MUSCULOSKELETAL DISCOMFORT AND MECHANICAL INJURIES EXPERIENCED BY THE INDIVIDUALS ENGAGED IN HOLDING DECORATIVE UMBRELLA LIGHTS IN BARAAT

APRIL- 2025 **VIDHI CHOKSHI**

MUSCULOSKELETAL DISCOMFORT AND MECHANICAL INJURIES EXPERIENCED BY THE INDIVIDUALS ENGAGED IN HOLDING DECORATIVE UMBRELLA LIGHTS IN BARAAT

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This is to certify Ms. Vidhi Chokshi study titled; "Musculoskeletal Discomfort and Mechanical Injuries Experienced by the Individuals Engaged in Holding Decorative Umbrella Light in Baraat." from Department of Family and Community Resource Management has been approved by the Institutional Ethics Committee for Human Research (IECHR), Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda. The study has been allotted the ethical approval number IECHR/FCSc/M.Sc./10/2024/20.

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CERTIFICATE

This is to certify that the thesis entitled "Musculoskeletal Discomfort and Mechanical Injuries Experienced by the Individuals Engaged in Holding Decorative Umbrella Light in Baraat" submitted for partial fulfilment of the requirement for the degree of Masters in the Faculty of Family and Community Sciences (Family and Community Resource Management) to the Maharaja Sayajirao University of Baroda, carried out by Vidhi Chokshi, is her original bonafide work.

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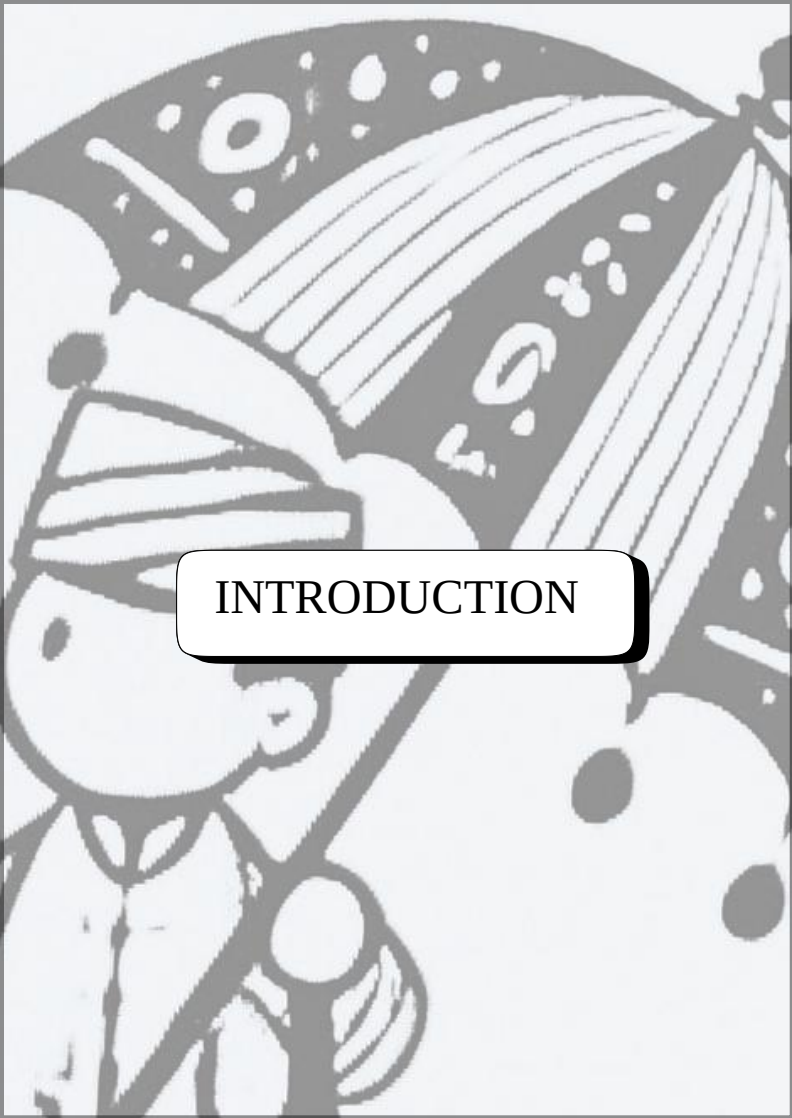


INTRODUCTION

CHAPTER I

INTRODUCTION

"The perpetuation of customs plays a crucial role in preserving global cultural diversity."

Hendra, 2023

1.1. Introduction

Indian weddings are grand events characterized by intricate customs, colourful garments, and a celebratory ambiance, reflecting the country's profound diversity and heritage. These rituals possess considerable societal and cultural significance, frequently lasting several days and encompassing multiple duties and responsibilities undertaken by various persons that ensure the success of the ceremonies **(Tiwari, 2019).**

The customs associated with Indian weddings can be traced back to the Vedic scriptures, which date back over 4,000 years. Indian weddings hold profound cultural significance, representing not only the union of two individuals but also the amalgamation of two families, and in some instances, the integration of distinct cultures and traditions **(Amrita, 2024).** Religious rites, sacraments, and customs play a pivotal role in shaping the institution of marriage **(Gupta & Singh, 2019).** Marriage is regarded as a sacred institution and a crucial milestone in human life **(Hendra, 2023).**

During Indian weddings, priests officiate elaborate ceremonies that encompass sacred rites and prayers. These traditions are believed to facilitate prosperity, ensure the continuation of the family lineage, and foster an enduring bond between the bride and groom. Historical records, including manuscripts and sculptures, indicate that traditional Indian wedding practices often involved the bride's family hosting the groom's family for the ceremony. Typically, these ceremonies were conducted in the bride's place of origin, reflecting deep-rooted cultural norms and practices.

Indian wedding customs have undergone significant evolution over time, incorporating modern influences while preserving their cultural essence. In contemporary settings, weddings are characterized by grand celebrations that often extend over several days, featuring elaborate rituals, vibrant attire, music, dance, and diverse culinary offerings. Traditional practices are increasingly being infused with modern elements, reflecting

the changing preferences of urban Indian couples. These adaptations include themed weddings, fusion cuisines, personalized vows, and destination venues.

An emerging trend in Indian weddings is the inclusion of various processions, which enhance the ceremonial grandeur and cultural richness of the events. These celebrations, deeply rooted in societal and cultural significance, involve extensive planning and execution, requiring contributions from numerous individuals to ensure their success. One such role involves holding decorative umbrella lights, a visually striking yet physically demanding task that adds to the aesthetic splendour of the occasion **(Soy and Sahoo, 2016).**

1.1.1 Use of Decorative Umbrella Lights in Baraat

The groom's procession to the wedding venue, commonly referred to as the baraat, is a central feature of Indian weddings, originating from ancient traditions and evolving over centuries. The development of the baraat tradition reflects the groom's celebration of his joy and anticipation for marriage. Historically, Indian weddings were characterized by elaborate customs, including communal festivities and rituals. The formalization of the groom's procession, referred to as baraat in Hindi and Urdu, became more structured during the medieval period. In this ceremonial procession, the groom is accompanied by his family and friends, amidst music, dance, and festivities, as he formally approaches the bride's family to seek her hand in marriage[1].

During the British colonial era, the baraat tradition continued to develop. Despite the introduction of British influences, particularly in urban areas, traditional practices like the baraat retained their cultural significance in regions where strong ties to these customs persisted. Following India's independence, these traditions endured, adapting to modern contexts while preserving their symbolic value.

A significant transformation occurred in the 1970s with the widespread adoption of decorative umbrella lights, coinciding with a broader trend towards more elaborate and visually impressive wedding celebrations. The incorporation of these vibrant and ornate lights became integral to baraat, enhancing the festive

atmosphere and visually highlighting the groom's arrival, reflecting a societal emphasis on aesthetically enhanced and memorable weddings.[2].

The use of decorative umbrella lights is particularly prevalent in regions such as Gujarat, Rajasthan, and parts of North India, where they have become a staple of baraat. This practice continues to evolve, incorporating contemporary designs to align with modern aesthetics. Modern decorative umbrella lights typically feature lightweight metal frames (e.g., aluminium or steel) for structural support. The canopy, traditionally crafted from silk or other vibrant, durable textiles, is often embellished with intricate embroidery, traditional motifs, and Zari work (using gold or silver threads). Additional decorative elements, such as small mirrors (shisha), sequins, beads, and energy-efficient LED technology (providing vivid, colourful lighting effects), further enhance their visual appeal. Handles are often adorned with beads, tassels, or decorative fabric, and some umbrellas incorporate small bells or ghungroos (traditional musical anklets) for added auditory and visual impact.

Given the outdoor nature of baraat, the materials and electrical components of the umbrella lights are treated with waterproof coatings. Individuals are typically hired on a wage basis to carry these lights, with a designated leader coordinating a group of approximately 30 people to ensure synchronized movements throughout baraat.

1.1.2 Musculoskeletal Discomfort and Mechanical Injuries from Decorative Umbrella Lights

The use of decorative umbrella lights in celebratory processions, particularly within the context of Indian baraats, presents a potential occupational health and safety concern for the individuals tasked with carrying these items. This practice exposes carriers to a range of physical strain that can lead to both musculoskeletal discomfort (MSD) and mechanical injuries.

Musculoskeletal discomfort (MSD) refers to pain, discomfort, or unease affecting the musculoskeletal system, including muscles, joints, ligaments, tendons, nerves, and other soft tissues **(Upadhyaya, 2020**).

According to Kroemer (1989),

> "Musculoskeletal discomfort (MSD) is defined as "discomfort, impairment, disability, or persistent pain in joints, tendons, muscles, and other soft tissues with or without physical manifestations."

According to the Workplace Health and Safety Regulation (2019),

> "Musculoskeletal discomfort is any injury or disease that affects the musculoskeletal discomfort system, whether it develops gradually or suddenly. It excludes injuries brought on by cutting as a result of the mechanical operation, crushing, or entrapment (including fractures and dislocations)".

Holding decorative umbrella lights for a long time, carrying them over longer distances, using incorrect postures, and not taking rest pauses while standing can all contribute to musculoskeletal discomfort. However, despite the festive atmosphere, standing for extended periods during the baraat can lead to musculoskeletal discomforts (MSD) and mechanical injuries experienced by the individuals who hold the umbrellas during the baraat. Musculoskeletal discomfort is a state in which the body experiences pain, discomfort, or uneasiness **(Patel, Chandra & Veer Kumar, 2024).**

Beyond musculoskeletal discomfort (MSD), the handling of decorative umbrella lights presents a risk of various mechanical injuries stemming from external forces. Several factors contribute to these injuries, including the weight and size of the umbrellas, the manner in which they are handled, and associated factors like heavy traditional clothing and uncomfortable footwear. These elements can strain joints and muscles, leading to discomfort and fatigue. Specifically, the weight of the umbrellas, particularly when combined with prolonged carrying times and awkward postures, can cause muscle strains and fatigue. The forces exerted during carrying also make joints, especially in the shoulder, elbow, wrist, and back, vulnerable to strain. Repetitive strain on the wrists, exacerbated by the grip required to hold the umbrella handle, can contribute to carpal tunnel syndrome, affecting the median nerve. The dynamic nature of the procession, often involving uneven terrain and potential obstructions, increases the risk of

trips, slips, and falls, resulting in injuries ranging from minor abrasions and contusions to more serious fractures or sprains.

The electrical components of the lights introduce electrical hazards, such as shocks and burns, with these risks heightened by outdoor settings and potential inclement weather. Finally, prolonged exposure to the bright illumination, particularly at close range, can cause ocular discomfort and, in extreme cases, potential photobiological damage. To mitigate these health-related issues, event organizers and individuals handling the lights should implement various coping strategies.

1.2. Justification of the Study

Indian wedding ceremonies, globally recognized for their opulent displays of light, colour, and deeply ingrained customs, constitute a significant expression of India's rich cultural heritage. These celebrations encompass a diverse array of traditions inextricably linked to geographical context, religious beliefs, and familial structures. Within this intricate framework, the baraat occupies a position of particular prominence, signifying the groom's ceremonial arrival at the wedding venue. [3] The baraat is typically characterized by musical performances, choreographed dance, and widespread jubilation, with the groom accompanied by a retinue of family members and close associates. A visually outstanding and culturally symbolic component of the baraat is the incorporation of decorative umbrella lights. These meticulously crafted luminaires, often constructed from a combination of textiles, metallic elements, light-emitting diodes (LEDs), and wooden handles, serve as potent emblems of the festive atmosphere and the cultural patrimony associated with Indian nuptial traditions.

However, notwithstanding the celebratory context and emphasis on visual spectacle, it is imperative to acknowledge the potential for adverse physical consequences among those tasked with bearing these decorative elements. While the aesthetic and symbolic dimensions of the baraat are frequently foregrounded, the physical demands placed upon the individuals carrying the umbrella lights are often overlooked. Despite efforts aimed at minimizing weight through material selection and design modifications, the inherent structural composition, intricate embellishments, and protracted durations of carriage inherent in the baraat can predispose individuals to musculoskeletal discomfort

and mechanical injuries. The cumulative effects of repetitive movements, sustained non-ergonomic postures, and the static loading imposed by carrying these often-substantial objects can manifest clinically as muscular soreness, articular stiffness and diminished range of motion. This potential for physical strain necessitates systematic investigation and the development of appropriate mitigation strategies.

A substantial researches, both internationally and within India, has comprehensively examined ergonomic challenges, the prevalence of musculoskeletal discomforts (MSDs), and associated risk factors across a diverse range of occupational settings. These studies have investigated MSDs among various worker populations, including those in industrial settings (e.g., construction and manufacturing), the service sector (e.g., bank employees and office staff), government agencies, and retail (e.g., shopkeepers). International studies have focused on specific occupational groups, such as dentists, exploring the impact of their work on musculoskeletal health **(Shakoor et al., 2022)**, and have developed and assessed tools for measuring MSDs in specific populations, such as the assessment of upper limb discomfort scales among workers in Brazil **(Silva et al., 2024).**

Similarly, Indian research has addressed MSDs within various contexts, including studies focusing on the informal sector, such as research on vegetable street vendors **(Rathod et al., 2024)**, and studies examining the cultural context of marriage arrangements and their impact **(Soy & Sahoo, 2016; Gupta & Singh, 2022).** Furthermore, research conducted within the Department of Family and Community Resource Management, The Maharaja Sayajirao University of Vadodara has contributed to this body of knowledge by investigating MSDs in professions such as marble cutting **(Jaiswal & Veerkumar, 2020)**, rose farming **(Mishra, Upadhyaya & Goswami, 2024)**, and office work **(Patel, Chandra & Veerkumar, 2024).**

However, despite this extensive research on MSDs in traditional occupational settings, a significant gap remains in understanding the physical demands associated with participation in traditional cultural celebrations. These celebrations often involve physically demanding activities, yet they have received limited attention from an occupational health perspective. This study aims to address this gap by investigating the musculoskeletal discomfort experienced by individuals holding decorative umbrella lights during Indian weddings, specifically within the context of the baraat. Through

rigorous data collection and analysis, this research will provide valuable insights into the ergonomic challenges inherent in this activity and propose evidence-based recommendations for mitigating associated risks. Further by focusing on this under-explored aspect of occupational health within a cultural context, this study will contribute to a more comprehensive understanding of the physical demands and challenges faced by individuals involved in such celebrations, ultimately informing strategies to enhance their well-being and occupational health.

1.3. Statement of the Problem:

The present study aims to assess the prevalence of perceived musculoskeletal discomfort and mechanical injuries experienced by the individuals holding decorative umbrella lights (Overhead and Pole Mounted) during baraat.

1.4. Objectives of the Study:

1. To collect the background information (age, gender and work experience) of the individuals engaged in holding decorative umbrella lights in Baraat.
2. To assess the perceived musculoskeletal discomfort experienced by the individuals engaged in holding decorative umbrella lights in Baraat.
3. To examine the extent of perceived exhaustion experienced by the individuals due to distance travelled while holding decorative umbrella lights in Baraat with maintaining adopted postures.
4. To assess the time spent, frequency and duration of rest pauses taken by the individuals engaged in holding decorative umbrella lights in Baraat.
5. To assess the mechanical injuries experienced by the individuals engaged in holding decorative umbrella lights in Baraat.
6. To propose coping strategies that can alleviate the musculoskeletal discomfort experienced by individuals engaged in holding decorative umbrella lights in Baraat.

1.5 Delimitations of the Study:

The present study was limited to:

1. The individuals residing in Vadodara district.
2. The individuals who were above 18 years and have minimum two years of work experience in holding decorative umbrella lights in Baraat.

3. The individuals who were physically and mentally normal (not physically and mentally challenged), especially females not in the pregnancy stage.
4. The individuals who were willing to participate in the research study.

1.6 Hypotheses of the Study:

1. The situational variables (viz. time spent and distance travelled) vary with the personal variables (viz. gender, age and work experience) of the individuals engaged in holding Decorative Umbrella Lights during Baraat.
2. There exists a difference in the intervening variables (duration of maintaining adopted posture while holding Decorative Umbrella Lights) due to personal variables (viz. gender, age and work experience) of the individuals engaged in holding Decorative Umbrella Lights during Baraat.
3. The intervening variable (duration of maintaining an adopted posture while holding decorative Umbrella lights) vary with the dependent variable (frequency of perceived musculoskeletal discomfort experienced) of respondents engaged in holding decorative umbrella lights (overhead and pole-mounted) Baraat.
4. There exists association between the dependent variable (extent of perceived musculoskeletal discomfort experienced) and the personal variables (age, gender, and work experience) of the respondents holding decorative Umbrella lights (overhead and pole-mounted) during Baraat.
5. There exists an association between dependent variable (extent of perceived musculoskeletal discomfort experienced) and the situational variables (time spent and distance travelled holding decorative umbrella light) of the respondents.
6. There exist an association between the situational variable (type of umbrella lights viz; overhead and pole mounted) with the dependent variable (extent of perceived musculoskeletal discomfort) of the respondents.
7. There exists a relationship between the situational variable (type of umbrella lights viz; overhead and pole mounted) and the intervening variable (duration of maintaining adopted posture while holding decorative umbrella light) of respondents.

REVIEW OF LITERATURE

CHAPTER II
REVIEW OF LITERATURE

A review of the literature is a methodical and thorough examination of previous studies that establishes a foundation for future research by outlining existing knowledge, identifying gaps, and explaining how the new study will contribute to advancing the field. It includes looking at previous research, such as journal articles, books, and papers, to understand what has already been discovered. To make it easier to follow, this review is divided into two parts: **Theoretical Orientation** and **Empirical Research Studies**.

2.1 Theoretical Orientation

2.1.1 Historical Context and Evolution of Indian Weddings

2.1.2 History and Significance of the Baraat

2.1.3 Decorative Umbrella Lights: Types and Uses

2.1.4 Potential Musculoskeletal Discomforts and Mechanical Injuries Associated with Decorative Umbrella Lights during Baraat

2.2 Empirical Research Studies

2.2.1 Research Studies conducted in India

2.2.2 Research Studies conducted in Abroad

Conclusion

2.1 Theoretical Orientation

2.1.1 Historical Context and Evolution of Indian Weddings

Marriage has been a fundamental social institution throughout history, shaping family structures, economic stability, and cultural traditions. Historical evidence suggests that marriage was often more of a contractual arrangement than a personal relationship based on love. In ancient Mesopotamia (2100–1800 BCE), marriage agreements were documented in Sumerian texts, highlighting their role in securing political alliances and inheritance rights **(Walker, 1992)**. These early marriages focused on maintaining social order and economic stability rather than personal choice.

In Indian culture, marriage has long been regarded as sacred. The origins of Indian wedding customs can be traced to the "Rig Veda" (1500–500 BCE), which emphasizes marriage as a means of maintaining social order and family unity **(Doniger, 2009)**. Arranged marriages, designed to strengthen familial bonds and ensure social harmony, have remained prevalent in Indian society. Marriage was not just a personal affair but an alliance between families, reinforcing social structures and traditions. Even today, arranged marriages continue to play a significant role, though modern influences have introduced greater individual choice and compatibility considerations.

During the Middle Ages (6th–16th centuries), local customs and religious practices influenced marriage traditions. The introduction of Islamic traditions, such as the "Nikah" (marriage contract), became an essential part of marriage practices in many regions, leading to a blend of Hindu and Islamic customs **(Khan, 2007)**. This period saw variations in wedding ceremonies based on regional and religious differences, creating a rich diversity of marital traditions across India. Marriage was closely linked to caste, community, and regional identity, reinforcing social norms and cultural heritage.

The British colonial era (1858–1947) introduced significant changes to Indian wedding traditions. Western influences impacted wedding attire, venue choices, and legal structures. The introduction of the Hindu Marriage Act of 1955 formalized marriage practices and emphasized legal rights, transforming certain

aspects of traditional marriage customs **(Chakrabarty, 2004; Brown, 2010)**. The colonial period also saw increased emphasis on personal choice and legal protections, though traditional customs largely persisted. The blending of Western and Indian traditions became particularly evident among the upper and middle classes, leading to a mix of formal attire, legal contracts, and celebratory receptions inspired by Western customs.

After India's independence in 1947, marriage traditions continued to evolve in response to social and economic changes. Urbanization and globalization influenced wedding practices, introducing new trends such as destination weddings, themed ceremonies, and elaborate pre-wedding events **(Kumar, 2018)**. The rise of mass media, including television, films, and social media, played a crucial role in shaping contemporary wedding trends. Today, Indian weddings are a fusion of traditional and modern elements, with many families opting for a mix of age-old rituals and personalized touches. While rural areas continue to uphold deeply rooted customs, urban weddings reflect global trends, incorporating innovative themes and customized celebrations.

Marriage remains a critical institution worldwide, significantly impacting respondents and families. Given its social importance, researchers and policymakers continue to examine marriage-related human rights issues, particularly concerning the legal minimum age for marriage and individual rights within the institution. The debate over arranged versus love marriages, gender roles, and the influence of modernity on marital traditions highlights the dynamic nature of marriage in contemporary society. As cultural and legal perspectives evolve, marriage continues to adapt, reflecting changing social norms and individual aspirations while preserving its historical and cultural essence [(3)].

2.1.2 History and Significance of the Baraat

2.1.2.1 Origins of the Baraat

The Baraat is a significant and symbolic procession in Indian weddings, marking the groom's grand and festive entrance to the bride's venue, accompanied by family and friends. While the term "Baraat" is widely recognized across India, its regional variations highlight the rich diversity

of wedding traditions. In Maharashtra, it is called "Varat," while in Gujarat, it is known as "Jaan." In Punjab, it is referred to as "Ghodi Chadna," and in Rajasthan, it is called "Dulha Aavjo." Similarly, in Bengal, the tradition is known as "Bor Jatri," in Tamil Nadu as "Kalyana Perahera," in Kerala as "Kaazhcha," and in Karnataka as "Varadhodike." In Andhra Pradesh and Telangana, it is referred to as "Pellikoduku Paddhati," while in Odisha, it is known as "Baraajatri." In Uttar Pradesh and Bihar, the term "Baraat" remains prevalent, and in Kashmir, the procession is called "Zang Traav." These regional names underscore India's vast cultural diversity in wedding traditions.

Historically, the Baraat was a means for the groom to exhibit his status and the prestige of his family, particularly among royal and noble circles. The groom would arrive in a lavish procession, often riding a richly adorned horse or elephant, accompanied by musicians, dancers, and attendants **(Mitra, 2011).** Over time, the Baraat evolved into an even more elaborate affair, incorporating intricate decorations and ceremonial attire for both the groom and his entourage **(Khan, 2002).**

This tradition has deep roots in ancient Indian customs. Historical texts and epics such as the Mahabharata and the Ramayana describe various celebratory arrivals for groom parties, emphasizing the importance of these in royal and noble weddings **(Doniger, 2009)**. These accounts illustrate how grandeur and ceremonial displays played a central role in historical wedding traditions. Exploring the origins and historical development of the Baraat provides valuable insights into its cultural significance and the evolving customs associated with this festive tradition.

2.1.2.2 Trends in Indian Wedding Baraats

The Baraat typically takes place in the evening or at night, utilizing elaborate lighting and decorations to enhance the festive atmosphere. Indian weddings are known for their intricate rituals and vibrant celebrations, which often reach their peak during evening hours **(Iyer, 1878).** The timing of the Baraat is also influenced by the auspicious moment or muhurat,

determined by Hindu astrology. However, contemporary trends, particularly in urban and destination weddings, have led to Baraats being scheduled during the day for convenience and practicality.

The winter season, from November to February, is the most popular period for weddings in India due to its pleasant weather, making it ideal for outdoor events. According to **Sharma (2023)**, winter months witness the highest number of weddings, reflecting their desirability during this time. This season also coincides with various festivals and holidays, enhancing the celebratory atmosphere. Conversely, the monsoon season, from June to September, presents challenges such as heavy rainfall and humidity, often necessitating covered or indoor venues. During the summer months, from March to June, weddings are typically held in the cooler hours of the evening or night to avoid extreme heat. Some families opt for cooler locations, such as hill stations or coastal areas, to mitigate high temperatures during summer weddings.

In regions such as Gujarat and Rajasthan, Baraats are particularly colourful and often incorporate traditional dance forms like Garba, adding a unique regional touch to the celebration. This examination of the timing and seasonal trends during baraats within Indian weddings illustrates a blend of traditional customs and modern adaptations, providing a comprehensive understanding of this vibrant and essential aspect of Indian wedding culture.

2.1.2.3 Changing Practices in the Baraat

Social reform movements in the early 20th century significantly influenced wedding customs in India. These reforms aimed at improving the status of women and led to changes in dowry practices, promoting more egalitarian wedding traditions **(Dube, 2001)**. As consumer culture grew and disposable income increased, weddings became more extravagant, featuring upscale venues, designer attire, and elaborate decorations. These celebrations evolved into grand social events, often reflecting the families' socioeconomic status **(Ghosh, 2006).**

Media has also profoundly impacted Indian weddings, with Bollywood films and global trends introducing new concepts and aesthetics. This influence has led to the incorporation of modern decorative elements, making themed celebrations, destination weddings, and fusion styles that blend contemporary and traditional elements increasingly popular **(Singh, 2012).**

Technology has transformed many aspects of wedding preparation. Digital invitations and live streaming services allow couples to reach a broader audience and incorporate interactive elements into their celebrations **(Sharma, 2023)**. Social media platforms have also significantly shaped modern wedding trends, influencing decoration choices and overall aesthetics by sharing bridal preparations and providing real-time updates during the event **(Choudhury and Roy 2021)**.

In contemporary India, the country's multiculturalism has led to the blending of various cultural and religious traditions. Fusion weddings now integrate elements from different cultures, such as Hindu and Christian customs or international styles, into traditional ceremonies **(Bhattacharya, S., 2021)**. Additionally, modern Indian weddings are increasingly accommodating diverse family structures and personal tastes, reflecting inclusivity through a wide range of celebrations and decorations that honour various cultural and individual identities **(Kumar, 2023).**

2.1.3 Decorative Umbrella Lights: Types and Uses

Decorative umbrella lights serve as ornamental lighting fixtures, characterized by a canopy-like structure embellished with various light sources such as LED or incandescent bulbs. These lights have gained significant popularity in Indian weddings, particularly during baraats, where they contribute to the grandeur and elegance of the procession. Further, by seamlessly blending aesthetic appeal with functional illumination, decorative umbrella lights enhance the visual splendour of the wedding ambiance while fulfilling practical lighting needs.

2.1.3.1 Visual and Cultural Significance

The visual appeal of decorative umbrella lights is striking and vibrant, incorporating bold and intricate designs that often reflect traditional Indian motifs and patterns. These designs symbolize the rich cultural heritage of Indian weddings, making them an essential decorative element. During baraats, these lights not only illuminate the surroundings but also serve to highlight the celebratory nature of the event, enhancing the overall experience for participants and spectators alike.

The incorporation of traditional Indian craftsmanship with contemporary lighting technology results in an aesthetically captivating blend. Many umbrella lights are adorned with intricate embroidery, decorative elements, and embellishments that evoke timeless wedding themes. Such elements further contribute to their cultural significance, making them an indispensable feature of wedding decor **(Chaudhary, 2019).**

2.1.3.2 Functional Aspects and Practical Applications

Beyond their aesthetic appeal, decorative umbrella lights fulfil a functional purpose by providing illumination to specific areas of the wedding venue. These lights are commonly employed to highlight key spaces such as the dance floor, seating arrangements, and the stage. Their dual functionality—combining decoration with illumination—makes them an attractive choice for wedding planners and decorators **(Kumar, 2023)**. The strategic placement of these lights ensures that all critical areas remain well-lit and visually engaging, thereby enhancing the overall ambiance of the event.

2.1.3.3 Customization and Thematic Adaptability

Decorative umbrella lights are highly versatile and can be customized to align with various wedding themes and seasonal preferences. Their design and colour schemes are often tailored to complement the specific requirements of different wedding settings. For instance, warm colour palettes and intricate patterns are typically selected for winter weddings, whereas lighter fabrics and cooler tones are preferred for summer or

monsoon ceremonies. This adaptability allows for a personalized approach to wedding decor, ensuring a cohesive and harmonious aesthetic **(Singh, 2012)**.

2.1.3.4 Integration with Other Decorative Elements

The selection of decorative umbrella lights must take into account the dimensions and thematic elements of the wedding venue. These lights are frequently integrated with complementary decorative components such as drapery, fabric swags, and floral arrangements to create a unified and visually striking ambiance. Proper coordination of these elements enhances the elegance and sophistication of the wedding decor **(Sharma, 2023)**.

2.1.3.5 Types of Decorative Umbrella Lights

Decorative umbrella lights used in Indian wedding Baraats can be categorized into two primary types: overhead umbrella lights and decorative umbrella lights with poles.

1. **Overhead Umbrella Lights**
    - **Intricate Patterns**: These lights feature elaborate traditional designs, such as paisleys, floral motifs, and geometric shapes, adding cultural depth to the wedding decor.
    - **Luxurious Fabrics**: The canopy is typically constructed from rich materials like silk, brocade, or velvet, often adorned with intricate embroidery, Zari work, small tassels, or sequins, contributing to an opulent ambiance.
    - **Vibrant Colour Schemes**: Overhead umbrella lights are usually available in deep, vibrant colours like red, gold, and royal blue, which complement the grandeur of traditional Indian weddings.
    - **Positioning:** Overhead umbrella lights are held with arms raised, casting illumination from above.

2. **Decorative Umbrella Lights with Poles**
    - **Elaborate Patterns**: These lights showcase traditional motifs similar to overhead lights but feature an adjustable pole for ease of placement and mobility.
    - **Rich Fabrics**: The canopy is crafted from luxurious materials such as silk, brocade, or velvet, embellished with embroidery, Zari work, long tassels, or sequins, enhancing their visual appeal.
    - **Bold Colour Schemes**: Available in deep reds, golds, and royal blues, these lights are ideal for extravagant wedding settings.
    - **Positioning**: Decorative umbrella lights with poles are held in front, providing focused illumination to the surrounding area.
3. **Movable Light Towers on Wheels**
    - **Design**: They feature multiple tiers of decorative lighting, often arranged in symmetrical and culturally inspired patterns.
    - **Lighting Elements**: Common components include LED bulbs, chandeliers, and ornate motifs that enhance visual appeal.
    - **Mobility**: The towers are mounted on wheeled bases, enabling smooth movement along the procession route.
    - **Functionality**: They provide both illumination and visual structure, enriching the ceremonial landscape.
    - **Cultural Significance**: Their design often incorporates symbols reflecting regional traditions and festive grandeur.
    - **Spatial Impact**: These towers help organize visual focus and rhythm, complementing other decorative elements in the procession.
    - **Symbolic Value**: They represent a harmonious blend of traditional artistry and modern event design innovation.

Plate 1: Overhead Umbrella Light

Plate 2: Pole Mounted Decorative Umbrella Light

Decorative umbrella lights play a pivotal role in Indian wedding decor, merging aesthetic sophistication with functional lighting. Their diverse styles and patterns cater to different themes and settings, ensuring that each wedding reflects the desired ambiance and cultural heritage. As an essential element of Baraats, these lights enhance the visual and celebratory experience, making them a preferred choice among wedding planners and decorators.

2.1.4 Potential Musculoskeletal Discomforts and Mechanical Injuries associated with Decorative Umbrella Lights during Baraat

2.1.4.1 Factors Contributing to Potential Musculoskeletal Discomforts

Although no specific studies have investigated the physical challenges associated with holding decorative umbrella lights during an Indian wedding procession (baraat), extensive research on overhead load-bearing tasks provides valuable insights into the potential musculoskeletal risks involved. Respondents engaged in such activities for prolonged durations are highly susceptible to musculoskeletal disorders (MSDs) due to several contributing factors, including sustained strain, poor posture, repetitive stress, and environmental challenges.

One of the primary risk factors is prolonged overhead positioning, which places continuous stress on the shoulder, neck, and upper back muscles. Holding decorative umbrella lights above the head for extended periods requires sustained muscle engagement, leading to fatigue, discomfort, and an increased risk of chronic musculoskeletal issues. According to **Ludewig and Borstad (2003)** worker performing prolonged overhead tasks, such as construction workers and electricians, often experience significant fatigue and discomfort in the shoulder, neck, and upper back due to excessive strain. Over time, this strain can lead to persistent pain, limited mobility, and even structural damage to muscles and tendons.

Additionally, static posture is another major contributor to musculoskeletal discomfort. When respondents are required to maintain a fixed posture for

extended durations while holding the lights, it results in muscle stiffness and reduced blood circulation. This prolonged immobility exacerbates musculoskeletal pain and increases the likelihood of developing MSDs. **Ariens et al. (2000)** found that respondents who sustained static postures for long periods, particularly in occupations requiring overhead work, experienced significant stiffness, diminished circulation, and heightened discomfort. Poor blood flow to the muscles can also lead to muscle cramping and an increased risk of injury due to reduced oxygen and nutrient delivery.

Another significant factor contributing to discomfort is the weight of the decorative umbrella lights. The added weight of the lights, especially when held overhead for extended durations, significantly increases the load on the arms, shoulders, and spine. This prolonged strain can lead to muscle fatigue, joint stress, and potential musculoskeletal injuries. **Marras et al. (2000)** demonstrated that carrying heavy loads, particularly in overhead positions, placed excessive physical strain on workers, leading to chronic pain and musculoskeletal disorders. The heavier the load, the greater the strain on muscles and joints, resulting in a higher risk of conditions such as rotator cuff injuries, shoulder impingement, and spinal misalignment.

Repetitive stress is another critical concern for respondents engaged in holding decorative umbrella lights during a baraat. Repeatedly lifting, adjusting, or repositioning the lights over extended durations increases the likelihood of overuse injuries such as tendinitis and chronic muscle fatigue. **Van Rijn et al. (2009)** systematically reviewed the effects of repetitive stress and found that prolonged overhead tasks resulted in cumulative strain on the musculoskeletal system, increasing the risk of chronic injuries such as rotator cuff tendinitis and inflammation of the shoulder and elbow tendons. Over time, repetitive strain can lead to persistent pain and weakness, making it difficult for respondents to perform their tasks effectively.

Moreover, imbalance and asymmetry play a significant role in musculoskeletal discomfort. If respondents hold the decorative umbrella

lights predominantly on one side of the body, it can cause muscular imbalances and asymmetry, leading to postural issues and disproportionate strain on the spine and joints. **Kumar and Patel (2018)** examined asymmetric load distribution among workers and found that prolonged one-sided load-bearing led to postural misalignment, increased mechanical stress, and a heightened risk of developing musculoskeletal disorders. When the body is not evenly balanced while holding a load, it forces certain muscles to overcompensate, leading to pain, discomfort, and long-term postural deformities.

Another contributing factor is poor ergonomics, particularly in the design of decorative umbrella lights. The absence of ergonomic considerations, such as comfortable grips and weight distribution, can exacerbate musculoskeletal discomfort. Inadequate handle design may lead to wrist pain, nerve compression, and other related musculoskeletal issues. **Silverstein et al. (1986)** emphasized that poor ergonomics in tool handles significantly contributed to wrist pain and nerve compression among workers performing overhead tasks. Without a proper grip or support structure, respondents holding decorative lights may experience excessive strain on their wrists and hands, leading to conditions such as carpal tunnel syndrome.

Environmental factors further amplify the physical strain associated with holding decorative umbrella lights during a baraat. Since the event typically takes place outdoors, respondents often have to navigate uneven terrain, crowded environments, and varying weather conditions while carrying the lights. **Ghosh et al. (2019)** found that working in outdoor environments with uneven surfaces and high mobility demands increased physical strain, contributing to overall musculoskeletal discomfort. Walking on uneven ground while maintaining an overhead load can lead to instability, increasing the risk of slips, falls, and additional strain on the lower body.

The cumulative effect of these factors can result in various musculoskeletal discomforts, primarily affecting the upper body due to sustained strain and repetitive motions. Shoulder pain is one of the most common complaints, as

continuous stress on the shoulder muscles and tendons can lead to inflammation, weakness, and reduced range of motion over time. Neck pain often arises from maintaining an elevated head position for long durations, resulting in muscle tension, stiffness, and potential nerve compression. Upper back pain is another prevalent issue, as prolonged arm elevation causes muscle fatigue and difficulty maintaining proper posture.

Additionally, elbow strain may develop from repetitive motions and overuse of the elbow joints, potentially leading to injuries such as medial or lateral epicondylitis (tennis elbow). Wrist pain is also a significant concern, often caused by improper grip techniques and awkward wrist positioning while holding the lights. Excessive strain on the wrist can lead to nerve compression, inflammation, and difficulty in maintaining a strong grip. Lower back pain can occur as respondents subconsciously adjust their posture to compensate for upper body strain, leading to improper spinal alignment and increased pressure on the lumbar region.

Furthermore, muscle fatigue is a frequent consequence of prolonged overhead load-bearing tasks, particularly affecting the arms, shoulders, and upper body, as continuous exertion depletes muscular endurance. Joint stiffness can result from maintaining static postures for extended periods, leading to restricted mobility and reduced flexibility over time. Tendinitis, an inflammatory condition affecting the tendons, is another potential risk due to repetitive overhead movements and sustained load-bearing. This condition can cause pain, swelling, and limited movement, making it difficult for respondents to continue their tasks comfortably.

Lastly, respondents performing prolonged overhead tasks may experience numbness or tingling sensations, often due to nerve compression caused by sustained postures. Prolonged stress on the muscles and joints can lead to nerve impingements, reducing circulation and causing sensations of numbness, tingling, or even temporary loss of strength in the arms and hands. These symptoms can significantly impact an individual’s ability to hold or manoeuvre the lights efficiently.

To mitigate these risks, it is essential to address musculoskeletal discomfort through proper ergonomics, regular breaks, and strengthening exercises. Ergonomically designed handles and lightweight materials can reduce strain on the hands and wrists, while frequent rest intervals can prevent excessive fatigue. Strengthening exercises targeting the shoulders, upper back, and core can help improve endurance and stability, reducing the likelihood of injury. Additionally, posture training and stretching exercises can enhance flexibility and circulation, preventing stiffness and discomfort. By implementing these preventive measures, respondents responsible for holding decorative umbrella lights during baraat can significantly reduce the risk of musculoskeletal disorders and improve their overall physical well-being.

2.1.4.2 Potential Mechanical Injuries

The prolonged carrying of decorative umbrella lights during baraat exposes respondents to various mechanical injuries, resulting from continuous physical exertion, poor ergonomic design, and environmental factors. These injuries pose significant health risks and may lead to long-term musculoskeletal complications.

Burn Injuries: Burns constitute a primary risk associated with decorative umbrella lights, particularly due to overheating of incandescent bulbs or faulty electrical wiring. The sustained emission of heat can lead to thermal injuries, ranging from first-degree burns, characterized by redness and irritation, to second-degree burns, which involve blistering and tissue damage. In severe cases, third-degree burns may occur, resulting in deep tissue damage with long-term implications. Furthermore, malfunctioning electrical components may lead to sparks or short circuits, heightening the risk of thermal injuries and fire hazards.

Lacerations and Abrasions: The structural composition of decorative umbrella lights presents risks of lacerations and skin abrasions, particularly when sharp edges, broken glass, or exposed metal components are present. During the installation, handling, or maintenance of these lights,

respondents may suffer minor to severe cuts, which could lead to infections or delayed healing if not adequately addressed. Additionally, the ergonomic inadequacy of the umbrella handle design may contribute to repeated friction-related abrasions, further exacerbating discomfort over time.

Thermal-Induced Skin Irritation and Redness: The close proximity of decorative umbrella lights to the face and upper body increases susceptibility to thermal-induced skin irritation. Prolonged exposure to heat sources results in localized skin redness, irritation, and discomfort. Additionally, prolonged contact with rough or allergenic materials within the umbrella structure may lead to dermatological reactions, including itching, rashes, and minor burns. These conditions are further intensified by environmental factors, such as high ambient temperatures during outdoor events**.**

2.1.4.3 Additional Occupational Hazards

In addition to mechanical injuries, respondents engaged in prolonged load-bearing activities involving decorative umbrella lights are at risk of visual strain, fatigue-related impairments, and postural stress injuries. These occupational hazards necessitate strategic ergonomic interventions to minimize adverse health effects.

Visual Fatigue and Eye Strain: Extended exposure to intense lighting emanating from decorative umbrella lights presents a significant risk to ocular health. The prolonged fixation on high-intensity or flashing lights leads to visual discomfort, temporary blurriness, and ocular fatigue. This phenomenon is exacerbated by the human eye's inability to rapidly adjust to fluctuating brightness levels, resulting in momentary vision impairment. To mitigate ocular fatigue, respondents should engage in frequent blinking, periodic gaze shifts, and limited direct exposure to intense illumination.

Heat-Related Discomfort and Excessive Perspiration: The thermal output of decorative umbrella lights, particularly those utilizing high-intensity bulbs, contributes to excessive perspiration and heat-induced

discomfort. The cumulative effect of carrying the umbrella, restricted airflow around the upper body, and sustained physical exertion creates an environment conducive to heat exhaustion. This issue is further compounded in humid outdoor conditions, increasing the likelihood of dehydration, dizziness, and thermal fatigue. Implementing heat-resistant materials, ensuring proper hydration, and allowing periodic rest intervals is essential to counteract these effects.

Risk of Fractures and Traumatic Injuries: The task of carrying decorative umbrella lights in crowded and uneven terrain elevates the likelihood of tripping, slipping, and subsequent falls, thereby increasing susceptibility to fractures and musculoskeletal trauma. Such injuries primarily affect the wrist, forearm, or lower extremities, depending on the nature of the fall. Furthermore, uneven weight distribution or abrupt loss of grip may result in sudden joint hyperextension, ligament damage, or bone fractures. Ensuring secure grip mechanisms, balanced load distribution, and stable footing is critical in minimizing trauma-related injuries.

Neck and Shoulder Strain: Prolonged overhead positioning of decorative umbrella lights exerts significant muscular stress on the cervical and scapular regions, leading to localized fatigue, stiffness, and chronic strain-related conditions. The sustained activation of shoulder stabilizing muscles may result in muscle spasms, restricted range of motion, and impingement syndromes. Over time, cumulative stress may predispose respondents to more severe musculoskeletal disorders, including tendon inflammation and cervical misalignment. The implementation of lighter structural materials, enhanced ergonomic handle designs, and periodic postural adjustments is essential in mitigating upper-body strain.

Hand and Wrist Overuse Syndromes: The continuous grip exertion required to stabilize decorative umbrella lights imposes excessive mechanical stress on the wrist flexor and extensor muscles, potentially leading to overuse syndromes such as carpal tunnel syndrome or repetitive strain injury (RSI). Symptoms may manifest as numbness, tingling sensations, or progressive hand weakness, ultimately impairing functional

dexterity. The incorporation of ergonomically contoured handles and grip rotation strategies is necessary to alleviate repetitive stress injuries.

Electrocution Hazards: The presence of faulty wiring, exposed electrical components, or poor insulation increases the risk of electrocution and electrical burns among respondents handling decorative umbrella lights. This risk is further heightened under wet conditions, where moisture serves as an electrical conductor, exacerbating shock-related injuries. Implementing regular maintenance protocols, ensuring protective insulation, and avoiding direct electrical contact in humid conditions is imperative in reducing electrical hazards.

Fatigue-Induced Impairments: Extended durations of continuous load-bearing without adequate rest intervals may lead to muscular exhaustion, postural instability, and cognitive fatigue. These factors significantly increase the risk of loss of balance, dizziness, and inadvertent accidents. Dehydration, inadequate muscle recovery, and improper postural support further exacerbate fatigue-related impairments. Scheduled rest breaks, hydration strategies, and load redistribution measures should be integrated to counteract physical exhaustion.

Cranial Impact Injuries: Improperly secured or misbalanced umbrella structures pose a head injury risk, particularly in conditions involving strong winds or sudden external impact. Accidental dislodgement or falling of the umbrella can result in direct cranial trauma, leading to contusions, concussions, or more severe traumatic brain injuries (TBIs). Precautionary measures, such as secure fastening mechanisms and heightened spatial awareness, are essential in preventing impact-related injuries.

Hence, the act of carrying decorative umbrella lights during baraat presents a multifaceted occupational hazard, encompassing mechanical injuries, musculoskeletal stress, thermal discomfort, and environmental risks. The cumulative strain placed on the upper body, postural muscles, and sensory organs necessitates comprehensive ergonomic interventions. By integrating lightweight materials, enhanced handle designs, and structured rest

intervals, the risk of physical strain and injury can be significantly reduced. Furthermore, implementing preventive safety measures, such as protective electrical insulation, grip stabilization techniques, and thermal-resistant components, is imperative in minimizing occupational hazards. Addressing these concerns through ergonomic modifications and structured safety protocols will ensure the safety, efficiency, and well-being of respondents carrying decorative umbrella lights while maintaining the aesthetic integrity of the baraat procession.

2.2 Empirical Research Studies

2.2.1 Research Studies Conducted in India

Kaur and Sharma (2014), conducted research on "Ergonomic assessment of existing methods of harvesting flowers from the fields". The field survey was conducted to know the existing flower plucking practices followed by farm women and the constraints face by them during plucking of rose and marigold flowers. A total sample of 60 farm women was intensively involved in flower plucking from Doraha block were purposively selected as respondents. The results of the study revealed that farm women were plucking the flowers (rose and marigold) with only one hand while the other hand was used for holding the polythene bag used for collecting the plucked flowers. It was observed that more time was needed to pluck the flowers as plucking was done with only one hand. It was found that this way of plucking flowers very tedious which also reduces the output of work. Further, no appropriate tools/devices either for plucking or for collecting the plucked flowers was being used which led to decreased efficiency in performing the household activities as reported by all the respondents. Keeping in view, there is a great need to design women-friendly tools keeping in view the ergonomic parameters of women involved in flower plucking activity. One such technology (harvest bag for collection of plucked flowers) was developed for the women to reduce their drudgery in this activity. The harvest bag for collection of plucked flowers was having adjustable straps uniformly and evenly distributed over the shoulders and waist and shaped pocket in the front which makes the bag friendlier and reduces drudgery while putting plucked flowers in the bag. It also

saved time as both hands were free to pluck the flowers which increased the output.

Yadav et al. (2016), examined the ergonomic factors contributing to work-related musculoskeletal disorders (WMSDs) among female labourers carrying head loads at construction sites in Haryana. The study involved 30 women aged 20-40 years with 8-10 years of work experience. Findings showed significant physiological changes due to their labour, including increased pulse rate (27.9 beats per minute), heart rate (32.7 beats per minute), and energy expenditure (6.4 kJ per minute). Oxygen uptake volumes decreased post-work, and the Rating of Perceived Exertion (RPE) classified the activity as moderately heavy (3.7). The study also reported a reduction in grip strength (19.7% in the right hand and 15.4% in the left) and spinal angle deviations in the lumbar (2.7%) and cervical (3.1%) regions. Extreme working conditions such as high temperatures, humidity, and dust exposure were identified as additional health risks for these labourers.

Sarkar et.al. (2016), conducted a study which was carried on the workers of a central market area in Kolkata to find out the prevalence of the Musculoskeletal Disorders. 210 male Manual Material Handling workers were randomly selected. Standardized Nordic Musculoskeletal questionnaire was used to assess the prevalence of MSD. Working posture was analysed by Ovako working posture analysis system (OWAS). SF12 questionnaire was used to assess the physical and mental health status. The results revealed that Lower back was found to be worst affected body part (68 per cent) followed by Knee (63 per cent), Neck (56 per cent) and Shoulder (41 per cent). The Physical composite score (PCS) and Mental composite score (MCS) were found to be 39.7 ± 9.11 and 46.0 ± 9.17 respectively. PCS, MCS and Frequency of lifting were found to be significant predictors of pain intensity rating. The regression model predicted 22.7 per cent of the variability in the scores of the pain intensity rating. It was concluded awkward postures along with the heavy load led to the development of musculoskeletal disorders.

Mishra and Singh (2017), studied a "Musculoskeletal Disorder in Flower Plucking Women." The aim of this study was to investigate the role performed by farm women engaged in floriculture and to find out the musculoskeletal (MSD)

disorder and occupational Hazards among the women. The results of the study depicted that, Women plays a significant and crucial role in Agriculture development, Livestock production and Floriculture as a manager decision-maker and skilled farm worker. The study was conducted in Faizabad District in U.P. wherein, 100 women involved in flower management were studied. It was found that the preferred activities by women were grading of flower (42%) as first followed by Deeping of flowers (34%), plucking of flower (12%) and storage flower (11%) respectively. Further, it was observed that less than half (40 %) of respondents suffered from the back pain, twenty per cent of women suffered Knee pain and nearly half (48%) were having poor postures and finger nodes. The researcher observed that stressful work, unawareness of new techniques in the use of equipment and unawareness for safety measures were the reason for musculoskeletal discomforts.

Nandy et.al, (2017), conducted a study on "Musculoskeletal Disorders among the Gardeners". Gardeners are at increased risk of occupational hazards and musculoskeletal disorders are common as they are exposed to high risk factors like unhealthy posture and lifting of heavyweight. The study was conducted on 60 gardeners. General information of the worker and work-related history was enquired using "Modified Nordic questionnaire. Anthropometric parameters were recorded. Examination of the gardeners was done. Analysis of working posture was done using OWAS method. The result revealed that low back pain was the commonest musculoskeletal disorder in gardeners followed with thigh, ankle and neck pain due to uncomfortable gardening posture during their work.

Pal and Dhara (2018), conducted a study on "Work-Related Musculoskeletal Disorders and Postural Stress of the Women Cultivators Engaged in Uprooting Job of Rice Cultivation". The study was aimed to evaluate postural stress and prevalence of musculoskeletal disorder (MSD) of women cultivators engaged in uprooting job of rice cultivation. The cross-sectional study was conducted on 166 women cultivators from different districts of West Bengal State, India. Prevalence and intensity of MSDs of the cultivators were evaluated by the Nordic questionnaire and 10-point body part discomfort scale. Work rest pattern and postural pattern were studied by direct observation method. Postural stress was

assessed by OVAKO Working Postures Analysis System (OWAS), Rapid Entire Body Assessment (REBA), Rapid Upper Limb Assessment (RULA), and Quick Exposure Checklist (QEC) methods and as well as by measuring the centre of gravity. MSD was highly prevalent among the study participants. Lower back, hip, wrist, shoulder, and knee were highly affected. Higher prevalence of MSDs among the cultivators may be because of prolonged working hours and awkward postures. The women cultivators had to start their day before dawn to finish off their household chores such as cooking, cleaning, washing clothes and dishes, etc., before they moved off to the fields, which altogether impose them under additional stress.

Jaiswal and Veer Kumar (2020), studied Musculoskeletal Pain and Postural Discomfort Among Marble Cutting Workers in the Marble Industry in Kishangarh. The study examined 220 marble cutters and found that repetitive tasks and poor ergonomics led to pain in the shoulders, back, and palms. Contributing factors included inadequate lighting, high noise levels, and extreme temperatures. The study emphasized the need for ergonomic interventions, worker training, and improved labour regulations.

Patel et al. (2023), conducted an observational study titled Association Between Work-Related Musculoskeletal Disorders and Fatigue Among Female Beauticians in Ahmedabad. The study assessed 80 female beauticians aged 18-40 years with up to 22 years of work experience. Using the Nordic Musculoskeletal Questionnaire (NMQ) and the Multidimensional Assessment of Fatigue (MAF), the study found that 83% of participants experienced musculoskeletal pain in at least one body part. The most affected regions were the neck (36%), shoulders (29%), elbows (14%), wrists/hands (24%), upper back (22%), lower back (45%), knees (63%), and ankles/feet (33.93%). A significant correlation was found between WMSDs and occupational fatigue ($r = 0.658$, $p < 0.005$), indicating a moderate positive relationship. The study emphasized the need for ergonomic interventions and educational programs to address these health concerns.

Mishra and Upadhyay (2024), examined Musculoskeletal Discomforts Experienced by Rose Farm Workers in Vadodara District. The study assessed 60 rose harvesters and found that prolonged bending and repetitive movements led

to pain in the back, neck, wrists, and feet, with the most severe discomfort in the feet and buttocks. The study highlighted the lack of protective measures and rest breaks and suggested ergonomic modifications to reduce physical strain.

Patel et al. (2024), conducted a study titled Musculoskeletal Discomfort Experienced by Office Staff: A Hindrance to Efficient Work Performance. The study involved 120 office workers aged 25-48 in Vadodara and found that prolonged sitting, poor posture, and extensive computer use contributed to musculoskeletal discomfort. The study recommended strategies such as ergonomic adjustments and frequent breaks to improve worker well-being and productivity.

2.2.2 Research Studies Conducted Abroad

Shakoor et al. (2022), conducted a study on The Impact of Occupational Musculoskeletal Disorders on Dentists in Lahore, Pakistan. Due to prolonged and precise work, dentists are at high risk for musculoskeletal disorders (MSDs), affecting their efficiency and career longevity. The study surveyed 450 dentists (52.4% men and 47.6% women) aged 24-65. It found that 87.3% of participants reported musculoskeletal issues, with 94.9% seeking medical treatment and 82.7% avoiding routine activities due to their conditions. Additionally, 70.7% had taken sick leave due to MSDs, and 98.7% attributed their discomfort to ergonomic issues in the workplace. The study concluded that MSDs significantly impact dentists, leading to absenteeism and reduced work efficiency.

Silva et al. (2024), conducted a systematic review titled Assessment of the Musculoskeletal Discomfort Scale for Upper Limbs Among Workers in Inner Brazil. The review analysed 20 studies involving 194,863 construction workers to assess the prevalence and causes of work-related musculoskeletal disorders (WRMSDs). It found that WRMSDs were highly common, with prevalence rates ranging from 25% to 96% over 12 months. Key contributing factors included awkward postures (OR = 2.4), manual material handling (OR = 2.2), long working hours (OR = 4.0), high job demands (OR = 1.6), and mental stress (OR = 1.8). The study suggested further research to establish causation and develop preventive measures.

Kearney, et.al (2016), conducted "A Descriptive Study of Body Pain and Work-related Musculoskeletal Disorders among Latino farm workers Working on Sweet Potato Farms in Eastern. The aimed of the study was to describe the prevalence of work-related musculoskeletal disorders (WMSDs) and self-reported pain among Latino farm workers who work extensively in hand-harvesting sweet potatoes. The data were obtained from a cross-sectional survey of farm workers 120 in eastern North Carolina. Univariate and bivariate analyses were used to describe personal, work characteristics, and self-reported pain associated with musculoskeletal injuries. Overall, seventy-nine percent of farm workers reported any type of pain or discomfort. The highest reported areas of pain were in the back (66%) and shoulder areas (31%)**.**

Ajayi, et.al (2015), researched on "Assessment of the Impact of Musculoskeletal Disorders on Nigerian Construction Workers". The purpose of the study was to assess the impact of construction activities as construction work entails non-ergonomic activities, range of in-situ work at various levels and construction workers. The sample of 100 contractors was drawn from registered general contractors with the Ministry of Works and housing in six states of South-West Nigeria. All the respondents were working as a fulltime contractor within the construction industry. The study revealed that baseline knowledge regarding the WMDs is inadequate as there is major concern about safety procedures and feedback from site employees. The result of the study indicated, there was a need for an increase in training, knowledge on strategies to reduce the onset of WMDs among construction workers. However, there was an improvement in baseline knowledge, but the need to address the knowledge areas of health and safety of construction workers was significant. Regrettably, there was no evidence of medical surveillance mechanism in the study to show how the health status of workers was monitored. Furthermore, the study confirmed that construction activities impact negatively on the construction worker as a result of various body actions and affects the physical nature of the workers.

Kim, et.al (2019), researched on **"**Prevalence of Upper Extremity Musculoskeletal Diseases and Disability among Fruit Tree Farmers in Korea". The study aimed to examine the prevalence of upper extremity musculoskeletal

diseases (MSD) and to identify factors influencing disability among fruit tree farmers in Korea. This study was conducted as a part of the Namgaram study, wherein 460 fruit tree farmers underwent clinical evaluations, including physical assessments, laboratory tests, simple radiographic examinations, and magnetic resonance imaging studies of the upper extremities. Disability was assessed using the Disabilities of the Arm, Shoulder, and Hand outcome measure. The result revealed that mean DASH score in fruit farmers was fourteen per cent (range 0 to 81.67). Some farmers had experiences of injuries to the hands (8.7%), arms (5.7%), and shoulders (11.5%). Majority of the respondents (89.6%) had at least one MSD. More specifically, the prevalence of various upper extremity MSD were as follows: 60.4 per cent for rotator cuff tear, 20.9 per cent for golf elbow, 40.9 per cent for tennis elbow, and 58.0 per cent for hand osteoarthritis. Fruit tree farmers remain at risk for MSD of the upper extremities. Disability tended to worsen with more MSD. Thus, it was found necessary to educate farmers about prevention strategies but also to develop an effective management system for agricultural work-related MSD and a surveillance system at the government level for the health problems of farmers.

Conclusion

The literature reviewed highlights that work-related musculoskeletal disorders are prevalent among various occupational groups engaged in physically demanding tasks, including construction workers, agricultural labourers, marble industry workers, beauticians, gardeners, and office staff. Repeated exposure to awkward postures, heavy loads, and prolonged standing contribute significantly to these discomforts. Despite numerous studies across diverse occupations, there is limited research focusing on the musculoskeletal discomfort of individuals holding decorative umbrella lights during Baraat. These workers are subjected to sustained static postures and load-bearing activities, leading to pain in the shoulders, neck, and lower back. The absence of ergonomic solutions in this occupation points to a significant research gap. Therefore, this study intends to explore the musculoskeletal discomfort experienced by decorative umbrella light holders in Vadodara and to recommend ergonomic interventions aimed at reducing their physical strain and improving their occupational well-being.


METHODOLOGY

CHAPTER III

METHODOLOGY

The present chapter describes the methodological approach employed to assess perceived musculoskeletal discomforts and mechanical injuries experienced by respondents involved in holding decorative umbrella lights during the Baraat. To ensure a systematic presentation, the chapter is structured into eleven sections, each of which is elaborated upon in the following descriptions:

3. 1 Research Design

3. 2 Operational Definition

3. 3 Conceptual Framework of the Study

3. 4 Locale of the Study

3. 5 Unit of Inquiry

3. 6 Sample Size and Sampling Procedure

3. 7 Construction and Description of the Tool

3. 8 Establishment of the Content Validity of the Tool

3. 9 Data Collection

3. 10 Data Analysis

3. 11 Suggestions of Coping Strategies to reduce perceived MSD experienced by the respondents engaged in holding decorative umbrella lights in Baraat

3.1 Research Design:

Since the present study aims to assess the perceived musculoskeletal discomforts experienced by the respondents engaged in holding Decorative Umbrella Light during Baraat, a descriptive research design was considered to be the most appropriate method to carry out the present investigation. To reach the objective of the study an exhaustive plan of work and consecutive procedures adopted are explained here.

3.2 Operational Definitions for the present study:

3.2.1 Decorative Umbrella Light: For the present study, a decorative umbrella light referred to colourful, illuminated umbrella-shaped structures held by the respondents (both males and females) during the Baraat (Indian wedding procession) to enhance the visual appeal of the event. These umbrella lights include overhead umbrella lights as well as pole mounted lights.

3.2.2 Extent of Perceived Musculoskeletal Discomfort: For the present study, it referred to the extent of **Perceived Body Discomfort measured** through following parameters;

3.2.2.1 The Extent of Exhaustion experienced by the respondents due to Distanced Travelled while Holding overhead or pole mounted Decorative Umbrella Light during Baraat Measured on five continuum scale viz. Not Exhausted, Little Exhausted, Moderately Exhausted, Extremely Exhausted and Completely Exhausted and the ascribed scores were1,2,3,4,5 respectively.

3.2.2.2 The Extent of Frequency and Severity of Perceived Body Discomfort was measured through Psychophysiology Corlett and Bishop's Body Part Discomfort Standardized Scale (1976). The scale is a subject symptom survey tool that evaluates the frequency and severity of discomfort in various body parts based on the respondent's experience. The frequency of discomfort experienced in the upper and lower body parts by respondents engaged in holding (overhead or pole mounted) decorative umbrella lights during the Baraat was measured using a frequency. The response options included "Always," "Sometimes," and "Never," with corresponding scores of 3, 2, and 1, respectively. The possible range of scores for the upper body was between 9 and 27, while for the lower body, the scores ranged from 18 to 54. The severity of discomfort in both the upper and lower body parts was assessed using a severity, which utilized a five-point continuum scale: "Very

Severe Pain," "Severe Pain," "Moderate Pain," "Mild Pain," and "No Pain," with assigned scores of 5, 4, 3, 2, and 1, respectively. The potential minimum and maximum scores for the upper body were 18 and 76, respectively, while for the lower body, the scores ranged from 9 to 38.

3.2.2.3 The Extent of Frequency and Severity of Perceived Hand Discomfort was measured through the Cornell Hand Discomfort Questionnaire (1994). The Questionnaire is a self-report measure designed to assess the frequency and severity of perceived hand discomfort in the left hand and right hand of respondents. The response options for the frequency of discomfort were: "Several times every day," "Once every day," "3-4 times last week," "1-2 times last week," and "Never," with assigned scores of 5, 4, 3, 2, and 1, respectively. The possible minimum and maximum scores were determined based on these responses, and the scores ranged from 4 to 30. For the severity of discomfort in the left and right hand, the responses were categorized using an equal distribution method, with the following options: "Very Uncomfortable", "Moderately Uncomfortable", "Slightly Uncomfortable", and "Not Uncomfortable", assigned scores of 3, 2, 1, and 0, respectively and the scores ranged from 6 to 18. The extent of interference experienced by the individual in the left hand and right hand while holding the decorative umbrella lights (overhead or pole mounted) was also assessed and the response options for the level of interference were: "Substantially Interfered", "Slightly Interfered," and "Not at All," with corresponding scores of 3, 2, and 1, respectively and the response scores ranged from 6 to 18.

3.2.2 Mechanical Injures: For the present study, it referred to the injuries such as cuts on the skin, pinching of the skin, hardening of the skin, tears in the skin, redness in the eyes, and redness on the face experienced by respondents while holding overhead or pole mounted decorative umbrella lights during a baraat.

3.2.3 Spontaneous Rest Pauses: For the present study, it is referred to the voluntary breaks taken by the respondent while holding the decorative umbrella light. These pauses are characterized by temporarily lowering the light, shifting weight, or taking brief moments of rest without official instruction. The frequency and duration of these pauses were recorded in minutes.

3.2.4 Duration of Maintaining Adopted Posture: For the present study, it referred to the actual time spent in hours during baraat with adopted posture by the respondents holding decorative umbrella light (overhead and Pole mounted).

- The posture adopted by the respondent while holding **overhead decorative umbrella lights** includes **"Standing with arms raised"** for holding the overhead decorative umbrella lights and **"Walking with arms raised"** while holding the overhead decorative umbrella lights.
- The posture adopted by the respondent while holding **pole-mounted decorative umbrella lights** the posture adopted includes "**Standing with hands in front**" while supporting the pole-mounted decorative umbrella light and **"Walking with hands in front"** while carrying the pole-mounted decorative umbrella light.

3.3 Conceptual Framework of the Study

3.3.1 Independent Variables of the Study

3.3.1.1 Personal Variables

- Gender
- Age (in years)
- Work Experience (in years)

3.3.1.2 Situational Variables of the Study

- Time spent while holding decorative umbrella lights during baraat.
- Distance travelled while holding decorative umbrella lights during baraat.
- Type of decorative umbrella light

3.3.2 Intervening Variable of the Study

- Duration of maintaining the adopted posture by the respondents during the baraat.

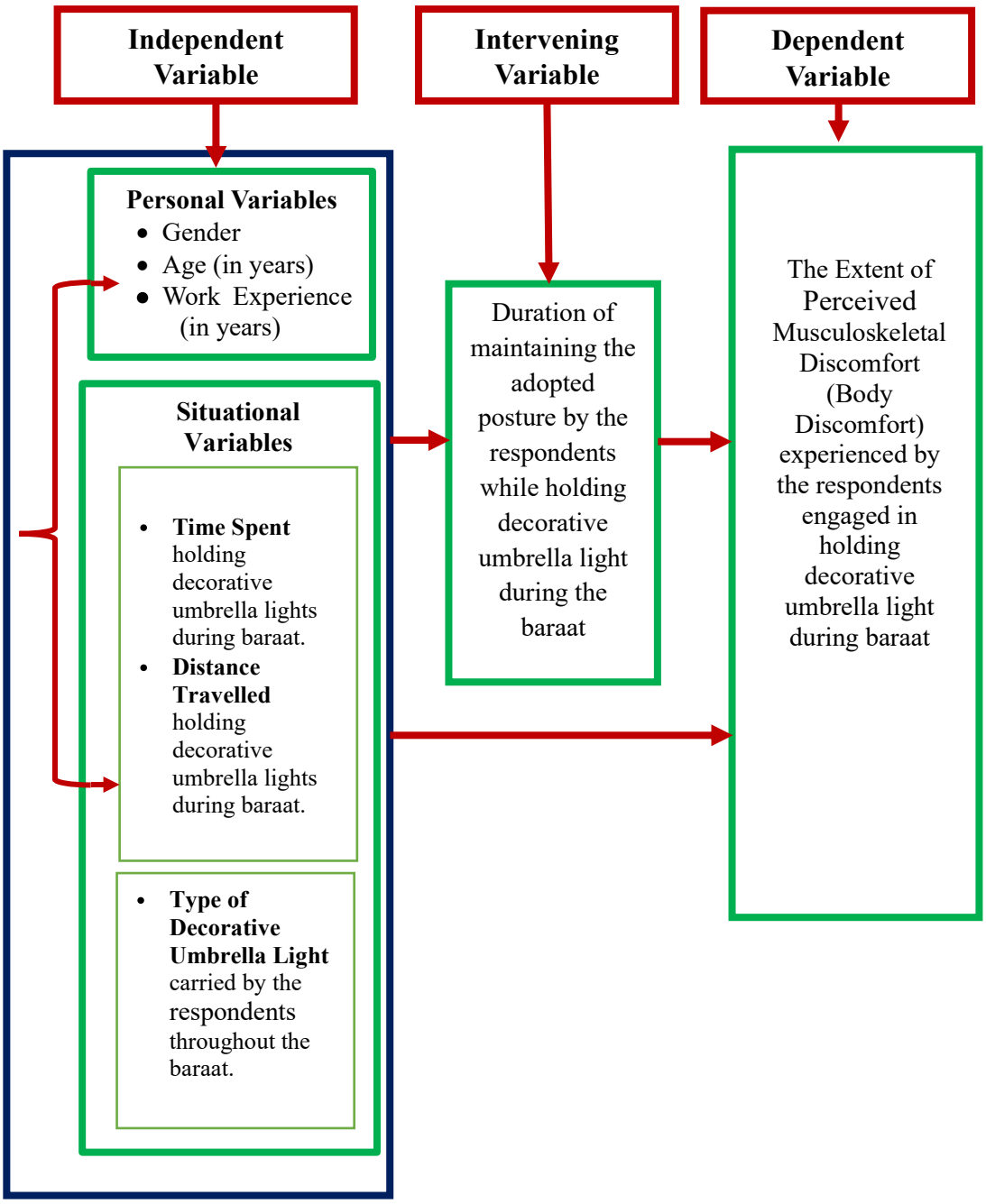
3.3.3 Dependent Variable of the Study

- The extent of perceived musculoskeletal discomfort (Perceived Body Discomfort) experienced by the respondents engaged in holding decorative umbrella light during baraat.

3.3.4 Explanation of the Conceptual Framework of the Study

The schematic presentation in **figure 1**, demonstrates the hypothesized relationships between variables. Personal variables like gender, age and work experience, along with situational factors such as time spent holding the umbrella, distance travelled, and the umbrella's weight, are expected to influence Perceived musculoskeletal discomfort. Crucially, the duration of maintaining a specific posture while holding the umbrella is identified as an intervening variable, significantly impacting the probability of discomfort. This framework suggests that a complex interplay of personal, situational, and postural factors contributes to the development of Perceived musculoskeletal discomfort in respondents holding decorative umbrellas during Baraat.

Figure 1: Schematic presentation of Hypothetical Relationship between the Variables



3.4 Locale of the Study

The locale of the present study was Vadodara district in the state of Gujarat.

3.5 Unit of Inquiry

The unit of inquiry for the present study consisted of respondents engaged in the profession of Baraat, with at least two years of experience in holding decorative umbrella lights. These respondents were physically and mentally healthy (not affected by any physical or mental challenges), especially females, not pregnant, and willing to participate in the study.

3.6 Sample size and Sampling Procedure

3.6.1 Selection criteria for the respondents holding Decorative Umbrella Lights

For the present study, the criteria set for the selection of the respondents holding decorative umbrella lights were as follows:

The present study was limited to;

1. The respondents residing in Vadodara District.
2. The respondents who were above 18 years and have minimum two years of work experience in holding umbrella light in barat.
3. The respondents who were physically and mentally normal (not physically and mentally challenged), especially females not in the pregnancy stage.
4. The respondents who were willing to participate in the research study.

3.6.2 Sample size

The sample size for the present study comprised of 120 respondents engaged in holding Decorative Umbrella Lights during Baraat, each possessing a minimum of two years of occupational experience in this role.

3.6.3 Inclusive Criteria

Respondents were included who were:

- Residing in Vadodara district.

- Above 18 years and had a minimum of two years of work experience in holding umbrella lights during baraat.
- Engaged in holding Overhead decorative and Pole Mounted decorative umbrella light.
- Physically and mentally healthy (not physically or mentally challenged), particularly females who were not pregnant.
- Willing to participate in the research study.

3.6.4 Exclusive Criteria

Respondents were excluded who were:

- Engaged in playing music in the Baraat (i.e., members of the baraat band).

3.6.5 Sampling Procedure

For the present study, the manager of each Baraat group was initially contacted through the snowball technique, and respondents were then selected through purposive sampling from the respective Band groups. Once enough eligible respondents were identified, informed consent was obtained from the respondents willing to participate in the study.

3.7. Construction and description of the tool

For the present study, a comprehensive review of the literature provided the foundation for the researcher to identify and construct the appropriate tool for data collection.

- **Interview Schedule:** An interview schedule was designed to gather information regarding the respondents' background details, along with the frequency and severity of body discomfort. It also focused on identifying discomfort experienced in the right and left hands, as well as any mechanical injuries sustained by respondents involved in holding decorative umbrella lights during the Baraat.
- **Observation Sheet:** An observation sheet was utilized to assess the time spent, distance travelled, and the extent of exhaustion experienced in relation to the posture adopted by respondents engaged in holding decorative umbrella lights during the Baraat procession.

3.7.1 Construction of the tool

Interview Schedule: To assess the Perceived musculoskeletal discomfort and mechanical injuries experienced by respondents holding decorative umbrella lights. The use of an Interview Schedule was deemed appropriate for this research for the following reasons:

1. It was anticipated that the educational levels of respondents would vary widely, ranging from illiterate to those with basic literacy, a structured Interview Schedule was selected to ensure inclusivity and ease of participation.
2. The language of the interview schedule was adapted to suit the respondents' educational and linguistic abilities, minimizing the risk of misinterpretation of the questions.
3. The interview schedule format allowed respondents to clarify any doubts or ambiguities, ensuring accurate and reliable data collection on personal details, work experience, and physical body discomfort.
4. The interview schedule was deemed the most appropriate tool for systematically collecting essential data, including demographic details, work experience during baraat, and the frequency and severity of musculoskeletal discomfort.

Observation Sheet: The observation sheet was carefully constructed to assess various factors affecting the respondents engaged in holding decorative umbrella lights during the Baraat. It included details on the time spent by each respondent in holding the umbrella light, recorded in terms of total duration. The distance travelled while carrying the umbrella light was also noted to understand the extent of exhaustion experienced by the respondents. The observation sheet also focused on the posture adopted by the respondents throughout the baraat.

3.7.2 Description of the Tool

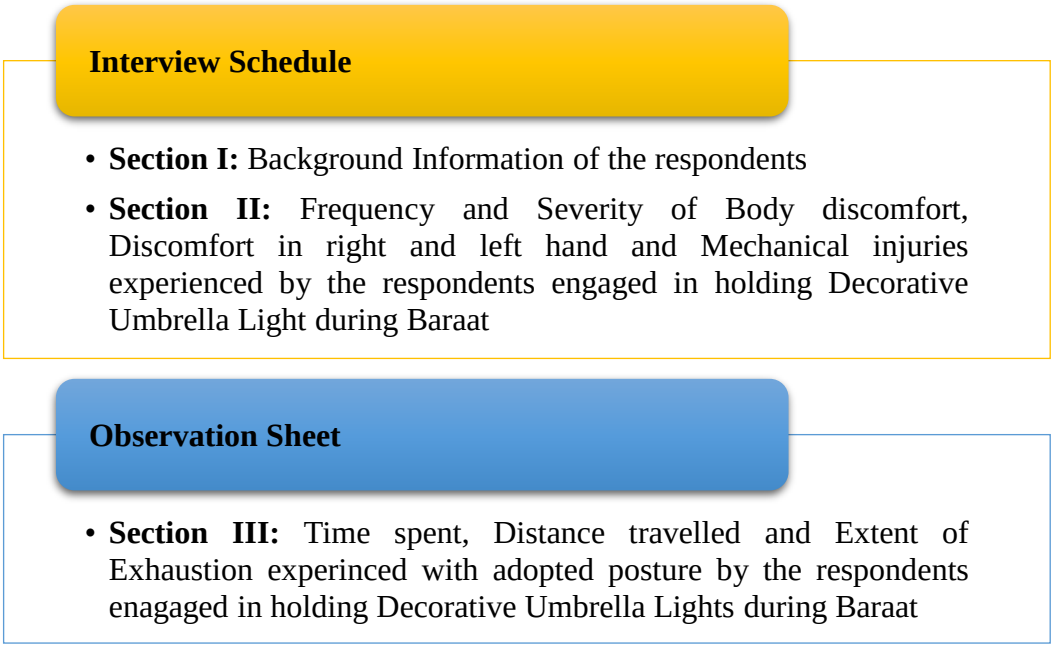


Figure 2: Description of the Data Collection Tool

Interview Schedule

Section I: Background Information of the respondents

This section sought information regarding the personal data of the respondents holding Overhead or Pole Mounted Decorative Umbrella Light during baraat like name, age (in years), gender, type of family, educational qualification, monthly income (in INR), work experience (in years), time of Baraat, types of Decorative Umbrella Lights used by the respondents engaged in holding Decorative Umbrella Light during Baraat.

Section II: Frequency and Severity of Perceived Body Discomfort, Discomfort experienced in Right and Left hand and Mechanical Injuries experienced by the respondents while holding Decorative Umbrella Light during Baraat

A. Frequency and Severity of Perceived Body Discomfort experienced by the respondents engaged in holding Decorative Umbrella Light during Baraat: This section outlines the methodology used to assess the frequency

and severity of Perceived Body Discomfort experienced by respondents holding decorative umbrella lights during Baraat. The evaluation of frequency and severity of Perceived Body Discomfort was carried out using, **Corlett and Bishop's Body Parts Discomfort Standardized Scale (1976)**. The frequency of discomfort was recorded on a three-point scale: "always," "sometimes," and "never." The severity of discomfort was assessed using a five-point scale: "very severe pain," "severe pain," "moderate pain," "mild pain," and "no pain."

B. **Discomfort experienced in Left Hand by the respondents engaged in holding Decorative Umbrella Light During Baraat:** This section assessed the discomfort experienced in the left hand by respondents holding decorative umbrella lights during Baraat. The **Cornell Hand Discomfort Questionnaire (CHDQ-1994)** was adopted for this. The duration of discomfort was assessed using a five-point scale, ranging from "Never" to "Several times every day." The severity of discomfort was measured on a three-point scale: "Slightly uncomfortable," "Moderately uncomfortable," and "Very uncomfortable." Additionally, the interference of discomfort with daily activities was evaluated using a three-point scale: "Not at all," "Slightly interfered," and "Substantially interfered.

C. **Discomfort experienced in Right Hand by the respondents engaged in holding Decorative Umbrella Light during Baraat:** This section assessed the discomfort experienced in the right hand by the respondents holding decorative umbrella lights during the Baraat. The **Cornell Hand Discomfort Questionnaire (CHDQ-1994)** for this. The duration of discomfort was assessed using a five-point scale, ranging from "Never" to "Several times every day." The severity of discomfort was measured on a three-point scale: "Slightly uncomfortable," "Moderately uncomfortable," and "Very uncomfortable." Additionally, the interference of discomfort with daily activities was evaluated using a three-point scale: "Not at all," "Slightly interfered," and "Substantially interfered."

D. **Mechanical Injuries Experienced by respondents while in holding Decorative Umbrella Lights during Baraat:** This section collected

information regarding the frequency and severity of mechanical injuries experienced by the respondents holding decorative umbrella lights during Baraat. The frequency of these injuries was assessed using a three-point Likert scale with the response options: "Always," "Sometimes," and "Never" and severity was evaluated using the categories: "Mild," "Moderate," and "Severe."

Observation Sheet

Section III: Time Spent, Distance Travelled, Levels of Extent perceived Exhaustion Experienced with Adopted Posture, and Rest Pauses taken by the respondents while holding Decorative Umbrella Lights during Baraat.

This section examines the time spent and distance travelled by the respondents holding decorative umbrella lights while maintaining the adopted posture, as well as the level of exhaustion, assessed using the five-point scale: "Not Exhausted," "Little Exhausted," "Moderately Exhausted," "Extremely Exhausted," and "Completely Exhausted." Furthermore, the frequency and duration of spontaneous rest pauses (those taken voluntarily by the respondents) during the Baraat were systematically recorded in the observation sheet. Furthermore, the frequency and time spent of spontaneous rest pauses (those taken voluntarily by the respondents) during the Baraat procession were systematically recorded.

3.8 Establishment of Content Validity of Tools

To establish the content validity of the data collection tools, it was given for evaluation to the panel of eleven judges, consisting of experts in the field of Ergonomics and faculty members from the Department of Family and Community Resource Management, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda. The judges were asked to evaluate the clarity and relevance of the items listed under each aspect, specifically related to Section I (Background Information), Section II D (Mechanical Injuries) and Section III (Time Spent, Distance Travelled, Levels of Extent perceived Exhaustion

Experienced with Adopted Posture, and Rest Pauses taken by the respondents while holding Decorative Umbrella Lights during Baraat), determining whether the items were clear or ambiguous, and relevant or irrelevant. For the assessment of the Frequency and Severity of Perceived Body Discomfort Experienced (Section II-A), Corlett and Bishop's Body Parts Discomfort Standardized Scale (1976) was employed. For discomfort experienced in the right and left hands (Section II-Band C), the Cornell Hand Discomfort Questionnaire (CHDQ-1994) was utilized.

3.9 Data Collection

The data for this study were collected by the researcher during the period from October to November 2024.

For aspects such as the demographic profile, frequency and severity of Perceived Body Discomfort, discomfort experienced in the left and right hands, and mechanical injuries, an interview schedule was used. This approach enabled the researcher to obtain detailed information directly from the respondents.

For other aspects, such as the time spent and distance travelled while maintaining the adopted posture (for respondents holding overhead decorative lights or pole mounted decorative umbrella lights), as well as the spontaneous rest pauses taken, video recording and direct observation sheet was utilized. These methods provided a more precise assessment of the physical demands and rest patterns adopted by the respondents during the Baraat.

Before data collection, informed consent **(Appendix I)** was obtained from all the respondents. The researcher explained the objective of the study, built rapport with the respondents to encourage honest responses, and ensured respondents voluntary participation.

3.10. Data Analysis

Various data analysis procedures, including categorization, coding, tabulation, and statistical analysis, were employed to analyse the data. These methods allowed for the systematic organization and interpretation of the collected data, ensuring accurate and reliable results.

3.10.1 Data Categorization

Categorization of Data - Interview Schedule

Section I: Background Information

1. **Age of the Respondents (in years):**
    - 20 - 35 years
    - 36 - 51 years
    - 52 - 67 years
2. **Gender of the Respondents:**
    - Male
    - Female
3. **Educational Qualification of the Respondents:**
    - Illiterate
    - Up to Primary School
    - Up to Secondary School
    - Up to Higher Secondary
    - Graduate
4. **Work Experience with Decorative Umbrella Lights (in years):**
    - 2 - 6 years
    - 7 - 11 years
5. **Personal Monthly Income (in ₹):**
    - 2000 - 4000
    - 4001 - 7000
6. **Family Monthly Income (in ₹):**
    - 20000 - 40000
    - 40001 – 60000

Section II: Frequency and Severity of Perceived Body Discomfort, Discomfort experienced in Right and Left hand and Mechanical Injuries by the respondents while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

A-1 Frequency of Perceived Discomfort experienced by the respondents in Upper Body Parts while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat: The frequency of Perceived Body Discomfort experienced by respondents in the upper body parts while holding (overhead or pole mounted) decorative umbrella lights during the Baraat was categorized using the equal distribution method. The responses to the frequency were classified as "Always," "Sometimes," and "Never," with ascribed scores of 3, 2, and 1, respectively. The minimum and maximum possible scores were calculated, and a range of scores was developed based on the equal distribution method to express the frequency of Perceived Body Discomfort s experienced by respondents in the upper body parts. The resulting frequency scores were classified into three categories:

Frequency of Perceived Upper Body Discomfort	Range of Score
High	43 - 54
Moderate	30 - 42
Low	18 - 29

A-2 Frequency of perceived Discomfort experienced by the respondents in Lower Body Parts while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat: The frequency was categorized on the basis of equal distribution method, the pattern of the responses of the frequency was Always, Sometimes, Never and the ascribed score for responses were 3, 2, 1 respectively. The possible minimum and maximum score were obtained and the range score was developed based on equal distribution method to express the frequency of Perceived Body Discomfort s experienced by the respondents in Lower Body Parts holding overhead or

pole mounted decorative umbrella lights during Baraat. The resulting frequency scores were classified into three categories:

Frequency of Perceived Lower Body Discomfort	Range of Score
High	22 - 27
Moderate	15 - 21
Low	9- 14

A-3 Severity of Perceived Body Discomfort experienced by the respondents in Upper Body Parts while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat: The severity of Perceived Body Discomfort experienced by respondents in the upper body parts while holding overhead or pole mounted decorative umbrella lights was determined using a severity categorized based on the equal distribution method. The responses were classified into five categories: "Very Severe Pain," "Severe Pain," "Moderate Pain," "Mild Pain," and "No Pain," with corresponding scores of 5, 4, 3, 2, and 1, respectively. The minimum and maximum possible scores were calculated, and a range of scores was established using the equal distribution method to represent the severity of Perceived Body Discomfort s in the upper body parts experienced by respondents while holding overhead or pole mounted decorative umbrella lights. The resulting severity scores were classified into five categories:

Severity of Upper Perceived Body Discomfort	Range of Score
Very Severe Pain	76-90
Severe Pain	61-75
Moderate Pain	48-60
Mild Pain	33-47
No Pain	18-32

A-4 Severity of Perceived Body Discomfort experienced by the respondents in Lower Body Parts while holding Overhead or Pole Mounted Decorative Umbrella Light during Baraat: The severity of Perceived Body Discomfort s experienced by respondents in the lower body parts while holding overhead or pole mounted decorative umbrella lights was determined using the equal distribution method. Responses were categorized as "Very Severe Pain," "Severe Pain," "Moderate Pain," "Mild Pain," and "No Pain," with corresponding scores of 5, 4, 3, 2, and 1, respectively. The minimum and maximum possible scores were calculated, and a range of scores was established to represent the severity of discomfort experienced in the lower body parts by respondents holding overhead or pole mounted decorative umbrella lights. The resulting severity scores were classified into five categories:

Severity of Body lower Discomfort	Range of Score
Very Severe Pain	38-45
Severe Pain	30-37
Moderate Pain	25-29
Mild Pain	17-24
No Pain	9-16

B-1 Frequency of Hand Discomfort experienced in Left Hand by the respondents while holding Overhead or Pole Mounted Decorative Umbrella Light during Baraat: The discomfort experienced in the left hand by respondents while holding overhead or pole mounted decorative umbrella lights was assessed by categorizing the duration of ache, pain, and discomfort using the equal distribution method. The responses were categorized as "Several times every day," "Once every day," "3-4 times last week," "1-2 times last week," and "Never," with corresponding scores of 5, 4, 3, 2, and 1, respectively. The minimum and maximum possible scores were determined, and a range of scores was established to express the discomfort experienced in the left hand by respondents holding overhead or pole mounted decorative umbrella lights.

Frequency of Left-Hand Discomfort	Range of Score
Several times everyday	25-30
Once every day	21-24
3-4 times last week	15-20
1-2 times last week	11-14
Never	4-10

B-2 Severity of Hand Discomfort experienced in Left Hand by the respondents while holding Overhead or Pole Mounted Decorative Umbrella Light during Baraat: The Severity of hand discomfort experienced in left hand by the respondents while holding overhead or pole mounted decorative umbrella lights, Experienced ache, pain, discomfort by respondents was categorized on basis of equal distribution method, the pattern of the responses of the level of uncomfortable, very uncomfortable, moderately uncomfortable and slightly uncomfortable and the ascribed score for responses were 3, 2, 1 respectively. The possible minimum and maximum score were obtained and the range score was developed based on equal distribution method to express the severity of discomfort experienced in left hand by the respondents holding overhead or pole mounted decorative umbrella lights.

Severity of Left-Hand Discomfort	Range of Score
Very Uncomfortable	15-18
Moderately Uncomfortable	10-14
Slightly Uncomfortable	6-9

B-3 Extent of Interference experienced in Left-Hand by the respondents while holding Overhead or Pole Mounted Decorative Umbrella Light during Baraat: The Extent of Interference experienced in left hand while holding decorative umbrella lights, by respondents was categorized on basis of equal distribution method, the pattern of the responses of the level of interference, substantially interfered, slightly interfered and Not at all the ascribed score for responses were 3, 2, 1 respectively. The possible minimum and maximum score were obtained and the range score was developed based on equal

distribution method to express the Extent of Interference experienced in left hand by the respondents holding overhead or pole mounted decorative umbrella lights.

Extent of Interference	Range of Score
Substantially interfered	15-18
Slightly interfered	10-14
Not at all	6-9

C-1 Frequency of Hand Discomfort experienced in Right Hand by the respondents while holding Overhead or Pole Mounted Decorative Umbrella Light Baraat: The discomfort experienced in the right hand by respondents while holding overhead or pole mounted decorative umbrella lights was assessed by categorizing the duration of ache, pain, and discomfort using the equal distribution method. The responses were classified as "Several times every day," "Once every day," "3-4 times last week," "1-2 times last week," and "Never," with corresponding scores of 5, 4, 3, 2, and 1, respectively. The minimum and maximum possible scores were calculated, and a range of scores was developed to represent the discomfort experienced in the right hand by respondents holding overhead or pole mounted decorative umbrella lights.

Frequency of Right-Hand Discomfort	Range of Score
Several times everyday	25-30
Once every day	21-24
3-4 times last week	15-20
1-2 times last week	11-14
Never	4-10

C-2 Severity of Hand Discomfort experienced in Right Hand by the respondents while holding Overhead or Pole Mounted Decorative Umbrella Light during Baraat: The Severity of hand discomfort experienced in right hand by the respondents while holding overhead or pole mounted decorative umbrella lights, Experienced ache, pain, discomfort by respondents was categorized on basis of equal distribution method, the pattern of the responses of the level of uncomfortable, very uncomfortable,

moderately uncomfortable and slightly uncomfortable and the ascribed score for responses were 3, 2, 1 respectively. The possible minimum and maximum score were obtained and the range score was developed based on equal distribution method to express the discomfort experienced in left hand by the respondents holding overhead or pole mounted decorative umbrella lights.

Severity of Right-Hand Discomfort	Range of Score
Very uncomfortable	15-18
Moderately uncomfortable	10-14
Slightly uncomfortable	6-9

C-3 Extent of Interference experienced in Right-Hand by the respondents while holding Overhead or Pole Mounted Decorative Umbrella Light during Baraat: The Extent of Interference experienced in right hand while holding overhead or pole mounted decorative umbrella lights, by respondents was categorized on basis of equal distribution method, the pattern of the responses of the level of interference, substantially interfered, slightly interfered and Not at all the ascribed score for responses were 3, 2, 1 respectively. The possible minimum and maximum score were obtained and the range score was developed based on equal distribution method to express the Extent of Interference experienced in right hand by the respondents holding overhead or pole mounted decorative umbrella lights.

Extent of Interference	Range of Score
Substantially interfered	15-18
Slightly interfered	10-14
Not at all	6-9

D-1 Frequency of Mechanical Injuries experienced by the respondents while holding Overhead or Pole Mounted Decorative Umbrella Light during Baraat: This section gathered information on the frequency of mechanical injuries (such as cuts on the skin, skin pinching, hardening of the skin, tears in the skin, redness in the eyes, and redness on the face) experienced by the respondents holding overhead or pole mounted decorative umbrella lights during Barrat. Frequency was assessed using a three-point Likert scale with the response options: "Always," "Sometimes," and "Never," with ascribed scores of 3, 2, and 1, respectively.

Frequency of Mechanical Injuries	Range of Score
High	15-18
Moderate	10-14
Low	6-9

D-2 Severity of Mechanical Injuries Experienced by the respondents while holding Overhead or Pole Mounted Decorative Umbrella Light During Baraat: This section collected information on the Severity of mechanical injuries (cuts on the skin, skin becomes pinched, hardening of the skin, tears in the skin, redness in the eyes, and redness on the face) experienced by the respondents holding overhead or pole mounted decorative umbrella lights during Barrat. Severity was assessed using a three-point Liker scale with response options: Severity was evaluated using the categories: "Severe," "Moderate," and "Mild" and the ascribed score for responses were 3, 2, 1 respectively.

Severity of Mechanical Injuries	Range of Score
Severe	15-18
Moderate	10-14
Mild	6-9

Section III:

Categorization of data (Observation Sheet)

A. Time Spent and Distance Travelled by the respondents while holding Overhead Decorative Umbrella Light while maintaining the Adopted Posture.

A-1 Time Spent and Rest Pause taken by respondents holding Overhead Decorative Umbrella Lights: In this section, the time spent by respondents holding overhead decorative umbrella lights during Baraat. Is categorised into three primary postures: **"Standing with Raised Arms"**, **"Walking with Raised Arms"** and **"Duration of Spontaneous Rest Pause"** for the posture "**Standing with Raised Arms** for **Group 1 (n=30)** total **3 intervals** were allotted comprised **60 minutes** and **150 minutes** were spent with posture

"Walking with Raised Arms" in the Baraat. Among which **24 respondents** took spontaneous rest pause. Further, in **Group 2 (n=30)** total **4 intervals** were allotted comprised of **88 minutes** for the posture "**Standing with Raised Arms"** and **152 minutes** were spent with posture **"Walking with Raised Arms"** among which **26 respondents** took spontaneous rest pause. The duration of rest pause is described in three categories:

Spontaneous Rest Pause	Range Score (min)
Short Duration	6-9
Moderate Duration	10-12
Long Duration	13-15

A-2 Time spent and Rest Pauses taken by the respondents with holding Pole Mounted Decorative Umbrella Lights: In this section, the time spent by respondents holding pole mounted decorative umbrella lights during Baraat. Is categorised into three postures: **"Standing with Arms in Front"**, **"Walking with Arms in Front"** and **"Duration of Spontaneous Rest Pause"** for the posture "**Standing with Arms in Front"** for **Group 1 (n=30)** total **4 intervals** were allotted comprised **75 minutes** and **175 minutes** were spent with posture **"Walking with Arms in Front"** in the Baraat. Among which **32 respondents** took spontaneous rest pause. Further, in **Group 2 (n=30)** total **4 intervals** were allotted comprised of **55 minutes** for the posture **"Standing with Arms in Front"** and **245 minutes** were spent with posture **"Walking with Arms in Front"** among which **23 respondents** took spontaneous rest pause. The duration of rest pause is described in three categories:

Spontaneous Rest Pause	Range Score (min)
Short Duration	2-6
Moderate Duration	7-11
Long Duration	12-15

A-3 Distance Travelled and extent of exhaustion of respondents holding Overhead Decorative Umbrella Lights: In this section, the distance

travelled by respondents holding overhead decorative umbrella lights with posture **"Walking with Raised Arm"** during Baraat is categorised as follow:

Walking with Raised Arm	
Distance Travelled	**Range of Score (meter)**
Long Distance	0-833
Moderate Distance	833-1667
Short Distance	1667-2500

The Extent of Body Discomfort Experienced (measured through the extent of exhaustion) by the respondents engaged in holding Overhead Decorative Umbrella Lights

Extent of Perceived Exhaustion	Range of Score
Completely Exhausted	5
Extremely Exhausted	4
Moderately Exhausted	3
Little Exhausted	2
Not Exhausted	1

A-4 Distance Travelled and extent of exhaustion of respondents holding Pole-Mounted Decorative Umbrella Lights: In this section, the distance travelled by respondents holding pole mounted decorative umbrella lights with posture **"Walking with Arm in Front"** during Baraat is categorised as follow:

Walking with Arms in Front	
Distance Travelled	**Range of Score (meter)**
Long Distance	0-833
Moderate Distance	833-1667
Short Distance	1667-2500

The Extent of Body Discomfort Experienced (measured through the extent of exhaustion) by the respondents engaged in holding Pole Mounted Decorative Umbrella Lights

Extent of Perceived Exhaustion	Range of Score
Completely Exhausted	5
Extremely Exhausted	4
Moderately Exhausted	3
Little Exhausted	2
Not Exhausted	1

3.10.2 Coding

Coding involves categorizing data and organizing it into tables. Information from each section of both the interview schedule and the observation sheet is then transferred to an Excel Sheet for further analysis.

3.10.3 Tabulation

Tabulation constitutes a critical step in the technical process, wherein categorized data is systematically organized into tables. The raw data is transformed into a structured, tabular format, facilitating a clear and concise presentation of the results.

3.10.4 Statistical Analysis

Table 1 describes the types of statistical analyses used for exploring relationships between independent variables like personal variable (like age, gender, and work experience) and situational, (time spent, distance travelled and types of decorative umbrella lights) intervening variable (duration of maintaining adopted posture) and dependent variable (like perceived musculoskeletal discomfort experienced by the respondents). The analyses include Pearson correlations, t-tests, ANOVAs, and regression analyses, indicating an effort to explore these relationships at multiple levels and through different statistical methods.

Table 1: Description of Relational Statistic Applied

Personal Variable	**Situational Variable**	**Relational Statistic Applied**
Age	Time Spent on Holding Decorative Umbrella Lights	Pearson Correlation
	Distance Travelled by Respondents Holding Decorative Umbrella Lights	
Gender	Time Spent on Holding Decorative Umbrella Lights	t-test
	Distance Travelled by Respondents Holding Decorative Umbrella Lights	
Work Experience	Time Spent on Holding Decorative Umbrella Lights	Pearson Correlation
	Distance Travelled by Respondents Holding Decorative Umbrella Lights	
Personal Variable	**Intervening Variable**	**Relational Statistic Applied**
Age	Duration of Maintaining the Adopted Posture	Anova
Gender		t-test
Work Experience		Anova
Situational variable		t-test
Type of light		
Intervening Variable	**Dependent Variable**	**Relational Statistics Applied**
Duration Of Maintaining the Adopted Posture	Frequency of Perceived Musculoskeletal Discomfort	Anova
Personal Variable	**Dependent Variable**	**Relational Statistic Applied**
Age	Extent of Perceived Musculoskeletal Discomfort	Regression Analysis
Gender		
Work Experience		
Situational Variable	**Dependent Variable**	**Relational Statistic Analysis**
Time Spent on Holding Decorative Umbrella Lights	Extent of Perceived Musculoskeletal Discomfort	Regression Analysis
Distance Travelled by Respondents Holding Decorative Umbrella Lights		
Situational Variable	**Dependent Variable**	**Relational Statistic Analysis**
Type of light	Extent of Perceived Musculoskeletal Discomfort	Chi-square

FINDINGS AND DISCUSSIONS

CHAPTER IV

FINDINGS AND DISCUSSION

The chapter "Findings and Discussion" is the most important in a thesis as well in any type of research reports. The present chapter describes the analysis of data followed by the interpretation and discussion. To ensure systematic presentation, the chapter is organized in to following sections.

4.1 Section I: Background Information of the respondents

4.2 Section II: Perceived Body Discomfort, Hand Discomfort and Mechanical Injuries experienced by the respondents engaged in holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

4.2.1 Perceived Frequency and Severity of Body Discomfort experienced by the respondents engaged in holding Decorative Umbrella Light during Baraat.

4.2.2 Perceived Hand Discomfort experienced by the respondents engaged in holding Decorative Umbrella Lights during Baraat.

4.2.3 Mechanical Injuries experienced by the respondents engaged in holding Decorative Umbrella Light during Baraat.

4.3 Section III: Time Spent, Rest pause taken, Distance Travelled and Extent of Exhaustion Experienced with Adopted Posture by the the respondents engaged in holding Decorative Umbrella Light during Baraat.

4.4 Section IV: Testing of Hypotheses

4.5 Section V: Suggested Coping Strategies to overcome Body Discomfort experienced by the respondents engaged in holding Decorative Umbrella Light during Baraat.

SECTION I

4.1 Background Information

The data presented in **table 2** presents a comprehensive overview of the background characteristics of the respondents, including age, gender, educational qualifications, work experience, personal monthly income, and family monthly income.

Table 2: Frequency and Percentage distribution of the respondents according to the Background Information

Sr.no.	Background Information	Respondents(n=120)	
		f	%
1.	**Age (in yrs)**		
	20-35	24	20
	36-51	82	68.33
	52-67	14	11.67
	Mean		**40**
	Standard Deviation		**8.90**
2.	**Gender**		
	Male	57	47.9
	Female	62	52.1
3.	**Educational Qualification**		
	Illiterate	27	22.7
	Up to Primary School	61	51.3
	Up to Secondary School	19	16
	Up to Higher Secondary	12	10
	Graduate	-	-
4.	**Work Experience (in years)**		
	2-6	67	55.83
	7-11	53	44.17
	Mean		**6.2**
	Standard Deviation		**2.48**
5.	**Personal Monthly Income (in INR)**		
	2,000-4,000	66	55
	4,001-7,000	53	44.17
	Mean		**₹4079.17**
	Standard Deviation		**₹1237.7**
6.	**Family Monthly Income (in INR)**		
	20,000-40,000	92	76.67
	40,001-60,000	25	20.83
	Mean		**₹33416.67**
	Standard Deviation		**₹ 8142.48**

4.1.1 Age (in years)

Regarding the age of the respondents, the data exhibited in **table 2** reveals that the age ranged from 20 to 67 years. It was observed that 20 per cent of the respondents belonged to the age group of 20 to 35 years, 68.33 per cent were in the age group of 36 to 51 years, and 11.67 per cent were in the age group of 52 to 67 years. This indicates that the respondents were middle-aged, with mean age of 40 years.

4.1.2 Gender

Concerning to Gender**, table 2** demonstrate that 52.1 per cent of the respondents were females, while 47.9 per cent were males. This indicates that the gender profile of the respondents reflects a nearly equal distribution of males and females.

4.1.3 Educational Qualification

With regards to the educational qualifications of the respondents, the data exhibited in **table 2** reveals that 51.3 per cent of the respondents had education up to the primary level, 22.7 per cent were illiterate, 16 per cent had completed secondary education, and 10 per cent had completed higher secondary education. None of the respondents had completed graduation. Thus, it can be concluded that the respondents had low educational attainment.

4.1.4 Work Experience (in years)

Regarding the work experience of the respondents, the data presented in **table 2** reveals that the respondents' work experience ranged from 2 to 11 years, with an average of 6.2 years. The analysis further indicates that 55.83 per cent of the respondents had work experience between 2 to 6 years, while the remaining 44.17 per cent of the respondents had been working for 7 to 11 years. These findings suggest that the respondents, had relatively limited professional experience.

4.1.5 Personal Monthly Income (in INR)

Regarding the personal monthly income of the respondents, the data presented in **table 2** reveals that 55 per cent of the respondents had a personal monthly income ranging from ₹2,000 to ₹4,000, while 44.17 per cent of the respondents reported a personal monthly income between ₹4,001 to ₹7,000. The mean personal monthly income was found to be ₹4,079.17.

4.1.6 Family Monthly Income (in INR)

Regarding the family monthly income of the respondents, the data presented in **table 2** reveals that 76.67 per cent of the respondents had a family monthly income ranging from ₹20,000 to ₹40,000, while 20.83 per cent of the respondents reported a family monthly income between ₹40,001 to ₹60,000. The mean family monthly income was found to be ₹33,416.67. The findings indicate that although respondents' earnings were relatively low, the overall family income was higher due to multiple earning members within the family, thereby contributing to improved financial stability.

SECTION II

4.2 Perceived Body Discomfort, Hand Discomfort and Mechanical Injuries experienced by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat.

This section deals with the perceived body discomfort, hand discomfort, and mechanical injuries experienced by respondents engaged in holding decorative umbrella lights (overhead or pole-mounted) during Baraat. Data on body discomfort was collected through **Cornett and Bishop's Body Parts Discomfort Standardized Scale (1976)**, administered by the investigator in two parts, viz., upper body parts and lower body parts. The extent of frequency and severity of perceived hand discomfort was measured through the **Standardized Cornell Hand Discomfort Questionnaire (1994)**, administered separately for the left hand and the right hand.

4.2.1 Frequency and Severity of Perceived Body Discomfort experienced by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat

4.2.1.1: Frequency of Perceived Body Discomfort experienced in Upper Body Parts by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat.

Table 3, depicts the frequency of perceived body discomfort experienced by respondents in the Upper Body Parts while holding decorative umbrella lights (overhead or pole mounted) during the Baraat.

1. Neck:

According to **table 3**, among respondents holding overhead decorative umbrella lights, 73.33 per cent reported experiencing Frequency of perceived neck discomfort always, while 20 per cent experienced it sometimes, and only 6.67 per cent reported never experiencing discomfort. This indicates that frequency of discomfort in neck is highly prevalent during holding overhead umbrella lights during barat, mainly due to the upward holding position.

Similarly, for respondents holding pole-mounted umbrella lights, only 16.67 per cent experienced neck discomfort always, while 78.33 per cent, experienced it sometimes, and 5 per cent reported never experiencing neck discomfort **(table 3).**

2. Clavicle Discomfort (Left and Right):

As depicted in **table 3**, among respondents holding overhead decorative umbrella lights, 76.67 per cent experienced the frequency of perceived discomfort in both the left clavicle and the right clavicle always, while 13.33 per cent experienced it sometimes, and 10 per cent reported no discomfort. This high frequency of discomfort can be attributed to the continuous upward holding posture required to support the overhead lights, which places prolonged strain on the clavicle region.

In comparison, respondents holding pole mounted decorative umbrella lights reported comparatively less frequency of perceived discomfort in both the left and right clavicle. It can be observed that, 51.67 per cent reported frequency of perceived discomfort always, 40 per cent experienced it sometimes, and 8.33 per cent reported no discomfort **(table 3).**

3. Shoulder Discomfort (Left and Right):

According to **table 3,** discomfort in the left shoulder and right shoulder was experienced always by 75 per cent of respondents holding overhead decorative umbrella lights, while 18.33 per cent experienced it sometimes, and 6.67 per cent reported no discomfort.

While, respondents holding pole-mounted decorative umbrella lights reported comparatively lower discomfort in both shoulders. It can be observed that, 30 per cent experienced left shoulder discomfort always, while 68.33 per cent experienced it sometimes, and 1.67 per cent never experienced discomfort. For the right shoulder, 31.67 per cent experienced discomfort always, 66.67 per cent sometimes, and 1.67 per cent never **(table 3).**

Table 3: Frequency and Percentage distribution of respondents according to Frequency of Perceived Body Discomfort experienced in Upper Body Parts while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat (n=120)

Sr no	Body Parts	Frequency Scale of Body Discomfort experienced Overhead Decorative Umbrella Lights (n=60)							Frequency Scale of Body discomfort experienced Pole Mounted Umbrella Lights n=60)						
		Always		Sometimes		Never		Wt. Mean Score (3-1)	Always		Sometimes		Never		Wt. Mean Score (3-1)
		f	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	
1.	Neck	44	73.33	12	20.00	04	06.67	2.66	10	16.67	47	78.33	03	05.00	2.12
2.	Clavicle Left	46	76.67	08	13.33	06	10.00	2.67	31	51.67	24	40.00	05	08.33	2.43
3	Clavicle Right	46	76.67	08	13.33	06	10.00	2.67	31	51.67	24	40.00	05	08.33	2.43
4.	Left Shoulder	45	75.00	11	18.33	04	06.67	2.68	18	30.00	41	68.33	01	01.67	2.28
5.	Right Shoulder	45	75.00	11	18.33	04	06.67	2.68	19	31.67	40	66.67	01	01.67	2.30
6.	Left Arm	48	80.00	07	11.66	05	08.33	2.71	25	41.67	33	55.00	02	03.33	2.38
7.	Right Arm	48	80.00	07	11.66	05	08.33	2.71	26	43.33	32	53.33	02	03.33	2.40
8.	Left Elbow	25	41.67	32	53.33	03	05.00	2.37	21	35.00	38	63.33	01	01.67	2.33
9	Right Elbow	24	40.00	35	58.33	01	01.67	2.38	22	36.67	37	61.67	01	01.67	2.35
10	Left Forearm	19	31.67	35	58.33	06	10.00	2.22	15	25.00	39	65.00	06	10.00	2.15
11	Right Forearm	22	36.67	32	53.33	06	10.00	2.27	14	23.33	40	66.67	06	10.00	2.18
12	Left Wrist	22	36.67	32	53.33	06	10.00	2.27	16	26.67	34	56.67	10	16.67	2.10
13	Right Wrist	20	33.33	33	55.00	07	11.67	2.22	49	81.66	09	15.00	02	03.33	2.78
14	Right Palm	18	30.00	38	63.33	04	06.67	2.23	52	86.66	08	13.33	00	00.00	2.86
15	Left Palm	17	28.33	37	61.67	06	10.00	2.18	49	81.66	09	15.00	02	03.33	2.78
16	Upper Back	56	93.33	04	06.66	00	00.00	2.93	20	33.33	36	60.00	04	06.67	2.27
17	Mid Back	23	38.33	26	43.33	11	18.33	2.20	27	45.00	28	46.67	05	08.33	2.37
18	Lower Back	15	25.00	29	48.33	16	26.67	1.98	23	38.33	32	53.33	05	08.33	2.30
Total Weighted Mean								2.62	**Total Weighted Mean**						2.37

4. Arm Discomfort (Left and Right):

As described in **table 3**, 80 per cent of respondents holding overhead decorative umbrella lights experienced discomfort in both the left arm and right arm always, while 11.66 per cent experienced it sometimes, and 8.33 per cent reported no discomfort.

Similarly, among respondents holding pole-mounted umbrella lights, 41.67 per cent reported left arm discomfort always, while 55 per cent experienced it sometimes, and 3.33 per cent never. Similarly, for the right arm, 43.33 per cent experienced discomfort always, 53.33 per cent sometimes, and 3.33 per cent never **(table 3)**.

5. Elbow Discomfort (Left and Right):

Regarding discomfort in both the left elbow and right elbow it was observed that respondents holding overhead decorative umbrella lights, 41.67 per cent experienced discomfort in the left elbow always, and 40 per cent in the right elbow always. Discomfort was reported sometimes by 53.33 per cent in the left elbow and 58.33 per cent in the right elbow, while, 5 per cent for left elbow and 1.67 per cent for right elbow reported no discomfort **(table 3)**.

Among respondents holding pole-mounted decorative umbrella lights, 35 per cent experienced left elbow discomfort always and 36.67 per cent experienced right elbow discomfort always. Discomfort was experienced sometimes by 63.33 per cent in the left elbow and 61.67 per cent in the right elbow, while 1.67 per cent in both cases reported no discomfort **(table 3).**

6. Forearm Discomfort (Left and Right):

As described in **table 3**, 31.67 per cent of respondents holding overhead decorative umbrella lights experienced left forearm discomfort always, while 36.67 per cent experienced right forearm discomfort always. Discomfort was experienced sometimes by 58.33 per cent in the left

forearm and 53.33 per cent in the right forearm. While, 10 per cent in both cases reported no discomfort.

Whereas, respondents holding pole-mounted decorative umbrella lights experienced less frequent discomfort. For the left forearm, 25 per cent experienced discomfort always, while 65 per cent experienced it sometimes, and 10 per cent never. For the right forearm, 23.33 per cent reported discomfort always, 66.67 per cent sometimes, and 10 per cent never **(table 3).**

7. Wrist Discomfort (Left and Right):

Regarding wrist Discomfort, as revealed in **table 3**, respondents holding overhead decorative umbrella lights experienced left wrist discomfort 36.67 per cent and right wrist discomfort 33.33 per cent always. Discomfort was experienced sometimes by 53.33 per cent in the left wrist and 55 per cent in the right wrist, while 10 to 11.67 per cent reported no discomfort.

While, respondents holding pole-mounted decorative umbrella lights, 26.67 per cent experienced left wrist discomfort always, while a significantly higher 81.66 per cent experienced right wrist discomfort always. Discomfort was experienced sometimes by 56.67 per cent in the left wrist and 15 per cent in the right wrist, with 16.67 per cent and 3.33 per cent respectively reporting no discomfort **(table 3)**.

8. Palm Discomfort (Left and Right)

As presented in **table 3**, respondents holding overhead decorative umbrella lights reported experiencing discomfort always in the left palm 28.33 per cent and right palm 30 per cent. Discomfort was experienced sometimes by 61.67 per cent of respondents in the left palm and 63.33 per cent in the right palm. Whereas, 10 per cent and 6.67 per cent of respondents reported never experiencing discomfort in the left and right palms, respectively.

While, among respondents holding pole-mounted umbrella lights, discomfort was significantly higher in both palms. Discomfort was

experienced always by 81.66 per cent of respondents in the left palm and 86.66 per cent in the right palm **(table 3)**.

9. Back Discomfort (Upper, Mid, and Lower)

As presented in **table 3**, respondents holding overhead decorative umbrella lights reported experiencing back discomfort across all regions upper, mid, and lower back. Specifically, 93.33 per cent of respondents always experienced upper back discomfort, indicating the considerable physical strain resulting from the sustained overhead holding posture required to support the umbrella light. For mid back discomfort, 38.33 per cent of respondents always experienced it, while 25 per cent always experienced lower back discomfort.

In comparison, respondents holding pole-mounted umbrella lights reported relatively lower levels of upper back discomfort. Among these, 33.33 per cent always experienced upper back discomfort. However, discomfort in the mid and lower back was more frequent, with 45 per cent always experiencing mid back discomfort and 38.33 per cent always experiencing lower back discomfort **(table 3).**

Figure 3 provides a comparative representation of the perceived body discomfort experienced by respondents in various upper body parts while holding decorative umbrella lights (Overhead and Pole Mounted Umbrella Lights) during the Baraat.

Figure 3: Frequency of Perceived Body Discomfort experienced in Upper Body Parts by the respondents while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat based on Weighted Mean Scores

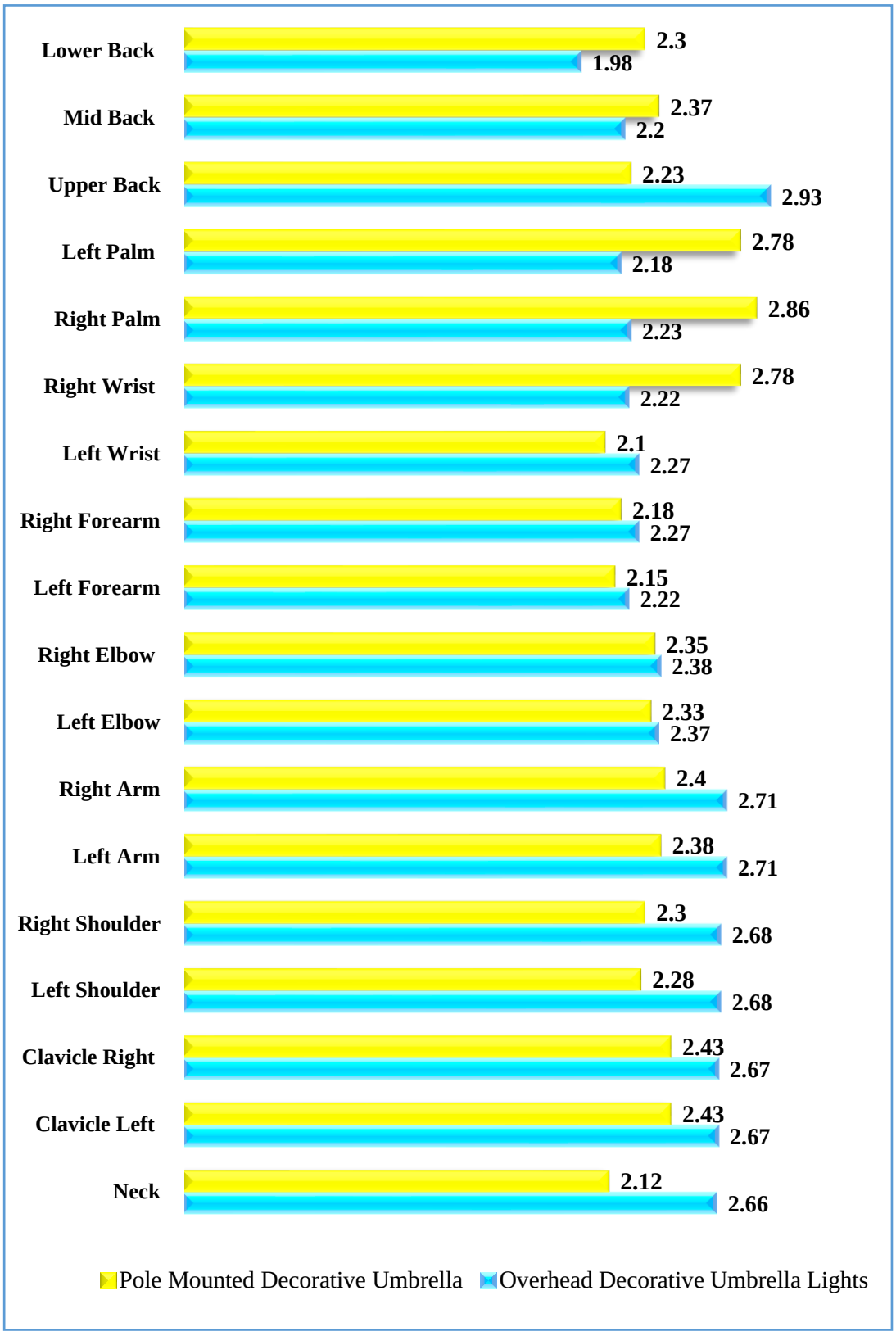
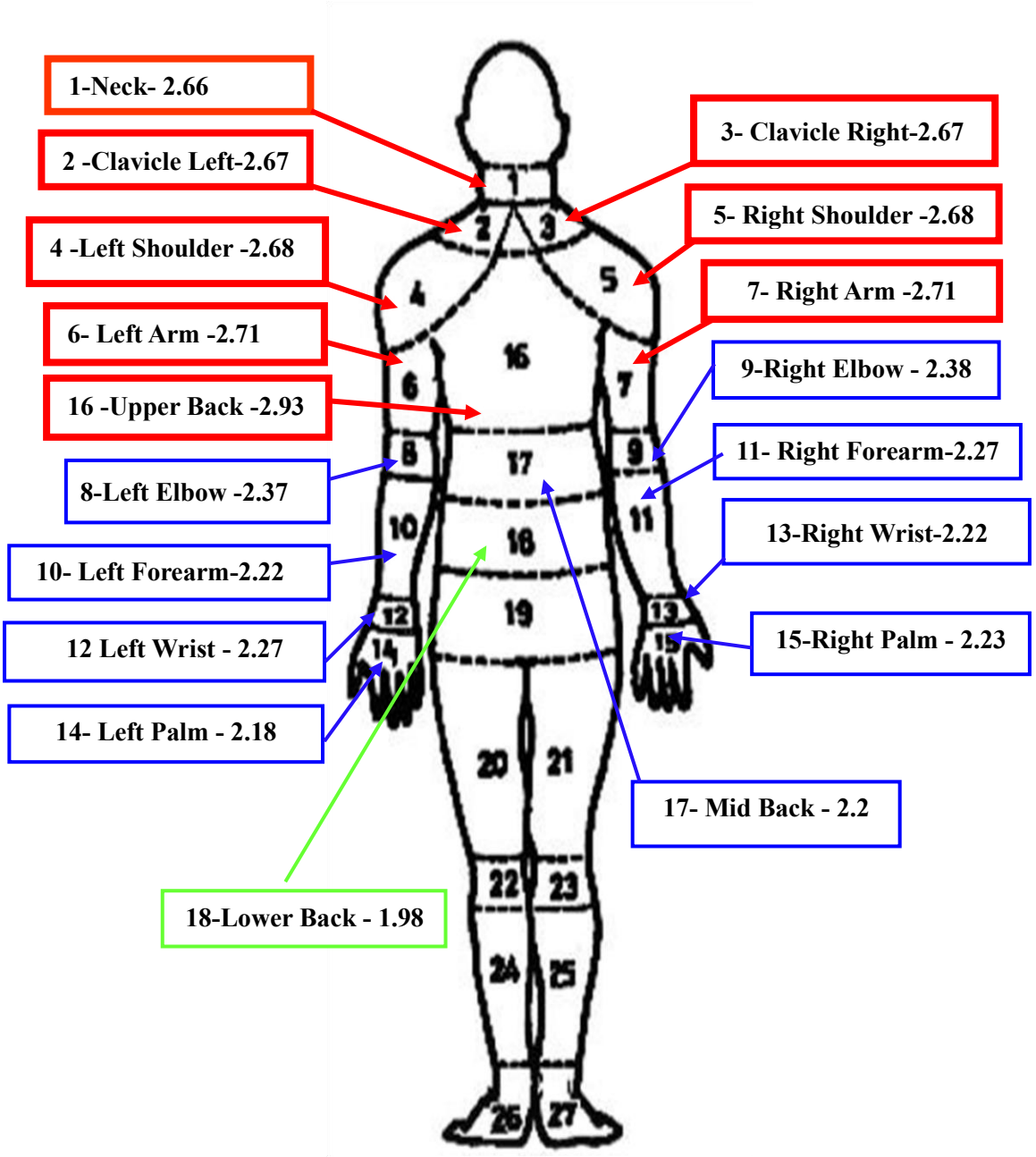
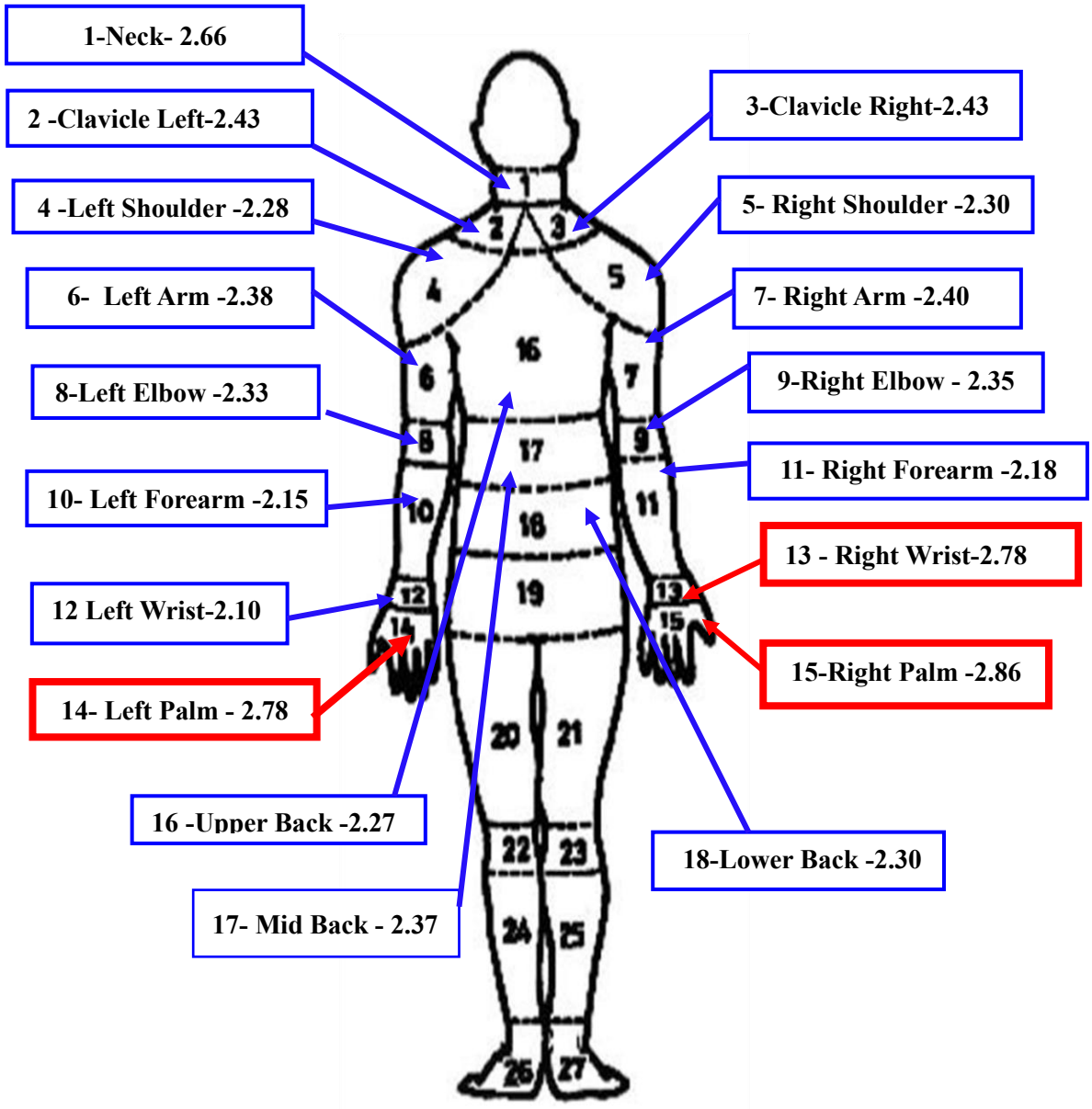


Figure 4: Frequency of Perceived Body Discomfort experienced in Upper Body Parts by the respondents while holding Overhead Decorative Umbrella Light during Baraat based on Weighted Mean Scores



Frequency of Discomfort	Always	Sometimes	Never
Weighted Mean Score Range	2.5 to 3.0	2.0 to 2.49	1.0 to 1.99
Interpretation of discomfort	High Frequency of Discomfort	Moderate Frequency of Discomfort	Low / No Frequency of Discomfort

Figure 5: Frequency of Perceived Body Discomfort experienced in Upper Body Parts by the respondents while holding Pole Mounted Decorative Umbrella Light during Baraat based on Weighted Mean Scores



Frequency of Discomfort	Always	Sometimes	Never
Weighted Mean Score Range	2.5 to 3.0	2.0 to 2.49	1.0 to 1.99
Interpretation of discomfort	High Frequency of Discomfort	Moderate Frequency of Discomfort	Low/No Frequency of Discomfort

The data reveals that respondents holding overhead decorative umbrella lights experienced more discomfort in the upper body parts, especially in the neck 2.66, shoulders right and left both 2.68, upper back 2.93, arms right and left 2.71, and clavicle right and left 2.67. These body parts consistently recorded high discomfort scores, with weighted mean values ranging 2.5 to 3.0, indicating significant strain caused by the overhead position. The finding can indicate that holding the light overhead for a long time forces the body to stay in a fixed posture, which puts continuous pressure on the shoulders, neck, upper back, and arms. When the muscles stay in the same position for too long without movement, they become tired and stiff, increasing the feeling of discomfort **(figure 3)**.

Regarding the respondents holding pole-mounted decorative umbrella lights, the data reveals that the palms and wrists, particularly on the dominant right side, experienced the highest levels of discomfort, with weighted mean scores ranging between 2.5 and 3.0. The right wrist recorded a weighted mean score of 2.78, indicating significant discomfort in this area. Furthermore, the right palm exhibited the highest discomfort level, with a weighted mean score of 2.86, followed by the left palm, which recorded a weighted mean score of 2.78. The findings highlight clearly highlight that the hands and wrists experienced the most discomfort when holding pole-mounted decorative umbrella lights, emphasizing the strain caused by continuous gripping and control of the pole over an extended period **(figure 3)**.

The overall analysis of highlights that the type of decorative umbrella light being carried significantly influences the pattern and location of body discomfort experienced by the respondents. Overhead decorative umbrella lights caused higher discomfort in the upper body, particularly in the neck, shoulders, upper back, arms, and clavicle, due to the sustained overhead posture required to hold the light. This posture leads to continuous muscle strain and restricted movement, resulting in fatigue and stiffness in these body parts **(figure 3)**.

On the other hand, pole-mounted decorative umbrella lights caused the highest body discomfort in the palms and wrists, especially on the dominant side, along with moderate discomfort in the lower back. This is due to the need for constant gripping and control of the pole, which puts continuous stress on the hands and wrists, while the lower back muscles are engaged to maintain stability and balance **(figure 3)**.

Overall distribution of the respondents according to the Frequency of Perceived Body Discomfort experienced in Upper Body Parts by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat

Table 4 describes the overall distribution of the respondents according to frequency of perceived upper body discomfort while holding (overhead or pole-mounted) decorative umbrella lights during baraat.

Table 4: Overall distribution of the respondents according to the Frequency of Perceived Body Discomfort experienced in Upper Body Parts while holding Decorative Umbrella Lights (Overhead or Pole Mounted).

(n=120)

Sr.no.	Perceived Body Discomfort Level	Range of Score	Overhead Umbrella Light (n=60)		Pole Mounted Umbrella Ligh (n=60)	
			f	%	*f*	%
1.	**High**	**43 - 54**	**39**	**65.00**	**36**	**60.00**
2.	Moderate	30 - 42	19	31.66	23	38.33
3.	Low	18 - 29	02	03.33	01	01.66

The data indicates that among respondents carrying overhead decorative umbrella lights, 65.00 per cent experienced high upper body discomfort, followed by 31.66 per cent who experienced moderate discomfort, and only 3.33 per cent reported experiencing low discomfort. Similarly, among respondents holding pole-mounted decorative umbrella lights, 60.00 per cent reported high upper body discomfort, while 38.33 per cent experienced moderate discomfort, and only 1.66 per cent experienced low discomfort. Therefore, it can be concluded that both types of decorative umbrella lights, namely overhead and pole-mounted, contributed significantly to upper body discomfort among the respondents engaged in holding them during the Baraat. However, the type of discomfort, its intensity, and the body parts affected varied between the two designs. The overhead decorative umbrella lights caused more strain on the upper body parts, particularly the Clavicle, shoulders, upper back, arms, elbows and neck. This could be attributed to the requirement of keeping the arms elevated for prolonged durations, coupled with the necessity of maintaining a static posture with minimal movement. On the other hand, the pole-mounted decorative umbrella lights also led to considerable upper body discomfort. Herein, the wrists and palms

experienced higher discomfort due to the continuous gripping required to hold the pole **(table 4)**.

4.2.1.2: Frequency of Perceived Body Discomfort experienced in Lower Body Parts by the respondents engaged in holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat

In **table 5**, presents the Frequency of Perceived Body Discomfort experienced in Lower Body Parts by the respondents engaged in holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

1. Buttocks Discomfort:

Regarding discomfort in the buttocks, among respondents holding overhead decorative umbrella lights, 6.67 per cent reported experiencing frequency of discomfort always, 15.00 per cent experienced frequency of discomfort sometimes, and 78.33 per cent revealed that they never experienced discomfort **(table 5)**.

Similarly, among respondents holding pole-mounted decorative umbrella lights, 6.67 per cent reported frequency of discomfort always, 20.00 per cent experienced frequency of discomfort sometimes, and 73.33 per cent reported never experiencing discomfort in the buttocks. These findings suggest a slightly higher prevalence of occasional discomfort in the respondents holding pole-mounted umbrella light compared to respondents holding overhead umbrella light in Baraat **(table 5)**.

2. Left Thigh Discomfort:

For discomfort in the left thigh, 5 per cent of respondents carrying overhead umbrella lights reported always experiencing discomfort, 8.33 per cent experienced discomfort sometimes, and 86.67 per cent reported never experiencing discomfort **(table 5)**.

Table 5: Frequency and Percentage distribution of respondents according to Frequency of Perceived Body Discomfort experienced in Lower Body Parts while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat (n=120)

Sr. no	Body Parts	Respondents with Overhead Decorative Umbrella Lights (n=60)							Respondents with Pole Mounted Decorative Umbrella Lights (n=60)						
		Always		Sometimes		Never		Wt. Mean Score (3-1)	Always		Sometimes		Never		Wt. Mean Score (3-1)
		f	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	
1.	Buttocks	04	06.67	09	15.00	47	78.33	1.28	04	06.67	12	20.00	44	73.33	1.33
2.	Left thigh	03	05.00	05	08.33	52	86.67	1.18	02	03.33	08	13.33	50	83.33	1.20
3.	Right thigh	03	05.00	06	10.00	51	85.00	1.20	02	03.33	08	13.33	50	83.33	1.20
4.	Left knee	08	13.33	43	71.67	09	15.00	1.98	10	16.67	48	80.00	02	03.33	2.13
5.	Right knee	08	13.33	43	71.67	09	15.00	1.98	11	18.33	47	7833	02	03.33	2.15
6.	Left leg	33	55.00	22	36.67	05	08.33	2.47	43	71.67	15	25.00	02	03.33	2.68
7.	Right leg	33	55.00	22	36.67	05	08.33	2.47	44	73.33	14	23.33	02	03.33	2.70
8.	Left foot	22	36.67	31	51.67	07	11.67	2.25	14	23.33	44	73.33	02	03.33	2.20
9.	Right foot	22	36.67	31	51.67	07	11.67	2.25	14	23.33	44	73.33	02	03.33	2.20
Total Weighted Mean								1.90	**Total Weighted Mean**						2.00

While, among respondents holding pole-mounted umbrella lights, 3.33 per cent experienced discomfort always, 13.33 per cent experienced it sometimes, and 83.33 per cent indicated that they never experienced discomfort in the left thigh. While discomfort was relatively low in both the respondents holding overhead and pole-mounted umbrella lights, a higher percentage of pole-mounted umbrella light holders reported occasional discomfort in the left thigh **(table 5)**.

3. Right Thigh Discomfort:

For discomfort in the right thigh, among respondents with overhead umbrella lights, 5 per cent experienced discomfort always, 10 per cent experienced discomfort sometimes, and 85 per cent never experienced discomfort **(table 5)**.

Similarly, in the pole-mounted group, 3.33 per cent reported frequency of discomfort always, 13.33 per cent experienced frequency of discomfort sometimes, and 83.33 per cent reported never experiencing discomfort in the right thigh **(table 5)**.

4. Left Knee Discomfort:

Regarding discomfort in the left knee,13.33 per cent of respondents holding overhead umbrella lights reported discomfort always, 71.67 per cent experienced frequency of discomfort sometimes, and 15 per cent never experienced discomfort **(table 5)**.

Whereas, among respondents holding pole-mounted umbrella lights, 16.67 per cent reported frequency of discomfort always, 80 per cent experienced frequency of discomfort sometimes, and only 3.33 per cent reported no discomfort in the left knee. These results suggest that the respondents with pole-mounted umbrella light experienced a higher frequency of both always and occasional discomfort in the left knee compared to the respondents holding overhead umbrella light in Baraat **(table 5)**.

5. Right Knee Discomfort:

For discomfort in the right knee, 13.33 per cent of respondents with overhead umbrella lights reported discomfort always, 71.67 per cent experienced discomfort sometimes, and 15.00 per cent never experienced discomfort **(table 5)**.

Whereas, among respondents with pole-mounted umbrella lights, 18.33 per cent reported discomfort always, 78.33 per cent experienced discomfort sometimes, and only 3.33 per cent reported never experiencing discomfort in the right knee. A greater percentage of respondents holding pole-mounted umbrella light reported both constant and occasional discomfort in the right knee compared to the respondents holding overhead umbrella light in Baraat **(table 5)**.

6. Left Leg Discomfort:

Regarding discomfort in the left leg, 55.00 per cent of respondents with overhead umbrella lights experienced discomfort always, 36.67 per cent experienced it sometimes, and 8.33 per cent reported never experiencing discomfort **(table 5)**.

Whereas, among respondents holding pole-mounted umbrella lights, 71.67 per cent experienced discomfort always, 25.00 per cent experienced it sometimes, and only 3.33 per cent reported no discomfort in the left leg. The respondents holding pole-mounted umbrella lights demonstrated a significantly higher rate of constant discomfort in the left leg compared to the respondents holding overhead umbrella light in Baraat **(table 5)**.

7. Right Leg Discomfort:

A similar pattern was noted for discomfort in the right leg. Among respondents with overhead umbrella lights, 55.00 per cent experienced discomfort always, 36.67 per cent experienced it sometimes, and 8.33 per cent reported never experiencing discomfort **(table 5)**.

For respondents with pole-mounted umbrella lights, 73.33 per cent experienced discomfort always, 23.33 per cent experienced it sometimes, and only 3.33 per cent reported never experiencing discomfort in the right leg. Again, respondents holding pole-mounted umbrella lights exhibited a higher prevalence of constant discomfort in the right leg compared to the respondents holding overhead umbrella light in Baraat **(table 5)**.

8. Left Foot Discomfort:

When examining discomfort in the left foot, 36.67 per cent of respondents with overhead umbrella lights experienced discomfort always, 51.67 per cent experienced it sometimes, and 11.67 per cent reported never experiencing discomfort **(table 5)**.

While, respondents with pole-mounted umbrella lights, 23.33 per cent experienced discomfort always, 73.33 per cent experienced it sometimes, and only 3.33 per cent reported never experiencing discomfort in the left foot. The respondents holding pole-mounted umbrella lights exhibited a notably higher incidence of occasional discomfort in the left foot compared to the respondents holding overhead umbrella light in Baraat **(table 5)**.

9. Right Foot Discomfort:

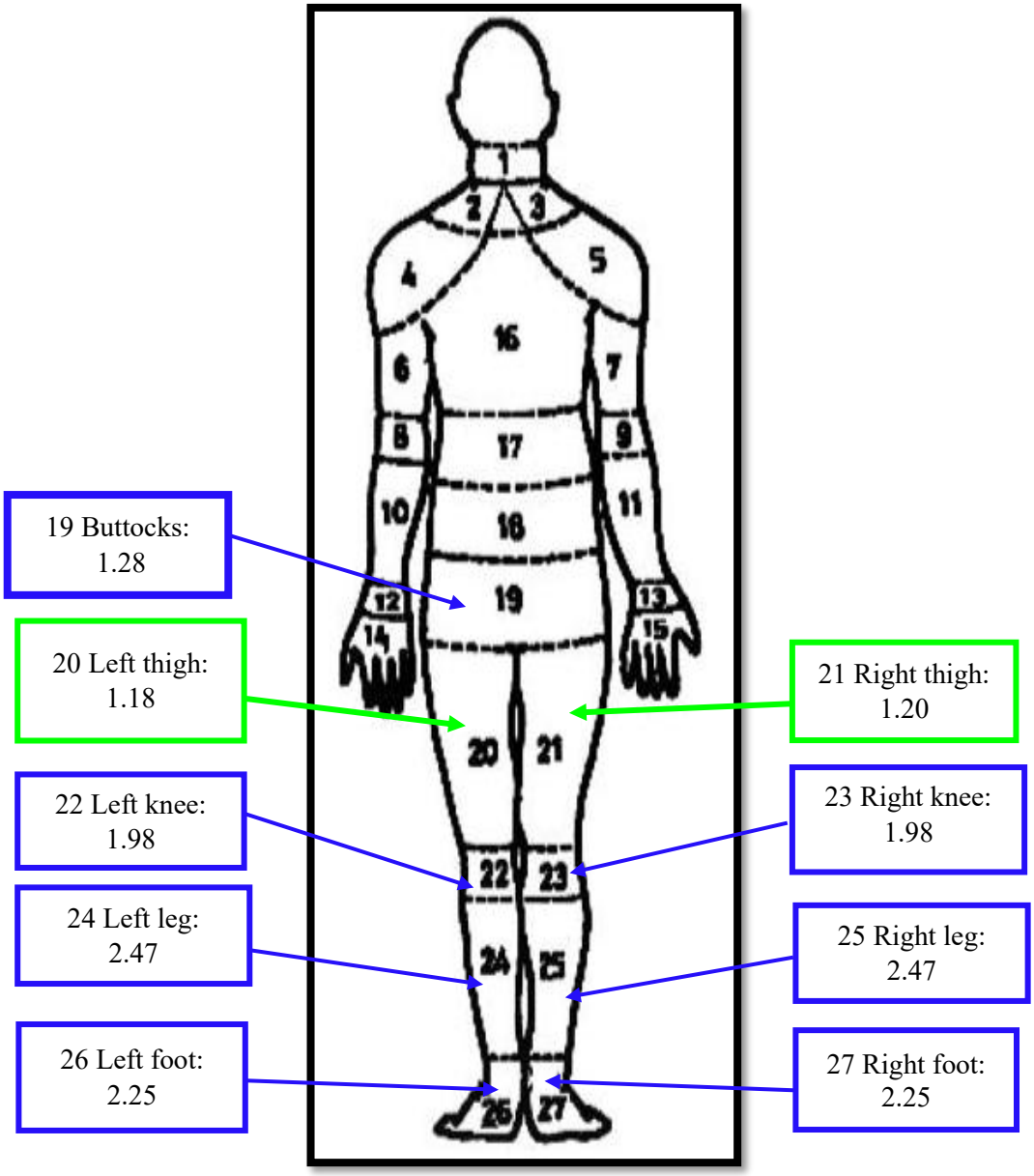
For discomfort in the right foot, 36.67 per cent of respondents holding overhead umbrella lights experienced discomfort always, 51.67 per cent experienced it sometimes, and 11.67 per cent reported never experiencing discomfort **(table 5)**.

Similarly, among respondents with pole-mounted umbrella lights, 23.33 per cent experienced discomfort always, 73.33 per cent experienced it sometimes, and only 3.33 per cent reported no discomfort in the right foot. It can be observed that respondents holding pole-mounted umbrella lights revealed a higher prevalence of occasional discomfort in the right foot compared to the respondents holding overhead umbrella light in Baraat. Therefore, it can be concluded that respondents holding pole-mounted decorative umbrella lights tend to experience a higher frequency of both

constant and occasional discomfort, particularly in the legs and feet, compared to the respondents holding overhead umbrella lights **(table 5)**.

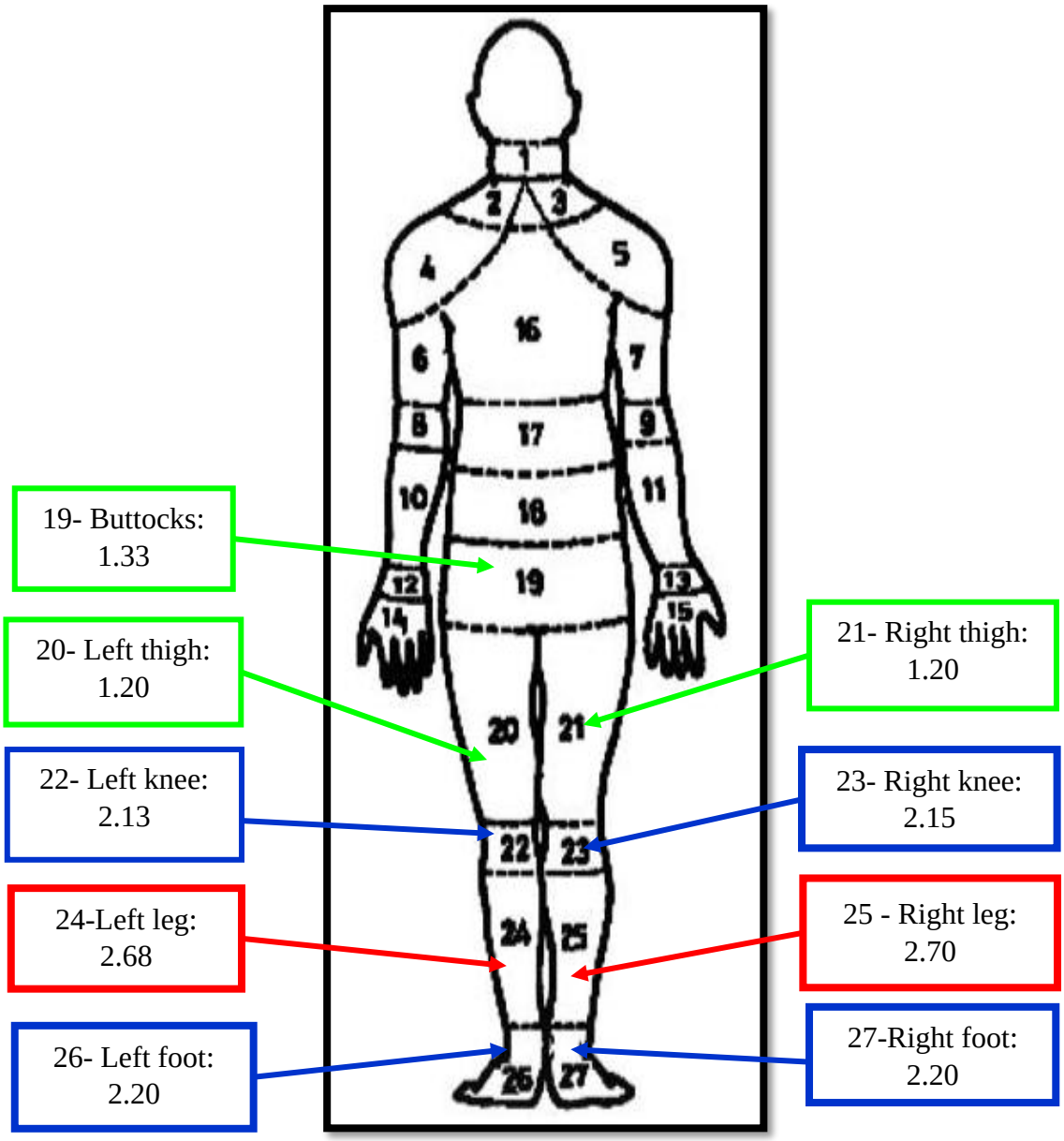
Figure 6: **Frequency of Perceived Body Discomfort experienced in Lower Body Parts by the respondents while holding Decorative Umbrella Lights (overhead and pole mounted) during Baraat based on Weighted Mean Score.**

Figure 7: Frequency of Perceived Body Discomfort experienced in Lower Body Parts by the respondents while holding Overhead Decorative Umbrella Lights during Baraat based on Weighted Mean Score.



Frequency of Discomfort	Always	Sometimes	Never
Weighted Mean Score Range	2.5 to 3.0	2.0 to 2.49	1.0 to 1.99
Interpretation of discomfort	High Frequency of Discomfort	Moderate Frequency of Discomfort	Low/No Frequency of Discomfort

Figure 8: Frequency of Perceived Body Discomfort experienced in Lower Body Parts by the respondents while holding Pole Mounted Decorative Umbrella Lights during Baraat based on Weighted Mean Score.



Frequency of Discomfort	Always	Sometimes	Never
Weighted Mean Score Range	2.5 to 3.0	2.0 to 2.49	1.0 to 1.99
Interpretation of discomfort	High Frequency of Discomfort	Moderate Frequency of Discomfort	Low/No Frequency of Discomfort

Figure 6, presents a comparative representation of the frequency of discomfort experienced by respondents in various lower body parts while holding decorative umbrella lights (Overhead and Pole-Mounted) during Baraat.

Among respondents holding overhead lights, discomfort in the buttocks (1.28), left thigh (1.18), and right thigh (1.20) was in the Low/No Frequency range (1.0 to 1.99), indicating minimal strain in these areas. The knees (1.98) were also in the Low/No Frequency range but close to Moderate Frequency (2.0 to 2.49). Moderate discomfort was reported in the feet (2.25), while the legs (2.47) experienced the highest strain, nearing the High Frequency range (2.5 to 3.0). Overall, respondents experienced moderate discomfort, particularly in the legs, knees, and feet **(figure 6)**.

For respondents holding pole-mounted lights, discomfort in the buttocks (1.33), left thigh (1.20), and right thigh (1.20) also fell within the Low/No Frequency range, similar to overhead lights. However, discomfort in the knees (2.13–2.15) and feet (2.20) was categorized as Moderate Frequency. The legs (2.68–2.70) exhibited a High Frequency of Discomfort, indicating significant strain while holding the pole-mounted lights. This suggests that pole-mounted lights place greater stress on the lower body, especially the legs **(figure 6)**.

Thus, it can be concluded that respondents holding overhead lights experienced moderate discomfort in the legs, knees, and feet, while respondents holding pole-mounted lights reported even higher discomfort, particularly in the legs. Knees and feet discomfort levels were also slightly higher for respondents holding pole-mounted lights, though both types of lights caused similar levels of strain in the buttocks and thighs. Overall, both overhead and pole-mounted lights led to moderate discomfort, but pole-mounted lights resulted in a higher frequency of discomfort in the legs, indicating greater physical strain **(figure 6)**.

Overall distribution of the respondents according to the Frequency of Perceived Body Discomfort experienced in Lower Body Parts by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat

Table 6: Overall distribution of the respondents according to the Frequency of Perceived Body Discomfort experienced in Lower Body Parts by the respondents holding Decorative Umbrella Lights (Overhead or Pole Mounted) (n=120)

Sr. no.	Perceived Body Discomfort Level	Range of Score	Overhead Umbrella Light (n=60)		Pole Mounted Umbrella Light (n=60)	
			f	%	*f*	%
1.	High	22-27	04	06.66	06	10.00
2.	**Moderate**	**15-21**	**48**	**80.00**	**51**	**85.00**
3.	Low	9-14	08	13.33	03	05.00

The data in **table 6** shows the overall distribution of respondents according to the frequency of perceived body discomfort experienced in lower body parts while holding overhead and pole-mounted decorative umbrella lights. The results indicates that for respondents with overhead umbrella lights, 80.00 per cent of respondents experienced a moderate frequency of perceived body discomfort, with scores ranging from 15 to 21. 13.33 per cent reported a low frequency of perceived body discomfort scores between 9 and 14, and only 6.66 per cent experienced a high frequency of perceived body discomfort scores between 22 and 27.

For respondents with pole-mounted umbrella lights, 85.00 per cent reported moderate frequency of discomfort scores between 15 and 21, 10.00 per cent experienced high frequency of discomfort scores between 22 and 27, and 5.00 per cent experienced low frequency of discomfort scores between 9 and 14. This data suggests that both the respondents holding overhead and pole-mounted umbrella lights primarily reported moderate frequency of discomfort, although a higher percentage of respondents in the pole-mounted group experienced high frequency of discomfort compared to the respondents with overhead umbrella lights **(table 6)**.

4.2.1.3: Severity of Perceived Body Discomfort experienced by in Upper Body Parts by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat

The data provided in **table 7** presents a detailed analysis of the severity of body discomfort experienced by respondents while holding decorative umbrella lights Overhead or Pole Mounted) during Baraat.

1. Neck:

The severity of discomfort in the neck was significantly higher for respondents holding overhead umbrella lights, with 31.67 per cent of respondents reporting severe pain and 6.67 per cent reporting very severe pain. This suggests that the overhead positioning of the lights places considerable strain on the neck, especially in terms of muscle and joint discomfort **(table 7)**.

While, the severity of discomfort in the neck for respondents holding pole-mounted umbrella lights was much lower, with only 6.67 per cent reporting mild pain and 1.67 per cent reporting very severe pain. This highlights that the pole-mounted umbrella lights put less strain on the neck region compared to the overhead configuration **(table 7)**.

2. Clavicles (Left and Right):

The analysis of discomfort experienced in the clavicle region revealed that, for the left clavicle, respondents holding overhead umbrella lights reported notable discomfort, with 35 per cent experiencing severe pain and 3.33 per cent reporting very severe pain. Whereas, respondents holding pole-mounted umbrella lights reported a substantially higher incidence of severe discomfort, with 66.67 per cent of respondents experiencing severe pain, and none reporting very severe pain. A similar trend was observed for the right clavicle, where 31.67 per cent of respondents with overhead umbrella lights reported severe pain and 6.67 per cent reported very severe pain **(table 7)**.

Whereas, 68.33 per cent of respondents holding pole-mounted umbrella lights reported severe pain, with no respondents reporting very severe pain. These findings indicate that pole-mounted umbrella lights are associated with a higher frequency of discomfort in the clavicle region, particularly on the left side **(table 7)**.

3. Both Shoulders (Left and Right):

The severity of discomfort in the left shoulder was found to be higher among respondents holding overhead umbrella lights, with 15.00 per cent of respondents reporting very severe pain, and 23.33 per cent reporting severe pain. Similarly, discomfort in the right shoulder was also notable, with 11.67 per cent of respondents experiencing very severe pain, and 26.67 per cent reporting severe pain **(table 7).**

Whereas, among respondents holding pole-mounted umbrella lights, no respondents reported experiencing very severe pain in the shoulders. However, 25.00 per cent of respondents reported severe pain in the left shoulder, while 23.33 per cent reported severe pain in the right shoulder. These findings indicate that overhead umbrella lights tend to cause greater discomfort in the shoulders **(table 7).**

4. Arms (Left and Right):

The discomfort in both the left arm and right arm was found to be high among both respondents. For the left arm, 25.00 per cent of respondents holding overhead umbrella lights reported experiencing very severe pain, indicating substantial discomfort across the sample. In comparison, 38.33 per cent of respondents holding pole-mounted umbrella lights reported severe pain, suggesting that the strain on the arm was more pronounced with this type of lighting setup. A similar trend was observed for the right arm, where 25.00 per cent of respondents holding overhead umbrella lights reported very severe pain, while 38.33 per cent of respondents holding pole-mounted umbrella lights reported severe pain **(table 7).**

Table 7: Frequency and Percentage distribution of respondents according to Severity of Perceived Body Discomforts experienced in Upper Body Parts while holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat. (n=120)

Sr. no	Body Parts	Respondents with Overhead Decorative Umbrella Lights (n=60)											Respondents with Pole Mounted Decorative Umbrella Lights (n=60)										
		Very Severe Pain		Severe Pain		Moderate Pain		Low Pain		No Pain		Wt. Mean Score (5-1)	Very Severe Pain		Severe Pain		Moderate Pain		Low Pain		No Pain		Wt. Mean Score (5-1)
		f	%	*f*	%	*f*	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	*f*	%	*f*	%	
1	Neck	04	06.67	19	31.67	21	35.00	12	20.00	04	06.67	3.11	01	01.67	04	6.67	49	81.67	03	05.00	03	05.00	2.95
2.	Clavicle Left	02	03.33	21	35.00	22	36.67	09	15.00	06	10.00	3.06	01	01.67	40	66.67	14	23.33	00	00.00	05	08.33	3.53
3	Clavicle Right	04	06.67	19	31.67	21	35.00	10	16.67	06	10.00	3.08	00	00.00	41	68.33	14	23.33	00	00.00	05	08.33	3.51
4.	Left Shoulder	09	15.00	14	23.33	18	30.00	15	25.00	04	03.33	3.15	00	00.00	15	25.00	26	43.33	18	30.00	01	01.67	2.97
5.	Right shoulder	07	11.67	16	26.67	17	28.33	16	26.67	04	05.00	3.10	01	01.67	14	23.33	26	43.33	18	30.00	01	01.67	2.93
6.	Left arm	15	25.00	13	21.67	21	35.00	06	10.00	05	08.33	3.45	04	06.67	23	38.33	12	20.00	19	31.67	02	03.33	3.13
7.	Right Arm	15	25.00	12	20.00	22	36.67	06	10.00	05	08.33	3.43	04	06.67	23	38.33	12	20.00	19	31.67	02	03.33	3.13
8.	Left elbow	08	13.33	09	15.00	19	31.67	21	35.00	03	05.00	2.96	03	05.00	21	35.00	24	40.00	11	18.33	01	01.67	3.23
9	Right elbow	09	15.00	10	16.67	19	31.67	21	35.00	01	01.67	3.08	03	05.00	21	35.00	24	40.00	11	18.33	01	01.67	3.23
10	Left forearm	09	15.00	21	35.00	14	23.33	10	16.67	06	10.00	3.28	09	15.00	15	25.00	20	33.33	10	16.67	06	10.00	3.18
11	Right forearm	08	13.33	21	35.00	13	21.67	12	20.00	06	10.00	3.21	10	16.67	14	23.33	20	33.33	10	16.67	06	10.00	3.20
12	Left Wrist	06	10.00	21	35.00	19	31.67	08	13.33	06	10.00	3.21	03	05.00	14	23.33	14	23.33	19	31.67	10	16.67	2.68
13	Right Wrist	06	10.00	19	31.67	21	35.00	07	11.67	07	11.67	3.16	10	16.67	15	25.00	14	23.33	19	31.67	02	03.33	3.20
14	Right Palm	10	16.67	08	13.33	20	33.33	18	30.00	04	06.67	3.03	17	28.33	17	28.33	13	21.67	13	21.67	00	00.00	3.63
15	Left Palm	05	08.33	10	16.67	21	35.00	18	30.00	06	10.00	2.83	18	30.00	13	21.66	14	23.33	13	21.67	02	16.67	3.53
16	Upper back	21	35.00	11	18.33	17	28.33	11	18.33	00	21.67	3.70	08	13.33	09	15.00	22	36.67	17	28.33	04	06.67	3.00
17	Mid back	10	16.67	11	18.33	17	28.33	11	18.33	11	18.33	2.96	12	20.00	22	36.67	13	21.67	08	13.33	05	08.33	3.46
18	Lower back	12	20.00	07	11.67	13	21.67	12	20.00	16	26.67	2.78	12	20.00	10	16.67	23	38.33	10	16.67	05	08.33	3.23
Total Weighted Mean												3.14	**Total Weighted Mean**										3.17

These findings indicate that while both types of umbrella lights contribute to arm discomfort, the pole-mounted umbrella lights result in greater severity of pain in both arms **(table 7).**

5. Elbows (Left and Right):

Discomfort in the left elbow among respondents holding overhead umbrella lights was notable, with 15.00 per cent reporting very severe pain and 31.67 per cent reporting severe pain. Similarly, discomfort in the right elbow followed a comparable pattern, with 16.67 per cent of respondents experiencing very severe pain, and 31.67 per cent reporting severe pain **(table 7)**.

Whereas, among respondents holding pole-mounted umbrella lights, 40.00 per cent reported experiencing severe pain in both elbows, while only 5.00 per cent reported very severe pain. Therefore, it can be concluded that the elbows experience greater discomfort when holding pole-mounted umbrella lights, likely due to the increased strain required to stabilize the lights for prolonged durations **(table 7).**

6. Forearms (Left and Right):

Discomfort in the left forearm was found to be significant among respondents, with 35.00 per cent reporting severe pain and 15.00 per cent experiencing very severe pain while holding overhead umbrella lights. A similar trend was observed in the right forearm, where 35.00 per cent of respondents reported very severe pain, and 13.33 per cent reported severe pain **(table 7).**

Among respondents holding pole-mounted umbrella lights, 25.00 per cent reported experiencing severe pain, while 15.00 per cent experienced very severe pain in the left forearm. A similar pattern was noted in the right forearm, where 25.00 per cent reported severe pain and 15.00 per cent reported very severe pain **(table 7).**

Therefore, it can be concluded that both the respondents holding overhead and pol mounted umbrella lights cause to considerable forearm discomfort. However, the severity of pain was notably higher among respondents holding overhead umbrella lights. This increased discomfort is likely attributable to the sustained overhead posture required to hold the lights, which places additional strain on the muscles and joints of the forearm **(table 7).**

7. Wrists (Left and Right):

The analysis of wrist discomfort among respondents holding overhead and pole-mounted decorative umbrella lights reveals variations in the intensity of pain experienced in both wrists. Among respondents holding overhead decorative umbrella lights, 10.00 per cent reported very severe pain in the left wrist, while 35.00 per cent experienced severe pain. Moderate pain was reported by 31.67 per cent, and 13.33 per cent experienced low pain, while 10.00 per cent reported no pain. Similarly, in the right wrist, 10.00 per cent of respondents experienced very severe pain, and 31.67 per cent reported severe pain. Moderate pain was noted by 35.00 per cent, while 11.67 per cent experienced low pain, and 11.67 per cent reported no pain **(table 7).**

Among respondents holding pole-mounted decorative umbrella lights, 5.00 per cent reported very severe pain in the left wrist, and 23.33 per cent experienced severe pain. Moderate and low pain were reported by 23.33 per cent and 31.67 per cent, respectively, while 16.67 per cent experienced no pain. In the right wrist, 16.67 per cent of respondents reported very severe pain, while 25.00 per cent experienced severe pain. Moderate pain was observed in 23.33 per cent, and 31.67 per cent reported low pain, while 3.33 per cent had no pain **(table 7).**

Thus, it can be concluded that discomfort in the left wrist was more visible among respondents holding overhead decorative umbrella lights, with a higher percentage reporting severe and moderate pain. However, in the case of pole-mounted lights, the right wrist exhibited greater discomfort, particularly with a higher proportion of respondents experiencing very

severe pain. This suggests that with overhead lights requiring more sustained elevation, affecting both wrists, while pole-mounted lights exert increased pressure on the right wrist due to prolonged gripping and weight distribution **(table 7)**.

8. Palms (Left and Right):

The analysis of palm discomfort among respondents holding overhead and pole-mounted decorative umbrella lights indicates a higher prevalence of pain among respondents handling pole-mounted lights. Among respondents holding overhead decorative umbrella lights, 16.67 per cent reported experiencing very severe pain in the right palm, while 13.33 per cent experienced severe pain. Moderate and low pain were reported by 33.33 per cent and 30.00 per cent, respectively, with 6.67 per cent experiencing no pain. Whereas, the left palm exhibited relatively lower discomfort, with 8.33 per cent reporting very severe pain and 16.67 per cent experiencing severe pain **(table 7).**

While, respondents holding pole-mounted decorative umbrella lights reported significantly higher levels of discomfort in both palms. In the right palm, 28.33 per cent of respondents experienced very severe pain, while an equal percentage (28.33 per cent) reported severe pain. Moderate and low pain were reported by 21.67 per cent each, with no respondents reporting the absence of pain. Similarly, in the left palm, 30.00 per cent of respondents experienced very severe pain, and 21.66 per cent reported severe pain, while 23.33 per cent and 21.67 per cent reported moderate and low pain, respectively **(table 7)**.

Thus, it can be concluded that the discomfort in the right palm was more pronounced than in the left palm when holding overhead lights, likely due to the dominant hand exerting greater force while holding the light. However, in the case of respondents holding pole-mounted lights, both palms exhibited nearly equal levels of discomfort, indicating that the sustained grip required to hold the pole contributed to uniform pressure distribution across both hands **(table 7).**

9. Back (Upper, Mid, and Lower):

Discomfort in the upper, mid, and lower back was significantly influenced by the type of decorative umbrella lights used by the respondents. Among individuals holding overhead decorative umbrella lights, the upper back exhibited the highest discomfort, with 35.00 per cent reporting very severe pain and 18.33 per cent experiencing severe pain. Moderate and low pain were reported by 28.33 per cent and 18.33 per cent, respectively, while none of the respondents reported no pain **(table 7).**

While, respondents holding pole-mounted decorative umbrella lights reported relatively lower discomfort in the upper back, with 13.33 per cent experiencing very severe pain and 15.00 per cent reporting severe pain, while 36.67 per cent experienced moderate pain, followed by 28.33 per cent with low pain and 6.67 per cent reporting no pain **(table 7).**

In the mid-back region, 16.67 per cent of respondents holding overhead decorative umbrella lights reported very severe pain, and 18.33 per cent experienced severe pain. Moderate pain was observed among 28.33 per cent, while 18.33 per cent reported low pain, and an equal proportion (18.33 per cent) experienced no pain **(table 7).**

Among respondents holding pole-mounted decorative umbrella lights, 20.00 per cent reported very severe pain, while 36.67 per cent experienced severe pain. Moderate pain was noted in 21.67 per cent, while 13.33 per cent experienced low pain, and 8.33 per cent reported no pain **(table 7).**

Discomfort in the lower back followed a different trend, with 20.00 per cent of respondents holding overhead decorative umbrella lights reporting very severe pain and 11.67 per cent experiencing severe pain. Moderate and low pain were reported by 21.67 per cent and 20.00 per cent, respectively, while 26.67 per cent reported no pain **(table 7).**

Among respondents holding pole-mounted decorative umbrella lights, 20.00 per cent experienced very severe pain, and 16.67 per cent reported

severe pain. Moderate pain was observed in 38.33 per cent, while 16.67 per cent experienced low pain, and 8.33 per cent reported no pain **(table 7).**

This indicates that the upper back experienced the highest discomfort among respondents holding overhead decorative umbrella lights, while mid and lower back pain was more prominent among respondents holding pole-mounted decorative umbrella lights. The sustained elevation required for overhead lights likely contributed to the strain in the upper back, whereas the prolonged gripping and weight-bearing nature of pole-mounted lights may have resulted in increased discomfort in the mid and lower back regions **(table 7)**.

Figure 9: Severity of Perceived Body Discomfort experienced in Upper Body Parts by the respondents while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat based on Weighted Mean Scores

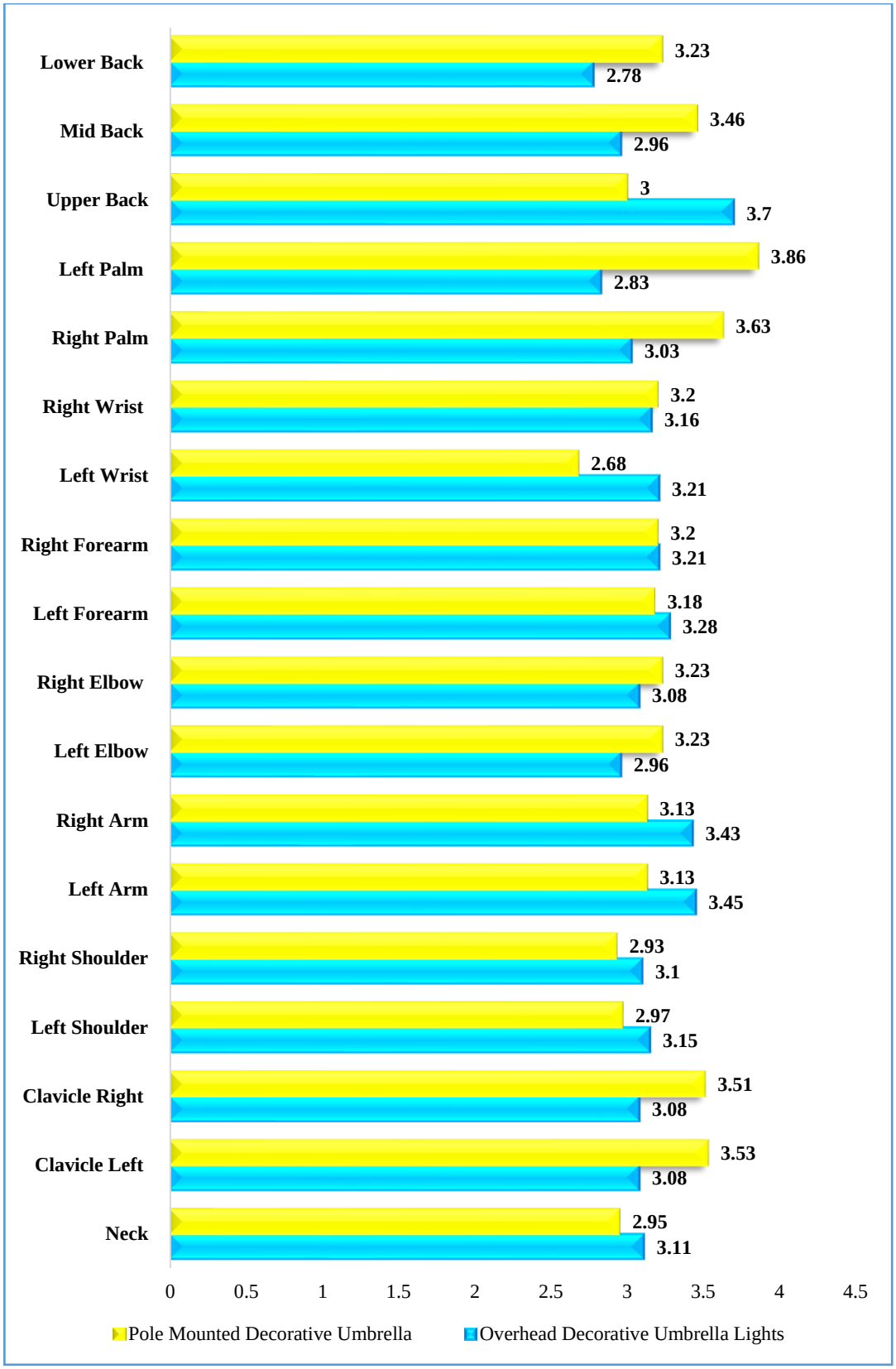
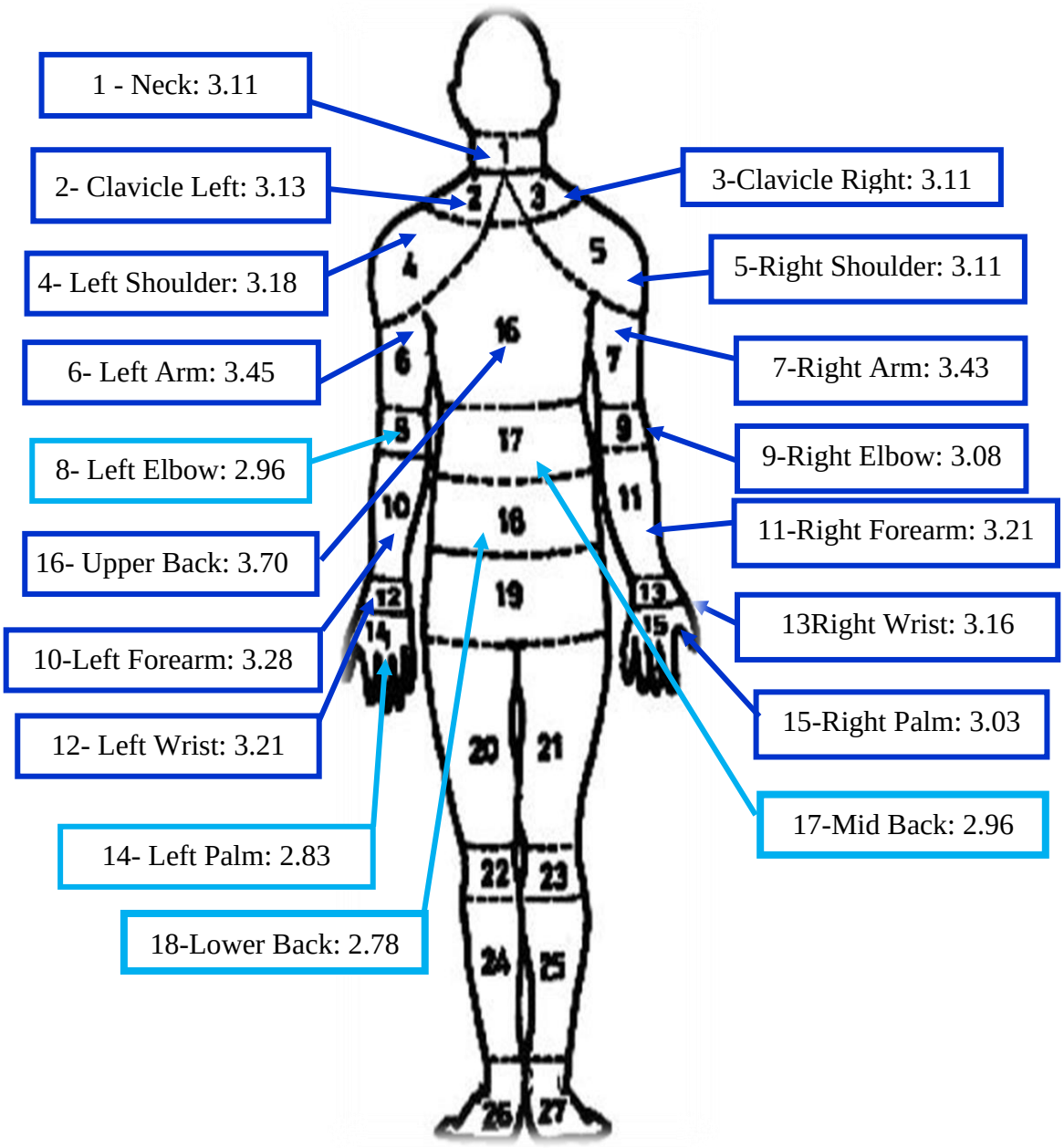
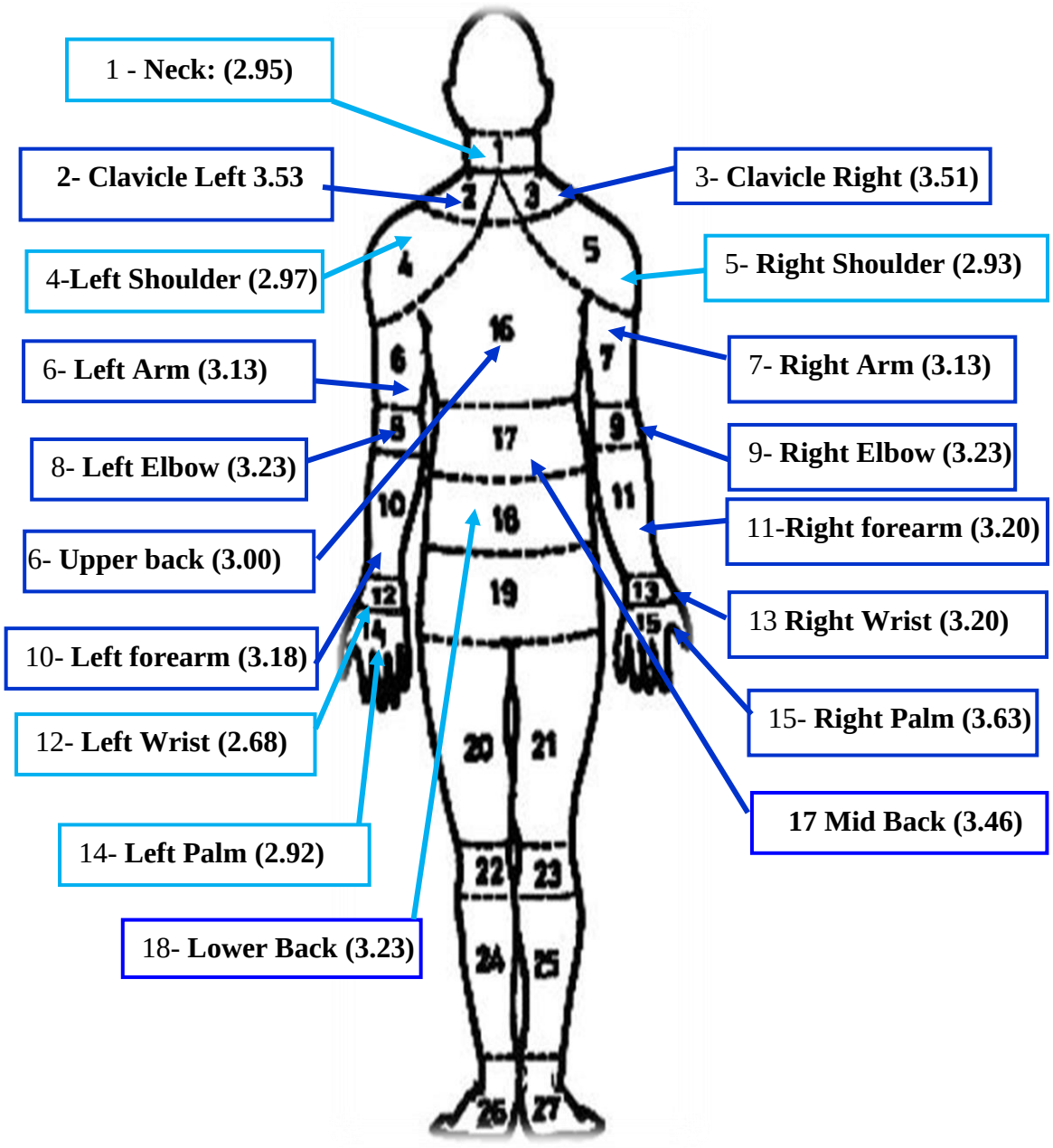


Figure 10: Severity of Perceived Body Discomforts experienced in Upper Body Parts by respondents engaged in holding Overhead Decorative Umbrella Lights during Baraat based on Weighted Mean Score



Severity of Discomfort	**No pain**	**Low Pain**	**Moderate Pain**	**Severe Pain**	**Very Severe Pain**
Score Range	1.00 - 1.99	2.00 - 2.99	3.00 - 3.99	4.00 - 4.99	5.00

Figure 11: Severity of Perceived Body Discomforts experienced in Upper Body Parts by respondents engaged in holding Pole Mounted Decorative Umbrella Lights during Baraat Based on Weighted Mean Score



Severity of Discomfort	**No pain**	**Low Pain**	**Moderate Pain**	**Severe Pain**	**Very Severe Pain**
Score Range	1.00 - 1.99	2.00 - 2.99	3.00 - 3.99	4.00 - 4.99	5.00

The **figure 9**shows that respondents experienced varying levels of discomfort while holding both overhead umbrella lights and pole-mounted decorative umbrella lights, with multiple upper body regions affected by moderate pain due to physical strain.

The neck experienced moderate pain (Mean: 3.11) when holding overhead lights, attributed to prolonged upward positioning and continuous engagement of neck muscles. However, no discomfort was reported in the neck while holding pole-mounted lights **(figure 9)**.

The clavicles displayed significant discomfort across both tasks, with moderate pain in the left (Mean: 3.13) and right clavicles (Mean: 3.11) for overhead lights, and the highest pain levels in the left (Mean: 3.53) and right clavicles (Mean: 3.51) for pole-mounted lights, indicating heavy load-bearing strain **(figure 9)**.

Shoulders also experienced moderate pain during both tasks, with overhead lights causing discomfort in the left (Mean: 3.18) and right (Mean: 3.11) shoulders due to elevated arm postures. For pole-mounted lights, discomfort was lower but still present, with pain levels of 2.97 (left) and 2.93 (right) **(figure 9)**.

The arms were significantly affected in both cases. Holding overhead lights led to moderate pain in the left (Mean: 3.45) and right (Mean: 3.43) arms, while pole-mounted lights also caused moderate pain in the left (Mean: 3.13) and right (Mean: 3.13) arms, indicating continuous muscular exertion **(figure 9)**.

Elbows experienced similar discomfort across both conditions, with moderate pain reported for both the left and right elbows (Mean: 3.23) due to prolonged static postures and joint stress **(figure 9)**.

Forearms were also notably impacted, showing moderate pain while holding overhead lights in the left (Mean: 3.28) and right (Mean: 3.21) forearms. Likewise, pole-mounted lights resulted in moderate discomfort with scores of 3.18 (left) and 3.20 (right), highlighting continuous gripping effort **(figure 9)**.

Wrists exhibited moderate discomfort with overhead lights, showing pain in the left (Mean: 3.21) and right (Mean: 3.16) wrists. For pole-mounted lights, discomfort was

moderate in the right wrist (Mean: 3.20), while the left wrist reported lower pain (Mean: 2.68), indicating uneven load distribution and grip pressure **(figure 9)**.

The palms experienced varying discomfort levels. Overhead lights caused low pain in the left palm (Mean: 2.83) and moderate pain in the right palm (Mean: 3.03). In contrast, pole-mounted lights led to moderate pain in the right palm (Mean: 3.63), likely due to repetitive gripping, and lower pain in the left palm (Mean: 2.92) **(figure 9)**.

The back regions experienced noticeable strain. While holding overhead lights, the upper back showed the highest discomfort (Mean: 3.70), followed by the mid-back (Mean: 2.96) and lower back (Mean: 2.78). For pole-mounted lights, discomfort was highest in the mid-back (Mean: 3.46), followed by the lower back (Mean: 3.23) and upper back (Mean: 3.00) **(figure 9)**.

In conclusion, respondents predominantly experienced moderate discomfort in the upper back, arms, shoulders, and forearms while holding overhead lights, and in the clavicles, mid-back, arms, forearms, and palms while holding pole-mounted lights. The most significant discomfort areas were the clavicles and upper back for overhead lights and the clavicles, mid-back, and hands for pole-mounted lights, reflecting the physical demands and postural challenges of both tasks **(figure 9)**.

Overall distribution of the Respondents according to the Severity of Perceived Body Discomfort experienced in Upper Body Parts by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat

Table 8 presents the overall distribution of respondents based on the severity of body discomfort experienced in the upper body parts while holding decorative umbrella lights (Overhead or Pole Mounted) during the Baraat.

Table 8: Overall distribution of the Respondents according to the Severity of Perceived Body Discomfort experienced in Upper Body Parts by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat (n=120)

Sr. no.	Perceived Body Discomfort	Range of Score	Overhead Umbrella (n=60)		Pole Mounted Umbrella (n=60)	
			f	%	*f*	%
1.	Very Severe Pain	76-90	00	00.00	04	06.66
2.	Severe Pain	61-75	17	28.33	21	35.00
3.	**Moderate Pain**	**48-60**	**33**	**55.00**	**27**	**45.00**
4.	Mild Pain	33-47	10	16.66	07	11.66
5.	No Pain	18-32	00	00.00	01	01.66

The findings indicate that among respondents holding overhead umbrella lights, 28.33 per cent reported severe pain, while 55.00 per cent experienced moderate pain and 16.66 per cent reported mild pain. Notably, none (0.00 per cent) of the respondents in reported very severe pain or no pain respectively **(table 8)**.

Whereas, among respondents holding pole-mounted umbrella lights, 6.66 per cent reported very severe pain, while 35.00 per cent experienced severe pain, 45.00 per cent reported moderate pain, 11.66 per cent experienced mild pain and 1.66 per cent of respondents reported no pain **(table 8)**.

This data evidently demonstrates that greater percentage of respondents holding overhead umbrella lights reporting severe and moderate pain. Whereas, respondents holding pole-mounted umbrella lights reported moderate or mild pain and a small percentage of experiencing no pain **(table 8)**.

4.2.1.4: Perceived Severity of Body Discomfort Experienced in Lower Body Parts by the respondents engaged in holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat

The data in **table 9,** highlights the severity of body discomfort experienced by respondents while holding Decorative Umbrella Lights, (Overhead or Pole Mounted) during Baraat. The analysis focuses on different lower body parts, combining both right and left sides for a comprehensive understanding.

1. Discomfort in the Buttocks

Among respondents holding Overhead Decorative Umbrella Lights, 73.33 per cent of the respondents, reported experiencing no pain in the buttock region.5.00 per cent, reported very severe pain, while 6.67 per cent experienced severe pain **(table 9)**.

Similarly, in the case of Pole Mounted Decorative Umbrella Lights, 73.33 per cent of respondents did not experience any discomfort in the buttocks. However, 11.66 per cent, reported severe pain, indicating that the pole-mounted mechanism may exert discomfort on the body **(table 9)**.

2. Discomfort in the Thighs (Right and Left)

The respondents holding Overhead Decorative Umbrella Lights, 85 per cent reported experiencing no discomfort in the thigh region, with. 3.33 per cent, reported experiencing moderate pain, while 3.33 per cent experienced severe pain. The respondents holding Pole Mounted Decorative Umbrella Lights also reported a similar trend, with 83.33 per cent experiencing no pain in the thigh region. However, in this category, 8.33 per cent reported severe pain, which is slightly higher compared to respondents holding overhead lights. This suggests that the pole-mounted variation might contribute to a discomfort on the thighs due to differences in weight distribution and holding posture **(table 9)**.

3. Discomfort in the Knees (Right and Left)

Pain in the knee region was reported at a higher frequency compared to the buttocks and thighs. Among respondents holding Overhead Decorative Umbrella Lights, 15 per cent reported experiencing no pain, whereas 16.67 per cent experienced severe pain. Additionally, 26.67 per cent of respondents experienced moderate pain, while 40.83 per cent reported experiencing mild pain. For respondents holding Pole Mounted Decorative Umbrella Lights, knee pain was reported more frequently. In this category, only 3.33 percent of respondents experienced no pain, while 20 per cent reported severe pain. Additionally, 46.67 per cent reported moderate pain,

and 24.16 per cent experienced mild pain. The higher percentage of severe and moderate pain in this category suggests that pole- mounted lights may exert sever discomfort on the knees due to prolonged standing and the distribution of weight while holding the lights **(table 9)**.

4. Discomfort in the Legs (Right and Left)

The legs were among the most affected body parts, with a higher percentage of respondents reporting pain in both categories. Among respondents using Overhead Decorative Umbrella Lights, 30 per cent reported severe pain, while 25.83 per cent experienced moderate pain. Additionally, 21.66 per cent reported mild pain, while only 6.67 per cent of respondents reported experiencing no pain in the legs. The relatively high proportion of respondents experiencing severe and moderate pain indicates that holding the overhead lights for prolonged periods places discomfort on the leg muscles. Among respondents holding Pole Mounted Decorative Umbrella Lights, discomfort in the legs was even more noticeable. 43.33 percent reported severe pain, whereas 21.67 per cent experienced moderate pain. Additionally, 28.33 per cent of respondents experienced mild pain, while only 3.33 per cent reported experiencing no pain. This suggests that pole-mounted lights demand greater physical endurance, likely due to the pressure exerted on the lower limbs when holding the pole for extended durations **(table 9)**.

5. Discomfort in the Feet (Right and Left)

Discomfort in the feet was also frequently reported, particularly among respondents holding Pole Mounted Decorative Umbrella Lights. Among respondents holding Overhead Decorative Umbrella Lights, 30 per cent reported severe pain, while 32.5 per cent experienced moderate pain. Additionally, 20 per cent of respondents reported mild pain, while 10 percent reported no pain. This suggests that prolonged standing while holding the lights led to significant discomfort in the feet **(table 9)**.

Among respondents holding Pole Mounted Decorative Umbrella Lights, a similar pattern was observed. In this category, 32.5 per cent of respondents reported severe pain, whereas 28.33 per cent experienced moderate pain. Additionally, 25.83 per cent reported mild pain, while only 3.33 per cent of respondents reported experiencing no pain. This indicates that pole-mounted lights may cause additional discomfort on the feet compared to overhead lights, possibly due to the continuous effort required to stabilize the pole while walking. Thus, the analysis of body discomfort reveals that the Pole Mounted Decorative Umbrella Lights resulted in a higher incidence of severe pain across most lower body parts compared to Overhead Decorative Umbrella Lights. The knees, legs, and feet were the most affected body regions, with a notably higher percentage of respondents experiencing moderate to severe pain. On the other hand, the buttocks and thighs experienced relatively less discomfort, respondents reported no pain in these areas. The findings indicate that the pole-mounted decorative umbrella lights place a greater physical burden on the body, particularly in the lower limbs, may be due to weight distribution, posture, and prolonged standing during the Baraat **(table 9)**.

Table 9: Frequency and Percentage distribution of respondents according to Severity of Perceived Body Discomforts experienced in Lower Body Parts while holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat (n=120)

Sr. no	Body Parts	Respondents with Overhead Decorative Umbrella Lights Severity Scale (n=60)											Respondents with Pole Mounted Decorative Umbrella Lights Severity Scale (n=60)										
		Very Severe Pain		Severe Pain		Moderate Pain		Mild Pain		No Pain		Wt. Mean Score (5-1)	Very Severe Pain		Severe Pain		Moderate Pain		Mild Pain		No Pain		Wt. Mean Score (5-1)
		f	%	*f*	%	*f*	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	*f*	%	*f*	%	
1.	Buttocks	03	05.00	04	06.67	03	05.00	03	05.00	47	73.33	1.55	00	00.00	07	11.66	06	10.00	03	05.00	44	73.33	1.60
2.	Left thigh	00	00.00	02	03.33	02	03.33	04	06.66	52	85.00	1.23	00	00.00	05	08.33	03	05.00	02	03.33	50	83.33	1.38
3.	Right thigh	00	00.00	02	03.33	02	03.33	05	08.33	51	85.00	1.25	00	00.00	04	08.33	05	08.33	01	01.67	50	83.33	1.48
4.	Left knee	01	01.67	11	18.33	13	21.67	26	43.33	09	15.00	2.48	01	01.67	11	18.33	29	48.33	17	28.33	02	03.33	2.87
5.	Right knee	04	06.66	08	13.33	16	26.67	23	38.33	09	15.00	2.58	00	00.00	13	21.67	27	45.00	18	20.00	02	03.33	2.85
6.	Left leg	08	13.33	18	30.00	16	26.67	13	21.66	05	06.67	3.18	02	03.33	26	43.33	13	21.67	17	28.33	02	03.33	3.15
7.	Right leg	08	13.33	19	31.67	15	25.00	13	21.66	05	06.67	3.20	02	03.33	26	43.33	13	21.67	17	28.33	02	03.33	3.15
8.	Left foot	04	06.67	18	30.00	19	31.67	12	20.00	07	10.00	3.00	03	05.00	19	31.67	17	28.33	19	31.67	02	03.33	3.03
9.	Right foot	03	05.00	18	30.00	20	33.33	12	20.00	07	10.00	2.90	02	03.33	20	33.33	18	20.00	18	20.00	02	03.33	3.03
Total Weighted Mean												2.38	**Total Weighted Mean**										2.50

Figure 12: Severity of Perceived Body Discomforts experienced in Lower Body Parts by respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat based on Weighted Mean Score.

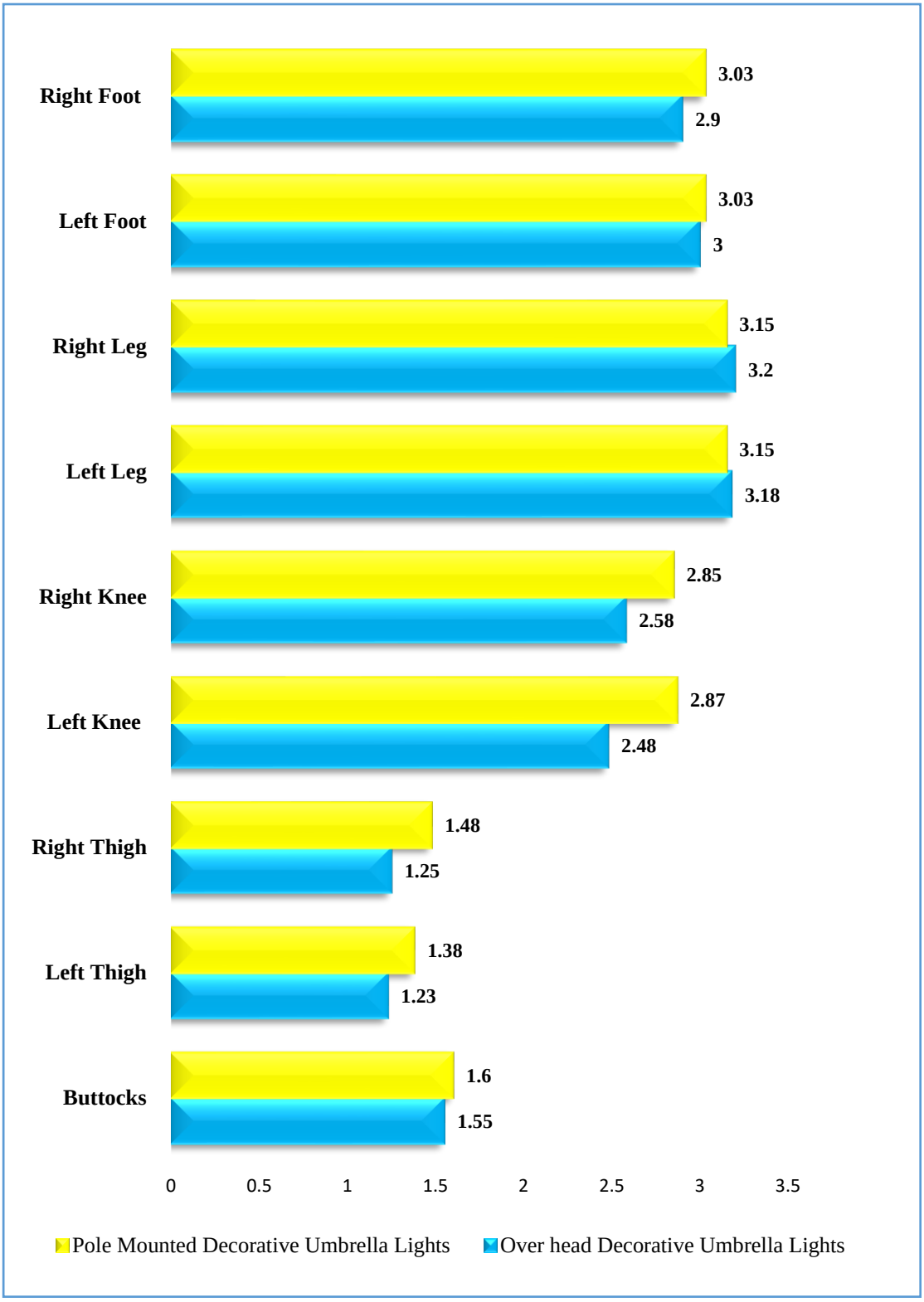
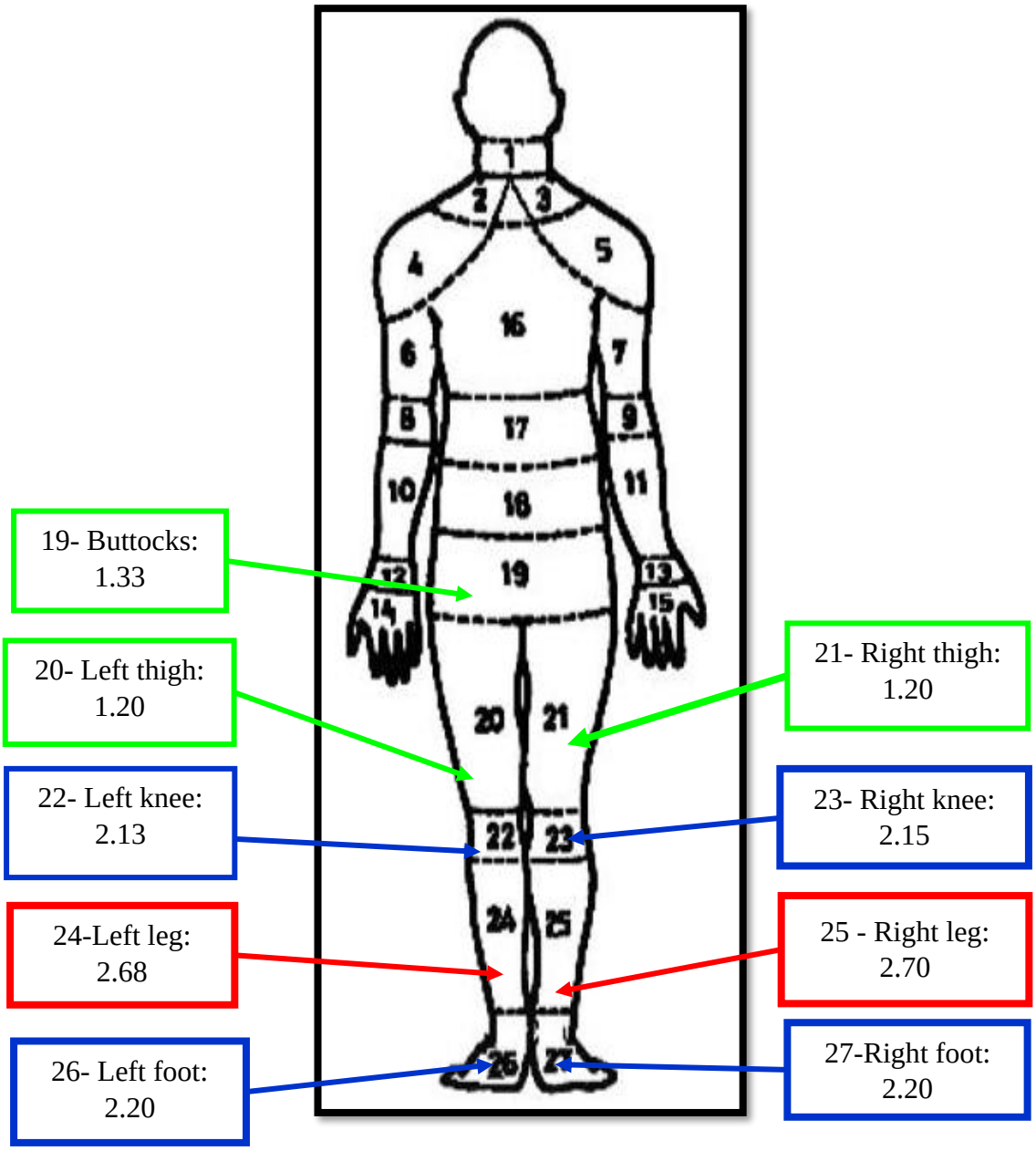
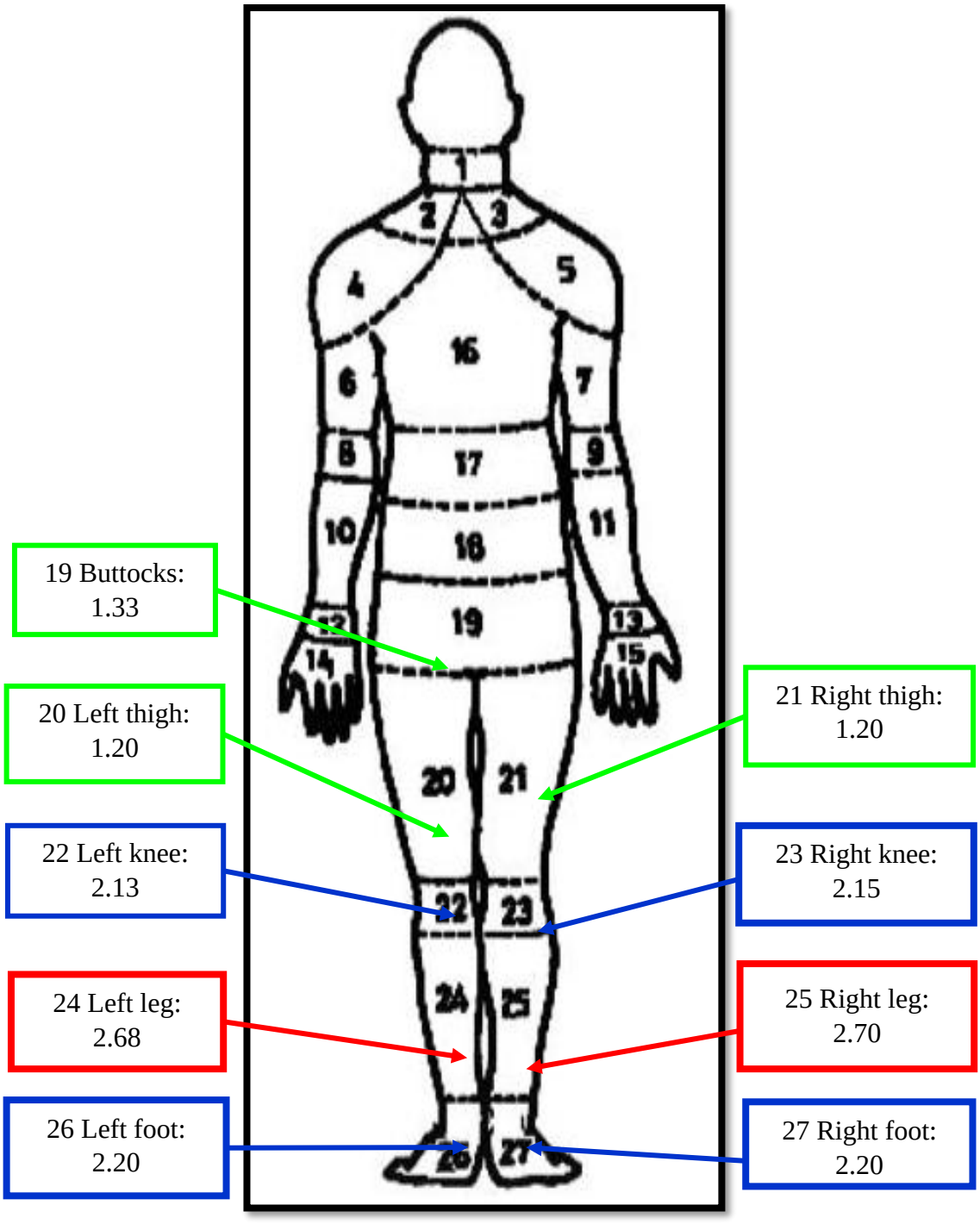


Figure 13: Perceived Severity of Body Discomforts experienced in Lower Body Parts by the respondents while holding Overhead Decorative Umbrella Lights during Baraat based on Weighted Mean Score.



Severity of Discomfort	**No pain**	**Low Pain**	**Moderate Pain**	**Severe Pain**	**Very Severe Pain**
Score Range	1.00 - 1.99	2.00 - 2.99	3.00 - 3.99	4.00 - 4.99	5.00

Figure 14: Severity of Perceived Body Discomforts experienced in Lower Body Parts by respondents engaged in holding Pole Mounted Decorative Umbrella Lights during Baraat based on Weighted Mean Score.



Severity of Discomfort	**No pain**	**Low Pain**	**Moderate Pain**	**Severe Pain**	**Very Severe Pain**
Score Range	1.00 - 1.99	2.00 - 2.99	3.00 - 3.99	4.00 - 4.99	5.00

The **figure 12** shows severity of discomfort experienced by respondents while holding both overhead decorative umbrella lights and pole-mounted decorative umbrella lights across lower body parts reveals similar patterns, with noticeable differences in specific regions.

In both cases, the buttocks and thighs exhibited low severity of discomfort. Weighted mean scores for the buttocks (1.33), left thigh (1.20), and right thigh (1.20) indicate minimal strain, suggesting that these areas were not significantly impacted during either activity **(figure 12)**.

However, discomfort in the knee region was more pronounced. Both tasks resulted in moderate discomfort in the knees, with weighted mean scores of 2.13 for the left knee and 2.15 for the right knee. This suggests that supporting body weight and maintaining stability for extended durations placed strain on the knee joints. Notably, respondents holding pole-mounted lights reported slightly greater knee discomfort compared to those holding overhead lights **(figure 12)**.

Leg discomfort was consistently moderate in both conditions. The left leg recorded a weighted mean score of 2.68 and the right leg 2.70, indicating significant muscle engagement and fatigue due to prolonged standing and balancing efforts **(figure 12)**.

Similarly, discomfort in the feet was reported at a moderate level for both left and right feet (weighted mean score of 2.20 each). This suggests that extended standing and supporting postural loads contributed to stress in the lower extremities, regardless of the type of light held **(figure 12)**.

Overall, respondents holding both types of decorative umbrella lights experienced low discomfort in the thighs and buttocks, but moderate discomfort in the knees, legs, and feet. The findings emphasize that prolonged holding of both overhead and pole-mounted decorative umbrella lights exerts considerable strain on weight-bearing joints, leg muscles, and feet, impacting physical comfort and endurance over time **(figure 12)**.

Overall Distribution of the Respondents according to the Perceived Severity of Body Discomfort experienced in Lower Body Parts by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat

Table 10: Overall distribution of the respondents according to the Severity of Perceived Body Discomfort experienced in Upper Body Parts while holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat (n=120)

Sr.no.	Perceived Body Discomfort	Range of Score	Overhead Umbrella (n=60)		Pole Mounted Umbrella (n=60)	
			f	%	*f*	%
1.	Very Severe Pain	38-45	00	00.00	00	00.00
2.	Severe Pain	30-37	07	11.66	07	11.66
3.	Moderate Pain	25-29	11	18.33	05	08.33
4.	**Mild Pain**	**17-24**	**33**	**55.00**	**45**	**75.00**
5.	No Pain	9-16	08	13.33	03	05.00

Table 10 presents the overall percentage distribution of respondents according to the severity of perceived body discomfort in upper body parts while holding Decorative Umbrella Lights (Overhead or Pole-Mounted) during Baraat.

The data reveals that none of the respondents in both the Overhead Umbrella Lights and Pole-Mounted Umbrella Lights categories experienced very severe discomfort (0.00 per cent) within the score range of 38–45 **(table 10)**.

In the severe pain category (score range: 30–37), 11.66 per cent of respondents in both Overhead Umbrella Lights and Pole-Mounted Umbrella Lights categories reported significant upper body discomfort, indicating high muscular strain and fatigue from prolonged weight-bearing postures **(table 10)**.

For moderate pain category (score range: 25–29), 18.33 per cent of respondents holding Overhead Umbrella Lights experienced moderate discomfort compared to 8.33 per cent of respondents holding Pole-Mounted Umbrella Lights. This suggests that holding an umbrella light overhead requires more muscular endurance, leading to higher levels of upper body strain **(table 10)**.

Regarding mild pain category (score range: 17–24), 55.00 per cent of respondents holding Overhead Umbrella Light and 75.00 per cent of respondents holding Pole-Mounted Umbrella Light experienced mild pain **(table 10)**.

Table 11: Weighted mean score of Frequency and Severity of Perceived Body Discomfort experienced by the Respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat (n=120)

Sr.no.	Body Parts	Frequency Weighted Mean Score (3-1)		Severity Weighted Mean Score (5-1)	
		Overhead Umbrella (n=60)	Pole Mounted Umbrella (n=60)	Overhead Umbrella (n=60)	Pole Mounted Umbrella
Upper Body Parts					
1	Neck	2.13	2.12	2.48	2.95
2.	Clavicle Left	2.22	**2.43**	3.08	**3.55**
3	Clavicle Right	2.25	**2.43**	3.08	**3.53**
4.	Left Shoulder	**2.41**	2.28	3.18	2.97
5.	Right shoulder	2.35	2.3	3.13	2.93
6.	Left arm	2.25	2.38	**3.50**	3.13
7.	Right Arm	2.23	2.4	**3.97**	3.13
8.	Left elbow	2.37	2.33	3.03	3.23
9	Right elbow	**2.38**	2.35	3.02	3.23
10	Left forearm	2.22	2.15	3.32	3.18
11	Right forearm	2.27	2.18	3.27	3.2
12	Left Wrist	2.27	2.1	3.22	2.68
13	Right Wrist	2.22	2.08	3.17	2.67
14	Right Palm	2.23	2.05	2.83	2.9
15	Left Palm	2.18	2.05	2.83	2.92
16	Upper back	2.07	2.27	3.00	3.00
17	Mid back	2.2	2.37	3.00	**3.48**
18	Lower back	1.98	2.3	2.65	3.2
Lower Body Parts					
19	Buttocks	1.28	1.33	1.6	1.45
20	Left thigh	1.18	1.2	1.25	1.37
21	Right thigh	1.2	1.2	1.25	1.45
22	Left knee	1.98	2.13	2.48	2.87
23	Right knee	1.98	2.15	2.42	2.85
24	Left leg	**2.47**	**2.68**	3.2	3.08
25	Right leg	**2.47**	**2.70**	**3.22**	**3.1**
26	Left foot	2.25	2.2	3.02	3.03
27	Right foot	2.25	2.2	2.98	3.03

Table 11 displays the analysis of the weighted mean scores for frequency and severity of body discomfort experienced by respondents engaged in holding decorative umbrella lights during the Baraat provides significant insights into the musculoskeletal strain associated with this task.

The data reveals that respondents holding Pole Mounted Umbrella Lights experienced the highest frequency of discomfort in the right leg (2.70) and left leg (2.68), indicating that prolonged standing and continuous weight-bearing primarily impact the lower limbs. Conversely, respondents holding Overhead Umbrella Lights reported the highest frequency of discomfort in the left shoulder (2.41) and right shoulder (2.35), suggesting that overhead lifting and sustained arm elevation place considerable stress on the upper body **(table 11)**.

When considering the perceived severity of discomfort, the findings highlight respondents holding Overhead Umbrella Lights experienced the most intense pain in the right arm (3.97), which can be attributed to the extended duration of holding the umbrella above shoulder level. On the other hand, respondents holding Pole Mounted Umbrella Lights reported the highest severity scores in the left clavicle (3.55) and right clavicle (3.53), indicating significant strain on the chest and shoulder region due to prolonged engagement in holding the pole-mounted light. Additionally, mid-back pain (3.48) and lower back pain (3.20) respondents holding Pole Mounted Umbrella lights reported as more severe compared to respondents holding Overhead Umbrella light, likely due to the static postural strain and the weight exerted on the spinal region **(table 11)**.

The comparative analysis suggests that while respondents holding Overhead Umbrella lights experience more severe discomfort in the upper body parts, particularly in the arms and shoulders. While respondents holding Pole Mounted Umbrellas lights report more frequent discomfort in the lower body, particularly in the legs and knees. This indicates that the type of umbrella and adopted posture significantly influences the musculoskeletal stress across different body regions **(table 11)**.

The findings highlight the importance of ergonomic interventions in reducing physical discomfort for respondents holding decorative umbrella lights **(table 11)**.

4.2.2 Perceived Hand Discomfort experienced by the respondents engaged in holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat

4.2.2.1 Frequency of Perceived Hand Discomfort experienced in Left Hand by the respondents engaged Holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat

Table 12 presents the frequency of discomfort, experienced by respondents holding Overhead Decorative Umbrella Lights and respondents engaged in holding Decorative Umbrella Lights over the past week.

1. Area A:

Among the respondents holding Pole Mounted Decorative Umbrella Lights exhibited a higher prevalence of discomfort, with 30.00 per cent reporting pain several times daily and 36.67 Per Cent experiencing it 3-4 times daily, yielding the highest Weighted Mean Score, 3.83 across all areas. Whereas, for Overhead Decorative Umbrella Lights, discomfort was more moderate, with 35.00 per cent experiencing pain 3-4 times daily and 33.33 per cent reporting it 1-2 times daily, leading to a lower Weighted Mean Score of 2.76 **(table 12)**.

2. Area B:

Among the respondents holding Overhead Decorative Umbrella Lights, 26.67 per cent felt discomfort 1-2 times daily, and 21.67 per cent sensed it 3-4 times. Whereas, 18.33 per cent, experienced it once daily, and only 1.67 per cent had severe pain several times daily, resulting in a Weighted Mean Score of 3.18. For the respondents holding Pole Mounted Decorative Umbrella Lights, discomfort was most frequent at 1-2 times daily, 40 per cent, followed by 3-4 times, 31.67 per cent. Around 13.33 per cent felt pain once daily, and another 13.33 per cent had it multiple times a day, leading to a Weighted Mean Score of 2.95 **(table 12)**.

3. Area C:

The discomfort was intense at 3–4 times daily (38.33 per cent) among respondents holding Overhead Decorative Umbrella Lights, with 28.33 per cent experiencing it once daily, contributing to a Weighted Mean Score of 2.95. However, respondents holding Pole Mounted Decorative Umbrella Lights of daily discomfort, with 36.67 per cent reporting pain once daily and 20.00 per cent experiencing it 3–4 times daily, resulting in a Weighted Mean Score of 3.30, indicating relatively greater discomfort in comparison to holding Overhead Decorative Umbrella Lights **(table 12)**.

4. Area D:

Among respondents holding Overhead Decorative Umbrella Lights, 30.00 per cent reported discomfort both 3–4 times and 1–2 times daily, leading to a Weighted Mean Score of 2.85. Respondents holding Pole Mounted Decorative Umbrella Lights, 36.67 per cent experiencing it 3–4 times daily and 31.67 per cent reporting it once daily, resulting in a Weighted Mean Score of 3.36 **(table 12)**.

5. Area E:

Among respondents holding Pole Mounted Decorative Umbrella Lights experienced significantly higher discomfort levels, as 50.00 per cent reported pain 3–4 times daily and 20.00 per cent reported it once daily, leading to a Weighted Mean Score of 3.16. Whereas, among respondents holding Overhead Decorative Umbrella Lights, discomfort was more evenly distributed, with 31.67 per cent experiencing it once daily and 35.00 per cent reporting it 3–4 times daily, with Weighted Mean Score of 2.21 **(table 12)**.

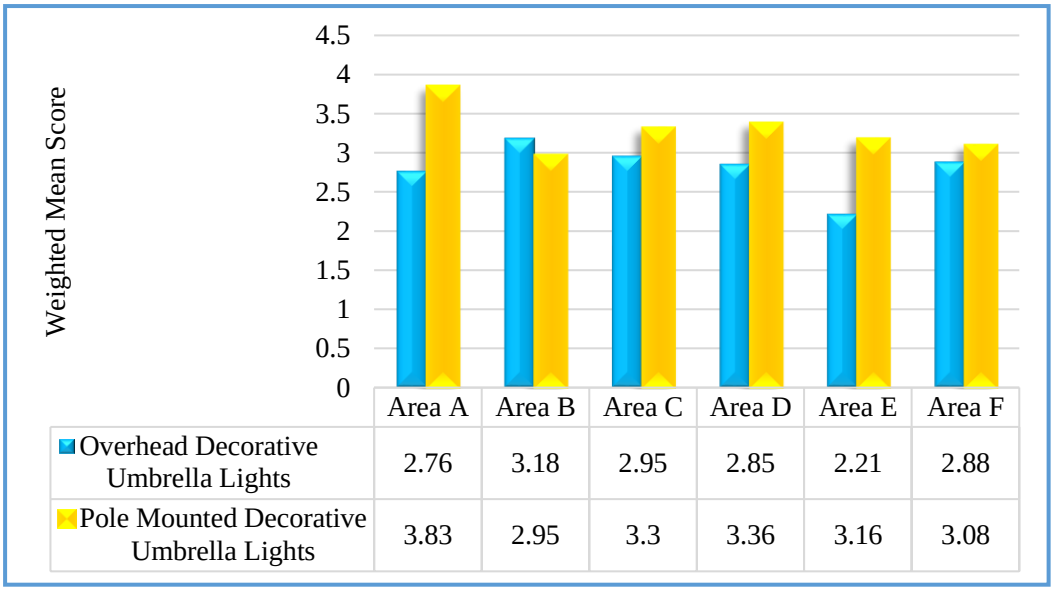
6. Area F:

The Respondents holding overhead decorative umbrella lights mostly experienced discomfort 3–4 times daily 48.33 per cent, while 15.00 per cent reported it once daily, resulting in a weighted mean score of 2.88. In

comparison, respondents holding pole-mounted decorative umbrella lights reported discomfort 3–4 times daily 33.33 per cent and once daily 31.67 per cent, leading to a weighted mean score of 3.08, indicating slightly greater discomfort than their overhead counterparts **(table 12)**.

Thus, the findings indicate that respondents holding pole-mounted decorative umbrella lights experienced higher frequencies and intensities of left-hand discomfort across most areas, with Area A (weighted mean score 3.83) and Area D (3.36) recording the most severe discomfort. Whereas, respondents holding overhead decorative umbrella lights reported lower discomfort levels, with Area E (weighted mean score 2.21) reflecting the least reported pain. The analysis underscores the ergonomic and physiological implications of prolonged engagement with decorative umbrella lights, necessitating further investigation into potential design modifications or work-rest interventions to mitigate discomfort among the respondents **(table 12)**.

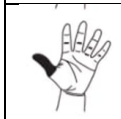
Figure 15: Frequency of Perceived Hand Discomfort experienced in Left-Hand Discomfort experienced by the respondents holding Decorative Umbrella lights (Overhead or Pole Mounted) during Baraat based on Weighted Mean Score



	Area A	Area B	Area C	Area D	Area E	Area F
Overhead Decorative Umbrella Lights	2.76	3.18	2.95	2.85	2.21	2.88
Pole Mounted Decorative Umbrella Lights	3.83	2.95	3.3	3.36	3.16	3.08

*__Key: Area A__-Thenar Eminence, __Area B-__ Hypothenar Eminence, __Area C-__ Metacarpophalangeal Joints, __Area D-__ Proximal Interphalangeal Joints, __Area E-__ Distal Interphalangeal Joints, __Area F-__ Carpal Region

Table 12: Frequency and Percentage distribution according to frequency of Perceived Hand Discomfort experienced in Left-Hand by respondents engaged in holding Decorative Umbrella lights (Overhead or Pole Mounted) during Baraat (n=120)

	Overhead Decorative Umbrella Lights (n=60)											Pole Mounted Decorative Umbrella lights(n=60)										
	Several times everyday		Once every day		3-4 times a day		1-2 times a day		Never		Wt. Mean Score (5-1)	Several times everyday		Once every day		3-4 times a day		1-2 times a day		Never		Wt. Mean Score (5-1)
	f	%	*f*	%	*f*	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	*f*	%	*f*	%	
 **Area A**	05	08.33	08	13.33	21	35.00	20	33.33	06	10.00	2.76	18	30.00	18	30.00	22	36.67	00	00.00	02	03.33	**3.83**
 **Area B**	14	23.33	11	18.33	13	21.67	16	26.67	06	10.00	**3.18**	08	13.33	08	13.33	19	31.67	23	38.33	02	03.33	2.95
 **Area C**	02	03.33	17	28.33	23	38.33	12	20.00	06	10.00	2.95	08	13.33	22	36.67	12	20.00	16	26.67	02	03.33	**3.30**
 **Area D**	03	05.00	15	25.00	18	30.00	18	30.00	06	10.00	2.85	08	11.67	19	31.67	22	36.67	09	15.00	02	03.33	**3.36**
 **Area E**	03	05.00	19	31.67	21	35.00	15	25.00	06	10.00	2.21	06	10.00	12	20.00	30	50.00	10	16.67	02	03.33	**3.16**
 **Area F**	04	06.67	09	15.00	29	48.33	12	20.00	06	10.00	2.88	03	05.00	19	31.67	20	33.33	16	26.67	02	03.33	**3.08**

4.2.2.2 Severity of Perceived Hand Discomfort experienced in Left Hand by respondents engaged in Holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

The data presented in **table 13** provides a comparative analysis of the severity of left-hand discomfort experienced by respondents holding Overhead Decorative Umbrella Lights and Pole Mounted Decorative Umbrella Lights during Baraat. The assessment categorizes discomfort levels into very uncomfortable, moderately uncomfortable, and slightly uncomfortable, with a Weighted Mean Score (3-1 scale) used to quantify the severity of discomfort in different hand areas. The data was collected during the last week of November 2024.

1. Area A:

Among respondents holding Overhead Decorative Umbrella Lights reported significant discomfort, with 81.67 per cent experiencing moderate discomfort, 11.67 per cent reporting extreme discomfort, and 6.67 per cent feeling slight discomfort. This led to a Weighted Mean Score of 2.05. Whereas, for Pole Mounted Decorative Umbrella Lights, discomfort levels were lower, with 78.33 per cent experiencing moderate discomfort, 20.00 per cent reporting slight discomfort, and none experiencing extreme discomfort, resulting in a lower Weighted Mean Score of 1.77 **(table 13).**

2. Area B:

Among respondents using Overhead Decorative Umbrella Lights, 26.67 per cent reported extreme discomfort, 46.67 per cent moderate discomfort, and 26.67 per cent slight discomfort, leading to a Weighted Mean Score of 2.00. On the other hand, respondents using Pole Mounted Decorative Umbrella Lights experienced less discomfort, with 15.00 per cent reporting extreme discomfort, 21.67 per cent moderate discomfort, and 61.67 per cent slight discomfort. This resulted in a lower Weighted Mean Score of 1.50 **(table 13)**.

3. Area C:

This area exhibited the highest discomfort levels. Among respondents holding Overhead Decorative Umbrella Lights, 36.67 per cent reported extreme discomfort, 51.67 per cent moderate discomfort, and 11.67 per cent slight discomfort, yielding a Weighted Mean Score of 2.25. However, discomfort was even more pronounced for respondents holding Pole Mounted Decorative Umbrella Lights, with 51.67 per cent reporting extreme discomfort, 31.67 per cent moderate discomfort, and 13.33 per cent slight discomfort, leading to the highest Weighted Mean Score (2.32) across all areas **(table 13)**.

4. Area D:

Among the respondents holding Overhead Decorative Umbrella Lights experienced 21.67 per cent extreme discomfort, 61.67 per cent moderate discomfort, and 16.67 per cent slight discomfort, with a Weighted Mean Score of 2.05. Whereas, respondents holding Pole Mounted Decorative Umbrella Lights reported significantly lower discomfort levels, with 6.67 per cent experiencing extreme discomfort, 61.67 per cent moderate discomfort, and 30.00 per cent slight discomfort, resulting in a Weighted Mean Score of 1.73 **(table 13)**.

5. Area E:

Among respondents holding Overhead Decorative Umbrella Lights experienced considerable discomfort, with 30.00 per cent reporting extreme discomfort, 50.00 per cent moderate discomfort, and 20.00 per cent slight discomfort, leading to a Weighted Mean Score of 2.10. In disparity, respondents holding Pole Mounted Decorative Umbrella Lights reported significantly lower discomfort levels, with only 5.00 per cent experiencing extreme discomfort, 48.33 per cent reporting moderate discomfort, and 41.67 per cent indicating slight discomfort, resulting in a Weighted Mean Score of 1.53 **(table 13)**.

6. Area F:

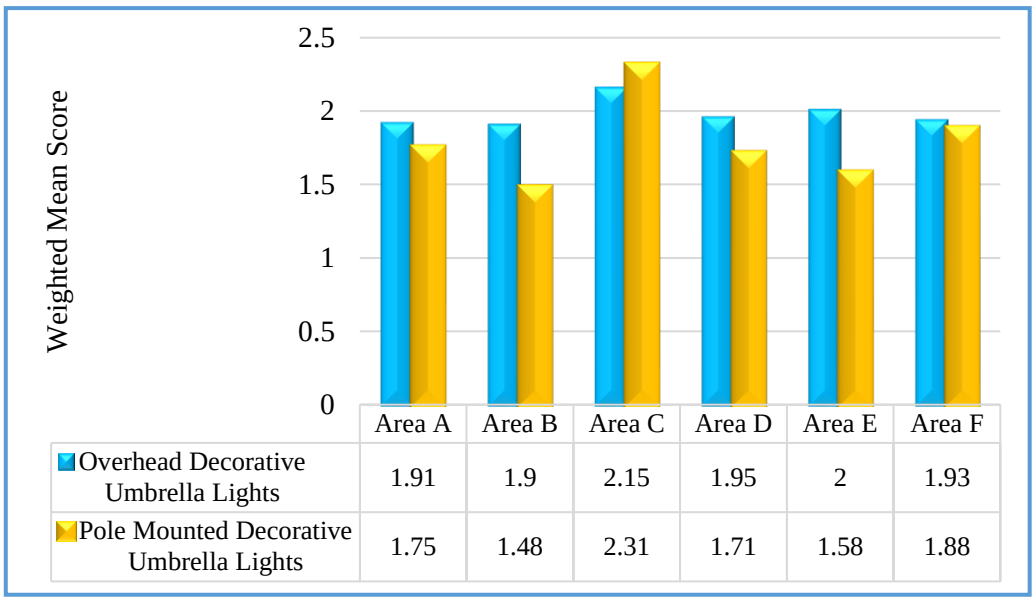
Among respondents holding Overhead Decorative Umbrella Lights, 30.00 per cent reported extreme discomfort, 43.33 per cent moderate discomfort, and 25.00 per cent slight discomfort, yielding a Weighted Mean Score of 2.02. Whereas, respondents holding Pole Mounted Decorative Umbrella Lights reported 15.00 per cent extreme discomfort, 61.67 per cent moderate discomfort, and 21.67 per cent slight discomfort, resulting in a Weighted Mean Score of 1.90, which is lower but still significant **(table 13)**.

Therefore, it can be concluded that respondents holding Overhead Decorative Umbrella Lights experienced higher discomfort levels across all hand areas compared to respondents holding Pole Mounted Decorative Umbrella Lights. Among the most affected areas, Area C exhibited the highest severity of discomfort for both categories, with Pole Mounted Decorative Umbrella Lights recording the highest Weighted Mean Score (2.32), while Overhead Decorative Umbrella Lights followed closely with a score of 2.25. Additionally, Area E showed substantial discomfort among the respondents using Overhead Decorative Umbrella Lights (Weighted Mean Score 2.10), whereas it remained one of the least affected areas for respondents using Pole Mounted Decorative Umbrella Lights (Weighted Mean Score 1.53). Across all areas, respondents holding Pole Mounted Decorative Umbrella Lights consistently reported lower discomfort levels, particularly in Areas B (1.50), D (1.73), and E (1.53). The findings highlight the impact of prolonged usage of Decorative Umbrella Lights on hand discomfort, emphasizing the need for coping strategies to reduce discomfort and ergonomic interventions **(table 13)**.

Table 13: Frequency and Percentage distribution according to Severity of Perceived Hand Discomfort experienced in Left-Hand by respondents while holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat (n=114)

	Overhead Decorative Umbrella Lights (n=56)							Pole Mounted decorative Umbrella lights(n=58)						
	Very Uncomfortable		Moderately Uncomfortable		Slightly Uncomfortable		Wt. Mean Score (3-1)	Very Uncomfortable		Moderately Uncomfortable		Slightly Uncomfortable		Wt. Mean Score (3-1)
	f	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	
 **Area A**	07	11.67	49	81.67	04	06.67	2.05	00	00.00	47	78.33	12	20.00	1.77
 **Area B**	16	26.67	28	46.67	16	26.67	2.00	09	15.00	13	21.67	37	61.67	1.50
 **Area C**	22	36.67	31	51.67	07	11.67	2.25	31	51.67	19	31.67	08	13.33	2.32
 **Area D**	13	21.67	37	61.67	10	16.67	2.05	04	6.67	37	61.67	18	30.00	1.73
 **Area E**	18	30.00	30	50.00	12	20.00	2.10	03	5.00	29	48.33	25	41.67	1.53
 **Area F**	18	30.00	26	43.33	15	25.00	2.02	09	15.00	37	61.67	13	21.67	1.90

Figure 16: Severity of Perceived Hand Discomfort experienced in Left-Hand by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat based on Weighted Mean Score.



	Area A	Area B	Area C	Area D	Area E	Area F
Overhead Decorative Umbrella Lights	1.91	1.9	2.15	1.95	2	1.93
Pole Mounted Decorative Umbrella Lights	1.75	1.48	2.31	1.71	1.58	1.88

***Key: Area A-**Thenar Eminence, **Area B-** Hypothenar Eminence, **Area C-** Metacarpophalangeal Joints, **Area D-** Proximal Interphalangeal Joints, **Area E-** Distal Interphalangeal Joints, **Area F-** Carpal Region

4.2.2.3 Perceived Extent of Interference experienced in Left Hand by the respondents engaged in Holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat

Table 14 presents the Perceived Extent of Interference experienced in Left Hand by the respondents engaged in Holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

1. Area A:

Among respondents holding Overhead Decorative Umbrella Lights, 76.67 per cent, reported that discomfort slightly interfered with the work ability, while 11.67 per cent each stated that it substantially interfered or did not interfere at all. Whereas, for respondents holding Pole Mounted Decorative Umbrella Lights, 98.33 per cent reported slight interference, while only

1.67 per cent reported no interference. None of the respondents in this group reported substantial interference **(table 14)**.

2. Area B:

Among respondents holding Overhead Decorative Umbrella Lights, 51.67 per cent reported slight interference, 38.33 per cent experienced substantial interference, and 10 per cent stated that discomfort did not interfere with the work ability. Whereas, all respondents holding Pole Mounted Decorative Umbrella Lights, 100 per cent, reported substantial interference with the work ability **(table 14)**.

3. Area C:

The highest proportion of respondents holding Overhead Decorative Umbrella Lights, 46.67 per cent, reported slight interference, while 43.33 per cent stated that discomfort substantially interfered with the work ability. Whereas, 10 per cent, reported no interference. Among respondents holding Pole Mounted Decorative Umbrella Lights, 76.67 per cent experienced slight interference, while 20 per cent reported substantial interference. Only 3.33 per cent did not experience any interference **(table 14)**.

4. Area D:

Among respondents holding Overhead Decorative Umbrella Lights, 68.33 per cent reported slight interference, 30 per cent stated that discomfort substantially interfered with the work ability, and only 1.67 per cent reported no interference. Whereas, 55 per cent of respondents holding Respondents engaged in holding Decorative Umbrella Lights reported slight interference, 43.33 per cent experienced substantial interference, and 1.67 per cent stated no interference **(table 14)**.

5. Area E:

Among respondents using Overhead Decorative Umbrella Lights, 58.33 per cent experienced slight interference, 30 per cent reported substantial interference, and 11.67 per cent reported no interference. Among respondents holding Pole Mounted Decorative Umbrella Lights, 56.67 per cent reported slight interference, while 40 per cent experienced substantial interference. Only 3.33 per cent of respondents reported no interference **(table 14)**.

6. Area F:

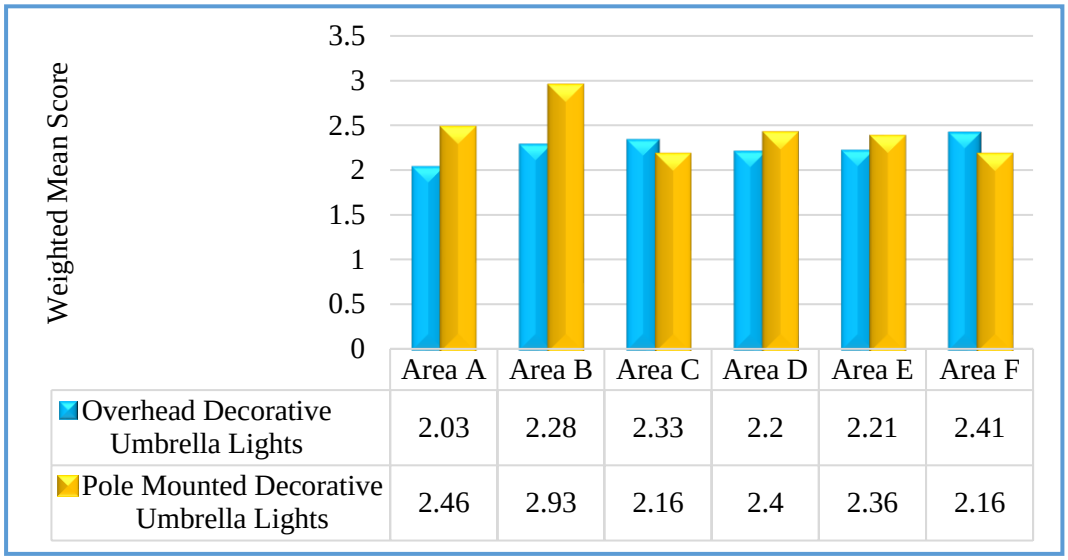
Among respondents holding Overhead Decorative Umbrella Lights, 45 per cent reported that discomfort substantially interfered with the work ability, while 38.33 per cent stated slight interference. While 16.67 per cent, reported no interference. Among respondents holding Pole Mounted Decorative Umbrella Lights, 78.33 per cent experienced slight interference, while 20 per cent reported substantial interference. Only 1.67 per cent did not experience any interference **(table 14)**.

Therefore, it can be concluded that Respondents holding Overhead Decorative Umbrella Lights reported higher levels of substantial interference in Areas B, C, and F, whereas respondents holding Respondents engaged in holding Pole Mounted Decorative Umbrella Lights experienced the most interference in Area B. The extent to which discomfort interfered with work ability varied across different areas, with some respondents experiencing substantial interference while others reported only slight or no interference **(table 14)**.

Table 14: Frequency and Percentage distribution according to Perceived Extent of Interference experienced in Left-Hand by the respondents engaged in Holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat (n=120)

	Overhead Decorative Umbrella Lights (n=60)							Pole Mounted decorative Umbrella lights(n=60)						
	Substantially Interfered		Slightly Interfered		Not at all		Wt. Mean Score (3-1)	Substantially Interfered		Slightly Interfered		Not at all		Wt. Mean Score (3-1)
	f	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	
 **Area A**	08	13.33	46	76.67	06	10.00	2.03	30	50.00	28	46.66	02	03.33	2.46
 **Area B**	23	38.33	31	51.67	06	10.00	2.28	58	96.66	00	00.00	02	03.33	2.93
 **Area C**	26	43.33	28	46.67	06	10.00	2.33	12	20.00	46	76.67	02	03.33	2.16
 **Area D**	18	30.00	36	60.00	06	10.00	2.20	26	43.33	32	53.33	02	03.33	2.40
 **Area E**	19	31.66	35	58.33	06	10.00	2.21	24	40.00	34	56.67	02	03.33	2.36
 **Area F**	31	51.66	23	38.33	06	10.00	2.41	12	20	46	76.66	02	03.33	2.16

Figure 17: Perceived Extent of Interference experienced in Left-Hand by the respondents while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat based on Weighted Mean Score



	Area A	Area B	Area C	Area D	Area E	Area F
Overhead Decorative Umbrella Lights	2.03	2.28	2.33	2.2	2.21	2.41
Pole Mounted Decorative Umbrella Lights	2.46	2.93	2.16	2.4	2.36	2.16

*Key: **Area A-**Thenar eminence, **Area B-** Hypothenar eminence, **Area C-** Metacarpophalangeal joints, **Area D-** Proximal interphalangeal joints, **Area E-** Distal interphalangeal joints, **Area F-** Carpal region

4.2.2.4 Frequency of Perceived Hand Discomfort experienced in Right-Hand by the respondents engaged holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat

Table 15 presents the Frequency of Perceived Hand Discomfort experienced in Right Hand by the respondents engaged Holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

1. Area A:

Among respondents holding Overhead Decorative Umbrella Lights, 48.33 per cent, experienced discomfort 1-2 times a day, while 28.33 per cent reported it 3-4 times a day and 13.33 per cent, felt discomfort once every day, while 8.33 per cent experienced it several times every day. Only 1.67 per cent of respondents reported no discomfort. Whereas, 58.33 per cent, experienced discomfort 1-2 times a day, while 35 per cent reported it 3-4 times daily. Only 5 per cent experienced it once daily, and 1.67 per cent reported no discomfort **(table 15)**.

2. Area B:

Respondents holding Overhead Decorative Umbrella Lights, 55 per cent, experienced discomfort 3-4 times a day, while 23.33 per cent felt it 1-2 times daily and 15 per cent, reported it once daily, while only 1.67 per cent experienced it several times daily. Whereas, for respondents holding Pole Mounted Decorative Umbrella Lights, 48.33 per cent, reported discomfort 1-2 times daily, while 20 per cent each experienced it 3-4 times or once daily and 11.67 per cent, experienced discomfort several times daily **(table 15)**.

3. Area C:

The respondents holding Overhead Decorative Umbrella Lights, 46.67 per cent, reported experiencing discomfort 3-4 times a day, while 28.33 per cent experienced it once daily and 15 per cent, reported discomfort 1-2 times a day, and 6.67 per cent experienced it several times daily. Only 3.33 per cent reported no discomfort. Among respondents holding Pole Mounted Decorative Umbrella Lights, 35 per cent experienced discomfort once daily, followed by 30 per cent who felt it 3-4 times daily and 25 per cent, reported it 1-2 times a day, while 8.33 per cent experienced it several times daily **(table 15)**.

4. Area D:

Among respondents holding Overhead Decorative Umbrella Lights, 41.67 per cent, reported experiencing discomfort 3-4 times a day, while 31.67 per cent experienced it once daily, while 18.33 per cent, reported discomfort 1-2 times a day, and 6.67 per cent experienced it several times daily. Only 1.67 per cent reported no discomfort. Among respondents holding Pole Mounted Decorative Umbrella Lights, 41.67 per cent experienced discomfort 3-4 times a day, followed by 25 per cent who reported it once daily and 16.67 per cent, experienced discomfort several times daily, while 13.33 per cent reported it 1-2 times a day **(table 15)**.

5. Area E:

Among respondents holding Overhead Decorative Umbrella Lights, 43.33 per cent experienced discomfort 3-4 times daily, while 28.33 per cent experienced it once daily, while 21.67 per cent, felt it 1-2 times a day, while 5 per cent experienced it several times daily. Only 1.67 per cent reported no discomfort. Among respondents holding Pole Mounted Decorative Umbrella Lights, 38.33 per cent reported experiencing discomfort 3-4 times a day, followed by 36.67 per cent who experienced it 1-2 times a day and 16.67 per cent, experienced discomfort once daily, while 8.33 per cent experienced it several times daily **(table 15)**.

6. Area F:

Among respondents holding Overhead Decorative Umbrella Lights, the highest proportion, 63.33 per cent, experienced discomfort 3-4 times daily, while 13.33 per cent experienced it once daily. A smaller portion, 10 per cent, reported experiencing it 1-2 times a day, and 6.67 per cent experienced it several times daily. Only 6.67 per cent reported no discomfort. Among respondents holding Pole Mounted Decorative Umbrella Lights, 46.67 per cent experienced discomfort 3-4 times daily, followed by 33.33 per cent who experienced it 1-2 times a day. A smaller portion, 18.33 per cent, experienced discomfort once daily, while only 1.67 per cent reported experiencing it several times daily **(table 15)**.

Therefore, it can be concluded that Respondents holding Overhead Decorative Umbrella Lights reported higher discomfort in Areas C and F, with more frequent occurrences several times a day or 3-4 times a day. Whereas, respondents holding Respondents engaged in holding Decorative Umbrella Lights experienced more frequent discomfort in Areas B and D. The frequency of ache, pain, and perceived musculoskeletal discomfort varied across different areas, with some respondents experiencing it several times a day and others reporting it less frequently or not at all **(table 15)**.

Table 15: Frequency and Percentage distribution according to Frequency of Perceived Hand Discomfort experienced in Right-Hand by the respondents engaged in holding Decorative Umbrella lights (Overhead or Pole Mounted) during Baraat (n=120)

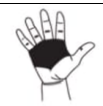
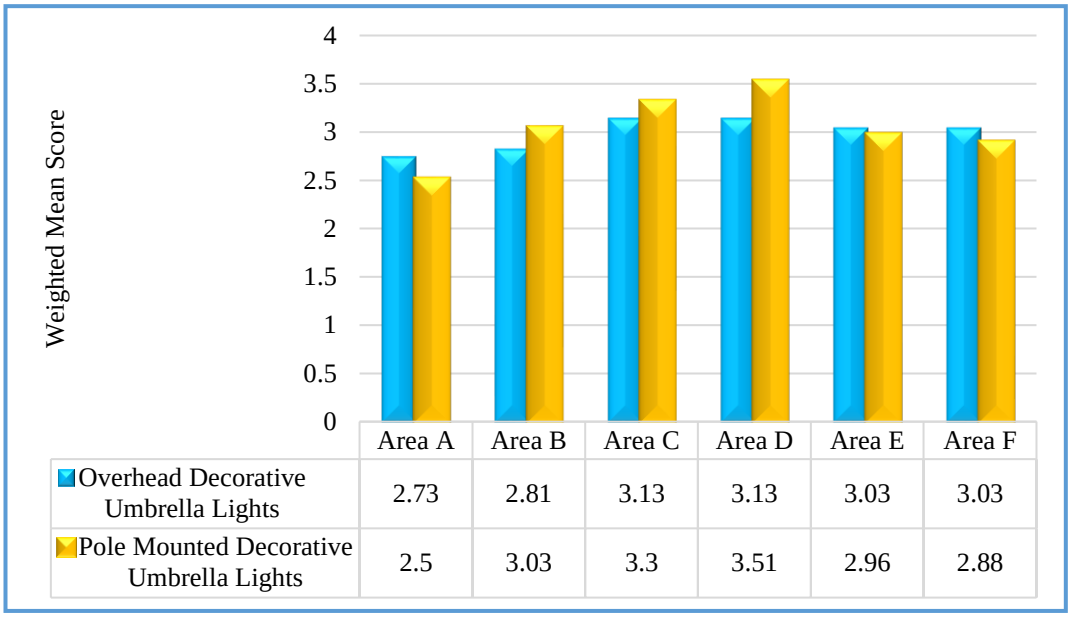
	Overhead Decorative Umbrella Lights (n=60)											Pole Mounted decorative Umbrella lights(n=60)										
	Several times everyday		Once every day		3-4 times a day		1-2 times a day		Never		Wt. Mean Score (5-1)	Several times everyday		Once every day		3-4 times a day		1-2 times a day		Never		Wt. Mean Score (5-1)
	f	%	*f*	%	*f*	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	*f*	%	*f*	%	
 **Area A**	05	8.33	08	13.33	17	28.33	26	43.33	04	6.67	2.73	01	01.66	03	05.00	21	35.00	35	58.33	00	00.00	2.50
 **Area B**	01	01.67	09	15.00	32	53.33	14	23.33	04	06.67	2.81	12	20.00	07	11.67	12	20.00	29	48.33	00	00.00	3.03
 **Area C**	04	06.67	17	28.33	26	43.33	09	15.00	04	06.67	3.13	06	10.00	21	35.00	18	30.00	15	25.00	00	00.00	3.30
 **Area D**	04	06.67	19	31.67	22	36.66	11	18.33	04	06.67	3.13	12	20.00	15	25.00	25	41.67	08	13.33	00	00.00	3.51
 **Area E**	03	05.00	17	28.33	23	38.33	13	21.67	04	06.67	3.03	05	08.33	10	16.67	23	38.33	22	36.67	00	00.00	2.96
 **Area F**	04	06.67	08	13.33	38	63.33	06	10.00	04	06.67	3.03	01	01.67	11	18.33	28	46.67	20	33.33	00	00.00	2.88

Figure 18: Frequency of Perceived Hand Discomfort experienced in Right-Hand by the respondents engaged in holding Decorative Umbrella lights (Overhead or Pole Mounted) during Baraat based on Weighted Mean Score



	Area A	Area B	Area C	Area D	Area E	Area F
Overhead Decorative Umbrella Lights	2.73	2.81	3.13	3.13	3.03	3.03
Pole Mounted Decorative Umbrella Lights	2.5	3.03	3.3	3.51	2.96	2.88

*Key: **Area A-**Thenar eminence, **Area B-** Hypothenar eminence, **Area C-** Metacarpophalangeal joints, **Area D-** Proximal interphalangeal joints, **Area E-** Distal interphalangeal joints, **Area F-** Carpal region

4.2.2.5 Severity of Perceived Hand Discomfort experienced in Right Hand by the respondents engaged in Holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

Table 16 presents Perceived Severity of Hand Discomfort experienced in Right Hand by the respondents engaged in Holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

1. Area A:

Among respondents holding Overhead Decorative Umbrella Lights, 70 per cent, reported feeling moderately uncomfortable, while 21.67 per cent felt slightly uncomfortable and 8.33 per cent, found it very uncomfortable. Whereas, for respondents holding Pole Mounted Decorative Umbrella Lights, 88.33 per cent, reported moderate discomfort, while 11.67 per cent

found it slightly uncomfortable. No respondents in this group reported feeling very uncomfortable **(table 16)**.

2. Area B:

Among respondents holding Overhead Decorative Umbrella Lights, 43.33 per cent felt moderately uncomfortable, while 31.67 per cent experienced slight discomfort. A notable 25 per cent reported feeling very uncomfortable. Whereas, for respondents holding Pole Mounted Decorative Umbrella Lights, 76.67 per cent, felt slightly uncomfortable, while 13.33 per cent found it very uncomfortable and 10 per cent reported moderate discomfort **(table 16)**.

3. Area C:

The respondents holding Overhead Decorative Umbrella Lights, 45 per cent, reported moderate discomfort, while 30 per cent found it very uncomfortable and 25 per cent, felt slightly uncomfortable. Among respondents holding Pole Mounted Decorative Umbrella Lights, 55 per cent, found it very uncomfortable, while 35 per cent reported moderate discomfort. Only 10 per cent experienced slight discomfort **(table 16)**.

4. Area D:

Among respondents holding Overhead Decorative Umbrella Lights, 55 per cent, felt moderately uncomfortable, while 26.67 per cent experienced slight discomfort and 18.33 per cent, reported feeling very uncomfortable. Whereas, for respondents holding Pole Mounted Decorative Umbrella Lights, 63.33 per cent, felt moderately uncomfortable, while 28.33 per cent experienced slight discomfort. Only 8.33 per cent found it very uncomfortable **(table 16)**.

5. Area E:

Among respondents holding Overhead Decorative Umbrella Lights, 46.67 per cent reported moderate discomfort, while 31.67 per cent found it

slightly uncomfortable and 21.66 per cent, felt very uncomfortable. Among respondents holding Pole Mounted Decorative Umbrella Lights, 48.33 per cent, reported moderate discomfort, while 46.67 per cent found it very uncomfortable. Whereas, 5 per cent, reported slight discomfort **(table 16)**.

6. Area F:

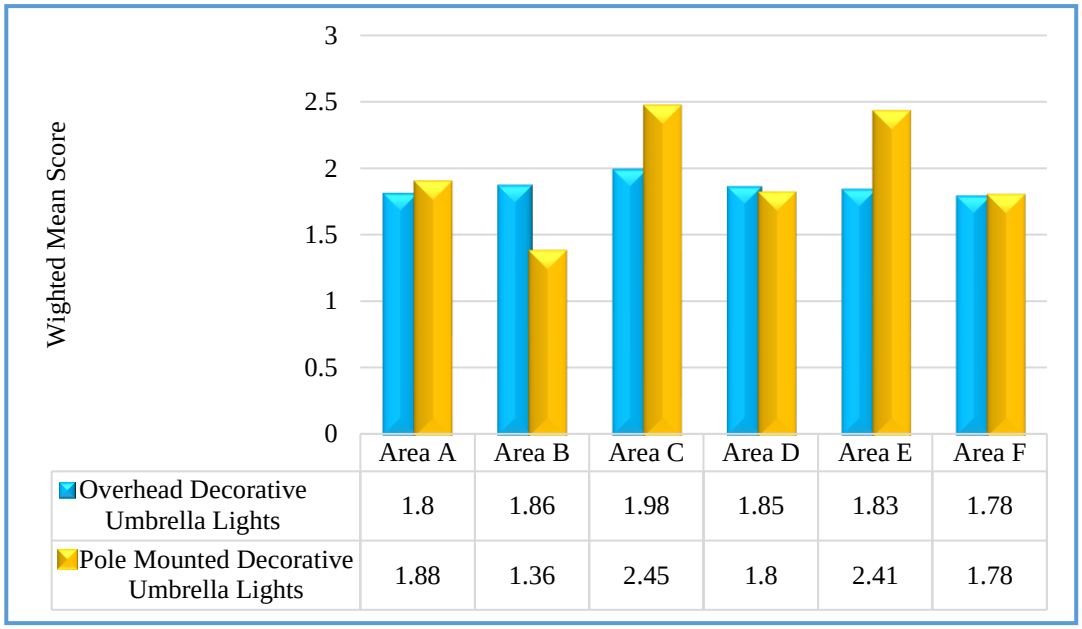
Among respondents holding Overhead Decorative Umbrella Lights, 38.33 per cent each reported feeling moderately and slightly uncomfortable, while 23.33 per cent experienced severe discomfort. Whereas, for respondents holding Pole Mounted Decorative Umbrella Lights, 71.67 per cent, felt moderately uncomfortable, while 25 per cent found it slightly uncomfortable. Only 3.33 per cent experienced severe discomfort **(table 16)**.

Therefore, it can be concluded that Respondents holding Overhead Decorative Umbrella Lights reported higher levels of discomfort in Areas C and F, with a significant proportion feeling very uncomfortable. Whereas, respondents holding Respondents engaged in holding Decorative Umbrella Lights experienced the highest discomfort in Areas C and E, where many reported feelings very uncomfortable. The comfort levels varied across different areas, with some respondents experiencing extreme discomfort while others reported only moderate or slight discomfort **(table 16)**.

Table 16: Frequency and Percentage distribution according to Severity of Perceived Hand Discomfort experienced in Right-Hand by the respondents engaged in holding Decorative Umbrella lights (Overhead or Pole Mounted) during Baraat (n=116)

	Overhead Decorative Umbrella Lights (n=56)							Pole Mounted decorative Umbrella lights(n=60)						
	Very Uncomfortable		Moderately Uncomfortable		Slightly Uncomfortable		Wt. Mean Score (3-1)	Very Uncomfortable		Moderately Uncomfortable		Slightly Uncomfortable		Wt. Mean Score (3-1)
	f	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	
 **Area A**	05	08.33	42	70.00	09	15.00	1.80	00	00.00	53	88.33	07	11.67	1.88
 **Area B**	15	25.00	26	43.33	15	25.00	1.86	08	13.33	06	10.00	46	76.67	1.36
 **Area C**	18	30.00	27	45.00	11	18.33	1.98	33	55.00	21	35.00	06	10.00	2.45
 **Area D**	11	18.33	33	55.00	12	26.67	1.85	05	08.33	38	63.33	17	28.33	1.8
 **Area E**	13	21.66	28	46.67	15	25.00	1.83	28	46.67	29	48.33	03	05.00	2.41
 **Area F**	14	23.33	23	38.33	19	31.33	1.78	02	03.33	43	71.67	15	25.00	1.78

Figure 19: Severity of Perceived Hand Discomfort experienced in Right-Hand by the respondents engaged in holding Decorative Umbrella lights (Overhead or Pole Mounted) during Baraat based on Weighted Mean Score.



	Area A	Area B	Area C	Area D	Area E	Area F
Overhead Decorative Umbrella Lights	1.8	1.86	1.98	1.85	1.83	1.78
Pole Mounted Decorative Umbrella Lights	1.88	1.36	2.45	1.8	2.41	1.78

*Key: **Area A**-Thenar eminence, **Area B-** Hypothenar eminence, **Area C-** Metacarpophalangeal joints, **Area D-** Proximal interphalangeal joints, **Area E-** Distal interphalangeal joints, **Area F-** Carpal region

4.2.2.6 Perceived Extent of Interference experienced in Right-Hand by the respondents while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat

Table 17 presents the Perceived Extent of Interference experienced in Right Hand by the respondents while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat**.**

1. Area A:

Among respondents holding Overhead Decorative Umbrella Lights, 78.33 per cent, reported that the work ability was slightly interfered with, while 11.67 per cent experienced no interference and 10 per cent, reported substantial interference. Whereas, for respondents holding Pole Mounted Decorative Umbrella Lights, 98.33 per cent, reported slight interference,

while only 1.67 per cent experienced no interference. No respondents reported substantial interference **(table 17)**.

2. Area B:

Among respondents holding Overhead Decorative Umbrella Lights, 60 per cent reported slight interference in the work ability, while 30 per cent experienced substantial interference and 10 per cent, reported no interference. Whereas, for respondents holding Pole Mounted Decorative Umbrella Lights, 66.67 per cent, experienced substantial interference, while 33.33 per cent reported slight interference. No respondents reported no interference **(table 17)**.

3. Area C:

The highest proportion of respondents holding Overhead Decorative Umbrella Lights, 43.33 per cent, reported both substantial and slight interference in the work ability and 13.33 per cent, experienced no interference. Among respondents holding Pole Mounted Decorative Umbrella Lights, 68.33 per cent, experienced slight interference, while 28.33 per cent reported substantial interference. Only 3.33 per cent experienced no interference **(table 17)**.

4. Area D:

Among respondents holding Overhead Decorative Umbrella Lights, 68.33 per cent, reported slight interference in the work ability, while 25 per cent experienced substantial interference and 6.67 per cent, reported no interference. Whereas, for respondents holding Pole Mounted Decorative Umbrella Lights, 63.33 per cent reported slight interference, while 33.33 per cent experienced substantial interference. Only 3.33 per cent reported no interference **(table 17)**.

5. Area E:

Among respondents holding Overhead Decorative Umbrella Lights, 55 per cent reported slight interference, while 31.67 per cent experienced substantial interference and 13.33 per cent, reported no interference. Among respondents holding Pole Mounted Decorative Umbrella Lights, 50 per cent reported slight interference, while 50 per cent experienced no interference. No respondents reported substantial interference **(table 17)**.

6. Area F:

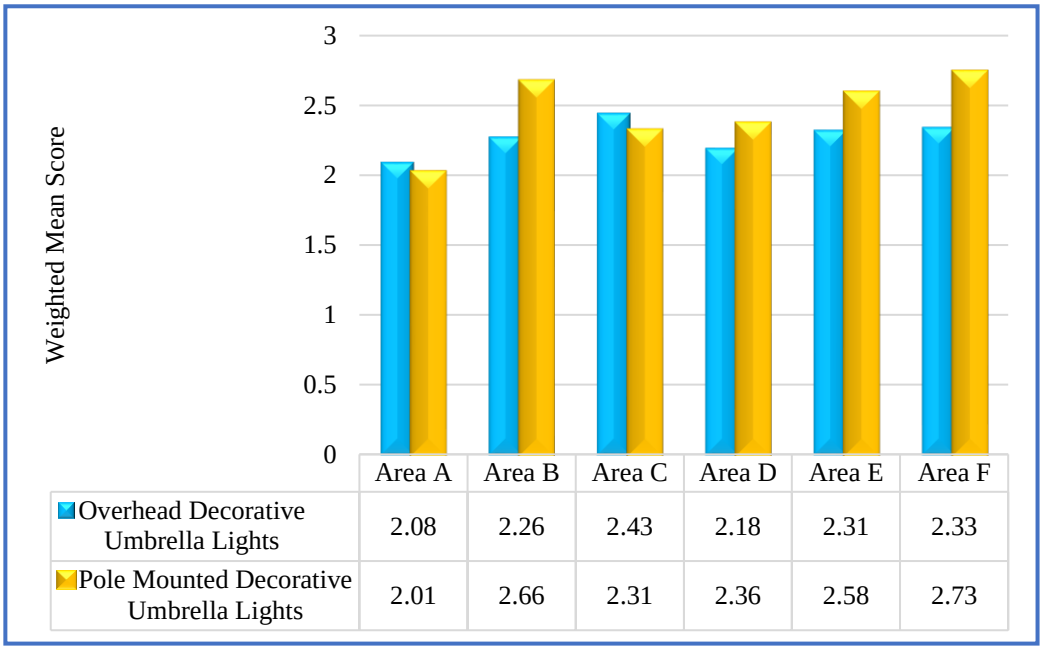
Among respondents holding Overhead Decorative Umbrella Lights, 53.33 per cent reported slight interference in the work ability, while 31.67 per cent experienced substantial interference and 15 per cent, reported no interference. Whereas, for respondents holding Pole Mounted Decorative Umbrella Lights, 73.33 per cent, reported no interference, while 26.67 per cent experienced slight interference. No respondents in this group reported substantial interference **(table 17)**.

Therefore, it can be concluded that Respondents holding Overhead Decorative Umbrella Lights reported higher levels of work interference in Areas C and B, with a significant proportion experiencing substantial interference. Whereas, respondents holding Respondents engaged in holding Decorative Umbrella Lights reported the highest levels of work interference in Areas B and D, where a notable percentage experienced substantial interference. The extent to which ache, pain, and musculoskeletal discomfort affected work ability varied across different areas, with some respondents experiencing substantial interference while others reported only slight or no interference **(table 17)**.

Table 17: Frequency and Percentage distribution according to Perceived Extent of Interference experienced in Right-Hand by the respondents engaged in holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat (n=120)

	Overhead Decorative Umbrella Lights (n=60)							Pole Mounted decorative Umbrella lights(n=60)						
	Substantially Interfered		Slightly Interfered		Not at all		Wt. Mean Score (3-1)	Substantially Interfered		Slightly Interfered		Not at all		Wt. Mean Score (3-1)
	f	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	
 **Area A**	09	15.00	47	78.33	04	06.67	2.08	01	01.66	59	98.33	00	00.00	2.01
 **Area B**	20	33.33	36	60.00	04	06.67	2.26	40	66.67	20	33.33	00	00.00	2.66
 **Area C**	30	50.00	26	43.33	04	06.67	2.43	19	31.66	41	68.33	00	00.00	2.31
 **Area D**	15	25.00	41	68.33	04	06.67	2.18	22	36.66	38	63.33	00	00.00	2.36
 **Area E**	23	38.33	33	55.00	04	06.67	2.31	35	58.33	25	41.66	00	00.00	2.58
 **Area F**	24	40.00	32	53.33	04	06.67	2.33	44	73.33	16	26.67	00	00.00	2.73

Figure 20: Perceived Extent of Interference experienced in Right Hand by the respondents while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat based on Weighted Mean Score



	Area A	Area B	Area C	Area D	Area E	Area F
Overhead Decorative Umbrella Lights	2.08	2.26	2.43	2.18	2.31	2.33
Pole Mounted Decorative Umbrella Lights	2.01	2.66	2.31	2.36	2.58	2.73

*Key: **Area A-**Thenar eminence, **Area B-** Hypothenar eminence, **Area C-** Metacarpophalangeal joints, **Area D-** Proximal interphalangeal joints, **Area E-** Distal interphalangeal joints, **Area F-** Carpal region

4.2.3 Mechanical Injuries experienced by the respondents engaged in holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat

4.2.3.1 Frequency of Mechanical Injuries experienced by the respondents while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

The data in **table 18** highlights the mechanical injuries experienced by respondents holding decorative umbrella lights (overhead or pole mounted) during the Baraat. The responses are categorized into three levels: Always, Sometimes, and Never, with percentage of frequency of mechanical injuries providing an overall indication of the prevalence of each injury.

1. Cuts on the Skin:

Among respondents holding Overhead Decorative Umbrella Lights, 66.67 per cent reported experiencing cuts on the skin Sometimes, while 33.33 per cent encountered them Always. Similarly, for respondents holding Pole Mounted Decorative Umbrella Lights, 16.67 per cent experienced cuts Always, whereas 83.33 per cent reported them Sometimes **(table 18)**.

2. Pinched Skin:

Among respondents holding Overhead Decorative Umbrella Lights with pressure, 33.33 per cent experienced pinching Always, while 55 per cent encountered it Sometimes. Only 11.67 per cent never faced this issue. For Pole Mounted Decorative Umbrella Lights, 65 per cent of respondents experienced this problem Always, while 35 per cent reported it Sometimes **(table 18)**.

3. Hardening of the Skin:

Among respondents using Overhead Decorative Umbrella Lights, 41.67 per cent reported experiencing skin hardening Always, while 56.67 per cent encountered it Sometimes. Only 1.67 per cent, never faced this issue. Similarly, for respondents handling Pole Mounted Decorative Umbrella Lights, 35 per cent reported experiencing skin hardening Always, whereas 63.33 per cent faced it Sometimes. This condition is a common concern among users, as prolonged handling of decorative umbrella lights can lead to skin hardening due to continuous friction and pressure **(table 18)**.

4. Tears in the Skin:

Among respondents holding Overhead Decorative Umbrella Lights, 36.67 per cent experienced tears on skin Always, while 55 per cent experienced it Sometimes. Only 8.33 per cent never encountered this issue. For Pole Mounted Decorative Umbrella Lights, 35 per cent experienced tears on skin Always, while 56.67 per cent encountered it Sometimes **(table 18)**.

5. Redness in the Eyes:

For Overhead Decorative Umbrella Lights, 46.67 per cent of respondents experienced redness in the eyes Always, while 45 per cent reported it Sometimes. Only 8.33 per cent never experienced redness in eyes due to bulb glare. For Pole Mounted Decorative Umbrella Lights, 46.67 per cent also reported experiencing eye redness Always, while 48.33 per cent faced it Sometimes **(table 18)**.

6. Redness on the Face Due to Extended Light Exposure:

Among Respondents engaged in holding Overhead Decorative Umbrella Lights, 56.67 per cent reported facial redness Always, while 31.67 per cent experienced it Sometimes. For Pole Mounted Decorative Umbrella Light holders, 51.67 per cent experienced redness Always, while 48.33 per cent faced it Sometimes **(table 18)**.

7. Electric Shocks:

For respondents holding Overhead Decorative Umbrella Lights, 10 per cent of respondents reported experiencing electric shocks Always, while 78.33 per cent encountered them Sometimes. Only 11.67 per cent never faced this issue. For Pole Mounted Decorative Umbrella Lights, 13.33 per cent of respondents experienced shocks Always, while 86.67 per cent reported it Sometimes **(table 18)**.

8. Blisters on the Skin:

For Overhead Decorative Umbrella Light, 41.67 per cent of respondents reported developing blisters Always, while 51.67 per cent experienced them Sometimes. Only 6.67 per cent never experienced blisters on skin from handling lights. For Pole Mounted Decorative Umbrella Lights, 30 per cent of respondents faced blisters Always, while 66.67 per cent reported it Sometimes **(table 18)**.

9. Blurry Vision:

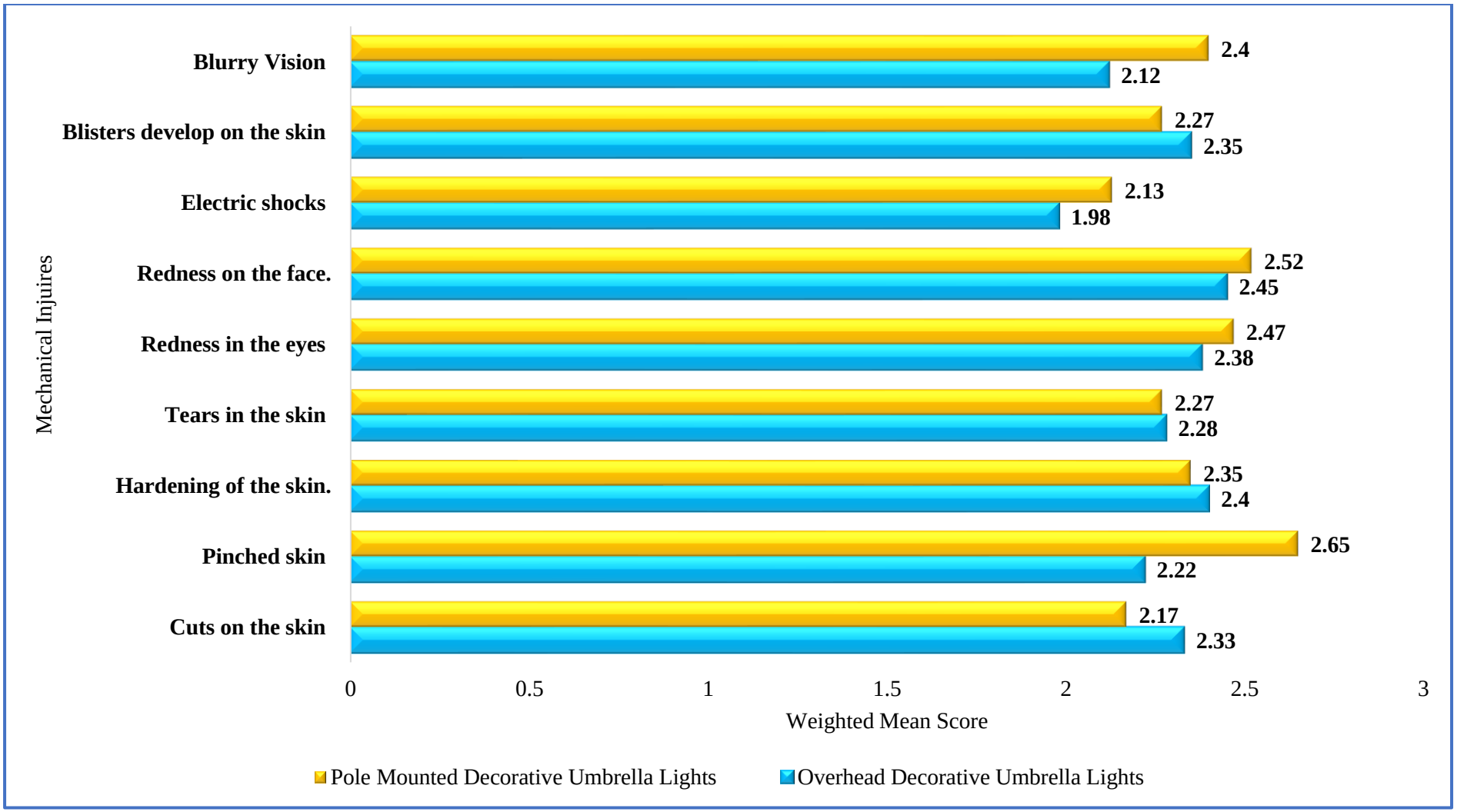
For Overhead Decorative Umbrella Light, 28.33 per cent of respondents experienced blurry vision from excessive light exposure Always, while 55 per cent faced it Sometimes. For Pole Mounted Decorative Umbrella Lights, 50 per cent of respondents reported blurry vision Always, while 40 per cent faced it Sometimes **(table 18)**.

Therefore, it can be concluded that the data reveals that mechanical injuries are common among respondents holding decorative umbrella lights during the Baraat. The most frequent injuries include redness in the eyes, redness on the face, and skin pinching due to handle pressure. Redness on the face and in the eyes were the most common issues, likely due to prolonged exposure to bright lights. Pinching of the skin and skin hardening were also frequently reported, especially for Respondents engaged in holding Decorative Umbrella Lights **(table 18)**.

Table 18: Frequency and Percentage distribution of the respondents according to Frequency of Mechanical Injuries experienced holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat (n=120)

Sr. no	Mechanical Injuries	Overhead Decorative Umbrella Lights (n=60) Frequency Scale							Pole Mounted Decorative Umbrella Lights (n=60) Frequency Scale						
		Always		Sometimes		Never		Wt. Mean Score (3-1)	Always		Sometimes		Never		Wt. Mean Score (3-1)
		f	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	
1.	Cuts on the skin	20	33.33	40	66.67	00	00.00	2.33	10	16.67	50	83.33	00	00.00	2.17
2.	Pinched skin	20	33.33	33	55.00	07	11.67	2.22	39	65.00	21	35.00	00	00.00	2.65
3.	Hardening of the skin.	25	41.67	34	56.67	01	01.67	2.40	21	35.00	38	63.33	01	01.67	2.35
4.	Tears in the skin	22	36.67	33	55.00	05	08.33	2.28	21	35.00	34	56.67	05	08.33	2.27
5.	Redness in the eyes	28	46.67	27	45.00	05	08.33	2.38	28	46.67	29	48.33	03	05.00	2.47
6.	Redness on the face.	34	56.67	19	31.67	07	11.67	2.45	31	51.67	29	48.33	00	00.00	2.52
7.	Electric shocks	06	10.00	47	78.33	07	11.67	1.98	08	13.33	52	86.67	00	00.00	2.13
8.	Blisters develop on the skin	25	41.67	31	51.67	04	06.67	2.35	18	30.00	40	66.67	02	03.33	2.27
9.	Blurry Vision	27	28.33	33	55.00	00	00.00	2.12	30	50.00	24	40.00	06	10.00	2.40
Total Weighted Mean								2.27	**Total Weighted Mean**						2.35

Figure 21: Frequency of Mechanical Injuries experienced by the respondents while holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat based on Weighted Mean Score



4.2.3.2 Severity of Mechanical Injuries experienced by the respondents holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

The data in **table 19** presents the severity of mechanical injuries experienced by respondents holding decorative umbrella lights (both overhead and Pole Mounted) during the Baraat. The severity of each injury is categorized into three levels: Mild, Moderate, and Severe, with the percentage indicating the overall impact of these injuries.

1. **Cuts on the Skin:**

For respondents handling Overhead Decorative Umbrella Lights, 11.67 per cent of respondents experienced severe cuts on skin, while 53.33 per cent faced moderate cuts and 35 per cent reported mild cuts. For Pole Mounted Decorative Umbrella Lights, 18.33 per cent of respondents reported severe cuts, while 81.67 per cent faced moderate cuts **(table 19)**.

2. **Skin Pinching:**

For Overhead Decorative Umbrella Lights, 26.67 per cent of respondents reported severe skin pinching due to handle pressure, while 33.33 per cent experienced moderate pinching, and 28.33 per cent faced mild pinching. For Pole Mounted Decorative Umbrella Lights, only 8.33 per cent reported severe pinching, while 33.33 per cent faced moderate pinching and 58.33 per cent experienced mild pinching **(table 19)**.

3. **Hardening of the Skin:**

For Overhead Decorative Umbrella Lights, 20 per cent of respondents reported severe skin hardening from prolonged handle use, 45 per cent experienced moderate hardening, and 33.33 per cent had mild hardening. For Pole Mounted Decorative Umbrella Lights, 25 per cent reported severe hardening, 46.67 per cent experienced moderate hardening, and 26.66 per cent had mild hardening **(table 19)**.

4. **Tears in the Skin:**

For Overhead Decorative Umbrella Lights, 26.67 per cent of respondents experienced severe tears in skin from gripping rigid handles, 45 per cent had moderate tears, and 20 per cent faced mild tears. For Pole Mounted Decorative Umbrella Lights, 16.67 per cent of respondents faced severe tears, 48.33 per cent had moderate tears, and 30 per cent experienced mild tears **(table 19)**.

5. **Redness in the Eyes:**

For Overhead Decorative Umbrella Lights, 21.67 per cent of respondents reported severe eye redness due to glare from bulb, 46.67 per cent faced moderate redness, and 23.33 per cent experienced mild redness. For Pole Mounted Decorative Umbrella Lights, 10 per cent of respondents reported severe redness, 51.67 per cent experienced moderate redness, and 33.33 per cent had mild redness **(table 19)**.

6. **Redness on the Face**:

For Overhead Decorative Umbrella Lights, 31.67 per cent of respondents experienced severe redness on face from extended light exposure, 41.67 per cent faced moderate redness, and 15 per cent had mild redness. For Pole Mounted Decorative Umbrella Lights, 8.33 per cent reported severe redness, 63.33 per cent experienced moderate redness, and 28.33 per cent had mild redness **(table 19)**.

7. **Electric shocks:**

For respondents holding Overhead Decorative Umbrella Lights, 15 per cent of respondents reported severe electric shocks, 55 per cent experienced moderate shocks, and 18.33 per cent had mild shocks. For Pole Mounted Decorative Umbrella Lights, no respondent reported severe electric shocks, while 86.67 per cent experienced moderate shocks and 13.33 per cent had mild shocks **(table 19)**.

8. Blisters develop on the skin

For Overhead Decorative Umbrella Lights, 18.33 per cent of respondents experienced severe blisters develop, 51.67 per cent had moderate blisters, and 23.33 per cent reported mild blisters. For Pole Mounted Decorative Umbrella Lights, 18.33 per cent of respondents reported severe blisters, 46.67 per cent had moderate blisters, and 31.66 per cent faced mild blisters **(table 19)**.

9. Blurry Vision

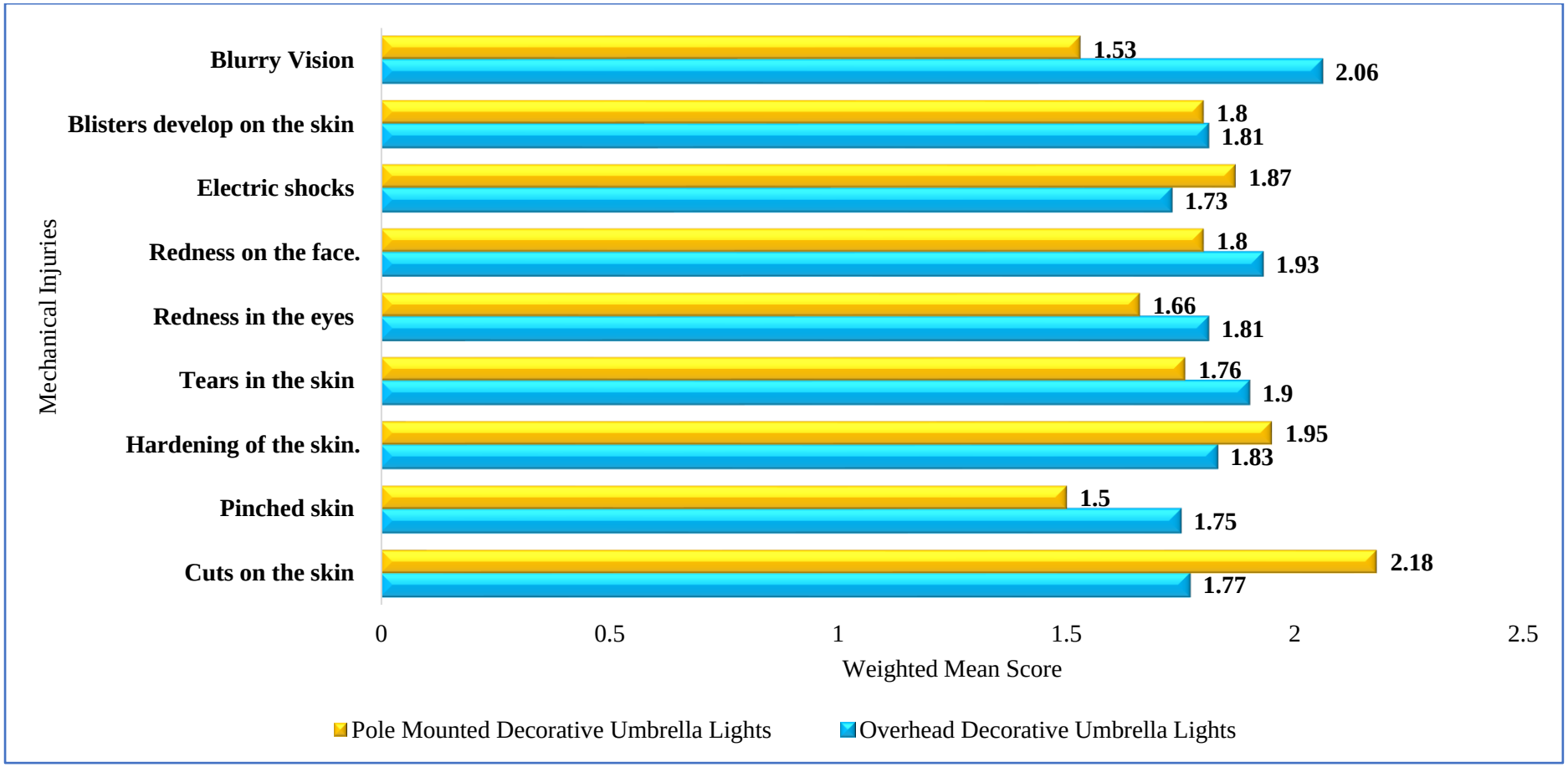
For Overhead Decorative Umbrella Lights, 33.33 per cent of respondents reported severe blurry vision, 40 per cent experienced moderate blurry vision, and 26.67 per cent had mild blurry vision. For Pole Mounted Decorative Umbrella Lights, 10 per cent of respondents experienced severe blurry vision, 43.33 per cent had moderate blurry vision, and 36.66 per cent reported mild blurry vision **(table 19)**.

Therefore, it can be concluded that the data reveals that mechanical injuries are common among respondents holding decorative umbrella lights during the Baraat. Skin cuts, pinching, and hardening are frequent issues, with most cases being mild to moderate in severity. Tears in the skin and redness (eyes and face) due to prolonged exposure to bright lights are also moderate concerns, with Overhead Decorative Umbrella Lights holders experiencing slightly higher severity levels. Respondents engaged in holding Decorative Umbrella Lights tend to experience fewer severe injuries but still report moderate discomfort and irritation **(table 19)**.

Table 19: Frequency and Percentage distribution of the respondents according to Severity of Mechanical Injuries experienced while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat (n=120)

Sr. no	Mechanical Injuries	Overhead Decorative Umbrella Lights (n=60) Severity Scale							Pole Mounted Decorative Umbrella Lights (n=60) Severity Scale						
		Severe		Moderate		Mild		Wt. Mean Score (3-1)	Severe		Moderate		Mild		Wt. Mean Score (3-1)
		f	%	*f*	%	*f*	%		*f*	%	*f*	%	*f*	%	
1.	Cuts on the skin	07	11.67	32	53.33	21	35	1.77	11	18.33	49	81.67	00	00.00	2.18
2.	Pinched skin	16	26.67	20	33.33	17	28.33	1.75	05	08.33	20	33.33	35	58.33	1.50
3.	Hardening of the skin.	12	20.00	27	45.00	20	33.33	1.83	15	25.00	28	46.67	16	26.66	1.95
4.	Tears in the skin	16	26.67	27	45.00	12	20.00	1.90	10	16.67	29	48.33	18	30.00	1.76
5.	Redness in the eyes	13	21.67	28	46.67	14	23.33	1.81	06	10.00	31	51.67	20	33.33	1.66
6.	Redness on the face.	19	31.67	25	41.67	09	15.00	1.93	05	08.33	38	63.33	17	28.33	1.80
7.	Electric shocks	09	15.00	33	55.00	11	18.33	1.73	00	00.00	52	86.67	08	13.33	1.87
8.	Blisters on skin	11	18.33	31	51.66	14	23.33	1.81	11	18.33	28	46.67	19	31.66	1.80
9.	Blurry vision	20	33.33	24	40.00	16	26.67	2.06	06	10.00	26	43.33	22	36.66	1.53
Total Weighted Mean								1.84	**Total Weighted Mean**						1.78

Figure 22: Severity of Mechanical Injuries experienced by the respondents engaged in holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat based on Weighted Mean Score.



SECTION III

4.3 Time Spent, Rest pause taken, Distance Travelled and Extent of Exhaustion Experienced with Adopted Posture by the the respondents engaged in Holding Decorative Umbrella Light during Baraat.

This section presents the Time Spent, Distance Travelled, Extent of Exhaustion Experienced, and Extent of Pain Experienced with Adopted Posture by the the Respondents Engaged in Holding Decorative Umbrella Light during Baraat. The two different types of decorative Umbrella were taken into consideration Respondents engaged in holding Overhead Decorative Umbrella Lights and decorative Umbrella light with Pole Mounted.

4.3.1 Time Spent, Distance Travelled, Extent of Exhaustion and Pain experienced based on Adopted Posture by respondents holding Overhead Decorative Umbrella Lights during Baraat

In the section the Time spent, Distance Travelled and Extent of Exhaustion Experienced during Baraat by the Respondents with Holding Overhead Decorative Umbrella Lights. The time spent (in minutes), the distance travelled and level of exhaustion experienced that Respondents engaged in holding decorative Umbrella lights spend in different activities, such as standing with raised arms and walking with raised arms during two groups (Group-1 and Group-2).

4.3.1.1 Time spent and Spontaneous Rest Pauses taken during Baraat by the respondents holding Overhead Decorative Umbrella Lights.

The data presented in **table 20(A)** provides a comparative analysis of the time spent and spontaneous rest pauses taken by respondents while holding overhead decorative umbrella lights across two groups (Group 1 and Group 2), each consisting of 30 respondents altogether total 60 respondents holding Overhead Decorative Umbrella Lights. The data represent the endurance of respondents in different time intervals and the frequency and duration of spontaneous rest pauses taken due to physical fatigue.

Table 20(A): Time spent (minutes) and Spontaneous Rest Pause taken by the respondents while holding Overhead Decorative Umbrella Lights (n=60)

Category	Group 1 (n=30)	Group 2 (n=30)
Posture adopted "Standing with Arms Raised" for Holding Light While Standing Still "Walking with Arms Raised" for Holding Light While Moving		
Interval 1 **Allotted Time with Holding Light Continuously**	20 min	20 min
No. of Respondents Holding light Continuously	25	24
No. of Respondents Taking spontaneous Rest Pauses	5	6
Rest Pause Duration (Minutes)	6 min (each)	5 min (each)
Interval 2 **Allotted Time with Holding Light Continuously**	15 min	25 min
No. of Respondents Holding light Continuously	26	23
No. of Respondents Taking spontaneous Rest Pauses	4	7
Rest Pause Duration (Minutes)	10 min (each)	10 min (each)
Interval 3 **Allotted Time with Holding Light Continuously**	25 min	19 min
No. of Respondents Holding light Continuously	15	25
No. of Respondents Taking spontaneous Rest Pauses	15	5
Rest Pause Duration (Minutes)	15 min (each)	5 min (each)
Interval 4 **Allotted Time with Holding Light Continuously**	-	24
No. of Respondents Holding light Continuously	-	22
No. of Respondents Taking spontaneous Rest Pauses	-	8
Rest Pause Duration (Minutes)	-	8 min (each)
Total Time Spent (All Intervals Combined)		
Total Time- Standing Intervals with holding lights	60 min	88 min
Total Time- Walking with Lights with holding lights	150 min	152 min
Grand Total Time Spent in Baraat	**210 min**	**240 min**

Group 1 Baraat

The total duration spent in the baraat by respondents in Group 1, while holding overhead decorative umbrella lights, was 210 minutes. This total duration was systematically categorized into two primary components:

1. **Standing with Arms Raised while Holding the Lights**: A total of **60 minutes** was allocated for this task, during which respondents were required to hold the lights overhead while standing still. This period was specifically designated to facilitate the baratis dance performance **(table 20(A))**.
2. **Walking with Arms Raised while Holding the Lights**: A total of **150 minutes** was dedicated to walking with the lights, signifying a prolonged engagement in the Baraat **(table 20(A))**.

The 60-minute standing duration was further segmented into three distinct intervals, each varying in duration and respondent endurance:

Interval 1 (20 minutes): Among the 30 respondents, 25 were able to maintain the posture continuously, whereas 5 respondents experienced muscular fatigue, necessitating spontaneous rest pauses of 6 minutes each **(table 20(A))**.

Interval 2 (15 minutes): The reduced time frame facilitated improved endurance, with 26 respondents completing the interval without interruption, while 4 respondents required rest pauses, each lasting 10 minutes **(table 20(A))**.

Interval 3 (25 minutes): A prolonged static posture led to a noticeable decline in endurance, as only 15 respondents could sustain the activity throughout the interval, while 15 respondents required rest pauses, each lasting 15 minutes **(table 20(A))**.

Group 2 Baraat

The total duration spent in the Baraat by respondents in Group 2, while holding overhead decorative umbrella lights, was 240 minutes. This total time was systematically categorized into two primary components:

1 **Standing with Arms Raised while Holding the Lights:** A total of **88 minutes** was allocated for this task, requiring respondents to maintain an overhead holding posture while standing still to facilitate the Baratis dance performance **(table 20(A))**.

2 **Walking with Arms Raised while Holding the Lights:** A total of **152 minutes** was dedicated to walking with the lights, representing an extended engagement in the Baraat **(table 20(A))**.

The 88-minute standing duration was further divided into four distinct intervals, with varying durations and respondent endurance:

Interval 1 (20 minutes): Among the 30 respondents, 24 sustained the posture continuously, whereas 6 respondents experienced muscular fatigue, necessitating spontaneous rest pauses of 5 minutes each **(table 20(A))**.

Interval 2 (25 minutes): A longer holding duration led to a slight decline in endurance, with 23 respondents maintaining the posture uninterrupted, while 7 respondents required rest pauses, each lasting 10 minutes **(table 20(A))**.

Interval 3 (19 minutes): Endurance levels improved in this interval, with 25 respondents successfully completing the task without interruption, while 5 respondents required rest pauses, each lasting 5 minutes **(table 20(A))**.

Interval 4 (24 minutes): This additional interval, exclusive to Group 2, required prolonged engagement. Here, 22 respondents sustained the activity, while 8 respondents required rest pauses, each lasting 8 minutes **(table 20(A))**.

The extended standing duration in **Group 2 (88 minutes) compared to Group 1 (60 minutes)** indicates a higher endurance threshold, potentially due to individual physiological variations or adaptive strategies employed by respondents. However, the observed spontaneous rest pauses suggest an

increasing demand for intermittent recovery as the task duration lengthens. These findings highlight the impact of prolonged static postures on muscular fatigue, necessitating strategic rest intervals to sustain performance **(table 20(A))**.

Therefore, the results indicate that Group 2 exhibited greater strength in holding the overhead decorative umbrella lights, as reflected in their higher total standing time (88 minutes compared to 60 minutes in Group 1). The spontaneous rest pauses taken were more frequent in longer duration intervals, particularly in Group 1 during Interval 3. Moreover, Group 2 participated in an additional standing interval (Interval 4), further extending their total time spent in the baraat to 240 minutes, which was 30 minutes longer than Group 1 **(table 20(A))**.

These findings suggest that muscular fatigue increases with prolonged static postures, necessitating spontaneous rest pauses, particularly in intervals with extended holding durations. The data also reflects inter-group variability in endurance, likely influenced by individual physiological capacity and prior experience in similar tasks **(table 20(A))**.

Table 20(B): Frequency and Percentage distribution according to the duration of Spontaneous Rest Pause taken by the respondents holding Overhead Decorative Umbrella Lights during Baraat. (n=60)

Duration of Spontaneous rest pause taken	Range score	*f*	%
Short Duration	6-9	16	26.66
Moderate Duration	10-12	11	18.33
Long Duration	13-15	20	33.33

The **table 20(B)** shows the frequency and percentage distribution of respondents according to the duration of spontaneous rest pauses taken while holding overhead decorative umbrella lights during the Baraat. The data, based on a sample of 60 respondents, reveals that a considerable proportion, 33.33 per cent, reported taking long-duration rest pauses. This indicates that prolonged breaks were a common necessity, possibly due to the physical exertion involved in carrying the decorative lights. Furthermore, 26.66 per cent of respondents reported taking short-duration rest pauses, suggesting

that a substantial number managed with brief intervals of rest. Additionally, 18.33 per cent of the respondents took moderate-duration rest pauses, reflecting a balanced pattern of rest-taking behaviour. Overall, the findings indicate variability in the duration of spontaneous rest pauses, with a marked inclination toward longer rest durations among the respondents.

4.3.1.2 Time spent and Spontaneous Rest Pauses taken during Baraat by the respondents with holding Pole Mounted Decorative Umbrella Lights.

The **table 21(A)** shows the time spent and spontaneous rest pauses taken by respondents (n=60) while holding pole-mounted decorative umbrella lights under two adopted postures: "Standing with Arms in Front" and "Walking with Arms in Front." The respondents were divided into two groups, Group 1 and Group 2, with 30 respondents in each group.

Group 1 Baraat

The total time spent by respondents in Group 1 while holding the Pole-Mounted Decorative Umbrella Lights during the baraat was 250 minutes. This total duration was systematically categorized into two primary components:

1. **Standing with Arms in Front while Holding the Lights**: A total of 75 minutes was allocated for this task, during which respondents were required to hold the lights overhead while standing still. This period was specifically designated to facilitate the baratis dance performance **(table 21(A))**.
2. **Walking with Arms in Front while Holding the Lights**: A total 175 minutes was dedicated to walking with the lights, signifying a prolonged engagement in the Baraat **(table 21(A))**.

The standing time of 75 minutes was further divided into three intervals:

Interval 1 (20 minutes): The allotted time for holding the light continuously was 20 minutes. Out of 30 respondents, 23 were able to sustain the posture,

while 7 respondents required spontaneous rest pauses, each lasting 5 minutes **(table 21(A))**.

Interval 2 (30 minutes): The allotted time was 30 minutes, but endurance decreased, with 17 respondents continuing without a break, whereas 13 respondents needed rest pauses, each lasting 10 minutes **(table 21(A))**.

Interval 3 (25 minutes): The allotted time was 25 minutes. Here, 18 respondents held the light continuously, while 12 took rest breaks, each lasting 6 minutes **(table 21(A))**.

Group 2 Baraat

The total time spent by respondents in Group 2 was 300 minutes, which was 50 minutes longer than Group 1 **(table 21(A))**.

1 **Standing with Arms in Front while Holding the Lights:** A total of 55 minutes was allocated for this task, requiring respondents to maintain an overhead holding posture while standing still to facilitate the Baratis dance performance **(table 21(A))**.
2 **Walking with Arms in Front while Holding the Lights:** A total of 245 minutes was dedicated to walking with the lights, representing an extended engagement in the Baraat **(table 21(A))**.

The standing time of 55 minutes was also divided into three intervals:

Interval 1 (15 minutes): The allotted time for holding the light was 15 minutes. 25 respondents managed to hold the light continuously, while 5 took spontaneous rest pauses, each lasting 6 minutes **(table 21(A))**.

Interval 2 (30 minutes): The allotted time was 30 minutes, but only 15 respondents could sustain the posture, while 15 needed rest pauses, each lasting 15 minutes **(table 21(A))**.

Table 21(A): Time spent (minutes) and Spontaneous Rest Pause taken by the respondents while holding Pole Mounted Decorative Umbrella Lights (n=60)

Category	Group 1 (n=30)	Group 2 (n=30)
Posture Adopted "Standing with Arms Extended Forward" for Holding Pole Light While Standing Still "Walking with Arms Extended Forward" for Holding Pole Light While in Motion		
Interval 1 **Allotted Time with Holding Light Continuously**	20 min	15 min
No. of Respondents Holding Light Continuously	23	25
No. of Respondents Taking Spontaneous Rest Pauses	7	5
Rest Pause Duration (Minutes)	5 min (each)	6 min (each)
Interval 2 **Allotted Time with Holding Light Continuously**	30 min	30 min
No. of Respondents Holding Light Continuously	17	15
No. of Respondents Taking Spontaneous Rest Pauses	13	15
Rest Pause Duration (Minutes)	10 min (each)	15 min (each)
Interval 3 **Allotted Time with Holding Light Continuously**	25 min	10 min
No. of Respondents Holding Light Continuously	18	27
No. of Respondents Taking Spontaneous Rest Pauses	12	3
Rest Pause Duration (Minutes)	6 min (each)	2 min (each)
Total Time Spent in Standing Intervals	75 min	55 min
Total Time Spent Walking with Lights	175 min	245 min
Over all Total Time Spent in Baraat	250 min	300 min

Interval 3 (10 minutes): The allotted time was 10 minutes, with 27 respondents continuing without rest, while 3 respondents took short rest pauses of 2 minutes each **(table 21(A))**.

This study compares the time spent and spontaneous rest pauses of two groups holding Pole Mounted Decorative Umbrella Lights in a Baraat: Group 1 (standing and walking) and Group 2 (walking continuously). Group 1 spent 75 minutes holding the lights while standing and 175 minutes walking, whereas Group 2 spent 55 minutes standing and 245 minutes walking. More respondents in Group 1 took spontaneous rest pauses, and their breaks were longer, especially during static holding, suggesting higher physical strain. In contrast, Group 2 took fewer and shorter breaks, indicating that walking while holding the lights may be less physically demanding. Overall, Group 2 participated for a longer duration (300 minutes) compared to Group 1 (250 minutes), highlighting that movement may help sustain performance and reduce fatigue.

Table 21 (B): Frequency and Percentage distribution according to the duration of Spontaneous Rest Pause taken by the respondents holding Pole Mounted Decorative Umbrella Lights during Baraat. (n=60)

Duration Of Spontaneous rest pause taken	Range score	*f*	%
Short Duration	2-6	47	78.33
Moderate Duration	7-11	13	21.66
Long Duration	12-15	15	25.00

The **table 21(B)** shows the frequency and percentage distribution of respondents according to the duration of spontaneous rest pauses taken while holding pole-mounted decorative umbrella lights during the Baraat. Out of 60 respondents, a majority, 78.33 per cent, reported taking short-duration rest pauses, indicating that most individuals preferred brief intervals of rest while performing this task. Additionally, 21.66 per cent of respondents took moderate-duration rest pauses, reflecting a smaller but noticeable group requiring a balanced period of rest. Interestingly, 25.00 per cent of the respondents reported taking long-duration rest pauses, suggesting that despite the prevalence of short breaks, a segment of participants experienced

higher levels of fatigue necessitating extended rest. Overall, the data highlights a predominant trend toward short-duration rest pauses, with some variability influenced by individual endurance and the physical demands of holding pole-mounted decorative lights.

4.3.1.3 Distance Travelled and Extent of Exhaustion experienced by the respondents while holding Decorative Umbrella Lights (Overhead and Pole Mounted) during Baraat.

The **table 22** shows the distribution of respondents based on the extent of body discomfort, measured in terms of exhaustion, while holding overhead decorative umbrella lights during the Baraat. The data is categorized according to the distance travelled by the respondents, divided into three ranges: short distance (0 to 0.83 km), moderate distance (0.83 to 1.67 km), and long distance (1.67 to 2.5 km). The extent of exhaustion is classified into five levels: not exhausted, little exhausted, moderately exhausted, extremely exhausted, and completely exhausted. For Baraat Group 1, it can be observed that among respondents covering a short distance, 16.67 per cent reported no exhaustion, while 23.33 per cent experienced little exhaustion.

However, 26.67 per cent reported moderate exhaustion, while 23.33 per cent were extremely exhausted, and another 23.33 per cent were completely exhausted. Notably, for respondents covering a long distance, only 6.67 per cent reported no exhaustion, while 10.00 per cent experienced little exhaustion. Conversely, the proportion of respondents reporting higher levels of exhaustion increased, with 20.00 per cent moderately exhausted, 30.00 per cent extremely exhausted, and a significant 33.33 per cent completely exhausted **(table 22)**.

A similar pattern is observed for Baraat Group 2. Among respondents traveling a short distance, 20.00 per cent reported no exhaustion, while 26.67 per cent experienced little exhaustion. Furthermore, 16.67 per cent of respondents were moderately exhausted, whereas 20.00 per cent experienced extreme exhaustion, and 16.67 per cent were completely exhausted. In the moderate distance category, 13.33 per cent of respondents were not

exhausted, and 16.67 per cent reported little exhaustion. However, 23.33 per cent experienced moderate exhaustion, while 20.00 per cent reported extreme exhaustion, and 26.67 per cent were completely exhausted. For respondents traveling a long distance, only 3.33 per cent of respondents were not exhausted, while 6.67 per cent experienced little exhaustion. The proportion of respondents experiencing moderate exhaustion was 16.67 per cent, while 33.33 per cent reported extreme exhaustion, and 40.00 per cent were completely exhausted **(table 22)**.

Table 22: Distance Travelled by the respondents holding Overhead Decorative Umbrella Lights during Baraat (n=60)

		The extent of Body Discomfort (Measured on Extent of Exhaustion)									
Distance Travelled	**Description**	**Not Exhausted**		**Little Exhausted**		**Moderately Exhausted**		**Extremely Exhausted**		**Completely Exhausted**	
Baraat Group 1 (n=30)		***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***
0 to 0.83 km (0 to 833 meters)	**Short Distance**	05	16.67	07	23.33	06	20.00	05	16.67	07	23.33
0.83 to 1.67 km (833 to 1,667 meters)	**Moderate Distance**	03	10.00	05	16.67	08	26.67	07	23.33	07	23.33
1.67 to 2.5 km (1,667 to 2,500 meters)	**Long Distance**	02	06.67	03	10.00	06	20.00	09	30.00	10	33.33
Baraat Group 2 (n=30)											
0 to 0.83 km (0 to 833 meters)	**Short Distance**	06	20.00	08	26.67	05	16.67	06	20.00	05	16.67
0.83 to 1.67 km (833 to 1,667 meters)	**Moderate Distance**	04	13.33	05	16.67	07	23.33	06	2000	08	26.67
1.67 to 2.5 km (1,667 to 2,500 meters)	**Long Distance**	01	03.33	02	06.67	05	16.67	10	33.33	12	40.00

The **table 23** presents the distribution of respondents based on the extent of body discomfort, measured in terms of exhaustion, while holding pole-mounted decorative umbrella lights during the Baraat. The table categorizes respondents based on the distance travelled, classified as short distance (0 to 0.83 km), moderate distance (0.83 to 1.67 km), and long distance (1.67 to 2.5 km). Additionally, the level of exhaustion is categorized into five levels: not exhausted, little exhausted, moderately exhausted, extremely exhausted, and completely exhausted.

For Baraat Group 1, among respondents covering a short distance, 26.67 per cent reported no exhaustion, while 23.33 per cent experienced little exhaustion. Furthermore, 16.67 per cent of respondents reported being moderately exhausted, while 13.33 per cent experienced extreme exhaustion, and 20.00 per cent were completely exhausted. In the moderate distance category, 13.33 per cent of respondents reported no exhaustion, while 20.00 per cent experienced little exhaustion. The percentage of respondents reporting moderate exhaustion increased to 23.33 per cent, while 23.33 per cent were extremely exhausted, and 20.00 per cent were completely exhausted. Among respondents travelled a long distance, only 6.67 per cent were not exhausted, and 13.33 per cent experienced little exhaustion. However, the proportion of respondents reporting higher levels of exhaustion increased, with 16.67 per cent moderately exhausted, 30.00 per cent extremely exhausted, and a substantial 33.33 per cent completely exhausted **(table 23)**.

Table 23: Distance Travelled by the respondents holding Pole Mounted Decorative Umbrella Lights during Baraat (n=60)

		The extent of Body Discomfort (Measured on Extent of Exhaustion)									
Distance Travelled	**Description**	**Not Exhausted**		**Little Exhausted**		**Moderately Exhausted**		**Extremely Exhausted**		**Completely Exhausted**	
Baraat Group 1 (n=30)		*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*
0 to 0.83 km (0 to 833 meters)	**Short Distance**	08	26.67	07	23.33	05	16.67	04	13.33	06	20.00
0.83 to 1.67 km (833 to 1,667 meters)	**Moderate Distance**	04	13.33	06	20.00	07	23.33	07	23.33	06	20.00
1.67 to 2.5 km (1,667 to 2,500 meters)	**Long Distance**	02	06.67	04	13.33	05	16.67	09	30.00	10	33.33
Baraat Group 2 (n=30)											
0 to 0.83 km (0 to 833 meters)	**Short Distance**	09	30.00	06	20.00	06	20.00	05	16.67	04	13.33
0.83 to 1.67 km (833 to 1,667 meters)	**Moderate Distance**	03	10.00	07	23.33	08	26.67	06	20.00	06	20.00
1.67 to 2.5 km (1,667 to 2,500 meters)	**Long Distance**	01	03.33	02	06.67	04	13.33	11	36.67	12	40.00

For Baraat Group 2, among respondents covering a short distance, 30.00 per cent of respondents reported no exhaustion, while 20.00 per cent experienced little exhaustion. Furthermore, 20.00 per cent reported moderate exhaustion, while 16.67 per cent experienced extreme exhaustion, and 13.33 per cent were completely exhausted. In the moderate distance category, 10.00 per cent of respondents were not exhausted, while 23.33 per cent experienced little exhaustion. Additionally, 26.67 per cent of respondents reported moderate exhaustion, while 20.00 per cent were extremely exhausted, and 20.00 per cent were completely exhausted. Among individuals covering a long distance, only 3.33 per cent of respondents were not exhausted, while 6.67 per cent experienced little exhaustion. 13.33 per cent of respondents experiencing moderate exhaustion, whereas 36.67 per cent were extremely exhausted, and 40.00 per cent reported being completely exhausted **(table 23)**.

These findings indicate a clear trend: as the distance travelled increases, the proportion of respondents experiencing higher levels of exhaustion also rises. This pattern is observed in both Baraat Group 1 and Baraat Group 2, where the percentage of respondents reporting extreme and complete exhaustion is significantly higher among those covering long distances compared to respondents covering short or moderate distances **(table 23)**.

Furthermore, the data suggest that holding pole-mounted decorative umbrella lights and overhead decorative umbrella lights for an extended period contributes substantially to physical exhaustion. The exertion required to carry these decorative lights during the Baraat intensifies with increasing distance, leading to greater physical discomfort among the respondents. Therefore, it can be concluded that prolonged participation in the Baraat while carrying decorative lights has a considerable impact on the respondents' level of exhaustion, with longer distances exacerbating their physical strain **(table 23)**.

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SECTION IV

4.4 Section IV: Testing of Hypotheses

This section presents the detailed statistical analysis of hypotheses of the present study. The relational statistic applied to test the hypotheses includes Analysis of Variance (ANOVA), 't' Test, and Pearson's Product Moment Correlation Coefficient. The details of rational statistics computed are described as follow:

Analysis of Variance (ANOVA) was computed to examine the differences in Personal Variables namely Age and Work Experience and the Situational Variables such as Time Spent and Distance Travelled by respondents holding Decorative Umbrella Lights during the Baraat.

't' Test was computed to find out the mean differences between Personal Variable Gender of respondents and Situational Variables namely Time Spent and Distance Travelled while holding Decorative Umbrella Lights during the Baraat.

Pearson's Product Moment Correlation Coefficient was computed to determine the interrelationship between the Situational Variable namely Time Spent and Distance Travelled while holding Decorative Umbrella Lights with the frequency and severity of Body Discomfort experienced by respondents during baraat.

For the purpose of statistical analysis following hypotheses were formulated

$H0_1$: The situational variables (viz. time spent and distance travelled) do not vary with the personal variables (viz. Gender, age and work experience) of the respondents engaged in holding Decorative Umbrella Lights (overhead and pole-mounted) during Baraat.

For the purpose of statistical analysis following sub hypotheses were formulated

$H0_{1.1}$: There exists no significant difference in situational variables (viz. time spent and distance travelled) due to a personal variable (Gender) of the respondents engaged in holding Decorative Umbrella Lights (overhead and pole-mounted) during Baraat.

The 't' test was computed to find out the significant difference in the mean score of situational variables (time spent and distance travelled) with the personal variable (Gender) of the respondents engaged in holding Decorative Umbrella Lights (overhead and pole-mounted) during Baraat **(table 24)**.

Table 24: 't' test showing the mean difference in the situational variable (viz. time spent and distance travelled) due to the personal variable (gender) of the respondents engaged in holding Decorative Umbrella Lights during Baraat.

Personal Variables Gender	Situational Variable			
	Time Spent Holding Umbrella Lights During Baraat			
	Mean Score	df	't' (Cal.)	Level of Significance
Female	5.24	118	-0.0762	N.S.
Male	5.56	118	-0.0762	N.S.
	Distance Travelled While Holding Umbrella			
Female	4.78	118	0.5685	N.S.
Male	5.02	118	0.5685	N.S.
N.S. =Not Significant at 0.05 level				

The **table 24** clearly depicts that no significant difference was found at **0.05 level** in the mean score of situational variables (viz. time spent holding umbrella lights during Baraat and distance travelled while holding umbrella lights) due to the personal variable (Gender). The computed t-values indicate that these differences are not significant.

Thus, the null hypotheses **$H0_{1.1}$** was accepted. Hence, it can be concluded the gender of the respondents do not significantly affect the time spent and distance travelled by the respondents holding Decorative Umbrella Lights (Overhead or Pole Mounted) during the Baraat **(table 24)**.

$H0_{1.2}$: There exists no relationship between the situational variable (viz. Time Spent and Distance Travelled) and the personal variables (age and work experience) of the respondents engaged in holding Decorative Umbrella Lights (overhead and pole-mounted) during Baraat.

The 'Pearson correlation coefficient' was computed to find out the variation between the situational variables (time spent and distance travelled) with the personal variables

(age and work experience) of the respondents engaged in holding Decorative Umbrella Lights during Baraat **(table 25).**

Table 25: 'Pearson correlation coefficient' showing the mean difference of situational variables (Time Spent and Distance Travelled) with the personal variable (age and work experience)

	Situational Variable		
Personal Variables	**Time Duration Spent Holding Umbrella**		
	N	**'r' values**	**Level of Significance**
Age	120	0.1078	N.S.
Work Experience	120	0.2564	N.S.
	Distance Travelled While Holding Umbrella		
Age	120	0.1163	N.S.
Work Experience	120	0.0728	N.S.
N.S. =Not Significant at 0.05 level			

The findings of **table 25** clearly highlights that the computed 'r' value for selected personal variables (age and work experience) was found to be not significant at **0.05 level**. Thus, it can be concluded that the situational variables namely time spent and distance travelled by the respondents has no relationship with their personal variables namely age and work experience of the respondents engaged in holding Decorative Umbrella Lights during Baraat.

$H0_2$: There exists no significant difference in the intervening variable (Duration of maintaining adopted posture while holding Decorative Umbrella Lights during Baraat) due to personal variables (age, gender, and work experience) of the respondents engaged in holding Decorative Umbrella Lights (overhead and pole-mounted)

For the purpose of statistical analysis following sub hypotheses were formulated

$H0_{2.1}$: The intervening variables (duration of maintaining the adopted posture while holding decorative Umbrella lights in baraat) do not vary due to personal variable (age and work experience) of the respondents engaged in holding umbrella lights (overhead and pole-mounted).

ANOVA was computed to find out the variation in the intervening variable duration of maintaining the adopted posture with their personal variables (age and work experience) of the respondents engaged in holding Decorative Umbrella Lights during Baraat **(table 26)**.

Table 26: Analysis of variance (ANOVA) for intervening variables (duration of maintaining the adopted posture while holding umbrella light) with personal variables (viz. age and work experience) of the respondents engaged in holding Decorative Umbrella Lights (overhead and pole-mounted) during Baraat.

Personal Variables	Intervening variable				
	Duration of Maintaining the Adopted Posture				
	Sum of Squares (SS)	Mean Square (MS)	df	'F' (Cal)	Level of Significance
Age	Between Groups	39.99	13.33	3	*0.01 level
	Within Groups	118.01	1.00	118	
Work Experience	Between Groups	12.60	4.20	3	**0.05 level
	Within Groups	118.20	1.00	118	

***Level of significance at 0.01 level*
****Level of significance at 0.05 level*

The findings of the **table 26**, clearly highlights that the computed F value for the selected intervening variable (duration of maintaining an adopted posture while holding decorative umbrella light) was found to be significant at **0.01 level** with the age of the respondents and at **0.05 level** with the work experience of the respondents. This indicates that the duration of maintaining an adopted posture while holding decorative umbrella light during Baraat significantly vary with the age and work experience of the respondents. Hence, the null hypotheses $\mathbf{H0_{2.1}}$ was rejected. Thus, it can be concluded that there is a significant variation in the duration of maintaining an adopted posture while holding decorative umbrella light due to the age and work experience of the respondents.

Further, a Post Hoc Test (Tukey's HSD) was computed to determine the specific groups which differ significantly **(table 27)**.

Table 27: Post Hoc Test (Tukey's HSD) for Age Groups and Duration of Maintaining Adopted Posture

Age Group Comparison	Mean Difference	p-value	Significance
20-35 vs. 36-51	7.51	0.0057	*0.01 level
20-35 vs. 52-67	-0.98	0.9843	N.S.
36-51 vs. 52-67	-8.32	0.0012	*0.01 level
***Level of significance at 0.01 level** *N.S. =Not Significant*			

The Post Hoc Test (Tukey's HSD) described in **table 27** depicts that perceived musculoskeletal discomfort experienced varies significantly across age groups at **0.01 level**. Respondents aged 36-51 experience significantly higher discomfort compared to respondents aged 20-35 ($p = 0.0057$) and 52-67 ($p = 0.0012$). However, there is no significant difference between the 20-35 and 52-67 age groups ($p = 0.9843$). These findings indicate that respondents belonging to the age group of 36-51 are at the highest risk of musculoskeletal discomfort, possibly due to reduced muscle endurance and flexibility.

Similarly, Post Hoc Test (Tukey's HSD) was computed to determine the specific work experience which differ significantly **(table 28)**.

Table 28: Post Hoc Test (Tukey's HSD) for Work Experience and Duration of Maintaining Adopted Posture

Work Experience (in years)	Mean Difference	p-value	Significance
2-6 vs 7-11	3.20	0.0180	*0.05 level
***** *Level of significance at 0.05 level*			

The findings of the Post Hoc Test (Tukey's HSD) indicates that there is a significant variation in perceived musculoskeletal discomfort experienced based on the work experience of the respondents at **0.05 level**. Respondents having 7-11 years of experience significantly perceived higher discomfort compared to respondents with the 2-6 years of experience. This suggests that as work experience increases, cumulative

physical strain from repetitive tasks and prolonged posture maintenance may lead to greater musculoskeletal discomfort **(table 28).**

$H0_{2.2}$: There exists no significant difference in intervening variable (duration of maintaining adopted posture while holding umbrella light) due to personal variable (Gender) of the respondents engaged in holding Decorative Umbrella Lights (overhead and pole-mounted) during Baraat.

The 't' test was computed to find out the significant difference in the mean score of the intervening variable (duration of maintaining adopted posture while holding umbrella light) with the personal variable (gender) of the respondents **(table 29)**.

Table 29: 't' test for duration of maintaining an adopted posture based on gender of the respondents.

Personal Variables	**Duration of maintaining adopted posture**			
Gender	**Mean Square**	**df**	**'t'** (Cal)	**Level of Significance**
Female	5.82	118	-0.1488	N.S.
Male	5.94	118	-0.1488	N.S.
N.S. = Not Significant at 0.05 level				

The finding of **table 29** clearly depicts that the intervening variable (duration of maintaining an adopted posture while holding umbrella light) do not differ due to the gender of respondents. Thus, the null hypotheses **$H0_{2.2}$** was accepted. Therefore, it can be concluded that the gender of the respondents does not have any impact on duration of maintaining an adopted posture of the respondents while holding decorative umbrella light during Baraat.

$H0_3$: The intervening variable (duration of maintaining an adopted posture while holding decorative Umbrella lights) do not vary with the dependent variable (frequency of perceived musculoskeletal discomfort experienced) of respondents engaged in holding Decorative Umbrella Lights (overhead and pole-mounted) Baraat.

ANOVA was computed to analyse the variation between the intervening variable (posture duration while holding decorative umbrella lights) and the dependent variable (frequency of perceived musculoskeletal discomfort).

Table 30: Analysis of variance (ANOVA) for selected intervening variable (duration of maintaining an adopted posture while holding decorative umbrella lights) with the dependent variable (frequency of perceived musculoskeletal discomfort experienced) by the respondents

Intervening Variable Duration of maintaining the adopted posture	Frequency of Body Discomfort				
	Sum of score	Mean Square	df	F (Cal)	Level of Significance
Between Groups	245.6	81.87	3	12.42	*0.01 level
Within Groups	712.4	6.14			
***** *Level of significance at 0.01 level*					

The findings of **table 30,** clearly highlighted that the computed F value for frequency of perceived musculoskeletal discomfort experienced by the respondents with the intervening variable (duration of maintaining the adopted posture while holding decorative Umbrella lights) was found to be significant at **0.01 level**. Hence, the null hypothesis **$H0_3$** was rejected.

Therefore, a Post Hoc Test (Tukey's HSD) was computed to determine the specific age group that differ significantly **(table 31)**.

Table 31: Post Hoc Test (Tukey's HSD) for Duration of group comparison

Duration Group Comparison (Minutes)	Mean Difference	p-value	Significance
0-20 vs. 20-40	3.2	0.021	** 0.05 level
0-20 vs. 40-60	5.6	0.003	* 0.01 level
0-20 vs. 60-80	7.8	0.000	* 0.01 level
0-20 vs. 80-100	9.2	0.000	* 0.01 level
20-40 vs. 40-60	2.4	0.068	N.S.
20-40 vs. 60-80	4.5	0.014	** 0.05 level
***** *Level of significance at 0.01 level* ****Level of significance at 0.05 level* *N.S. = Not Significant at 0.05 level*			

The findings of **table 31**, shows that the respondents who maintained the posture for 0-20 minutes experienced significantly (at 0.05 level) lower musculoskeletal discomfort than the respondents who maintained posture for 20-40 minutes. Similarly, the

respondents who maintained the posture for 40-60 minutes, 60-80 minutes, and 80–100 minute also experienced significantly (at 0.01 level) higher musculoskeletal discomfort than the respondents who maintained the posture for 0-20 minutes.

Further, it was also observed that the respondents who maintained the posture for 20-40 minutes experienced significantly (at 0.05 level) higher musculoskeletal discomfort than the respondents who maintained the posture for 20-40 minutes **(table 31)**.

However, there was no significant difference found in the perceived musculoskeletal discomfort experienced by the respondents who maintained the posture for 40-60 minutes and 20-40 minutes **(table 31)**.

Hence, it can be concluded that the respondents who maintained the posture for 80-100 minutes showed the highest perceived musculoskeletal discomfort indicating prolong static posture which led to extreme musculoskeletal discomfort **(table 31)**.

$H0_4$: There exists a significant association between the dependent variable (extent of perceived musculoskeletal discomfort experienced) and the personal variables (age, gender, and work experience) of the respondents holding Decorative Umbrella lights (overhead and pole-mounted) during Baraat.

Regression analysis was computed to find out the association between the dependent variable (extent of perceived musculoskeletal discomfort experienced) and the personal variables (age, gender, and work experience) of the respondents holding decorative Umbrella lights during Baraat **(table 32)**.

Table 32: Regression analysis between the extent of perceived musculoskeletal discomfort experienced and personal variables (age, gender, and work experience)

Personal Variable	Beta Coefficient	p-value	Significance
Age	0.0815	0.004	*0.05 level
Gender	-0.2465	0.660	N.S.
Work Experience	-0.0813	0.267	N.S.
** Level of significance at 0.05 level N.S. = Not Significant at 0.05 level*			

The finding of the regression analysis shows that the computed p-value was found to be significant **(at 0.05 level)**, indicates that there is an association between the age of the respondents and the perceived musculoskeletal discomfort experienced by the respondents **(table 32)**.

Further, it was found that, there is no significant association between the personal variables (gender and work experience) and the perceived musculoskeletal discomfort experienced by the respondents holding decorative Umbrella lights.
Hence, the null hypothesis **$H0_4$** was partially accepted **(table 32)**.

$H0_5$: There exists a significant association between dependent variable (extent of perceived musculoskeletal discomfort experienced) and the situational variables (time spent and distance travelled holding Decorative Umbrella Light) of the respondents.

Regression analysis was computed to know the association between dependent variable (extent of perceived musculoskeletal discomfort experienced) and the situational variables (time spent and distance travelled holding decorative umbrella light) of the respondents **(table 33)**.

Table 33: Regression analysis between the extent of musculoskeletal discomfort experienced by the respondents and the situational variables (time spent and distance travelled while holding Decorative Umbrella Lights during Baraat).

Situational Variable	B (Beta Coefficient)	p-value	Significance
Time Spent	-0.0226	0.277	N.S.
Distance Travelled	0.0015	0.182	N.S.
N.S. = Not Significant at 0.05 level			

The findings of the regression analysis shows that the computed p-value was not found significant **(at 0.05 level)**, indicates there is no association between the extent of musculoskeletal discomfort experienced by respondents and the situational variables (time spent and distance travelled while holding decorative Umbrella lights during Baraat) **table 33.** Hence, the null hypothesis **$H0_5$** was accepted **(table 33)**.

$H0_6$: There is no association between the situational variable (type of decorative umbrella lights viz; overhead and pole mounted) with the dependent variable (extent of perceived musculoskeletal discomfort) of the respondents.

Chi-Square Test of Independence was computed to know the association between the between situational variable (type of umbrella lights viz; overhead and pole mounted) with dependent variable (extent of perceived musculoskeletal discomfort) of the respondents **(table 34)**.

Table 34: Chi-Square Test between type of Decorative Umbrella Lights (pole mounted vs. overhead light) and perceived musculoskeletal discomfort experienced by the respondents.

Chi-Square (χ^2)	p-value	df	Significance
3.94	0.268	3	N.S.
N.S. = Not Significant at 0.05 level			

The finding of Chi-Square Test shows that the p-value is greater than 0.05, indicates that there is no significant association between the type of umbrella (overhead and pole mounted) hold by the respondents and the perceived musculoskeletal discomfort experienced by the respondents. Hence, the null hypothesis **$H0_6$** is accepted at **0.05 levels (table 36)**.

$H0_7$: There is no significant relationship between situational variable (type of umbrella lights viz; overhead and pole mounted) and the intervening variable (duration of maintaining adopted posture while holding decorative umbrella light) of the respondents.

The 't' test was computed to find out the significant difference in the mean score of the intervening variable (duration of maintaining adopted posture while holding umbrella light) with the situational variable (Types of Decorative Umbrella Light) of the respondents **(table 35)**.

Table 35: 't' test showing the relationship between the type of umbrella and the duration of maintaining the adopted posture by the respondents while holding decorative umbrella light.

Situational Variable	Duration of maintaining adopted posture			
Types of Decorative Umbrella Light	**Mean Square**	**df**	**'t'** (Cal)	**Level of Significance**
Overhead	14.74	59	-2 02	N.S.
Pole Mounted	20.25	59	9.75	***0.05 level**
** Level of significance at 0.05 level* *N.S. = Not Significant at 0.05 level*				

For respondents holding the Overhead Decorative Umbrella light, the mean square value was 14.74, with a calculated 't' value of -2.02. This result was found to be not significant at the **0.05 level**, indicating that the type of umbrella light (overhead) did not have a significant impact on the duration of maintaining the adopted posture. This suggests that the overhead situation of the decorative umbrella light neither facilitated nor hindered the respondents' ability to sustain the posture for an extended period **(table 35)**.

For respondents using the pole-mounted decorative umbrella light, the mean square value was 20.25, with a calculated 't' value of 9.75, which was found to be significant at the **0.05 level**. This indicates that the pole-mounted umbrella light significantly influenced the duration of maintaining the adopted posture. This suggests that respondents were able to sustain their posture for a longer duration with this type of umbrella light. The improved posture duration may be attributed to better weight distribution, ergonomic advantages, or reduced strain, making it more comfortable and stable for prolonged holding **(table 35)**.

Hence, the **$H0_7$** is partly accepted, as there was no significant relationship observed for the overhead umbrella light, but a significant relationship was found for the pole-mounted umbrella light. This advocates that the type and placement of decorative umbrella lights influence posture endurance differently, highlighting the ergonomic advantages of pole-mounted designs over overhead ones **(table 35)**.

SECTION V

4.5 Suggested Coping Strategies

Need-based coping strategies were suggested based on frequency and severity of musculoskeletal discomfort experienced by individual holding decorative umbrella light during baraat.

The following coping strategies have been suggested to enhance occupational comfort and efficiency:

1. It was observed that a majority of the respondents experienced a high frequency and severity of musculoskeletal discomfort in the right wrist and right palm. This can be attributed to the continuous repetition of gripping and holding actions, along with prolonged static postures in standing positions without adequate rest intervals, while carrying decorative umbrella lights during Baraat. Therefore, it is recommended that respondents utilize ergonomically designed, padded handles or adjustable grip attachments on the umbrella poles to reduce strain on the right wrist and right palm. Additionally, ergonomic modifications will contribute to the reduction of upper back, mid-back, and lower back discomfort, as they promote a more upright posture and minimize the need for compensatory forward flexion while holding the load during prolonged Baraats.

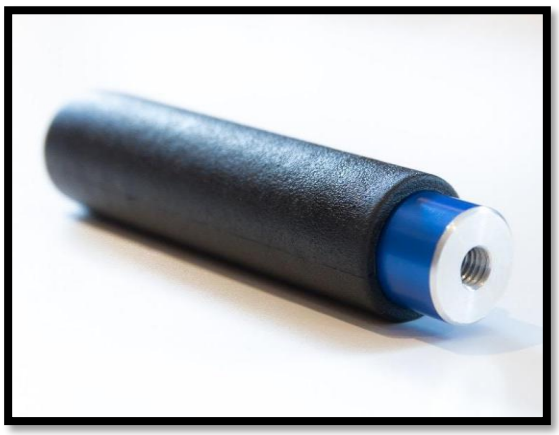


Plate 3: Padded Grips

2. It was observed that a majority of the respondents experienced musculoskeletal discomfort in the lower body parts, particularly the feet and legs. This discomfort can be attributed to the prolonged duration of standing and the distance covered during each Baraat. Therefore, it is recommended that respondents utilize ergonomically designed footwear, such as cushioned and supportive boots or shoes, to reduce foot and leg pain. The use of

appropriate footwear not only enhances comfort but also provides adequate arch and ankle support, thereby minimizing the risk of fatigue, swelling, and long-term musculoskeletal strain during extended processions.

Plate 4: Ergonomically designed shoes

3. It was observed that respondents engaged in holding decorative umbrella lights during Baraat often do not take rest pauses, leading to significant physical exhaustion and cumulative musculoskeletal discomfort. Therefore, it is recommended that respondents incorporate structured rest-pause intervals at regular short durations throughout the procession. These rest periods not only alleviate fatigue but also serve as an opportune time to perform gentle mobility and flexibility exercises, which can enhance circulation, reduce muscular stiffness, and prevent the onset of chronic discomfort associated with prolonged static postures and repetitive strain.

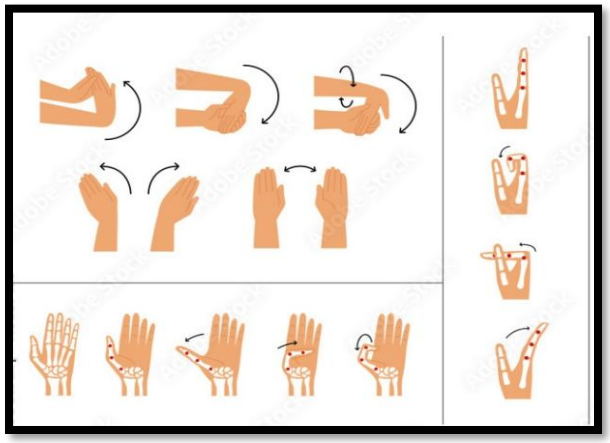


Plate 5: Stretching Exercise for Palm

Plate 6: Stretching Exercise for Upper and Lower Body

4. Prolonged gripping of a rigid pole, as required for holding decorative umbrella lights during Baraat, can lead to the development of bumps, blisters, and localized pressure points on the hands due to continuous friction and concentrated mechanical stress. This not only causes skin irritation and discomfort but also reduces hand dexterity and increases the risk of overuse injuries. To mitigate these effects, the use of soft foam or rubber padding on the pole handle is recommended, as it helps distribute pressure evenly, reduces friction, and dampens impact forces and vibrations that contribute to muscle fatigue. Additionally, wearing padded gloves provides further protection by enhancing grip stability, absorbing sweat, minimizing slippage, and reducing the transmission of vibrational forces to the forearm muscles and tendons. Together, these ergonomic interventions help prevent discomfort, improve endurance, and enable the respondents to perform their task more efficiently and safely over prolonged periods.

Plate 7: Padded Gloves

5. Irritation or blurry vision in the eyes caused by prolonged exposure to bright decorative lights during Baraat, it is recommended that respondents adopt multiple protective and preventive measures. First, the use of anti-glare protective eyewear or clear safety glasses with blue-light filtering properties can significantly reduce ocular strain, minimize redness, and prevent the onset of blurry vision.

Plate 8: Clear safety glasses with blue-Light filter

6. Irritation or blurry vision in the eyes caused by prolonged exposure to bright decorative lights during Baraat, it is recommended that respondents adopt multiple protective and preventive measures. First, the use of anti-glare protective eyewear or clear safety glasses with blue-light filtering properties can significantly reduce ocular strain, minimize redness, and prevent the onset of blurry vision.

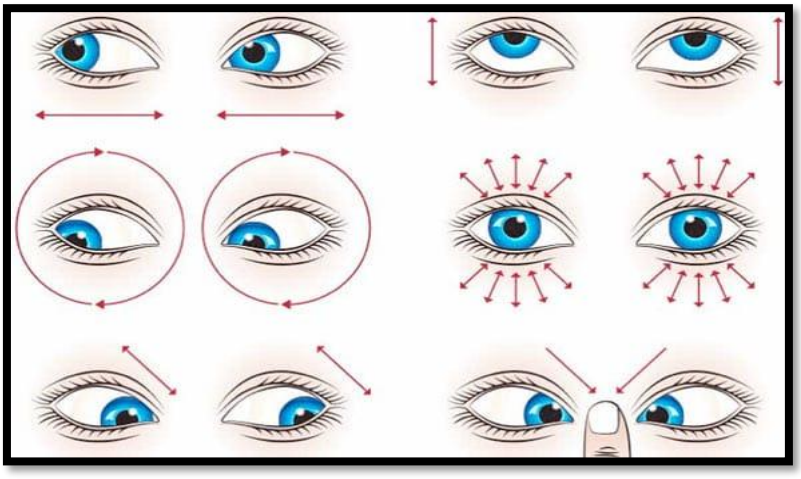
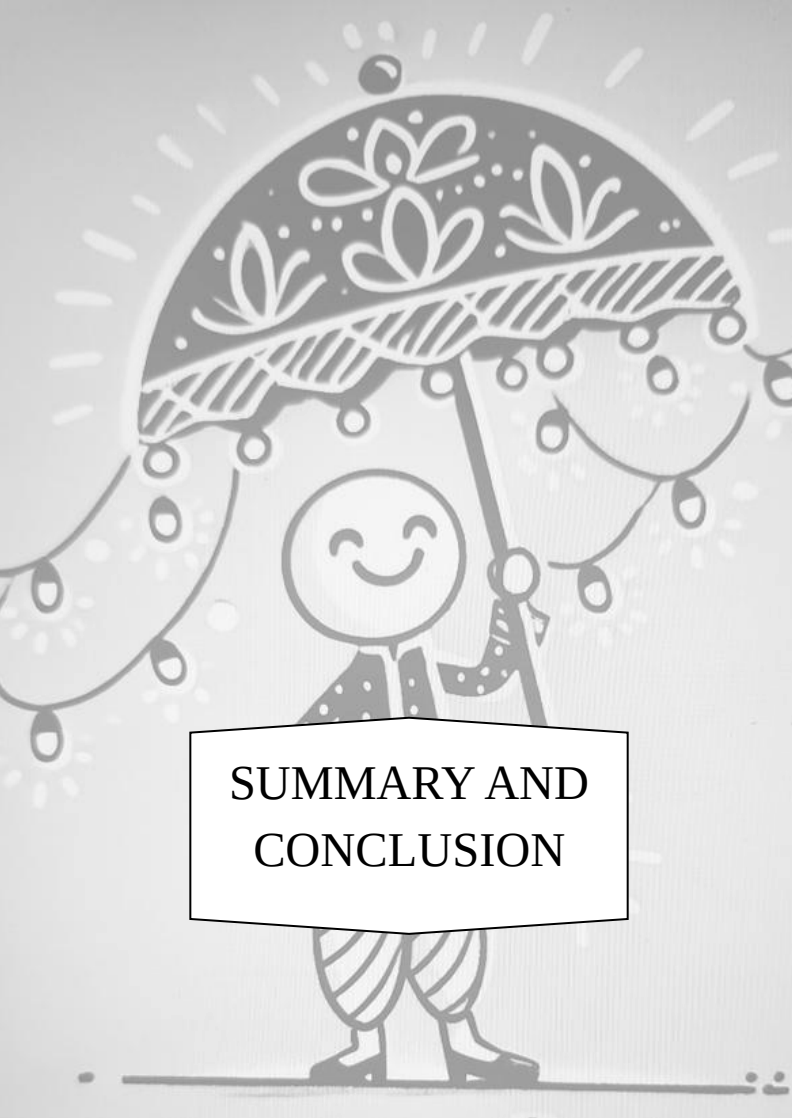


Plate 9: Eye relaxation exercise

7. The trolley-mounted decorative umbrella light can serve as an alternative to overhead or pole-mounted decorative umbrella lights during the Baraat. Prolonged use of overhead and pole-mounted lights often leads to musculoskeletal discomfort and mechanical injuries among the respondents. In contrast, the trolley-mounted design reduces physical strain by eliminating the need to carry the load, thereby promoting comfort, safety, and ease of use during extended ceremonial activities.

Plate 10: Trolly Umbrella Lights

Plate 11: Glimpse of Researcher Collecting Data



SUMMARY AND CONCLUSION

CHAPTER V

SUMMARY AND CONCULSION

Summary

The study investigates the musculoskeletal discomfort and mechanical injuries experienced by the respondents engaged in holding decorative umbrella lights during baraat. These illuminated, umbrella-shaped structures, whether handheld or pole-mounted, significantly enhance the event's visual appeal but impose considerable physical strain on workers. The study employs a descriptive research design and focuses on respondents aged 18 years and above, residing in Vadodara District, who are physically and mentally fit.

The research assesses the prevalence, severity, and contributing factors of musculoskeletal discomfort and mechanical injuries, including cuts, blisters, skin hardening, and redness, which arise from prolonged gripping, repetitive strain, and exposure to extreme environmental conditions. Additionally, it examines work-related hazards such as excessive sweating, electric shocks, blurry vision, and discomfort due to intense illumination. The study also evaluates variations in discomfort and injury prevalence based on age, gender, and work experience.

Findings indicate that respondents frequently experience perceived musculoskeletal discomfort, exhaustion, and mechanical injuries due to prolonged exposure to physically demanding tasks, inadequate ergonomic support, and lack of sufficient rest breaks. The research highlights the need for ergonomic interventions such as padded gloves, modified grip techniques, scheduled rest periods, and structured pre- and post-procession stretching routines. Moreover, the introduction of height-adjustable poles and improved ergonomic support mechanisms is recommended to alleviate biomechanical strain.

By identifying key occupational risk factors and proposing preventive strategies, this study contributes to enhancing occupational safety and well-being for respondents engaged in holding decorative umbrella lights. The findings underscore the critical need for ergonomic improvements to reduce physical strain, prevent long-term health implications, and improve overall workplace efficiency in this demanding occupation.

Statement of the Problem

The present study aims to assess musculoskeletal discomfort, mechanical injuries and work-related hazards among the respondents engaged in holding decorative umbrella lights during baraat.

Objectives of the Study

1. To collect the background information (age, gender and work experience) of the individuals engaged in holding decorative umbrella lights in Baraat.
2. To assess the perceived musculoskeletal discomfort experienced by the individuals engaged in holding decorative umbrella lights in Baraat.
3. To examine the extent of perceived exhaustion experienced by the individuals due to distance travelled while holding decorative umbrella lights in Baraat with maintaining adopted postures.
4. To assess the time spent, frequency and duration of rest pauses taken by the individuals engaged in holding decorative umbrella lights in Baraat.
5. To assess the mechanical injuries experienced by the individuals engaged in holding decorative umbrella lights in Baraat.
6. To propose coping strategies that can alleviate the musculoskeletal discomfort experienced by individuals engaged in holding decorative umbrella lights in Baraat.

Delimitations of the Study

1. The individuals residing in Vadodara district.
2. The individuals who were above 18 years and have minimum two years of work experience in holding decorative umbrella lights in Baraat.
3. The individuals who were physically and mentally normal (not physically and mentally challenged), especially females not in the pregnancy stage.
4. The individuals who were willing to participate in the research study.

Hypotheses of the Study

1. The situational variables (viz. time spent and distance travelled) vary with the personal variables (viz. gender, age and work experience) of the individuals engaged in holding Decorative Umbrella Lights during Baraat.
2. There exists a difference in the intervening variables (duration of maintaining adopted posture while holding Decorative Umbrella Lights) due to personal variables (viz. gender, age and work experience) of the individuals engaged in holding Decorative Umbrella Lights during Baraat.
3. The intervening variable (duration of maintaining an adopted posture while holding decorative Umbrella lights) vary with the dependent variable (frequency of perceived musculoskeletal discomfort experienced) of respondents engaged in holding decorative umbrella lights (overhead and pole-mounted) Baraat.
4. There exists association between the dependent variable (extent of perceived musculoskeletal discomfort experienced) and the personal variables (age, gender, and work experience) of the respondents holding decorative Umbrella lights (overhead and pole-mounted) during Baraat.
5. There exists an association between dependent variable (extent of perceived musculoskeletal discomfort experienced) and the situational variables (time spent and distance travelled holding decorative umbrella light) of the respondents.
6. There exist an association between the situational variable (type of umbrella lights viz; overhead and pole mounted) with the dependent variable (extent of perceived musculoskeletal discomfort) of the respondents.
7. There exists a relationship between the situational variable (type of umbrella lights viz; overhead and pole mounted) and the intervening variable (duration of maintaining adopted posture while holding decorative umbrella light) of respondents.

Methodology

The present study was undertaken to musculoskeletal discomfort and mechanical injuries among the respondents engaged in holding decorative umbrella lights Baraat of Vadodara district.

Purposive sampling technique was used for the selection the respondents who were engaged in holding decorative umbrella lights during Baraat. This study employs a

descriptive research design to systematically evaluate the perceived musculoskeletal discomfort experienced by individuals engaged in holding decorative umbrella lights during baraat. These lights, characterized by illuminated, umbrella-shaped structures, are either hand-held overhead or mounted on poles to enhance the aesthetic appeal of the event. The assessment of musculoskeletal discomfort was conducted using multiple parameters, including exhaustion due to prolonged duration and distance travelled, the intensity of bodily pain, and the frequency and severity of discomfort across various body regions. Exhaustion levels were measured on a five-point scale ranging from "Not Exhausted" to "Completely Exhausted," while body pain intensity was assessed on a continuum from "No Pain" to "Very Severe Pain." To comprehensively evaluate discomfort, the study utilized established ergonomic assessment tools. The Corlett and Bishop's Body Part Discomfort Scale (1976) was employed to assess upper and lower body discomfort, with frequency rated on a scale from 1 to 3 and severity from 1 to 5. Additionally, hand discomfort was analysed using the Cornell Hand Discomfort Questionnaire (1994), which quantifies discomfort in terms of frequency, severity, and interference with work activities. Beyond musculoskeletal discomfort, the study also examined mechanical injuries such as cuts, skin hardening, and redness, along with occupational hazards including electric shocks, excessive sweating, blister formation, and episodes of blurry vision encountered while holding decorative umbrella lights.

Major findings of the study

Section I: Background Information of the respondents

Information was gathered on the personal details of respondents holding overhead or pole-mounted decorative umbrella lights during the baraat. This included their name, age (in years), gender, family type, educational qualification, monthly income, work experience, and medical background. Additionally, data was collected on the timings of the baraat, the types of decorative umbrella lights used, and the actual duration of their participation in the Baraat.

Section II: Perceived Body Discomfort, Hand Discomfort and Mechanical Injuries experienced by the respondents engaged in holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

This section deals with the perceived body discomfort, hand discomfort, and mechanical injuries experienced by respondents engaged in holding decorative umbrella lights (overhead or pole-mounted) during Baraat. Data on body discomfort was collected holding the **Standardized Body Discomfort Scale developed by Collet and Bishop (1964)**, administered by the investigator in two parts, viz., upper body parts and lower body parts. The extent of frequency and severity of hand discomfort was measured holding the **Standardized Cornell Hand Discomfort Questionnaire (1994)**, administered separately for the left hand and the right hand.

Section III: Time Spent, Distance Travelled, Extent of Exhaustion Experienced, and Extent of Pain Experienced with Adopted Posture by the Respondents while holding Decorative Umbrella Light (Overhead or Pole Mounted) during Baraat.

This section presents the Time Spent, Distance Travelled, Extent of Exhaustion Experienced, and Extent of Pain Experienced with Adopted Posture by the the Respondents Engaged in Holding Decorative Umbrella Light during Baraat. The two different types of decorative Umbrella were taken into consideration Respondents engaged in holding Overhead Decorative Umbrella Lights and decorative Umbrella light with Pole Mounted.

Conclusion

Musculoskeletal discomfort and mechanical injuries represent critical occupational health challenges, particularly among individuals engaged in physically demanding and repetitive tasks. A noteworthy yet under-researched occupational group comprises individuals responsible for carrying decorative umbrella lights during *Baraat*—an essential element of traditional Indian weddings. These workers are subjected to sustained static postures, repetitive mechanical strain, awkward body positions, and prolonged weight-bearing activities, cumulatively leading to significant physical discomfort and elevated injury risk. This research endeavour aimed to systematically

assess the prevalence, nature, and severity of musculoskeletal discomfort and mechanical injuries among these individuals, alongside identifying key ergonomic and occupational determinants contributing to these adverse health outcomes.

A mixed-method research design was employed, incorporating both quantitative and qualitative methodologies. A purposive sample of 120 individuals engaged in carrying decorative umbrella lights was drawn from well-established wedding service agencies located in both urban and semi-urban areas of Vadodara, Gujarat. Data collection tools comprised the Standardized Body Discomfort Scale (Collet and Bishop, 1964), the Cornell Hand Discomfort Questionnaire (1994), and a structured mechanical injury checklist. In-depth interviews were conducted to gain qualitative insights into the lived experiences of these workers. Quantitative data were analysed using descriptive statistics, independent sample t-tests, and analysis of variance (ANOVA). Thematic analysis was applied to qualitative data to capture nuanced worker narratives.

The demographic analysis revealed that respondents ranged in age from 20 to 67 years, with the majority (68.33 per cent) falling within the age group of 36 to 51 years, and the mean age being 40 years. Females constituted 52.1 per cent of the respondents, while males accounted for 47.9 per cent. Educational attainment was predominantly low, with 51.3 per cent of respondents having completed only primary education, 22.7 per cent identified as illiterate, 16 per cent having completed secondary education, and none having pursued higher education. Work experience ranged from 2 to 11 years, with a mean of 6.2 years. The reported personal monthly income ranged from 2,000 to 7,000, with a mean income of 4,079.17, while family monthly income ranged between 20,000 and ₹60,000, averaging 33,416.67.

With respect to musculoskeletal discomfort, individuals carrying pole-mounted umbrella lights reported higher frequencies and severity of discomfort, particularly in the mid-back (45 per cent always experiencing discomfort) and lower back (38.33 per cent). Carriers of overhead umbrella lights experienced moderate discomfort in the legs, knees, and feet; however, those holding pole-mounted lights exhibited more severe discomfort in these regions, suggesting increased lower body strain associated with weight distribution and posture maintenance.

The severity of musculoskeletal pain was notably pronounced among pole-mounted umbrella carriers, with moderate to severe pain observed in the back, arms, forearms,

and palms. In contrast, minimal discomfort was reported in the buttocks and thighs. These observations underscore the cumulative musculoskeletal stress resulting from prolonged static and semi-static postures, compounded by the load-bearing nature of the task.

Hand discomfort analysis highlighted that pole-mounted umbrella carriers reported significant discomfort in the left hand, particularly in the thenar eminence and proximal interphalangeal joints. Conversely, overhead umbrella carriers reported higher levels of discomfort in the metacarpophalangeal joints of the right hand, indicating distinct biomechanical stress patterns based on the mode of light carriage.

Mechanical injuries were prevalent among respondents, with the most commonly reported issues being redness in the eyes and face (attributable to prolonged exposure to bright decorative lights), pinching of skin due to handle pressure, hardening of skin, and mild electric shocks. These injuries were predominantly mild to moderate in severity, with carriers of overhead lights experiencing slightly higher irritation of the eyes and facial skin.

The findings of this study highlight differences in endurance and rest-taking behavior between two groups holding Pole Mounted Decorative Umbrella Lights in a Baraat procession. Group 2 demonstrated greater endurance, reflected in their higher total standing time (88 minutes vs. 60 minutes in Group 1) and additional standing interval, extending their total participation to 240 minutes, 30 minutes longer than Group 1. Spontaneous rest pauses were more frequent in longer intervals, especially for Group 1 during Interval 3, indicating higher physical strain in static postures. The percentage distribution of rest pauses shows that 33.33 per cent of respondents took long-duration pauses, suggesting that extended breaks were common due to physical exertion, while 26.66 per cent took short-duration pauses, indicating brief recovery periods for some participants. Additionally, 18.33 per cent reported moderate-duration pauses, reflecting a balanced rest-taking approach. Another dataset revealed that 78.33 per cent of respondents preferred short-duration rest pauses, while 21.66 per cent took moderate pauses, and 25 per cent required long breaks, underscoring variability in endurance levels. Overall, the results suggest that continuous movement (Group 2) may help reduce fatigue, while static holding (Group 1) leads to greater physical strain and longer rest requirements.

The relationship between distance travelled and the extent of exhaustion experienced by respondents holding overhead decorative umbrella lights during the Baraat. Across both Group 1 and Group 2, a clear trend emerges: as the distance travelled increases, the proportion of respondents reporting extreme and complete exhaustion also rises. In Group 1, those covering a short distance exhibited lower exhaustion levels, with 16.67 per cent reporting no exhaustion, whereas those covering a long distance experienced significantly higher fatigue, with 33.33 per cent completely exhausted. A similar pattern is observed in Group 2, where 20.00 per cent of short-distance travellers reported no exhaustion, but among long-distance travellers, 40.00 per cent were completely exhausted. Notably, while Group 2 had a slightly higher proportion of respondents reporting no exhaustion at shorter distances, their exhaustion levels escalated more sharply at longer distances. These findings indicate that prolonged holding of overhead lights while walking in the Baraat leads to increased physical strain, with greater distances exacerbating exhaustion levels across both groups. The distance travelled and the level of exhaustion experienced by respondents holding pole-mounted decorative umbrella lights during the Baraat. Both Group 1 and Group 2 exhibited a progressive increase in exhaustion levels as the distance covered increased. While a higher proportion of short-distance travellers reported little to no exhaustion, extreme and complete exhaustion became significantly more prevalent among long-distance travellers, reaching 33.33 per cent and 40.00 per cent, respectively. This trend suggests that prolonged carrying of decorative lights imposes substantial physical strain, with fatigue intensifying over extended distances. Additionally, the comparison between overhead and pole-mounted lights indicates that both types contribute to exhaustion, reinforcing the impact of sustained participation in the Baraat procession. Overall, these findings highlight the physical demands associated with holding decorative lights for long durations, emphasizing the need for periodic rest breaks or ergonomic interventions to mitigate fatigue.

This study establishes that carrying decorative umbrella lights during Baraat is not merely a cultural engagement but a physically demanding and injury-prone occupation. The findings underscore the urgent need for targeted ergonomic interventions, periodic occupational health assessments, implementation of safety protocols, and awareness programmes to protect and enhance the well-being of these workers. Further research is warranted to design and field-test lightweight,

ergonomically optimised umbrella light structures and to evaluate structured physical training and stretching regimens aimed at reducing musculoskeletal discomfort and improving endurance within this occupational cohort.

Section IV: Testing of Hypotheses

The present section covers in detail the statistical analysis of the hypotheses of the present study. The relational statistic applied to test the hypotheses were ANOVA, “t” test, Coefficient of Correlation and Chi-square test was computed to analyse the findings statistically. The details of the rational statistics computed are described follows. Analysis of Variance was computed to show the difference between the personal variable namely Age and Work Experience and the situational variable namely time spent and distance travelled by the Respondents engaged in holding Decorative Umbrella Lights during Baraat. 't' test was applied to find out the mean difference between personal variable namely Gender of the Respondents and situational variables namely time spent while, distance travelled while walking when holding Decorative Umbrella Lights during Baraat. Pearson’s Product Moment Correlation Coefficient was computed to find out the interrelationship between the situational variable namely time spent while holding Decorative Umbrella Lights, distance travelled while walking with the Decorative Umbrella Lights with the frequency and severity of Musculoskeletal Discomfort experienced by the Respondents engaged in holding Decorative Umbrella Lights during Baraat.

Section V: Coping Strategies

The findings indicate that respondents experienced significant musculoskeletal discomfort, particularly in the right wrist, right palm, lower back, and lower limbs, due to prolonged gripping, static postures, and extensive walking while holding decorative umbrella lights during the Baraat. To mitigate these issues, ergonomic interventions such as padded handles, adjustable grips, cushioned footwear, and structured rest pauses are recommended to reduce strain and improve endurance. Additionally, prolonged gripping led to pressure points, blisters, and hand fatigue, which can be alleviated through foam padding on handles and padded gloves. The visual strain caused by bright decorative lights can be addressed with anti-glare eyewear, eye relaxation techniques, and hydration to prevent long-term ocular discomfort. A viable alternative to manual carrying is the trolley-mounted decorative

umbrella light, which eliminates the need for prolonged overhead or pole-mounted holding, thereby reducing mechanical injuries and enhancing overall comfort and safety during extended ceremonial events. These ergonomic modifications collectively promote better posture, reduced fatigue, and improved physical well-being for respondents participating in prolonged Baraat processions.

Implications of the study

The finding of the study has the following implications:

1. For the field of Family and Community Resource Management:

As the field of Family and Community Resource Management and has The field of Family and Community Resource Management has a core subject like Ergonomics, Consumer ergonomics, Human Resource Management, Extension in Resource Management in their curriculum. Therefore, the present research will be adding in the literature of studies done in the field of Family and Community Resource Management.

2. For the Respondents:

The findings of the present investigation regarding frequency and severity of musculoskeletal discomfort experienced in upper and lower body parts by the respondents engaged in holding decorative umbrella lights during Baraat also suggested coping strategies mention in the study can also be adopted for the same.

Recommendations for future researcher

1. A comparative study on musculoskeletal discomfort experienced by individuals carrying decorative umbrella lights in different cultural and occupational settings can be undertaken.

2. A research study can be carried out to examine the long-term physiological effects of carrying decorative umbrella lights, focusing on chronic musculoskeletal disorders and degenerative conditions.

3. A research study can be conducted to assess the impact of ergonomic interventions, such as lightweight materials and modified handle designs, in reducing physical strain for individuals carrying decorative umbrella lights.

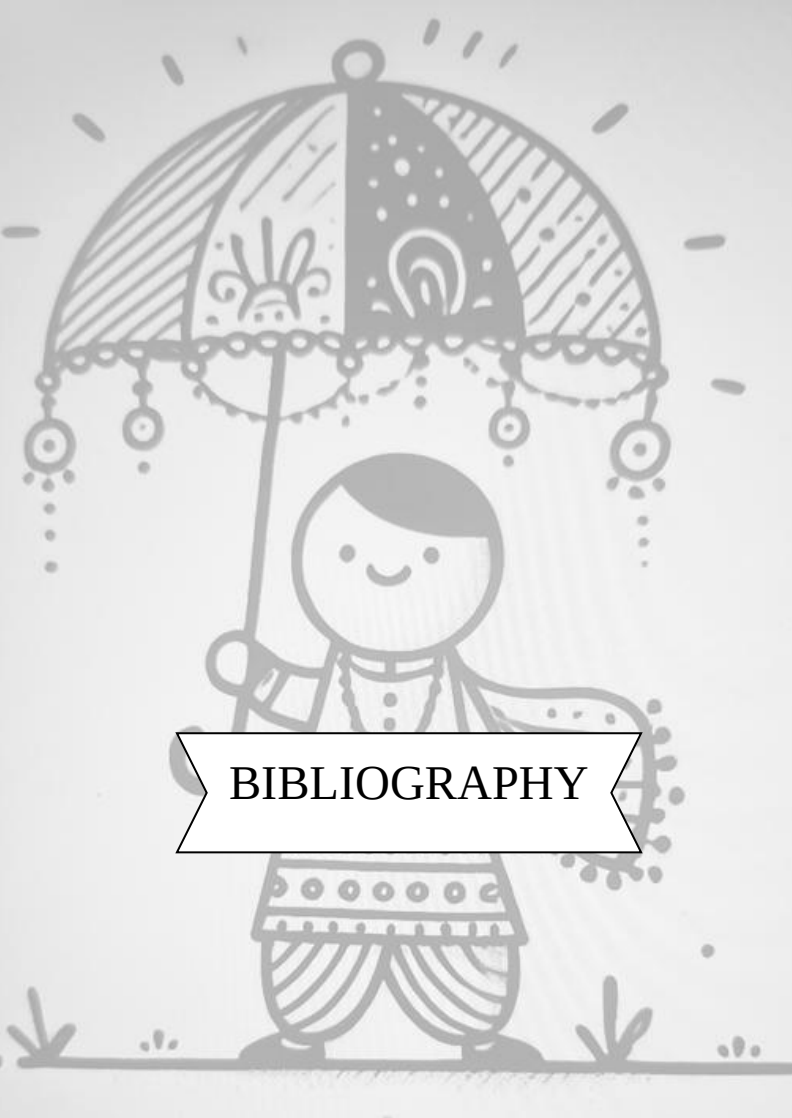
4. A research study can be undertaken to evaluate the effectiveness of coping strategies, including structured rest breaks, targeted stretching exercises, and supportive footwear, in minimizing musculoskeletal discomfort.

5. A study can be carried out to explore interdisciplinary approaches involving biomechanics, ergonomics, and occupational health for developing assistive devices or support systems for individuals carrying decorative umbrella lights.

6. A research study can be conducted to assess the social and economic challenges faced by individuals engaged in carrying decorative umbrella lights through qualitative analysis of worker experiences.

7. A study can be undertaken to employ technology-driven assessments, such as motion capture analysis, electromyography (EMG), and wearable sensors, to measure biomechanical stress and ergonomic inefficiencies.

8. A research study can be carried out to develop occupational health guidelines and safety recommendations for individuals carrying decorative umbrella lights, collaborating with event organizers and policymakers.



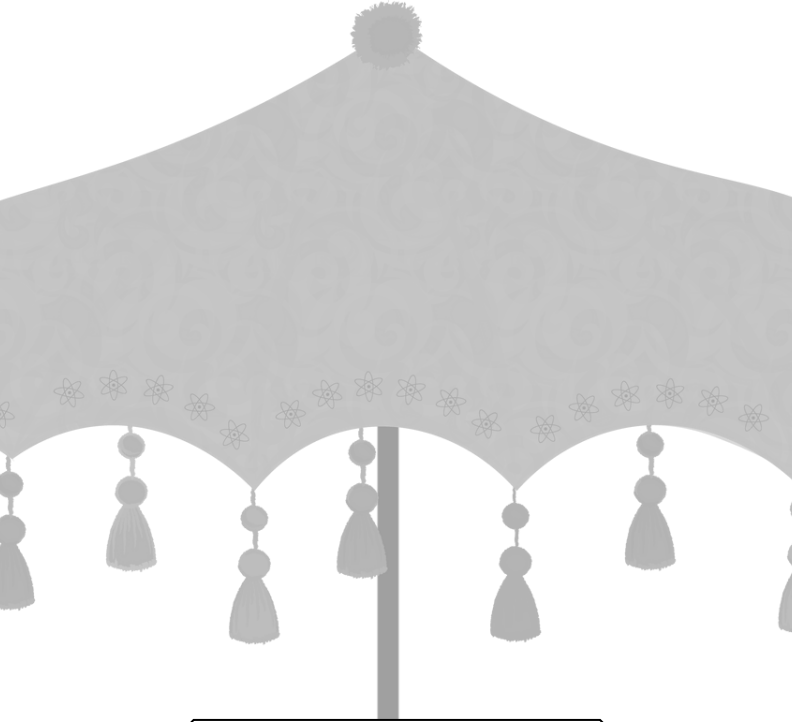
BIBLIOGRAPHY

Bibliography

- Amrita S., (2024). Preserving the Moment: An In-depth Exploration of Wedding Photography Trends and Styles.
- Brown, J. M. (2010). Modern India: The origins of an Asian democracy (2nd ed.). Oxford University Press.
- Bhattacharya, S. (2021). Fusion weddings in India: Blending traditions in contemporary ceremonies. Journal of South Asian Culture and Society.
- Chakrabarty, R. (2004). Marriage, love, caste and kinship in India: Practices and perceptions from the colonial period to the present. Oxford University Press.
- Choudhury, M., & Roy, S. (2021). The role of social media in shaping wedding planning decisions among millennials. International Journal of Marketing Studies.
- Dube, L. (2001). Anthropological explorations in gender: Intersecting fields. SAGE Publications India.
- Ghosh, B. (2006). The changing status of women in West Bengal, 1970–2000: The challenge of culture and political economy. SAGE Publications. Retrieved from
- Gupta H. and Singh Y., (2019). Emerging Trends of Hindu Marriage and their Impact.
- Grover, S. (2023). Marriage, love, caste, and kinship support: Lived experiences of the urban poor in India. Routledge.
- Hendra D., (2023). The presence of Mak Andam in the Lingga Malay Traditional Cultural Wedding Procession.
- Jaiswal and Veer Kumar, (2020). Musculoskeletal Pain and Postural Discomfort Among Marble Cutting Workers in the Marble Industry in Kishangarh.
- Kaur and Sharma, (2014). Ergonomic assessment of existing methods of harvesting flowers from the fields.
- Kaur, M. (2023). Multi-Culturalism: A study of India.
- Khan, M. A. (2007). Islamic law of marriage and divorce: The influence of local customs and interfaith traditions. Journal of Islamic Law and Culture, **9**(2), 85–102.
- Kumar, P. (2015). Reconceptualizing cultural globalization: Connecting the cultural global and the cultural local.
- Jones, G. W., & Ramdas, K. (2019)**.** Marriage and changing family structures in Asia: Implications for human rights and policy. Asian Journal of Social Science, 47(3), 327–350.
- Mishra and Singh, (2017). Musculoskeletal Disorder in Flower Plucking Women.

- Mishra U., Upadhyay E., (2020). Assessment of Musculoskeletal Discomforts experienced by the Rose Farm Workers of Vadodara District.
- Mishra U., Upadhyaya E. & Goswami P., (2024). Musculoskeletal Discomforts Experienced by the Rose Farm Workers of Vadodara District.
- Nandy, S., Gangopadhyay, S., & Hulke, S. M. (2017). Musculoskeletal Disorders among the Gardeners.
- Pal and Dhara (2018), Work-Related Musculoskeletal Disorders and Postural Stress of the Women Cultivators Engaged in Uprooting Job of Rice Cultivation.
- Patel S., (2024). Musculoskeletal Discomfort Experienced by Office Staff: A Hindrance to Efficient Work Performance.
- Patel S., Chandra S. and Veerkumar V., (2024). Musculoskeletal Discomfort Experienced by the Office Staff: A Hindrance in Efficient Work Performance.
- Patel N. P., Soni D. S., Talaviya R. M., Tank R. P., and Solanki M. S. (2023). Association Between Work-Related Musculoskeletal Disorders and Fatigue Among Female Beauticians in Ahmedabad.
- Sarkar K., Dev S., Das T., and Gangopadhyay S. (2016). Prevalence of musculoskeletal disorders among workers in a central market area of Kolkata, India. International Journal of Occupational Safety and Health
- Sen, S. (2017). Wedding traditions of India: Rituals, customs, and regional diversity. Roli Books.
- Shakoor A., Naz F., and Khan F. R. (2022). Impact of Occupational Musculoskeletal disorders on Dentists.
- Singh, K. (2018). Indian weddings: Cultural diversity and traditions. National Book Trust.
- Silva L. K. D., Silva A. T. C. D., Moreno C. F., Souza E. R. M. D., and Silva J. M. N. D. (2024) Assessment of the Musculoskeletal Discomfort Scale for Upper Limbs Among Workers in Inner Brazil.
- Sharma, M. (2022). Diversity and inclusivity in contemporary Indian weddings: Changing family structures and personal expression. Journal of South Asian Studies
- Sharma, R. (2023). Indian wedding seasons: Trends and timing insights. The Wedding Brigade.
- The Knot Worldwide. (2021). The global wedding report: Trends and technology.
- Uberoi, P. (2006). Freedom and destiny: Gender, family, and popular culture in India. Oxford University Press.

- Yadav R., and Khan A. (2016). Ergonomic factors contributing to work-related musculoskeletal disorders (WMSDs) among female labourers carrying head loads at construction sites in Haryana.



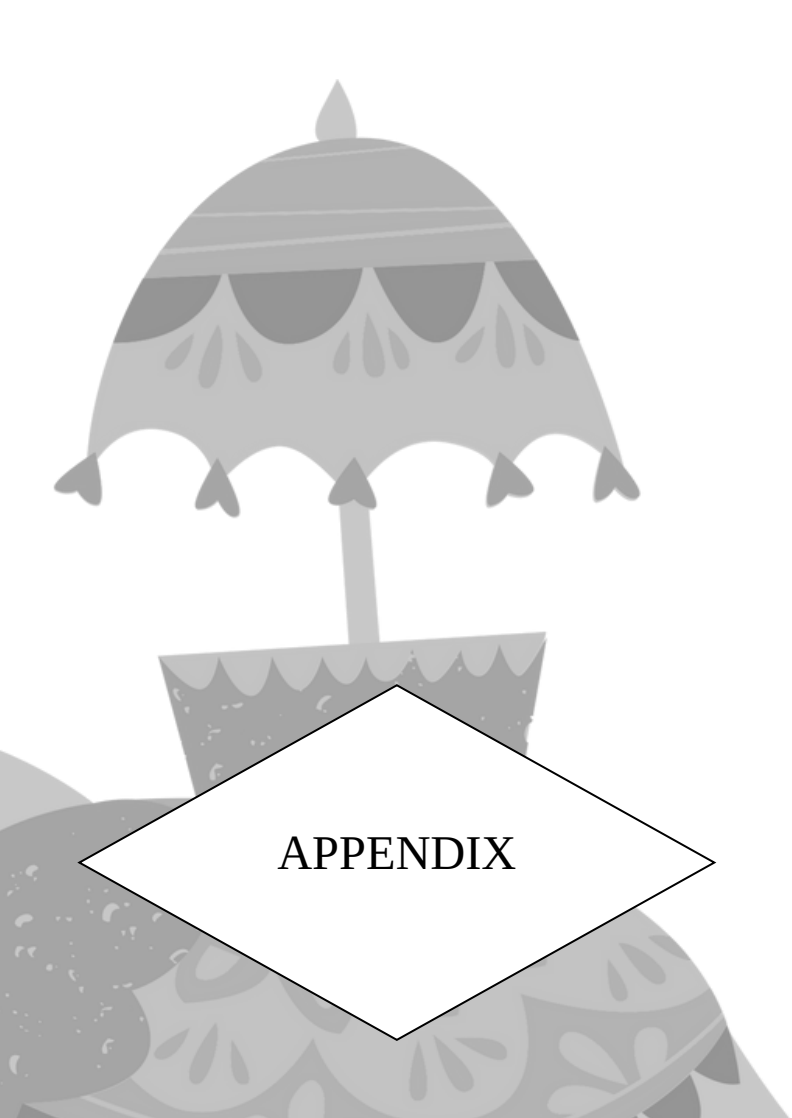
WEBLIOGRAPHY

Webliography

1. Indianetzone. (n.d.). History of Indian wedding. Indianetzone.com. https://www.indianetzone.com/2/history_indian_wedding.htm
2. Cooper, K. (n.d.). What's a Baraat? Kathryn Cooper Weddings. https://www.kathryncooperweddings.com/whats-a-baraat/
3. Here are the APA 7 format references for the sources you provided:
4. The Knot. (n.d.). Baraat wedding: Everything you need to know about this lively Indian wedding tradition. The Knot. https://www.theknot.com/content/baraat-wedding
5. Westbrook, R. (1988). Babylonian marriage agreements: 7th–3rd centuries B.C. Pontificio Istituto Biblico. https://books.google.com/books/about/Babylonian_Marriage_Agreements.html?id=OtgXAQAAIAAJ
6. Doniger, W. (1982). Hindus: An alternative history. Archive.org. https://archive.org/details/hindusalternativ0000doni
7. Uberoi, P. (1993). The family in India: Beyond the nuclear versus joint debate. Social Scientist, 21(3–4), 71–86. https://www.jstor.org/stable/43951877
8. Grover, S. (2023). Marriage, love, caste and kinship support: Lived experiences of the urban poor in India. Routledge. https://www.routledge.com/Marriage-Love-Caste-and-Kinship-Support-Lived-Experiences-of-the-Urban-Poor-in-India/Grover/p/book/9781032652849
9. Brown, J. M. (1994). Modern India: The origins of an Asian democracy. Oxford University Press. https://archive.org/details/modernindiaorigi0000brow
10. Tomlinson, J. (2015). Reconceptualizing cultural globalization: Connecting the cultural global and the cultural local. *ResearchGate*. https://www.researchgate.net/publication/282420170_Reconceptualizing_Cultural_Globalization_Connecting_the_Cultural_Global_and_the_Cultural_Local
11. Mitra, S. (2020). Wedding as text: Performing and re-creating social hierarchies through marriage ceremonies in India. Asian Journal of Social Science, 47(3), 355–376. https://doi.org/10.1163/15685314-04703005
12. Discover Walks. (2021, December 13). Indian weddings: 20 must-know traditions and ceremonies. Discover Walks Blog.

https://www.discoverwalks.com/blog/india/indian-weddings-20-must-know-traditions-and-ceremonies/

13. Basha, S. R. (2023). Multiculturalism: A study of India. ResearchGate. https://www.researchgate.net/publication/371165548_MULTICULTURALISM_A_STUDY_OF_INDIA
14. Times Group. (2023, August 15). Decoding South Indian weddings: Rituals, attire, and traditions. Times Group Ads Blog. https://ads.timesgroup.com/blog/matrimonial/decoding-south-indian-weddings-rituals-attire-and-traditions/1726125366908
15. Doniger, W. (1982). Hindus: An alternative history. Archive.org. https://archive.org/details/hindusalternativ0000doni
16. The Wedding Brigade. (n.d.). The Wedding Brigade: Everything for the Indian wedding. The Wedding Brigade. https://www.theweddingbrigade.com
17. Dube, S. C. (1992). Anthropological explorations in gender: Intersecting fields. Sage Publications. https://archive.org/details/anthropologicale0000dube
18. Singh, K. S. (Ed.). (1990). Changing status of women in India. Anthropological Survey of India. https://archive.org/details/changingstatusof0000unse_w0z1
19. Ubersfeld, A. (1999). Freedom and destiny: Gender, family, and fate in Indian culture. Archive.org. https://archive.org/details/freedomdestinyge0000uber
20. The Knot Worldwide. (n.d.). The Knot Worldwide: Global wedding platform. The Knot Worldwide. https://www.theknotww.com
21. Alvi, S., & Kazmi, S. H. A. (2021). Marriage in South Asia: Tradition, changes, and continuity. International Journal of Marketing Studies, 13(4), 45–55. https://doi.org/10.5539/ijms.v13n4p45
22. Would you like me to compile these into a Word or PDF reference list for easy use?
23. The Muscle Masher. (n.d.). Basic padded handle. The Muscle Masher. https://themusclemasher.com/product/basic-padded-handle/
24. Tecra Tools. (n.d.). Heavy-duty padded handle. Tecra Tools. https://tecratools.com/product1446.html



APPENDIX

APPENDIX I

Department of Family and Community Resource Management
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda

Respected Madam/Sir,

I am a senior M.Sc. student in the Department of Family and Community Resource Management, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara. As part of the partial fulfilment of my M.Sc. degree, I am conducting research on ″Musculoskeletal Discomfort and Mechanical Injuries Experienced by Individuals Engaged in Holding Decorative Umbrella Lights in Baraat."

Your responses will be kept strictly confidential. I would greatly appreciate your valuable suggestions and expert guidance to improve the study and ensure its completion. Your input will significantly contribute to its success.

With kind regards,

Sincerely,

Vidhi Chokshi

Vidhi Chokshi	**Dr. Urvashi Mishra**
Research Student	**Guide**

આદરણીય મેડમ/સાહેબ,

હું વડોદરાની મહારાજા સયાજીરાવ યુનિવર્સિટીની પરિવાર અને સમુદાય વિજ્ઞાન ફેકલ્ટી, પરિવાર અને સમુદાય સંસાધન વ્યવસ્થાપન વિભાગમાં સિનિયર એમ.એસ.સી. વિદ્યાર્થી છું. મારી એમ.એસ.સી. ડિગ્રીની આંશિક પૂર્ણતાના ભાગરૂપે, હું "બારાતમાં સુશોભન છત્રી લાઇટ્સ પકડી રાખતી વ્યક્તિઓ દ્વારા અનુભવાતી સ્નાયુબદ્ધ, અગવડતા અને યાંત્રિક ઇજાઓ" વિષય પર સંશોધન કરી રહી છું.

તમારા પ્રતિભાવો સંપૂર્ણપણે ગુપ્ત રાખવામાં આવશે. સંશોધનને વધુ ઉન્નત બનાવવા અને તેનું સફળતાપૂર્વક પૂર્ણ થવાનું સુનિશ્ચિત કરવા માટે, હું તમારા મૂલ્યવાન સૂચનો અને નિષ્ણાત માર્ગદર્શનની ખૂબ પ્રશંસા કરીશ. તમારું સહયોગ અને ઇનપુટ, આ અભ્યાસની સફળતામાં નોંધપાત્ર ફાળો આપશે.

સાદર,

વિધિ ચોક્સી

સંશોધન વિદ્યાર્થી
વિધિ ચોક્સી

ડૉ. ઉર્વશી મિશ્રા
માર્ગદર્શિકા

APPENDIX II

Interview Scheduled

Form no: _____

Section I: Background Information of the Respondent

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1. **Name of Respondent:_____**
2. **Age (in years): _____**
3. **Gender:**

□ Male

□ Female

□ Others

4. **Educational Qualification:**

□ Illiterate

□ Up to Primary School

□ Up to Secondary School

□ Up to Higher Secondary

□ Graduate

□ Any other: _____

5. **Work Experience (in years):** Years____Months____
6. **Monthly Income (in rupees):**

   a. **Personal Income:**

      Below 2000

      2000-3000

      3000-4000

      4000-5000

      Above 5000

   b. **Family Income:**

      Below 10, 000

      10,000-20,000

      20,000-30,000

      30,000-40,000

      40,000-50,000

      Above 50,000

7. **Timings of the Baraat**
    - 5.00 pm to 7. 00 pm
    - 7.00 pm to 9.00 pm
    - 9.00 pm 11.00 pm
8. **Frequency of Participation in the Baraat**
    - 1 Baraat per day
    - 2 Baraat per day
    - 3 Baraat per day
9. **Types of Decorative Umbrella Lights**
    - Overhead Decorative umbrella light
    - Umbrella light with pole
10. **Actual Time Spent Participating in the Baraat**
    - 1 Hour per day
    - 2 Hour per day
    - 3 Hour per day
    - 4 Hour per day
    - 5 Hour per day
    - 6 Hour per day

SECTION II

Frequency and Severity of Perceived Body Discomfort experienced by the Individuals Engaged in Holding Decorative Umbrella Light in Baraat

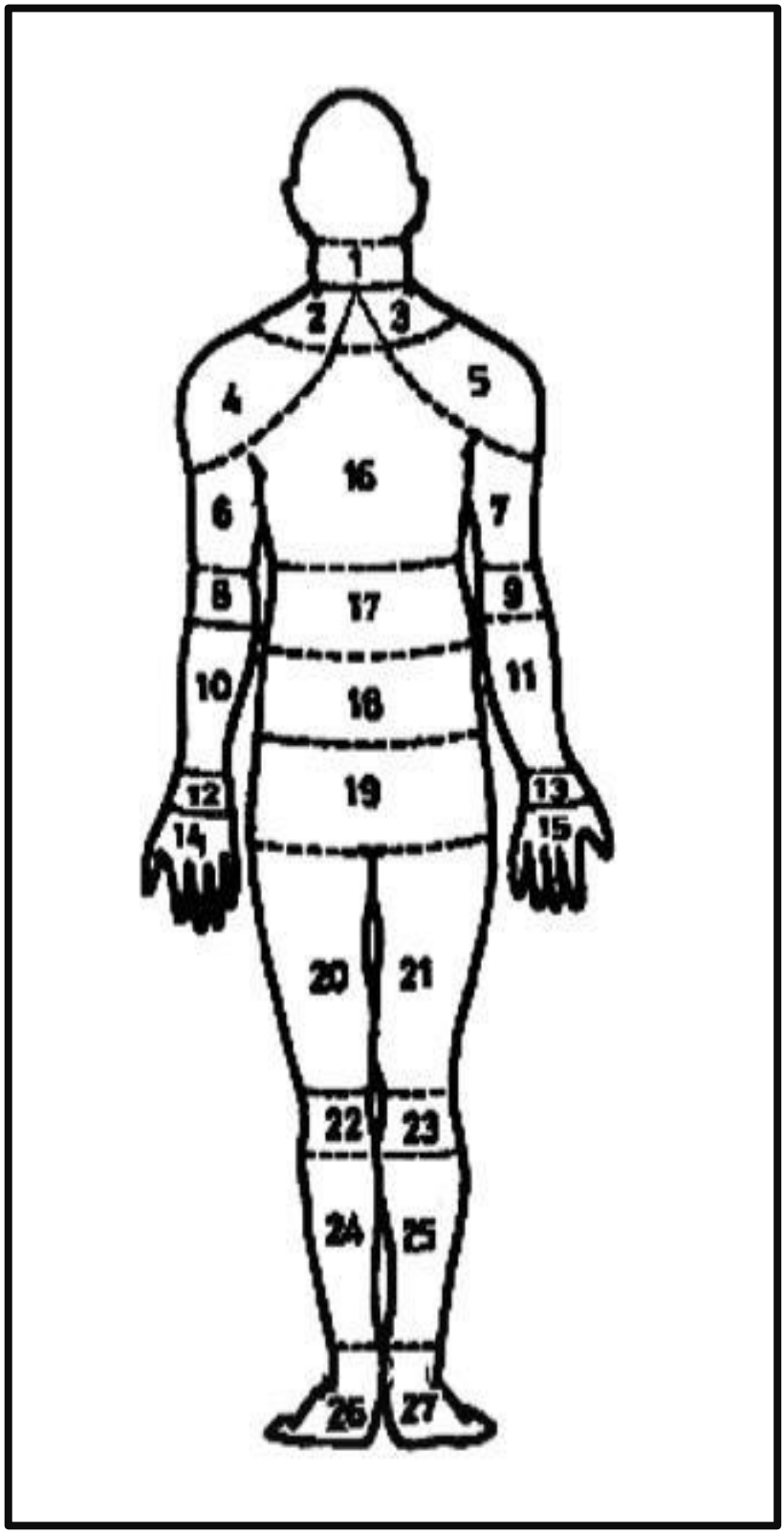
Note: ***The below SECTION II (A) is Corlett and Bishop's Body Parts Discomfort Standardized Scale (1976).***

A. Frequency and Severity of Perceived Body Discomfort experienced by the individuals engaged in holding decorative umbrella light in Baraat.

Overhead Decorative Umbrella Light / Decorative Umbrella Light Pole Light

Sr. no	Body Parts	Frequency of Body Discomfort			Severity of Body Discomfort				
		Always	Sometimes	Never	Very Severe Pain	Severe Pain	Moderate Pain	Mild Pain	No Pain
A-1 Upper Body Parts					**A-3 Upper Body Parts**				
1	Neck								
2.	Clavicle Left								
3	Clavicle Right								
4.	Left Shoulder								
5.	Right shoulder								
6.	Left arm								
7.	Right Arm								
8.	Left elbow								
9	Right elbow								
10	Left forearm								
11	Right forearm								
12	Left Wrist								
13	Right Wrist								
14	Right Palm								
15	Left Palm								
16	Upper back								
17	Mid back								
A-2 Lower Body Parts					**A-4 Lower Body Parts**				
18	Lower back								
19	Buttocks								
20	Left thigh								
21	Right thigh								
22	Left knee								
23	Right knee								
24	Left leg								
25	Right leg								
26	Left foot								
27	Right foot								

CORLETT AND BISHOP'S BODY PARTS DISCOMFORT STANDARDIZED SCALE (1976)



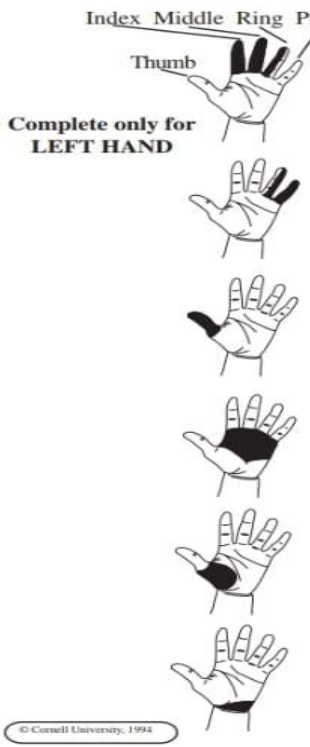
1. Neck
2. Clavicle Left
3. Clavicle Right
4. Left Shoulder
5. Right Shoulder
6. Left Arm
7. Right Arm
8. LeftElbow
9. Right Elbow
10. Left Forearm
11. Right Forearm
12. Left Wrist
13. Right Wrist
14. Left Palm
15. Right Palm
16. Upper Back
17. Mid Back
18. Lower Back
19. Buttocks
20. Left Thigh
21. Right Thigh
22. Left Knee
23. Right Knee
24. Left Leg
25. Right Leg
26. Left Foot
27. Right Foot

B. Discomfort experienced in <u>Left Hand</u> by the Individuals Engaged in Holding Decorative Umbrella Light in Baraat.

Note: ***The below SECTION II (B) is Cornell Hand Discomfort Questionnaire (CHDQ-1994).***

Overhead Decorative Umbrella Light / Decorative Umbrella Light Pole Light

The shaded areas in the diagrams below show the position of the body parts referred to in the questionnaire. Please answer by marking the appropriate box.

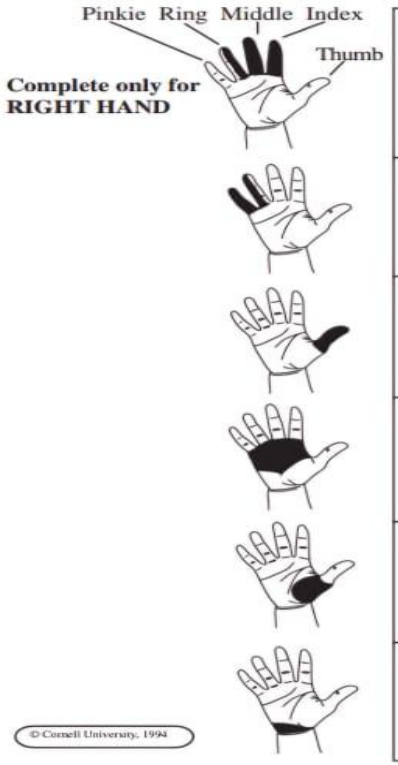


	During the last work <u>week</u> how often did you experience ache, pain, discomfort in:	If you experienced ache, pain, discomfort, how uncomfortable was this?	If you experienced ache, pain, discomfort, did this interfere with your ability to work?
Area A (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered
Area B (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered
Area C (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered
Area D (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered
Area E (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered
Area F (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered

C. Discomfort experienced in <u>Right Hand</u> by the Individuals Engaged in Holding Decorative Umbrella Light in Baraat.
Note: ***The below SECTION II (C) is Cornell Hand Discomfort Questionnaire (CHDQ-1994).***

Overhead Decorative Umbrella Light / Decorative Umbrella Light Pole Light

The shaded areas in the diagrams below show the position of the body parts referred to in the questionnaire. Please answer by marking the appropriate box.



	During the last work <u>week</u> how often did you experience ache, pain, discomfort in:	If you experienced ache, pain, discomfort, how uncomfortable was this?	If you experienced ache, pain, discomfort, did this interfere with your ability to work?
Area A (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered
Area B (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered
Area C (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered
Area D (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered
Area E (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered
Area F (Shaded area)	☐ Never ☐ 1-2 times last week ☐ 3-4 times last week ☐ Once every day ☐ Several times every day	☐ Slightly uncomfortable ☐ Moderately uncomfortable ☐ Very uncomfortable	☐ Not at all ☐ Slightly interfered ☐ Substantially interfered

D. Mechanical Injuries Experienced by the Respondents Engaged in Holding Decorative Umbrella Light in Baraat.

Overhead Decorative Umbrella Light / Decorative Umbrella Light Pole Light

S.N.	Mechanical Injuries	D1 Frequency Scale			D2 Severity Scale		
		Always	Sometimes	Never	Mild	Moderate	Severe
1)	Cuts on the skin.						
2)	Pinched Skin						
3)	hardening of the skin.						
4)	Tears in the skin.						
5)	Redness in the eyes.						
6)	redness on the face.						
7)	Electric shocks						
8)	Blisters on the Skin						
9)	Blurry Vision						

Observation Sheet

SECTION III

Time Spent, Rest pause taken, Distance Travelled and Extent of Exhaustion Experienced with Adopted Posture by the the respondents engaged in holding Decorative Umbrella Light during Baraat.

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1. Time Spent, Distance Travelled, Extent of Exhaustion Experienced, and Extent of Pain Experienced with Adopted Posture by the respondents engaged in holding Decorative Umbrella Light in Baraat

A. Time spent (minutes) and rest pause taken by the respondents while holding Overhead Decorative Umbrella Lights

Category	Group 1 (n=30)	Group 2 (n=30)
Posture adopted "Standing with Arms Raised" for Holding Light While Standing Still "Walking with Arms Raised" for Holding Light While Moving		
Interval 1 **Allotted Time with Holding Light Continuously**		
No. of Respondents Holding light Continuously		
No. of Respondents Taking spontaneous Rest Pauses		
Rest Pause Duration (Minutes)		
Interval 2 **Allotted Time with Holding Light Continuously**		
No. of Respondents Holding light Continuously		
No. of Respondents Taking spontaneous Rest Pauses		
Rest Pause Duration (Minutes)		
Interval 3 **Allotted Time with Holding Light Continuously**		
No. of Respondents Holding light Continuously		
No. of Respondents Taking spontaneous Rest Pauses		
Rest Pause Duration (Minutes)		
Interval 4 **Allotted Time with Holding Light Continuously**		
No. of Respondents Holding light Continuously		
No. of Respondents Taking spontaneous Rest Pauses		
Rest Pause Duration (Minutes)		
Total Time Spent (All Intervals Combined)		
Total Time- Standing Intervals with holding lights		
Total Time- Walking with Lights with holding lights		
Grand Total Time Spent in Baraat		

B. Time spent (minutes) and rest pause taken by the respondents while holding Pole Mounted Decorative Umbrella Lights

Category	Group 1 (n=30)	Group 2 (n=30)
Posture Adopted "Standing with Arms Extended Forward" for Holding Pole Light While Standing Still "Walking with Arms Extended Forward" for Holding Pole Light While in Motion		
Interval 1 **Allotted Time with Holding Light Continuously**		
No. of Respondents Holding Light Continuously		
No. of Respondents Taking Spontaneous Rest Pauses		
Rest Pause Duration (Minutes)		
Interval 2 **Allotted Time with Holding Light Continuously**		
No. of Respondents Holding Light Continuously		
No. of Respondents Taking Spontaneous Rest Pauses		
Rest Pause Duration (Minutes)		
Interval 3 **Allotted Time with Holding Light Continuously**		
No. of Respondents Holding Light Continuously		
No. of Respondents Taking Spontaneous Rest Pauses		
Rest Pause Duration (Minutes)		
Total Time Spent in Standing Intervals		
Total Time Spent Walking with Lights		
Over all Total Time Spent in Baraat		

C. Distance Travelled by the respondents Holding Decorative Umbrella Lights during Baraat

Overhead Decorative Umbrella Lights/Pole Mounted Decorative Umbrella Lights

		The extent of Body Discomfort (Measured on Extent of Exhaustion)									
Distance Travelled	**Description**	**Not Exhausted**		**Little Exhausted**		**Moderately Exhausted**		**Extremely Exhausted**		**Completely Exhausted**	
Baraat Group 1 (n=30)		*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*
0 to 0.83 km (0 to 833 meters)	**Short Distance**										
0.83 to 1.67 km (833 to 1,667 meters)	**Moderate Distance**										
1.67 to 2.5 km (1,667 to 2,500 meters)	**Long Distance**										
Baraat Group 2 (n=30)											
0 to 0.83 km (0 to 833 meters)	**Short Distance**										
0.83 to 1.67 km (833 to 1,667 meters)	**Moderate Distance**										
1.67 to 2.5 km (1,667 to 2,500 meters)	**Long Distance**										


ABSTRACT

ABSTRACT

Musculoskeletal discomfort and mechanical injuries are critical occupational health issues, especially among workers engaged in physically demanding tasks. One such under-researched occupational group includes respondents holding decorative umbrella lights during Baraat, an integral part of traditional Indian weddings. These respondents are exposed to sustained static postures, repetitive strain, awkward body positions, and prolonged weight-bearing activities, leading to significant physical discomfort and injury risks. This study aims to explore the prevalence, nature, and severity of musculoskeletal discomfort and mechanical injuries experienced by these respondents and to identify contributing ergonomic and occupational factors.

The objectives of the study were 1. To collect the background information (age, gender and work experience) of respondents engaged in holding decorative umbrella lights in Baraat. 2. To assess the musculoskeletal discomfort experienced by respondents holding decorative umbrella lights in Baraat. 3.To examine the extent of perceived exhaustion by the respondents engaged in Baraat due to time spent and distance travelled while holding decorative umbrella lights with maintaining adopted Postures. 4.To assess the frequency and duration of rest pauses taken by the respondents holding decorative umbrella lights in Baraat. 5.To assess the mechanical injuries experienced by respondents holding decorative umbrella lights in Baraat. 6.To propose coping strategies that can alleviate the musculoskeletal discomfort experienced by respondents engaged in holding decorative umbrella lights in Baraat.

A mixed-method research design was employed, involving both quantitative and qualitative approaches. A purposive sample of 120 decorative umbrella light carriers from prominent wedding agencies in urban and semi-urban areas of Vadodara was selected for the study. Data collection was conducted using standardized tools, including the Standardized Body Discomfort Scale developed by Collet and Bishop (1964), Standardized Cornell Hand Discomfort Questionnaire (1994) and structured mechanical injury checklist. In-depth interviews were also conducted to gather qualitative insights into the lived experiences of the workers. The quantitative data were analysed using descriptive statistics, t-tests, ANOVA and chi-square while qualitative data were subjected to thematic analysis.

The major findings of the study reveals that the age ranged from 20 to 67 years. It was observed that 20 per cent of the respondents belonged to the age group of 20 to 35 years, 68.33 per cent were in the age group of 36 to 51 years, and 11.67 per cent were in the age group of 52 to 67

years. This indicates that the respondents were middle-aged, with mean age of 40 years. Further, 52.1 per cent of the respondents were females, while 47.9 per cent were males and 51.3 per cent of the respondents had education up to the primary level, 22.7 per cent were illiterate, 16 per cent had completed secondary education, and 10 per cent had completed higher secondary education. None of the respondents had completed graduation. Work experience ranged from 2 to 11 years, with an average of 6.2 years. Personal monthly income ranges from 2000 to 7000 and mean was found to be ₹4,079.17. Family monthly income range between 20000 to 60000 was found to be ₹33,416.67.

Regarding frequency of body discomfort experienced in upper body parts and lower body parts while holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat. The respondents holding pole-mounted umbrella lights reported relatively lower levels of upper back discomfort. Among, 33.33 per cent respondents always experienced upper back discomfort. However, discomfort in the mid and lower back was more frequent, with 45 per cent always experiencing mid back discomfort and 38.33 per cent always experiencing lower back discomfort. Respondents holding overhead lights experienced moderate discomfort in the legs, knees, and feet, while respondents holding pole-mounted lights reported even higher discomfort, particularly in the legs. Knees and feet discomfort levels were also slightly higher for respondents holding pole-mounted lights, though both types of lights caused similar levels of strain in the buttocks and thighs. Overall, both overhead and pole-mounted lights led to moderate discomfort, but pole-mounted lights resulted in a higher frequency of discomfort in the legs, indicating greater physical strain.

The extent of body discomfort based on the severity of pain experienced by the respondents in upper body parts and lower body parts while holding Decorative Umbrella Lights (Overhead or Pole Mounted) during Baraat. Discomfort in the thighs and buttocks was minimal, but respondents holding pole-mounted decorative umbrella lights experienced moderate pain in the back, arms, forearms, and palms. The findings highlight substantial body discomfort, particularly in the clavicles, mid-back, and hands. The analysis of body discomfort reveals that the Pole Mounted Decorative Umbrella Lights resulted in a higher incidence of severe pain across most lower body parts compared to Overhead Decorative Umbrella Lights. The knees, legs, and feet were the most affected body regions, with a notably higher percentage of respondents experiencing moderate to severe pain. On the other hand, the buttocks and thighs experienced relatively less discomfort, respondents reported no pain in these areas. The

findings indicate that the pole-mounted decorative umbrella lights place a greater physical burden on the body, particularly in the lower limbs, may be due to weight distribution, posture, and prolonged standing during the Baraat.

The hand discomfort for left hand indicates that respondents holding pole-mounted decorative umbrella lights experienced higher frequencies and intensities across most areas, with Area A (Thenar eminence) and Area D (Proximal interphalangeal joints) recording the most severe discomfort. Whereas, respondents holding overhead decorative umbrella lights reported lower discomfort levels, with Area E (Distal interphalangeal joints) reflecting the least reported pain. The analysis underscores the ergonomic and physiological implications of prolonged engagement with decorative umbrella lights, necessitating further investigation into potential design modifications or work-rest interventions to mitigate discomfort among the respondents.

The hand discomfort for right hand indicates that respondents holding Overhead Decorative Umbrella Lights experienced higher discomfort levels across all hand areas compared to respondents holding Pole Mounted Decorative Umbrella Lights. Among the most affected areas, Area C (Metacarpophalangeal joints) exhibited the highest severity of discomfort with Pole Mounted Decorative Umbrella Lights and Overhead Decorative Umbrella Lights.

The data reveals that mechanical injuries are common among respondents holding decorative umbrella lights during the Baraat. The most frequent injuries include redness in the eyes, redness on the face, and skin pinching due to handle pressure. Redness on the face, in the eyes and blurry eyes were the most common issues, likely due to prolonged exposure to bright lights. Electric shocks, pinching of the skin and skin hardening were also frequently reported, especially for Respondents engaged in holding Decorative Umbrella Lights. The severity mechanical injuries are common among respondents holding decorative umbrella lights during the Baraat. Skin cuts, pinching, and hardening are frequent issues, with most cases being mild to moderate in severity. Tears in the skin and redness (eyes and face) due to prolonged exposure to bright lights are also moderate concerns, with Overhead Decorative Umbrella Lights holders experiencing slightly higher severity levels. Respondents engaged in holding Decorative Umbrella Lights tend to experience fewer severe injuries but still report moderate discomfort and irritation.

The given context highlights the endurance and muscular fatigue experienced by two groups during a baraat while holding overhead decorative umbrella lights. Group 2 demonstrated

greater endurance, holding the lights for 88 minutes compared to Group 1's 60 minutes and participating in a longer total baraat duration of 240 minutes versus 210 minutes. Interval-based analysis showed that longer static postures led to increased fatigue and spontaneous rest pauses, especially in the final intervals, indicating that muscular fatigue escalates with prolonged holding durations. The differences in endurance between the groups suggest individual physiological variations and adaptive capabilities, reinforcing the need for strategic rest periods to sustain performance during extended ceremonial activities.

The given context effectively demonstrates the impact of prolonged static and dynamic tasks on physical endurance while holding pole-mounted decorative umbrella lights during a baraat. Group 2 exhibited higher overall endurance, with a total participation time of 300 minutes, exceeding Group 1's 250 minutes. Despite having a shorter standing duration (55 minutes in Group 2 versus 75 minutes in Group 1), Group 2 sustained much longer walking periods (245 minutes compared to 175 minutes), reflecting greater overall engagement. In both groups, endurance decreased as interval durations increased, with respondents requiring more frequent and longer rest pauses in extended intervals, especially evident during the 30-minute second interval in both groups. Group 2's ability to maintain performance despite the extended total duration suggests higher physiological adaptability or resilience. The increasing trend of muscular fatigue and rest pauses in both groups emphasizes the physical challenges of prolonged static holding postures, supporting the need for planned rest intervals and task rotation to sustain performance and reduce fatigue during extended ceremonial activities.

The provided context is well-justified as it clearly illustrates the relationship between the distance travelled while holding both overhead and pole-mounted decorative umbrella lights during the Baraat and the corresponding levels of physical exhaustion experienced by the respondents. In both Group 1 and Group 2, the data consistently demonstrates that as the distance increases from short to long, the percentage of respondents reporting extreme and complete exhaustion significantly rises. This trend emphasizes the cumulative physical strain associated with extended durations of holding and carrying heavy, decorative objects. Additionally, the gradual decline in respondents reporting "not exhausted" or "little exhausted" as distance increases further validates the direct correlation between physical fatigue and prolonged engagement. The comparative analysis between Group 1 and Group 2, across both types of umbrellas lights, reinforces that regardless of the mode of holding (overhead or pole-mounted), distance is a key factor in intensifying physical discomfort. Therefore, the context

effectively highlights the increasing physiological burden with greater distances, justifying the importance of considering task duration and distance in managing fatigue and ensuring participant well-being during such ceremonial activities.

This research concludes that holding decorative umbrella lights in Baraat is not merely a cultural tradition but a physically demanding and injury-prone occupation. The study emphasizes the urgent need for ergonomic interventions, periodic health assessments, occupational safety guidelines, and awareness programs to mitigate discomfort and reduce mechanical injuries in this workforce. Further research is recommended to design and test lightweight, ergonomically optimized umbrella light structures and to evaluate the effectiveness of targeted exercise regimens in alleviating musculoskeletal discomfort among these workers.