 2023, involving 169 participants aged 18-25 from the University of Management and Technology (UMT) and the National College of Arts (NCA). The study excluded participants with systemic diseases and utilized the Numeric Pain Rating Scale and Rapid Upper Limb Assessment (RULA) for data collection, analyzed with SPSS version 25.

**Results**: Results revealed varying levels of risk: 26.04% low risk, 46.15% medium risk, and 26.63% very high risk based on RULA for right-sided limb assessment, with similar trends for left-sided assessment. Regarding pain levels, 50.09% experienced severe upper back pain, 43.2% neck pain, 46.2% shoulder pain, 18.3% elbow pain, and 23.7% wrist pain.

**Conclusion**: In conclusion, the use of Fades chairs significantly contributes to upper limb dysfunction among fashion design students, posing moderate to severe risks. This dysfunction could potentially impair their performance.

**Keywords**: Dysfunction; Fades Chairs; Prevalence; Upper Limb


Introduction

Fashion design is an exciting and aesthetically appealing sector that needs not just creativity but also accuracy and thorough consideration of design. Culture and different trends have an impact on it, and it changes across time and space (1). The majority of Fashion Designer students spent most of their time in sewing, stitching, sketching and working on still life bodies. Apparatus which is used by Fashion Designers is called as FaDeS Chairs (2).

Fashion designer students undergo rigorous training and engage in numerous manual tasks, including sketching, pattern cutting, sewing, and garment construction. These occupations frequently include lengthy periods of sitting, frequent movements of the hands, and uncomfortable postures, all of which elevate the possibility of acquiring upper limb dysfunction (3).

Fashion designer students are particularly vulnerable to the development of upper limb dysfunction due to the nature of their work and the demanding requirements of their education. Long periods of leaning over drawing tables, cutting materials, and using embroidery machines can result in weakness of the muscles, joint stress, and overuse injuries (4). Upper limb dysfunction refers to a group of musculoskeletal disorders and conditions that affect the hands, wrists, arms, and shoulders. Common concerns include carpal tunnel syndrome (CTS), tendinitis (inflammation of tendons), bursitis (inflammation of bursa), and shoulder impingement syndrome. Repetitive actions, extended static postures, poor ergonomics, and excessive force exertion can all contribute to these problems (5). One innovative solution that has garnered attention in recent years is the Fades chair. The Fades chair is an ergonomic seating option specifically designed to mitigate the risks associated with prolonged sitting and repetitive hand movements. With its adjustable features and ergonomic design, the Fades chair aims to promote optimal posture, reduce strain on the upper limbs, and enhance overall comfort during extended periods of work (6).

Furthermore, examining the Fades chair’s performance as an ergonomic solution in this specific group would give vital insights into its ability to decrease the dangers associated with extended sitting and repeated hand motions. By conducting research on the prevalence of upper limb dysfunction and evaluating the impact of the Fades chair, we can contribute to the existing knowledge.
base on occupational health in the fashion design industry. The information provided may educate educational institutions, designers, and students on the importance of ergonomics and the possible benefits of ergonomic sitting solutions such as the Fades chair (7). Previous studies explore the prevalence of upper limb dysfunction in fashion designer students and assess the effectiveness of the Fades chair in mitigating such issues. They shed light on the possible benefits of ergonomic sitting solutions in minimizing the risk of upper limb dysfunction and increasing the general well-being of aspiring fashion designers by reviewing the experiences of fashion design students and evaluating the impact of using the Fades chair (8).

Although the use of ergonomic seating has shown potential benefits in reducing the risk of musculoskeletal disorders in a variety of industries, its effectiveness in the context of fashion design education, as well as the prevalence of upper limb dysfunction among fashion designer students, has remained relatively unexplored (9). Fashion design necessitates a distinct combination of artistic ability, accuracy, and physical skill, often necessitating numerous hours of dedicated labor on various design parts (10). Students aspiring to be fashion designers are subjected to lengthy periods of sitting and demanding manual work, which may result in the development of upper limb dysfunction. Previous researches do not contribute to the occupational health of fashion designer students and provide valuable insights for educational institutions, industry professionals, and ergonomic designers alike (11). Academicians show under-studies as well as participate in different activates characterized by repetitive work for long duration while performing sewing, painting, drafting, sketching and sitting position, a reflection of the type of chair used, is one factor influencing their performance. Uses of Fades chairs for the long duration the potential to increase in intensity of pain at different parts of body especially at upper limb in fashion designer students. This study assessed the presently used FaDes chair and the effect of sitting posture.

Furthermore, the purpose of this study to enhance fashion designers’ students’ well-being and long-term health concerns, allowing them to follow their passion while reducing the risk of occupational injuries and diseases. Specifically, the study seeks to find out prevalence of upper limb dysfunction in fashion designing students using FaDeS chairs.

Methodology
Approval for this cross-sectional study was obtained from the institutional review board under letter number REC-093-2023. This observational study was conducted at various Fashion Designing Schools of Lahore from December 2022 to May 2023. Non-probability convenient sampling technique was used. Sample size was calculated using Raosoft Sample Size Calculator taking confidence interval 95% margin of error was 5%. The estimated sample size came out to be 169 fashion designer students with a population size of 300. This study included participants with age between 18-25 years students who were currently enrolled in their respective semesters from 4-8. Students working hours will be more than 3 hours. Only students working in sewing and sketching were included. Systemic diseases such as SLE, Multiple Sclerosis, and Rheumatoid Arthritis etc. were excluded. For data collection, Numeric Pain Rating Scale (NPRS) was used to assess the intensity of pain that has test-retest reliability of 0.79–0.96 and Rapid Upper Limb Assessment scale (RULA) used to evaluate ergonomics risk factors associated with upper limb dysfunction which has test retest reliability of 0.89-0.93 (12, 13). According to RULA scoring participant which score 1-2 at negligible risk, 3-4 at low risk, and 5-6 at medium risk, above 6 at very high risk. Written consent was taken from the participants before filling the questionnaires and the importance of study was explained. Data was entered and analyzed using IBM SPSS 25.

Results
According to demographics in Table 1, out of 169 participants 41.4% were male and 58.6% were females. 13.0% working for 2 hours, 21.3% for 3 to 5 hours, 32% for 6 to 8 hours, 33.7% for 9 to 10 hours per day. Table 2 shows that out of 169 participants suffered from moderate intensity pain in elbow (40.8%) and in wrist (41.4%) and high percentage of severe pain lies in upper back (50.9%), neck (43.2%) and shoulder (46.2%). As pain was asses by NPRS which state that 0 as none pain, 1 as mild, 2-4 moderate and 5-10 as severe pain. Table no 3 shows that right sided RULA, there was negligible risk in 1.18% working in sewing and sketching were included. Systemic diseases such as SLE, Multiple Sclerosis, and Rheumatoid Arthritis were excluded.

### Table 1. Demographics

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>70</td>
<td>41.4</td>
</tr>
<tr>
<td>Female</td>
<td>99</td>
<td>58.6</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Table 2. Frequency distribution of pain by NPRS

<table>
<thead>
<tr>
<th></th>
<th>Upper back pain</th>
<th>Neck pain</th>
<th>Shoulder pain</th>
<th>Elbow pain</th>
<th>Wrist pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>6 (3.6%)</td>
<td>4 (2.4%)</td>
<td>11 (6.5%)</td>
<td>23 (13.6%)</td>
<td>22 (13.0%)</td>
</tr>
<tr>
<td>Mild</td>
<td>20 (11.8%)</td>
<td>20 (11.8%)</td>
<td>24 (14.2%)</td>
<td>46 (27.2%)</td>
<td>37 (21.9%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>57 (33.7%)</td>
<td>72 (42.6%)</td>
<td>56 (33.1%)</td>
<td>69 (40.8%)</td>
<td>70 (41.4%)</td>
</tr>
<tr>
<td>Severe</td>
<td>86 (50.9%)</td>
<td>73 (42.3%)</td>
<td>78 (46.2%)</td>
<td>31 (18.3%)</td>
<td>40 (23.7%)</td>
</tr>
<tr>
<td>Total</td>
<td>169 (100%)</td>
<td>169 (100%)</td>
<td>169 (100%)</td>
<td>169 (100%)</td>
<td>169 (100%)</td>
</tr>
</tbody>
</table>
Table 3. RULA score of bilateral upper limbs

<p>| RULA score of | RULA score of |</p>
<table>
<thead>
<tr>
<th>Right side</th>
<th>Left side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freq.</td>
<td>Percent</td>
</tr>
<tr>
<td>Negligible risk</td>
<td>2</td>
</tr>
<tr>
<td>Low risk</td>
<td>44</td>
</tr>
<tr>
<td>Medium risk</td>
<td>78</td>
</tr>
<tr>
<td>Very high risk</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
</tr>
</tbody>
</table>

Discussion
The current study aims to find out the prevalence of musculoskeletal dysfunction in fashion designer students using FaDes chair. The problems of the FaDes chair in addressing the ergonomic challenges faced by fashion designer students and contribute to the existing knowledge base on occupation. Previous studies are cited to highlight the ergonomic problems in minimizing the risk of musculoskeletal disorders. The research acknowledges the limited exploration of ergonomic seating in the context of fashion design.

Several studies conducted in different countries investigated the prevalence of work-related musculoskeletal dysfunction (MSDs) among different occupational groups, such as sewing machine operators, handicraft workers, and fashion designers. While this study examined musculoskeletal pain in fashion design students. Both sets of research identified common affected body regions, including the lower back, upper back, neck, hip, thigh, buttocks, shoulder, elbow, wrist, knee, and ankle or feet (14).

A study conducted by Aftab Ahmad in 2021 concluded that postural positions of the wrist, lower arm, upper arm, trunk, and neck are highly vulnerable at risk (15). Workers usually are bound to adopt working strategies that include simultaneous bend and twist movements due to poor workstation design resulting in apt MSDs. The findings of the current study are pain in last 12 month in different regions of the body 85.2% in shoulders, 56.8% in elbow, 53.3% in wrists, 81.1% in neck and 78.1% in upper back, 46.7% in low back 20.7% in hip and knee due to poor working posture and contribute in Musculoskeletal dysfunction.

Another study conducted in 2019 (16) found that the most often affected areas were the neck (22.0%), shoulder (14.9%), elbow (14.4%), and knee (14.4%). While in the current study the prevalence of musculoskeletal pain was analyzed for different body regions, and the highest percentage of severe pain was reported in the upper back (50.9%), neck (43.2%), and shoulder (46.2%).

A study on a total of 289 people by DN et al. (17) found that lower back and neck were the two areas of the body where discomfort was most frequently reported. Although risk variables varied by year and sex, overall, worse mental health, enrollment in medical studies, engagement in organized sports (only for men), older age, and less hours of sleep and working hours were substantially linked with a greater incidence of MSKDs. In accordance to past study, current study emphasized that there was a direct relation of working hours with upper limb dysfunction.

Amensisa Hailu Tesfaye conducted a study which revealed findings of 607 people in total properly answered the questions on the survey (a response percentage of 95.44%) (18). There is no statistically significant difference in prevalence between males and females, but current study investigated the association between RULA score and working hours. It was found that there was a significant association between the RULA score of the right side and working hours (p-value 0.016), indicating that the risk of musculoskeletal disorders differed based on the number of working hours.

As our study is targeting an emerging domain of our society. It is very important thing to observe if they are doing their work in right posture. Otherwise, they will develop bad posture that will result in pain and can be reason for reduced working hours and distractions. Also, our study is reason for bringing attention of other researchers to work in this domain as many people are attracted toward this profession now a days. But they face problems due to poor ergonomic usage, poor handling of equipment and ultimately facing musculoskeletal dysfunction.

Conclusion
This study has shown that, in fashion designers, the chances of ergonomic related upper limb MSK dysfunction are greater than the lower limb as head, neck, upper back, shoulders, arm, elbow and wrist function are required more while performing task.

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Ethical Approval:
This study was approved by Institutional Review Board of School of Health Sciences, University of Management and Technology Lahore, Pakistan Ref. No. REC-093-2023 Date: 17-07-2023

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Authors’ Contribution:
RM: Conceptualization and writing original draft
MT: Data Analysis
TI: Methodology and writing original draft
AN: Review and Editing
WM: Data Analysis, Review and Editing
NAF: Methodology
References


