International Journal of Leading Research Publication (IJLRP)

E-ISSN: 2582-8010 ● Website: www.ijlrp.com ● Email: editor@ijlrp.com

# Prevalence of Work-Related Musculoskeletal Pain Among Professional Stuntmen

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**Abstract:**

**Background:** Work-related musculoskeletal Pain (WRMSP) have turned into one of the major occupational health problems, especially for those who are engaged in physically very demanding jobs. On top of that, professional stuntmen are generally performing repeatedly moving, being hit physically, standing for a long time in awkward positions, and/or working for long hours which are some of the many risk factors for them to develop musculoskeletal pain. Even though they are exposed to this kind of dangerous work situation, still it is a topic that has not been very well explored.

**Objective:** To determine the prevalence of work-related musculoskeletal pain among professional stuntmen.

**Methods:** An observational study was undertaken among 118 stunt professionals operating in Film City, Mumbai. The participants were picked through a convenient sampling technique. The data were obtained through the standardized Nordic Musculoskeletal Questionnaire (NMQ), which looks into musculoskeletal symptoms in various body parts within the last 12 months as well as the previous 7 days. Descriptive statistics such as frequency and percentage were used for data analysis.

**Results:** The study revealed that More than half of the respondents (56.77%) reported that at least one work pain-related musculoskeletal problem has emerged in their bodies. The most affected parts are neck (29.66%), shoulders (26.27%), and lower back (25.42%). During the last week, the majority of the pain was identified in the lower back (52.23%), with neck and shoulders following. In addition to producing discomfort, musculoskeletal pain was also revealed to restrict work activities, notably the ones involving lower back and neck, thus, highlighting the functional outcomes of these issues.

**Conclusion:** The present study demonstrates, more than half (56.77%) of the professional stuntmen suffer work-related musculoskeletal pain, which confirms that performing stunts exposes stuntmen to considerable occupational musculoskeletal burdens. The neck, shoulders, and lower back areas were identified as the most sensitive parts of the body, with back pain being the leading cause of recent prevalence and disability. These results align with the existing occupational health studies which point at repetitive loading, high-impact movements, and forceful exertions as risk factors for musculoskeletal disorders.

**Keywords:** Work Related Musculoskeletal Pain, Stuntmen, Occupational Health, Nordic Musculoskeletal Questionnaire, Prevalence.

## INTRODUCTION

A professional stunt performer is a person who has been trained to carry out risky and physically challenging activities that are part of the making of films, television shows, or live entertainment productions. These individuals, usually called stuntmen, stuntwomen, or stunt doubles, carry out dangerous activities like stunts, fight scenes, and acrobatic tricks, etc. to give a lifelike touch to the action scenes[1]. Unlike sportsmen, whom are, to a large extent, in a controlled environment and know their

physical limits, stunt performers are working in quite a different environment which is highly unpredictable and, therefore, leading to a higher probability of getting injured.

It is well established that musculoskeletal pain is multifactorial in origin and highly prevalent among the working population. Occupational risk factors such as repetitive movements, dynamic actions, and sustained or awkward postures significantly contribute to the development of musculoskeletal Pain (MSP) Repetitive arm movements, in particular, have been associated with neck pain and upper extremity symptoms, indicating a strong relationship between physical workload and musculoskeletal complaints[2]. Musculoskeletal pain is primarily the result of problems with the muscles, bones, joints, ligaments, and tendons, and it can not only limit one's physical capabilities but also lower the overall enjoyment of life. This type of pain can be either abrupt or ongoing. The two types of musculoskeletal pain; acute pain and chronic pain depend on the duration of the pain and situation leading up to it. However, musculoskeletal pain which is present for a long time is referred to as chronic and is generally linked to bodily changes like those caused by arthritis or prolonged mechanical stress[3].

Since the musculoskeletal system comprises of bones, nerves, tendons, ligaments, joints, cartilage, and spinal structures, it can easily be subjected to injury and strain especially in physically demanding such as work environments[4].

Stunt performance, by its very nature, involves great risks. Although safety features and precautionary actions are part of the ways of doing stunts, the fact remains that stunts are physically demanding and quite dangerous. Sometimes even the most carefully planned stunts may cause injuries because of the level and nature of the maneuvers performed[5].

These days, stunt performers are expected to have had significant training in a variety of subjects, including stage fighting, martial arts, and physical fitness. Additionally, obtaining insurance coverage and passing safety requirements for employment in the film and television industries typically need certification from professional stunt associations[6].

However, because their employment is physically demanding at all times, there is still a significant risk of injury.
Stunt performers frequently experience physical stress, and even minor errors in execution can lead to significant musculoskeletal injuries. The pressure to perform with precision, combined with demanding schedules and high expectations, contributes to both physical and psychological stress. These factors increase the likelihood of accidental injuries and long-term musculoskeletal complications[7]. However, despite the high-risk nature of this profession, there is a paucity of empirical research focusing on the occupational health of stunt performers, particularly in relation to musculoskeletal pain[8].

Work-related musculoskeletal disorders are cause by change of several occupational factors, such as repetitive motion, forceful exertions, awkward postures as well as insufficient rest periods[9]. Besides physical demands, psychosocial stressors are also major contributors to this pain. When a person feels that they cannot handle the demands at work, stress related to work can occur, which can then lead to physical and mental health problems, such as musculoskeletal pain[10].

In stunt performance, these factors are further compounded by irregular work schedules, high-risk tasks, and the expectation of rapid recovery following injuries. A culture of resilience within the stunt community often leads performers to continue working despite experiencing pain or injury. This underreporting of injuries can result in inadequate recovery and increased risk of chronic musculoskeletal dysfunction[11].

To assess musculoskeletal symptoms in occupational settings, formalized tools similar as the Nordic Musculoskeletal Questionnaire (NMQ) have been extensively employed. Developed under the Nordic Council of Ministers, the NMQ provides a dependable and validated system for assessing musculoskeletal complaints across colorful body regions[12]. It enables standardized data collection and comparison across different populations and occupational groups[13].

Given the physically demanding and high- threat nature of trick work, understanding the frequence and distribution of musculoskeletal pain among trick players is essential. Reliable data regarding the frequence, inflexibility, and anatomical distribution of musculoskeletal symptoms can help identify threat factors and companion preventative strategies.

Through the present research, the authors are going to find out latent risk factors, by first establishing the occurrence and localization of musculoskeletal pain. This knowledge will then allow the introduction of health-related remodeling of workplace design, precautionary actions, and rehabilitative measures. If compliant, these will lead to enhancing stunt artists' health and safety as well as career durability.

## METHODOLOGY

### Study Design

The present study was designed as a cross-sectional observational study to determine the prevalence of work-related musculoskeletal pain among professional stuntmen. Data collection was carried out during a single assessment period using a standardized questionnaire. The study focused on identifying the distribution of musculoskeletal Pain across different body regions.

### Participants

A total of 118 professional stuntmen participated in the study. Participants were recruited using a convenient sampling method from Film City, Mumbai. All participants were actively involved in stunt-related activities, particularly fighting scenes.

The inclusion criteria were:

- Male stunt performers aged between 21 and 40 years
- Minimum of one year of professional stunt experience
- Individuals actively engaged in stunt performance work
- Working hours ranging from 12–18 hours per day

Participants were excluded if they:

- Had pre-existing neurological conditions affecting musculoskeletal function
- Had any diagnosed rheumatic disorders.

### Sample Size Calculation

The required sample size for the present cross-sectional study was calculated using the standard formula for estimating prevalence in epidemiological studies. The expected prevalence of musculoskeletal pain among stuntmen was assumed to be 75%. based on findings from previous studies investigating musculoskeletal pain in stuntmen populations. Substituting the values into the formula yielded an initial sample size of 288 participants. Since the target population of professional stuntmen available within the study area was relatively small (approximately n = 200), Finite Population Correction (FPC) was applied to obtain a more accurate sample size. After applying the finite population correction, the calculated sample size was 118.3 which was rounded up to 118 participants.

### Study Setting and Duration

The study was conducted at Film City, Mumbai, over a period of 6 months. Participants were assessed during their working schedules with prior consent and coordination.

**Data Collection**

Participants were selected based on the defined inclusion and exclusion criteria. The purpose and procedure of the study were clearly explained to all participants prior to data collection. Written informed consent was obtained from each participant before their involvement in the study.

Data were collected using a structured questionnaire administered in person. The questionnaire included demographic details such as age, years of experience, and working hours, along with questions related to musculoskeletal symptoms.

**Outcome Measures**

Musculoskeletal pain was assessed using the Nordic Musculoskeletal Questionnaire (NMQ), a standardized and validated tool commonly used in occupational health studies.

The NMQ evaluates musculoskeletal pain across nine anatomical regions:

Neck, Shoulders, Elbows, Wrists/Hands, Upper back, Lower back, Hips/Thighs, Knees, Ankles/Feet.

The questionnaire assessed symptoms over two recall periods:

- Presence of musculoskeletal pain in the last 12 months
- Presence of musculoskeletal pain in the last 7 days

Participants were also asked whether the symptoms were having an impact on activity limitation or while performing stunt and/or activities of daily living.

**Statistical Analysis**

Data analysis was performed using Microsoft Excel 2021. The collected data were organized and analyzed using descriptive statistics. The results were presented using tables, bar graphs, and pie charts for better visualization and interpretation.

**Ethical Considerations**

Ethical clearance for the study was obtained from the Institutional Ethical Committee prior to the commencement of the study. All procedures were conducted in accordance with ethical guidelines. Participants were informed about the purpose of the study, and confidentiality of their data was maintained throughout. Participation was voluntary, and individuals were free to withdraw from the study at any time without any consequences.

## RESULTS

**Age Distribution**

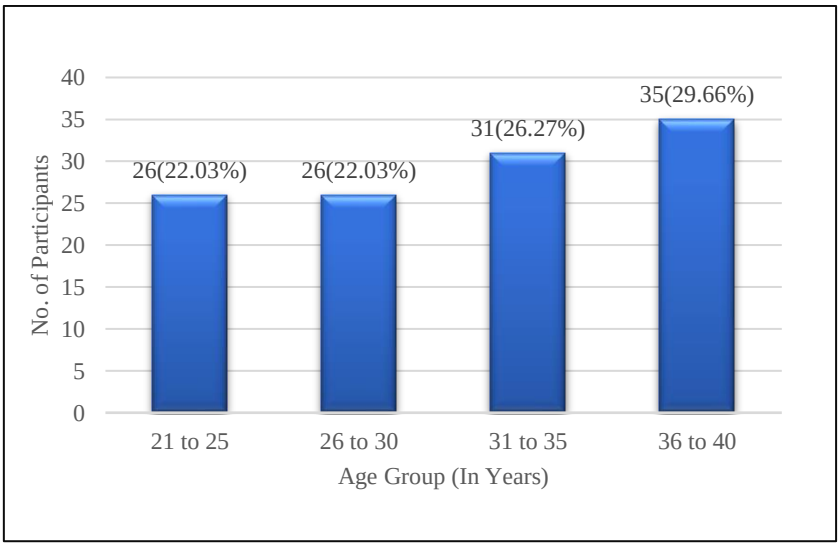


**Figure 1: Age-wise distribution of participants**

The age-wise distribution showed that the maximum number of participants belonged to the 36–40 years age group (n = 35, 29.66%), and minimum belong to 21–25 years and 26–30 years age groups each included 26 participants (22.03% each).

**Years Of Experience Distribution**

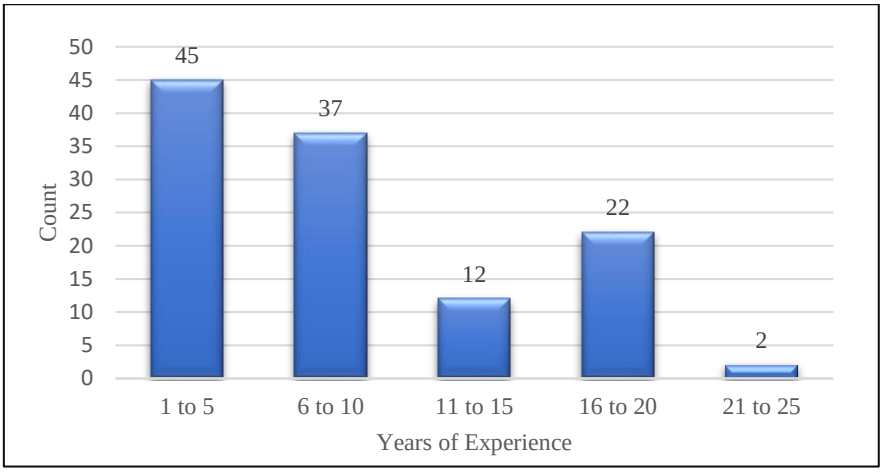


**Figure 2: Distribution of participants by years of experience**

The distribution of years of experience among the participants showed that the majority belonged to the 1 to 5 years (38.13%, n=45). However, only a small fraction of individuals had 21 to 25 years of experience (1.69%, n=2).

**Prevalence**

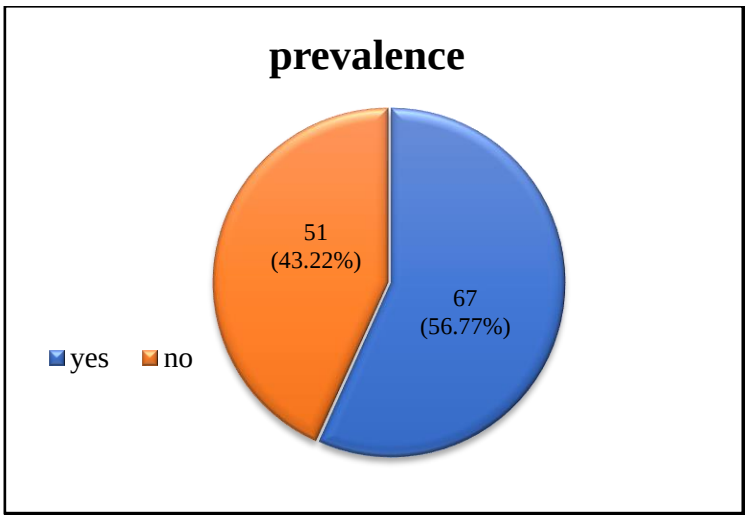


**Figure 3: Prevalence of Work-Related Musculoskeletal Pain**

67 participants (56.77%) reported work-related musculoskeletal pain, while 51 participants (43.22%) reported no pain.

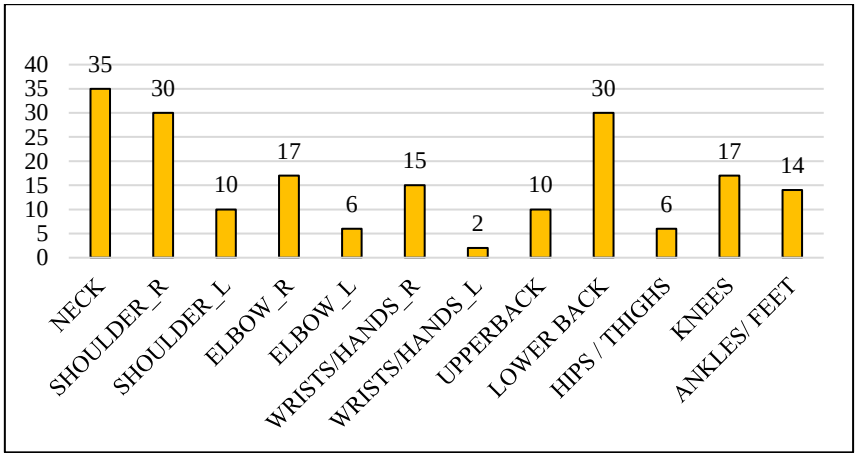


**Figure 4: Musculoskeletal Pain in the Last 12 Months**

Among affected participants, the neck (52.24%, n=35) was the most commonly affected region, followed by the lower back and right shoulder (44.78%, n=30 each). Moderate prevalence was observed in the elbow and knees (25.37%, n=17 each), wrist/hand (22.39%, n=15), and ankles/feet (20.90%, n=14), while lower involvement was seen in the shoulder (left) and upper back (14.93%, n=10), and minimal in the hips/thighs and left-sided joints.

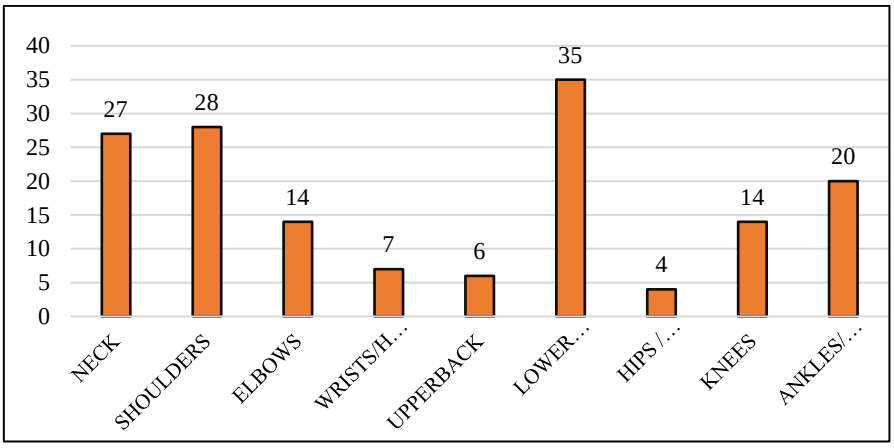


**Figure 4: Musculoskeletal Pain in the Last 7 Days**

In the last 7 days musculoskeletal pain was most prevalent in the lower back (52.24%, n=35), followed by the shoulders (41.79%, n=28) and neck (40.30%, n=27). Moderate involvement was observed in the ankles/feet (29.85%, n=20), elbows and knees (20.90%, n=14 each), while lower prevalence was seen in the wrists/hands (10.45%, n=7), upper back (8.96%, n=6), and hips/thighs (5.97%, n=4).

## DISCUSSION

The aim of the present research was to assess the rate of work-related musculoskeletal pain (WRMSP) among professional stuntmen, a group who face highly dangerous occupational hazards through their regular exposure to high-intensity, repetitive, and physically challenging activities at work. Results from this research showed that 56.77% of the respondents suffered from musculoskeletal pain, thus pointing out a significant occupational health issue within this community. This percentage is also much greater than the one observed in the general population where the incidence of musculoskeletal pain is thought to be 35%[14], thus emphasizing the increased susceptibility of stunt performers to such disorders.

The higher rate seen in this study is due to the nature of stunt work which includes repeated movements, high-force actions, awkward body positions. In this research, the lower back, neck, and shoulders were

mentioned as the most frequently affected areas. More specifically, lower back pain was the most prevalent pain in the last 7 days, whereas most people reported neck pain over the last 12 months. Such data complements the worldwide burden of musculoskeletal disorders, where low back pain is considered a leading cause of disability globally[15]. The lower spine is at high risk for damage as stunt activities such as falling, jumping, and combat scenes involve repetitive loading, axial compression, and unwelcome forces.

Neck pain prevalence can be explained by repetitive acceleration-deceleration movements and sustained muscular tension during stunt execution. Bernard and Putz-Anderson highlighted that repetitive motion and awkward postures significantly contribute to cervical spine disorders, which supports the findings of this study[9]. Similarly, the high prevalence of shoulder pain can be attributed to repetitive upper limb movements, including bracing during falls and performing fight sequences, which place considerable stress on the shoulder joint complex.

Another important observation in this study is the dominant side involvement, particularly in the upper extremities. This may be due to asymmetrical loading patterns during stunt performance, such as weapon handling or repetitive unilateral movements. The Nordic Musculoskeletal Questionnaire (NMQ), a validated tool for assessing regional musculoskeletal symptoms[16], effectively captured these patterns, reinforcing its applicability in occupational health research.

Despite the high overall prevalence, it is quite impressive that 43.22% of the participants did not report any musculoskeletal pain. This indicates that there might be protective factors within this group. A potential factor that might be responsible is physical conditioning and adaptability. Muscular training and working in physically demanding environments regularly not only build up muscle strength, but these physical activities also result in flexibility and neuromuscular coordination leading to less injuries[17]. Several studies conducted on sportspersons have revealed that the introduction of well-planned conditioning programs may contribute towards a significant decrease in the occurrence of musculoskeletal injuries[18].

Another contributing factor could be the distribution of work experience. In this study, the majority of participants had 1–10 years of experience, indicating relatively lower cumulative exposure to occupational stress. According to da Costa and Vieira, the duration of exposure is a key determinant in the development of musculoskeletal pain[19]. Therefore, individuals with shorter careers may not yet have developed chronic symptoms associated with long-term repetitive strain.

Besides several other factors, incorporation of such self-regulation factors like warm-up, rest periods and recreational methods may help in symptom reduction. Barbe et al. discovered that giving enough rest between repeated tasks can drastically lessen the extent of tissue injury and also prevent the progression of musculoskeletal Pain[20].

However, this should be viewed along with the fact that some individuals may not report their pain accurately as highlighted by Russell et al.[8]. Due to cultural factors and fears of job loss, stunt performers may be less inclined to reveal injuries.

The findings of this study further highlight the impact of musculoskeletal pain on work performance. Lower back and neck pain were the major causes of work restrictions, indicating that workplace-related musculoskeletal pain (WRMSP) affects not only physical health but also job productivity. This is consistent with previous studies in the film industry, which reported that musculoskeletal injuries require reduced work capacity and more absenteeism[21].

Additionally, the presence of pain in the last 7 days suggests ongoing mechanical stress and inadequate recovery, which may predispose individuals to chronic musculoskeletal conditions. Barbe et al. emphasized that repetitive loading without sufficient recovery leads to cumulative tissue damage and long-term dysfunction[20]. This highlights the need for structured recovery protocols and workload management in stunt professionals.

The occupational environment of stunt performers further compounds these risks. Unlike athletes, stuntmen often lack access to standardized training programs, physiotherapy support, and injury surveillance systems. This gap in occupational health infrastructure increases the likelihood of untreated injuries and chronic conditions. Studies by Kusnezov et al. and Shrier et al. have similarly emphasized the need for targeted injury prevention strategies in the film industry[9,22].

Moreover, psychosocial factors such as work pressure, irregular schedules, and performance expectations may also contribute to musculoskeletal pain. Giga et al. highlighted that occupational stress can exacerbate physical strain and increase the risk of injury[10]. In stunt performers, the pressure to perform flawlessly and return to work quickly after injury may further aggravate musculoskeletal conditions.

The results of this study indicate that stunt performers face musculoskeletal stress pattern related into those seen in athletes and other high-risk job categories, yet they have less access to support resources. This highlights the critical importance of developing comprehensive occupational health strategies, such as ergonomic training, planned physical conditioning, consistent physiotherapy evaluations, and instruction on preventing injuries.

## CONCLUSION

According to this research, musculoskeletal disorders constitute a prevalent condition among professional stuntmen as over half of the respondents revealed musculoskeletal pain. It was especially neck, shoulders, and the lower back that were the areas that caused problems most often. The physically demanding and repetitive characteristics of the agreement surely constitute a major cause of these.
This data implies the necessity for improved preventative measures such as adequate training, rest, and physiotherapy assistance to decrease the incidence of injuries and maintain the health of the stunt performers.

## ACKNOWLEGDEMENT

I would like to express my sincere gratitude to Almighty Allah for His guidance, strength, and blessings throughout the completion of this research work.
I am deeply thankful to my parents for their constant support, encouragement, and belief in me, which has been my greatest source of motivation.
I extend my heartfelt thanks to Dr. Albin Jerome (PT), Principal of St. Andrews College of Physiotherapy, for granting me permission to conduct this study and for his support throughout the process.
I am especially grateful to my guide, Dr. Nikita Waghmare (PT), for her valuable guidance, continuous encouragement, and insightful suggestions, which greatly contributed to the successful completion of this research.
I would also like to thank all the participants who willingly took part in this study and contributed their time and cooperation.
Lastly, I thank my friends and colleagues for their support and motivation during the course of this work.

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