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Title: Prevalence of Work-related Musculoskeletal Disorders and Associated Sociocultural Reporting Behaviors in Kuwait's Construction Industry

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Abstract

Background

Work-related Musculoskeletal Disorders (WMSDs) are a significant occupational health challenge in the global construction industry. Research on WMSDs in Gulf Cooperation Council (GCC) countries, particularly Kuwait, is limited. This study examines the prevalence of WMSDs among construction workers in Kuwait, an understudied country with a workforce composition similar to other GCC countries.

Objective

This study assesses the prevalence of WMSDs among construction workers in Kuwait and examines the influence of sociocultural factors on reporting behaviors.

Methods

A modified Nordic-Musculoskeletal Questionnaire (NMQ), complemented by qualitative observations, was used to assess WMSDs among 117 construction workers in Kuwait. This approach provided a

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comprehensive understanding of both WMSD prevalence and sociocultural factors influencing reporting. Although the sample size may limit generalizability, it offers important insights into WMSDs in Kuwait.

Results

Results showed 52.14% of workers experienced pain, mainly in the lower back (34.12%) and shoulders (23.07%). Suboptimal working conditions and cultural factors like uncertainty avoidance and high power distance were noted, highlighting the interplay between physical health and cultural context in WMSD reporting.

Conclusion

This research provides valuable insights into WMSD prevalence in an understudied region and highlights the significant impact of cultural factors on health reporting. The prevalence of WMSDs in Kuwait was lower than in similar studies elsewhere, possibly due to cultural factors leading to underreporting. The findings emphasize the need for culturally sensitive occupational health policies and reporting mechanisms in Kuwait's construction industry. The study also offers guidance for managing WMSDs in other GCC countries with similar cultural and labor dynamics.

Keywords

Musculoskeletal Diseases, Construction Industry, Cultural Characteristics, Ergonomics, Occupational Health, Workplace, Kuwait

1 Introduction

The construction sector relies heavily on manual labor, with workers regularly engaging in physically demanding tasks that pose safety risks and hinder productivity. According to Kim et al. construction work is "inherently complex, involving substantial task variability and irregular work periods; repetitive manual handling of materials, often in non-optimal postures; and working at a fast pace in a dynamic and often unstructured or unpredictable environment" [1]. These challenges are further intensified by harsh environmental conditions such as extreme heat, cold, or dust [2].

Jang et al. identified several occupational risk factors commonly found on construction sites that contribute to the development of Work-related Musculoskeletal Disorders (WMSDs): (1) repetitive tasks, (2) applied force, (3) awkward postures, and (4) exposure to vibration [3]. These factors result in substantial wear and tear on the musculoskeletal system [4,5].

WMSDs arise from continuous and cumulative exposure to these risks, making workers particularly vulnerable to acute injuries and possibly chronic pain, especially in areas such as the back, knees, shoulders, and arms. According to Jang et al., the musculoskeletal pain most commonly manifests in three key regions [3]: (1) upper extremities, including neck, shoulders, back, arms, elbows, wrists, hands and fingers; (2) lower extremities, includes thighs, knees, legs, ankles and toes; and (3) lower back.

The prevalence and impact of WMSDs in the construction industry are substantial, with studies indicating that approximately 30% of construction workers suffer from WMSDs, making these disorders a leading cause of worker absenteeism and early retirement [6–8]. Beyond individual health, WMSDs carry broader implications to the industry, including: (1) Economic impact, with increased medical costs and added burden on healthcare system; (2) Productivity loss, resulting in reduced work efficiency and potential project delays; and (3) Workforce sustainability, characterized by higher turnover rates and challenges in retaining older workers. These consequences highlight the need to understand and address WMSDs in the construction industry to maintain worker health, enhance productivity and ensure workforce sustainability.

1.1 Prevalence of WMSDs

WMSDs are a significant occupational health concern in the construction industry worldwide, with consistently higher rates compared to other sectors. In the European Union (EU), 60% of employees reported WMSDs as their most common Work-related health complaint, with construction workers accounting for 52% of these cases [9,10]. Similarly, a comprehensive study conducted in the United States from 1992 to 2014 found that the rate of WMSDs in the construction industry significantly exceeded that of all industries combined. As a result, in 2014, construction workers affected by WMSDs were taking a median of 13 days off annually, an increase of five days compared to 1992, reflecting the rising prevalence of WMSDS and their growing impact on workforce productivity [11].

A study using the Nordic Musculoskeletal Questionnaire (NMQ) in South China found that 57.9% of 380 construction workers reported WMSDs in the previous 12 months, with the most common complaints being neck pain, followed by pain in the shoulders, upper back, and lower back [7]. In Korea, a study of 120 workers revealed an even higher WMSD prevalence at 87%, with back pain being the most frequently reported issue [12]. Research in Pakistan indicated that 397 out of 666 construction workers (59.6%) experienced some form of pain, with lower back issues being the most prevalent [13]. Similar studies conducted in Iran and India found that WMSDs had prevalence rates of 88.3 % among iron workers and 72% among painters, respectively [14,15].

In Nigeria, a study on plumbers found that 84.6% of 130 participants reported WMSDs in the last 12 months, and 50.8% reported them within the last 7 days, with lower back pain being the most common complaint [16].

While there are some variations across studies, lower back pain consistently emerges as one of the most prevalent WMSDs among workers worldwide, with 80% of the people experiencing it at some point in their life [17]. Neck, shoulder, and upper back pain are also frequently reported, as identified through the literature [13,14,15], though their relative prevalence varies by region and specific occupation.

1.2 Research Gap and Questions

A critical gap in the literature is the lack of comprehensive studies in Gulf Cooperation Council (GCC) countries, specifically Kuwait. These countries feature a unique construction workforce comprised almost entirely of expatriates [18,19], which may influence WMSD prevalence and reporting patterns. Kuwait's multicultural expatriate workforce, combined with local cultural norms, creates a distinctive environment that affects how workers perceive, report, and manage WMSDs.

Working conditions in Kuwait are often suboptimal, characterized by long extensive working hours and inadequate safety regulations [20], which suggests a potentially higher prevalence of WMSDs. However, this remains untested due to the scarcity of region-specific studies. The reliance on expatriate labor, challenging working conditions, and lack of comprehensive research make Kuwait and other GCC countries critical areas for WMSD investigation.

This study aims to address these gaps by investigating WMSD prevalence among construction workers in Kuwait, incorporating qualitative insights and observations alongside NMQ data. The research seeks to provide a nuanced understanding of WMSDs in this understudied region and encourage scholars to investigate further into this topic. The following research questions guides the study (RQs):

RQ1: What is the prevalence of WMSDs among expatriate construction workers in Kuwait, and how does this compare to global trends?

RQ2: How do demographic factors (such as age and experience) correlate with reported WMSDs among construction workers in Kuwait?

RQ3: What qualitative insights can be gained from workers' perceptions and experiences regarding WMSDs, and how do these complement NMQ quantitative data?

Given that other GCC countries share similar workforce structures and conditions, this research represents an essential step toward creating safer work environments in the GCC construction industry, with the potential to reduce absenteeism, increase productivity, and enhance the well-being of the expatriate workforce.

2 Materials and Methods

A quantitative methodological approach, enriched with qualitative insights, was employed to provide a comprehensive understanding of WMSDs in Kuwait's unique construction context. This approach is based on the socio-ecological model of occupational health proposed by Punnett et al., which acknowledges that workplace health outcomes are influenced by multiple factors – both psychological and physical - linked to the individual behavior, organizational structure, and environmental elements [21].

The study starts by selecting the most appropriate self-reporting tool for quantitative data collection. Subsequently, the sampling technique is discussed and elaborated to ensure transparency and replicability. Finally, the data analysis approach is described, elaborating on the statistical techniques used. Figure 1 shows the process.

<Figure 1 here>

2.1 Quantitative Data Collection

The NMQ was selected as the primary method for quantitative data collection, due to its standardized, reliable nature and its relevance for screening WMSDs in ergonomic and occupational health context. Additionally, the NMQ is straightforward, easy to use, and suitable for both self-administration or interviews [22].

The NMQ begins with basic demographic questions, including job position, gender, age, height, weight, years of experience, and weekly work hours. It then categorizes the body into nine parts: neck, shoulders, elbows, wrists/hands, upper back, lower back, knees, hips/thighs, and ankles/feet, addressing areas identified by Jang et al. [3]. The questionnaire uses a simple yes/no multiple-choice format with three columns: pain in the last 12 months, pain preventing work in the last 12 months, and pain in the last 7 days.

To address the limitation of binary responses, a Likert scale of 1 to 5 was introduced for all nine body parts aimed at assessing the pain severity. 1 represents very minimal severity and 5 indicates very severe pain. If participants answer ‘yes’ to pain, they are asked to rate its severity. Figure 2 shows the modified version of the questionnaire.

<Figure 2 here>

2.2 Qualitative Data Collection

While quantitative data offers measurable prevalence rates and correlations, the qualitative component explores cultural and personal factors that may affect WMSD reporting. Moreover, it aids in clarifying potential biases in self-reporting. The qualitative data collected includes two main elements:

(1) Observational field notes: Research assistants recorded workers' behaviors, interactions, and reactions during the survey process. Particular attention was paid to non-verbal cues such as hesitations in answering, expressions of discomfort, or reluctance to report pain. These notes were recorded immediately after each survey was completed, ensuring consistency across different participants.

(2) Workers' reflective comments: Participants were invited to share their experiences through open-ended discussions about work-related pain, cultural attitudes toward pain reporting, and their coping strategies.

A total of 24 comments were collected from the participants, which were recorded and analyzed using thematic analysis following Braun and Clarke's [23] approach.

2.3 Sampling method and survey distribution

The population selected for this research comprises Kuwait's construction workforce, which is heavily reliant on expatriate workers from different countries [24]. The inclusion criteria for the study were male expatriate workers aged 20 and above, who were skilled laborers with at least one year of professional experience and had been employed in Kuwait for at least one year. Workers with less than one year of construction experience, those who had been in Kuwait for less than a year, or those with pre-existing or non-work-related musculoskeletal disorders were excluded from the study.

The modified NMQ was translated into Arabic, the primary language spoken by many workers in Kuwait, while the original English version was used for those whose first language is not Arabic. The questionnaires were administered under supervision to ensure clarity and consistency, and tasks typically performed by the workers included repetitive lifting, overhead activities, prolonged standing, carrying, bending, and working in awkward postures – activities known to cause significant physical strain [25].

A convenience sampling technique was employed [26]. While not entirely random, efforts were made to minimize bias and capture diverse experiences. Data collection was conducted over the course of one month from March to April 2024, covering a total of 16 construction sites across Kuwait. At each site, all available workers that fit the inclusion criteria were invited to participate. Confidentiality and anonymity were assured to the participants, and it was emphasized that their responses would not impact their employment status or working conditions. Informed consent was obtained from all participants before data collection, ensuring that they have fully understood the purpose and scope of the study. Survey responses, workers' comments, and field observations were collected. To further ensure anonymity, the data collected by the research assistant was randomized before analysis. The study was conducted in accordance with the principles outlined in the Helsinki Declaration, ensuring that all participants were treated ethically, with respect for their privacy and voluntary participation.

2.4 Data analysis

The collected survey data were manually entered into an Excel spreadsheet, cleaned, and saved as a .CSV file for analysis. The entire analysis was conducted using Python 3 in a Google Colaboratory environment, utilizing several prominent Python libraries for data manipulation and visualization.

The following analysis methods were employed:

(1) Normality testing –Quantile-to-Quantile (Q-Q) plots were used to visually access data normality.

(2) Descriptive analysis – Determining means, median, standard deviations, maximum, and minimum values.

(3) Inferential analysis - Kendall's τ correlation coefficient employed for hypothesis testing and to identify correlations.

For inferential analysis, in which correlations are found, the following descriptive scale according to Schober et al. was followed, using a significance level of $p<0.05$ to determine statistical significance [27]. The correlation scale used was as follows:

(1) Correlation coefficient +1 or -1: A perfect positive correlation or a perfect inverse correlation.

(2) Coefficients between 0.1 – 0.39: Weak correlation.

(3) Coefficients between 0.4 – 0.69: Moderate correlation.

(4) Coefficients between 0.7 – 0.89: Strong correlation.

(5) Coefficients between 0.9 – 1: Very strong correlation.

Normality of the demographic data was assessed to determine the most appropriate statistical methods for analysis, specifically whether parametric tests could be applied [28]. This assessment involved plotting histograms and quantile to quantile (Q-Q) plots to visually evaluate the data distribution [29].

3 Results

The subsequent section presents the study's findings, beginning with an overview of the respondents' demographics. It then details the prevalence of WMSDs, the severity of the reported conditions, and absenteeism resulting from WMSDs. The section concludes with correlation and significance analysis.

3.1 Demographic profile

The demographic profile is summarized in this section, with the findings presented in Table 1.

<Table 1 here>

The ages of the participants range from 20 to 63 years, with a mean age of 38.55 years and a standard deviation of 9.08 years, indicating a moderate distribution around the mean. worker heights ranged from 150 cm to 190 cm, with an average of 170.93 cm and a standard deviation of 7.64 cm. The mean weight was 76.60 kg, with a standard deviation of 12.66 kg. The considerable variation in weight reflects differences in body composition and possibly the type of work executed.

Experience levels ranged from 2 to 50 years, illustrating a diverse range of expertise. The mean experience was approximately 13.97 years.

3.1.1 Normality of demographic

Figure 3 to 6 present the histogram and Q-Q plots for the demographic data collected.

<Figure 3 here>

< Figure 4 here>

<Figure 5 here>

<Figure 6 here>

The histogram analysis reveals a right-skewed distribution across all demographic variables, albeit to different extents. This skewness indicates that most of the observations - including the median and the mode - are clustered towards the lower end of the spectrum, with the tail extending towards higher values.

Specifically, the data indicates that many workers are young, with heights between 165-175 cm and 2-13 years of experience. This concentration of younger individuals implies that the findings are more reflective of the experiences and conditions of younger workers.

The Q-Q plots were used to visually assess normality. For normality to be accepted, the data points must fall on the straight line that resembles the theoretical normally distributed data [30]. However, all the Q-Q plots show discrepancies from the theoretical normal distribution, with age displaying the smallest departure and years of experience showing the most substantial divergence. Based on these discrepancies, the assumption of normality is rejected.

3.2 Exploring the Prevalence of WMSDs

An analysis of the prevalence of WMSDs over the last 12 months, as summarized in Table 2, reveals that out of a sample of 117 workers, 61 reported issues in at least one body part, representing 52.14% of the total sample. Lower back problems were the most commonly reported, with 40 individuals (34.12% of the sample) affected. Other body parts such as elbows, wrist/hands, upper back, hips/thighs and ankles/feet, were also reported, but their prevalence was lower compared to the lower back.

<Table 2 here>

Table 3 presents the percentage of workers who reported pain in one to nine body parts. Most workers reported pain in one body part (17.9%), followed by two body parts (12.8%). Three and four body parts were reported by 8.5% and 6.8% of the workers, respectively. Only 4.3% and 1.3% of workers reported pain in five and six body parts, while no workers reported pain in more than six body parts.

<Table 3 here>

3.3 Severity of WMSDs conditions

It is significantly important to shed light on the severity of pain and discomfort experienced by the affected individuals and the impact of these conditions on their well-being. This section illustrates the severity of discomfort reported by the construction workers per body part. Figure 7 presents the findings. Please note that none of the reported average exceeded 2.75, therefore the x-axis does not exceed severity level of 3.

The lower back exhibited the highest severity level, with an average of 2.75. The number reported can be described as moderate, indicating that the pain is neither mild nor severe. Both ankles/feet and upper back also showed high average severity scores (2.67 and 2.6, respectively) but was only reported 6 and 10 times, respectively. This suggests that pain prevalence does not always correlate with its severity.

The knees, wrist/hands, and shoulders all reported severity levels between 2.33 to 2.42, while the neck and hips/thighs showed the lowest average severity levels at 2 and 1.87, respectively.

<Figure 7 here>

Presenting only the average severity offers a limited perspective. To provide a more comprehensive view, Figure 8 shows a heatmap of the frequency of reported pain for each body part, broken down by severity levels.

<Figure 8 here>

The heatmap reveals that the majority of reported lower back pain severity is at levels 2 and 3, with 50% reporting moderate severity (level 3) and 30% reporting mild severity (level 2). These results align with the average scores reported in Figure 7, indicating a significant inclination towards moderate discomfort among workers. Notably, 6 out of the 40 reported lower back cases were classified as high severity (level 4), representing 15% of lower back pain cases. While this percentage might appear modest, it remains concerning, as these high-severity cases account for 60% of all reported incidents at this severity level across all body parts. Such cases highlight the impact of severe pain on a worker's quality of life, potentially leading to absenteeism and productivity losses.

Similarly, for shoulder pain, 13 out of 27 complaints were of mild severity (level 2), equivalent to 48.2% of all shoulder complaints and 20% of all complaints at this severity level. Moderate severity (level 3) was reported in 37% of shoulder complaints and 17 % of all level 3 severity complaints. Only one case reported a severity level of 4 for shoulder pain.

The analysis of knee pain further underscores the prevalence of moderate severity (level 3) complaints, reported by 10 out of 21 workers, accounting for 47.6% knee complaints and 17% of all reported level 3 severity complaints.

Table 4 summarizes the severity level frequencies across all body parts (150 reported complaints). The majority of reported pain falls within level 2 and level 3 (mild and moderate severity), though 6.6 % of cases were classified as severe (level 4).

<Table 4 here>

3.4 Absenteeism due to WMSDs during the last 12 months

Figure 9 illustrates the number of absences per body part alongside the average severity level. Although attempts were made to collect data on the exact number of days off due to WMSDs, many responses were unclear, with most workers indicating uncertainty about the exact number of days taken off. Consequently, only whether workers had taken any days off in the last 12 months was recorded, limiting the ability to fully assess the economic impact and severity of the absences.

<Figure 9 here>

The figure shows that out of the 40 reported cases of lower back pain, 7 resulted in absences, accounting for 17.5% of the cases. Shoulder-related complaints were reported by 27 individuals (23.07% of the sample), with 5 individuals taking absences, accounting for 18.5% of reported cases. Additionally, neck resulted in two absences, while elbow, upper back, hips/thighs, and knee pain each led to a single absence.

Table 5 provides further insights into the severity levels at which workers are more likely to take time off.

<Table 5 here>

Of the six cases reporting a lower back severity level of 4, only one led to an absence. Among the 20 cases reporting a severity level of 3, only five workers were absent. Similarly, for shoulder pain at a severity level of 3, three individuals took time off.

3.5 Correlation and significance analysis

Further data exploration was conducted using inferential analysis to investigate relationships between reported WMSDs and demographic variables. Due to the non-normal data distribution, non-parametric analysis using Kendall's Tau (τ) was applied, as it does not require normality assumptions [31]. Given that lower back and shoulder WMSDs were most prevalent, Kendall's τ coefficient was calculated in relation to demographic variables, absences, and other WMSDs, as shown in Figure 10.

<Figure 10 here>

*Note: 'A_shoulders' indicates absence due to shoulders, while 'A_lower back' signifies absence due to lower back.

According to the descriptive correlation scale defined by Schober et al., age, weight, years of experience, and height demonstrate negligible correlations with both lower back and shoulder WMSDs, despite positive values [27]. Given the predominance of younger workers in the sample, it is premature to conclude that age or experience does not correlate with the development of WMSDs. A larger, more diverse sample size, covering a broader age and experience range, is required to draw more conclusive results.

For lower back WMSDs, a weak positive correlation of 0.35 was observed for absences due to lower back pain and 0.29 for absences due to shoulder pain. These correlations indicate that workers are possibly likely to take time off for pain in either the lower back or shoulders. Conversely, shoulder pain does not necessarily lead to absence due to lower back issues (Kendall's τ= 0.20), but it correlates more strongly with absences due to shoulder pain (Kendall's τ = 0.39).

A moderate positive correlation of 0.49 was found between shoulder and neck pain, as well as a positive correlation of 0.28 between shoulder pain with wrist/hands pain. Additionally, a positive correlation of 0.46 between lower back and shoulder pain and a moderate positive correlation of 0.43 was also identified between shoulder and knee pain.

To better understand whether these correlations are statistically significant and unlikely to have occurred by chance, a significance test was conducted. Table 6 and 7 report the significance level of Kendall's τ correlation coefficient. All Kendall's τ correlation coefficients of less than 0.3 and are insignificant, are not reported in this table. Please note that A-Lower back and A-Shoulders refer to absences during the last 12 months due to lower back pain and shoulder pain, respectively.

<Table 6 here>

<Table 7 here>

From table 6 and table 7, several insights can be drawn. The significance test reject the H_0 for the shoulders, A-shoulders, and A-lower back. This rejection suggests that the observed correlations are unlikely due to chance and consistent with the potential explanations discussed earlier. Similarly, all correlations involving shoulder data with coefficients greater than 0.3 rejected the H_0 for all variables, indicating significant associations consistent with the findings.

3.6 Quantitative Data Thematic Analysis

A total of 24 comments were collected from the 117 workers surveyed. Thematic analysis of these comments revealed three key themes: (1) Normalization of Pain, evidenced by phrases such as "We got addicted to the pain" and "I have reached a point where I got used to the pain, it no longer affects my life"; (2) Cultural Stigma Around Complaining, reflected in comments like "It is shameful in my culture to complain about pain" and "We are strong men from the countryside, we can handle any sort of pain"; and (3) Pain as Temporary and Manageable, illustrated by statements such as "After work, I feel some discomfort in the whole body, but when I sleep and wake up the next day for work, it's all gone".

4 Discussion

This study offers valuable insights into the prevalence, nature, and underlying factors influencing WMSDs among expatriate construction workers in Kuwait. The findings highlight the interplay between physical demands, cultural norms, employment structures, and economic pressures that shape both the occurrence and reporting of WMSDs in this unique occupational setting.

4.1 Prevalence of WMSDs in Kuwait and its relationship to current literature

The overall prevalence of WMSDs in this study is notably lower than the rates reported in many international contexts. In South China, for example, 57.9% of construction workers experienced WMSDs within the past year [7], while prevalence rates in Korea (87% [12]), Iran (88.3% among ironworkers [14]), India (72% among painters [15]) and Nigeria (84.6% among plumbers [16]) are considerably higher. Even within the European Union, where 52% of work-related health complaints are attributed to WMSDs [9], the observed prevalence exceeds that found in Kuwait.

This discrepancy raises questions about the accuracy of reporting in Kuwait. The lower prevalence may not necessarily indicate a healthier workforce, but rather may reflect systematic underreporting influenced by local economic, social, and cultural conditions.

4.2 Body Region of Concern: Lower Back and Beyond

Despite the lower overall prevalence, specific body region analysis revealed important WMSD distribution patterns. Lower back pain emerged as the predominant concern, affecting 34.12% of participants, followed by shoulder complaints (23.07%). The dominance of lower back WMSDs aligns with global trends [32] and the current focus of ergonomic interventions, as evidenced by the development of 109 back-support specific exoskeleton models [33].

The findings demonstrate a notable pattern of multiple body part involvement, with 12.8% of workers reporting pain in two body regions and 8.5% in three regions. The correlation observed between shoulder and neck disorders suggests a biomechanical relationship in construction tasks, where repetitive overhead activities and sustained arm elevation create compound strain along the upper extremity kinetic chain. While exoskeletons are being developed to address various musculoskeletal strains in construction, and can potentially aid in shoulders and neck pain, Al-Khiami et al. [10] note that more research is needed to fully understand their effectiveness in construction settings.

This strain is particularly exacerbated when workers have a higher Body Mass Index, as additional weight can increase the mechanical demands on musculoskeletal structures [34]. Of particular concern is the severity pattern - while lower back pain showed the highest average severity (2.75), both ankles/feet and upper back displayed comparable severity scores (2.67 and 2.6) despite their lower prevalence. This indicates that pain prevalence does not necessarily correspond to severity, highlighting the need for comprehensive WMSD assessment beyond prevalence rates alone.

4.3 Productivity Impacts: Absenteeism and Functional Capacity

The impact of WMSDs on workforce productivity manifests through multiple pathways. While lower back pain showed higher prevalence (34.12%), shoulder disorders, despite lower prevalence (23.07%), resulted in comparable absenteeism rates (18.5% vs 17.5%). This pattern suggests that upper extremity WMSDs may have a disproportionate impact on work capacity, particularly given the demanding nature of construction tasks. Arm elevation, specifically in overhead activities, has been identified as a major contributor to shoulder WMSDs [35], highlighting the relationship between task demands and functional impairment.

The long-term implications of WMSDs are substantial. Longitudinal research has shown that shoulder disorders can lead to premature workforce exit [10], with work-life reductions ranging from 1.8 to 8.1 years [36]. Chen et al. [37] further demonstrated that one-third of WMSDs result in disabilities and early retirement. The magnitude of this impact is evident in productivity metrics - in the United Kingdom alone, WMSDs accounted for 9,466,000 lost workdays, averaging 17.1 days per case and representing 40% of all construction industry absences [37].

These findings underscore the importance of developing targeted interventions that address not only the most prevalent disorders but also those with the greatest impact on work capacity and workforce retention.

Understanding the differential impacts of various WMSDs is crucial for implementing effective prevention strategies and maintaining workforce sustainability.

4.4 Sociocultural, Economic, and Cultural Dimensions Influencing Underreporting

Kuwait’s construction sector is characterized by a predominantly young expatriate workforce (mean age 38.55 years) and high turnover rates due to short-term contracts [19]. This workforce composition is characteristic of all GCC countries, where expatriate workers constitute the majority of the construction sector based on the statistics provided by Statista [18] , creating similar challenges across the regionThe relative absence of older workers – who are generally more susceptible to WMSDs [38] – may partially explain the lower reported prevalence. More importantly, the transient nature of employment relationships can discourage workers from reporting health issues. Workers may fear that admitting to pain or discomfort could jeopardize their job security, prompting them to minimize symptoms or refrain from reporting entirely [39,40]. Similar patterns have been observed in other construction contexts; a study in Hong Kong's construction industry demonstrated how management commitment, co-worker influence, and hierarchical structures significantly influence workers' reporting behaviors [41].

Economic realities exacerbate this problem. Many workers are paid daily, and any absence due to pain directly reduces their income. Some even work weekends for overtime pay, prioritizing immediate financial stability over long-term health. As a result, the need to maintain steady earnings can override the motivation to seek treatment or report WMSDs, thereby contributing to underestimation of the true scope of these conditions.

Cultural factors further reinforce underreporting. Kuwait’s high scores in uncertainty avoidance (80) and power distance (90) [42] foster an environment in which workers are less likely to disclose health issues. They may associate reporting pain with risking future employment or appearing weak. This cultural backdrop aligns with Hofstede’s dimensions, where individuals in high power distance societies tend to comply with authority and avoid challenging hierarchical structures [43–45]. Workers may feel compelled to present themselves as physically capable to their superiors, reinforcing a "toughness" narrative and discouraging open communication about health concerns. The findings of Kwon and Farndale [46] also support this perspective, highlighting that cultures characterized by high power distance, strong uncertainty avoidance, and collectivism tend to suppress employees' willingness to voice concerns. In such cultural settings, raising workplace issues is often perceived as risky, leading individuals to engage in self-censorship. This cultural dynamic provides insight into why workers, even when experiencing WMSDs, may consciously refrain from reporting them. Both external pressures and internalized norms within the cultural context create significant barriers to open communication.

Though countries such as Korea, Iran, and India share some cultural traits [42], the Kuwaiti context is unique. Kuwait's workforce predominantly comprises expatriates on temporary work permits, whereas in other regions – like Korea – unionization efforts have been established for migrant workers, fostering greater security and encouraging workers to advocate for better working conditions [47]. Furthermore, the workforce demographics in Korea differ significantly from Kuwait's: approximately 33% of Korea's labor force is over the age of 50 [12]. Older workers are generally more aware of the long-term health consequences of physical strain and may be more inclined to report WMSDs. In contrast, Kuwait's younger workforce may not fully recognize the severity of their symptoms, viewing physical discomfort as an inherent part of the job. Without the support structures, unionization, and diverse age ranges, the combination of cultural dimensions, economic instability, and temporary employment status in Kuwait thus creates an environment that suppresses accurate WMSD reporting.

4.5 Psychological Coping Mechanisms and the Normalization of Pain

Beyond cultural and economic factors, psychological defense mechanisms influence how workers perceive and report discomfort. Many participants appear to have normalized chronic pain, evident by the observations by the research assistant and comments by workers, downplaying its significance or framing it as a routine aspect of their job rather than a treatable health condition. This normalization can be understood as a defense mechanism to maintain self-esteem and mitigate anxiety, as described by Bowins

[48]. Workers frequently invoked notions of strength and resilience, perceiving the admission of pain as a sign of weakness or diminished masculinity – values of particular importance when job security is precarious.

Moreover, none of the surveyed individuals reported WMSDs in the previous seven days, despite earlier admissions of chronic discomfort. Such adaptive behavior, also evident by workers' comments, not only hinders accurate data collection but also delays intervention, leaving workers vulnerable to exacerbated conditions and potential long-term disability.

Ultimately, understanding the complex interplay of international comparisons, bodily risk areas, economic constraints, cultural dimensions, and psychological coping strategies is essential for developing effective, sustainable interventions. By acknowledging and addressing the multifaceted nature of WMSD underreporting, stakeholders can create a healthier, more productive workforce that benefits both workers and the broader construction industry.

5 Conclusion and Recommendations

This study has utilized the NMQ questionnaire, supplemented by field observations and workers comments, to assess WMSDs among Kuwait's construction workers. A total of 117 surveys were collected. While the sample size might limit generalizability, it allows for nuanced insights and understanding of the current status of Kuwait in relation to expatriate construction workers. It seeks to provide valuable insights and establish a basis for future, larger-scale research, while also addressing key sociocultural aspects relevant to this workforce.

The prevalence rate was 52.14 % during the last 12 months, with lower back and shoulder pain being the most common and severe, leading to the most absences. While most correlations between WMSDs and demographic variables were weak to moderate, they suggest that construction tasks are physically demanding, particularly affecting the shoulders, lower back, and knees.

While most of the construction workers in Kuwait are young, a weak correlation associated with shoulders and lower back WMSDs with age was perceived. This suggests that with age, the possibility of developing WMSDs is increased.

Additionally, the findings highlight the influence of Kuwait's working conditions, cultural factors such as uncertainty avoidance and power distance, and job instability on the underreporting of WMSDs. Fear of being perceived as unfit for construction activities and the authoritative power dynamics with superiors contribute to communication barriers that can further aggravate the tendency to underreport. Additionally, temporary contracts, payment methods, and the pressure to financially support their families, drive workers to neglect and endure pain to continue working.

The findings of this study have important implications for Kuwait's construction industry and occupational health practices. First, there is a need for tailored occupational health policies that consider both WMSD prevalence and Kuwait's cultural context, particularly high-power distance and uncertainty avoidance. This could involve developing confidential and culturally sensitive reporting systems to encourage workers to disclose health issues without fear of job loss. Second, implementing ergonomic interventions and training programs targeting the most affected body parts is crucial for prevention. These should be complemented by regular health check-ups and ergonomic assessments. Finally, effectively addressing WMSDs could yield significant economic benefits, including reduced absenteeism and increased productivity. These implications highlight the need for a comprehensive approach to WMSD management in Kuwait's construction sector, combining policy changes, preventive measures, cultural sensitivity, and ongoing research to ensure workers' health and well-being.

The findings and recommendations outlined in this study, while focused on Kuwait, hold relevance for the broader GCC region due to shared labor market characteristics and similar construction sector challenges. Adapting and implementing the proposed strategies across these countries could lead to significant improvements in occupational health standards and worker safety. This regional perspective emphasizes the need for collaborative efforts in addressing WMSDs, potentially inspiring unified policy changes and preventive measures across the GCC.

5.1 Limitations

Several limitations must be acknowledged in this research. First, the sample size, which might not fully represent the entire construction workforce in Kuwait. Future research should aim to include a larger, more diverse sample to strengthen the generalizability of the findings, particularly older workers. Additionally, further demographic variables are essential to be considered for a more comprehensive understanding of WMSDs, mainly data concerning their muscles strength, physical activity, and medical history. Secondly, relying on self-reported data for assessing the prevalence and severity of WMSDs can introduce bias. Workers may underreport due to self-defense mechanisms or fear of job loss stemming from cultural behaviors. Incorporating objective measurements, such as clinical assessments, can enhance the findings and provide a more comprehensive understanding of the subjective responses.

Ethical Approval: Not Applicable

Informed Consent: All participants were informed about the purpose and nature of the study and were assured of the anonymity of their responses. Participation was entirely voluntary, and participants implicitly gave consent by completing the questionnaire.

Conflict of Interest: The authors declare that they have no conflict of interest

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Tables & Figures

Table 1. Demographic profile descriptive analysis

Statistics	Age (years)	Height (cm)	Weight (Kg)	Experience (years)
Mean	38.55	170.93	76.60	13.97
Std	9.08	7.64	12.66	9.27
Min	20.00	150.00	55.00	2.00
Lower quartile	31.00	165.00	68.00	7.00
Middle quartile	38.00	170.00	74.00	12.00
Upper quartile	44.00	175.00	85.00	19.00
Max	63.00	190.00	116.00	50.00

Table 2. Frequency of WMSDS per body part during the last 12 months

Body part	Total count	% Frequency
Neck	14	11.96
Shoulders	27	23.07
Elbows	12	10.26
Wrist/hand	12	10.26
Upper back	10	8.55
Lower back	40	34.12

One or both hips/thighs	8	6.84
One or both knees	21	17.95
One or both ankles/feet	6	5.13

Table 3. Percentage of Workers reporting 1 to 9 body parts

No. of Body part	% of workers reporting
1	17.9
2	12.8
3	8.5
4	6.8
5	4.3
6	1.7
7	0
8	0
9	0

Table 4. Prevalence of each severity level from the total of reported complaints across all body parts

Severity	Prevalence of each severity level (Percentage)
Level 1	10.6
Level 2	43.3
Level 3	39.3
Level 4	6.6
Level 5	0

Table 5. Reported absences per severity level*

Body part	Severity level 1	Severity level 2	Severity level 3	Severity level 4
Neck	0	1	1	0
Shoulders	0	1	3	1
Elbows	0	0	1	0
Wrist/hands	0	0	0	0
Upper back	1	0	0	0
Lower back	0	1	5	1
Hips/thighs	0	1	0	0
Knees	0	1	0	0
Ankles/feet	0	0	0	0

*Please note that severity level 5 was excluded from the table since none of the responses had severe problems.

Table 6. Lower back Kendall's τ and significance*

Variables	Lower back Kendall's τ	Lower back significance (S/NS)
Shoulders	0.461	0.000 S
A-Lower back	0.350	0.000 S

*A-Lower back – Absence during the last 12 months due to lower back pain

Table 7. Shoulders Kendall's τ and significance*

Variables	**Shoulders Kendall's τ**	**Shoulders significance (S/NS)**
Neck	0.486	0.000 S
Lower back	0.461	0.001 S
One or both hips/thighs	0.334	0.000 S
Knees	0.431	0.000 S
A-Shoulders	0.386	0.000 S

*A-Shoulders – Absence during the last 12 months due to shoulders pain

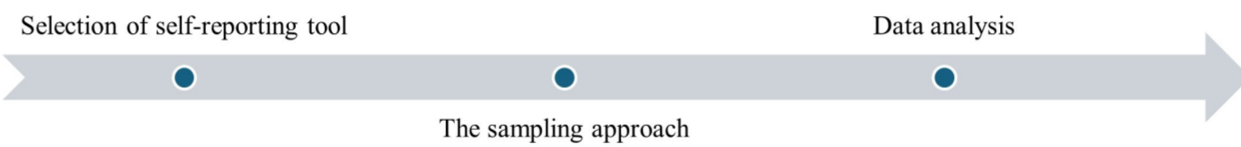
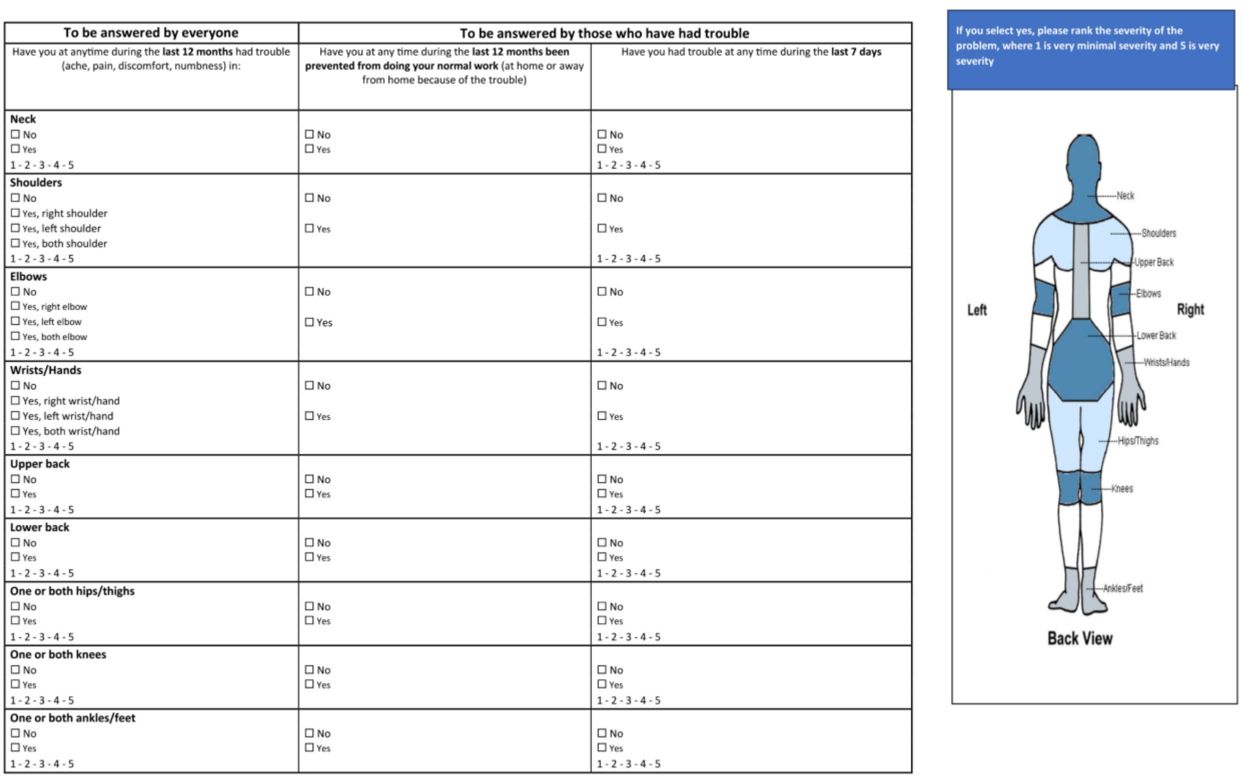


Figure 1. Process followed in methodology



To be answered by everyone	To be answered by those who have had trouble	
Have you at anytime during the **last 12 months** had trouble (ache, pain, discomfort, numbness) in:	Have you at any time during the **last 12 months been prevented from doing your normal work** (at home or away from home because of the trouble)	Have you had trouble at any time during the **last 7 days**
Neck ☐ No ☐ Yes 1 - 2 - 3 - 4 - 5	☐ No ☐ Yes	☐ No ☐ Yes 1 - 2 - 3 - 4 - 5
Shoulders ☐ No ☐ Yes, right shoulder ☐ Yes, left shoulder ☐ Yes, both shoulder 1 - 2 - 3 - 4 - 5	☐ No ☐ Yes	☐ No ☐ Yes 1 - 2 - 3 - 4 - 5
Elbows ☐ No ☐ Yes, right elbow ☐ Yes, left elbow ☐ Yes, both elbow 1 - 2 - 3 - 4 - 5	☐ No ☐ Yes	☐ No ☐ Yes 1 - 2 - 3 - 4 - 5
Wrists/Hands ☐ No ☐ Yes, right wrist/hand ☐ Yes, left wrist/hand ☐ Yes, both wrist/hand 1 - 2 - 3 - 4 - 5	☐ No ☐ Yes	☐ No ☐ Yes 1 - 2 - 3 - 4 - 5
Upper back ☐ No ☐ Yes 1 - 2 - 3 - 4 - 5	☐ No ☐ Yes	☐ No ☐ Yes 1 - 2 - 3 - 4 - 5
Lower back ☐ No ☐ Yes 1 - 2 - 3 - 4 - 5	☐ No ☐ Yes	☐ No ☐ Yes 1 - 2 - 3 - 4 - 5
One or both hips/thighs ☐ No ☐ Yes 1 - 2 - 3 - 4 - 5	☐ No ☐ Yes	☐ No ☐ Yes 1 - 2 - 3 - 4 - 5
One or both knees ☐ No ☐ Yes 1 - 2 - 3 - 4 - 5	☐ No ☐ Yes	☐ No ☐ Yes 1 - 2 - 3 - 4 - 5
One or both ankles/feet ☐ No ☐ Yes 1 - 2 - 3 - 4 - 5	☐ No ☐ Yes	☐ No ☐ Yes 1 - 2 - 3 - 4 - 5

Figure 2. Modified NMQ based on Kuorinka et al., (1987)

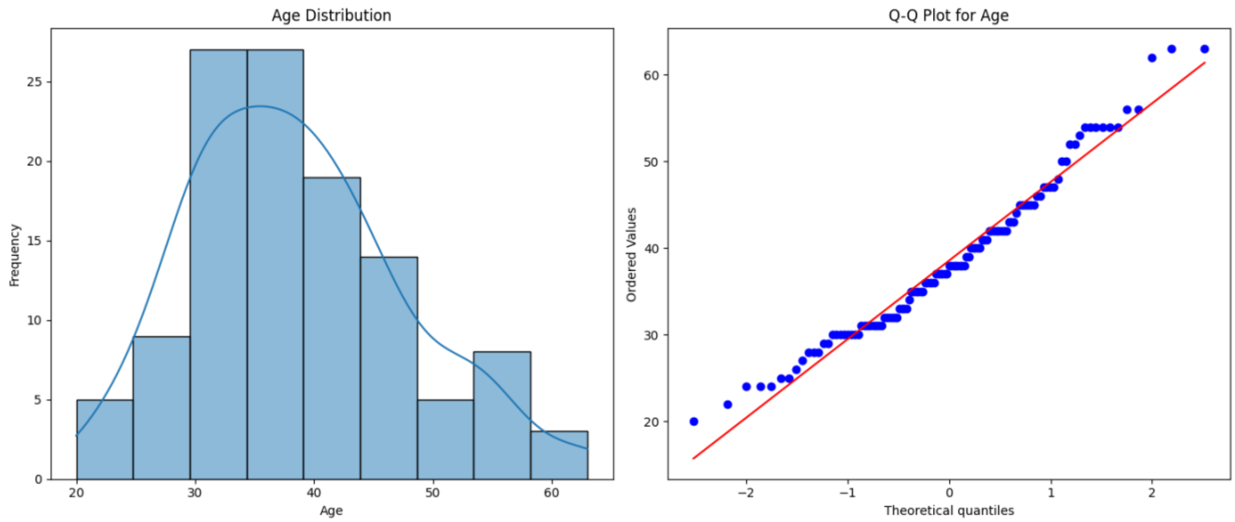


Figure 3. Normality test of age

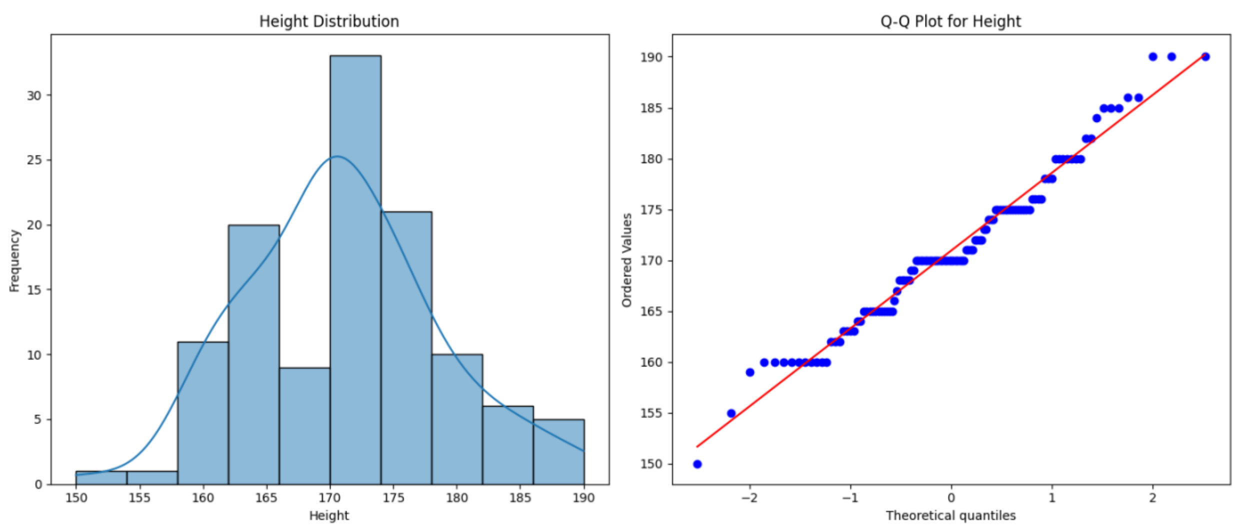


Figure 4. Normality test of height

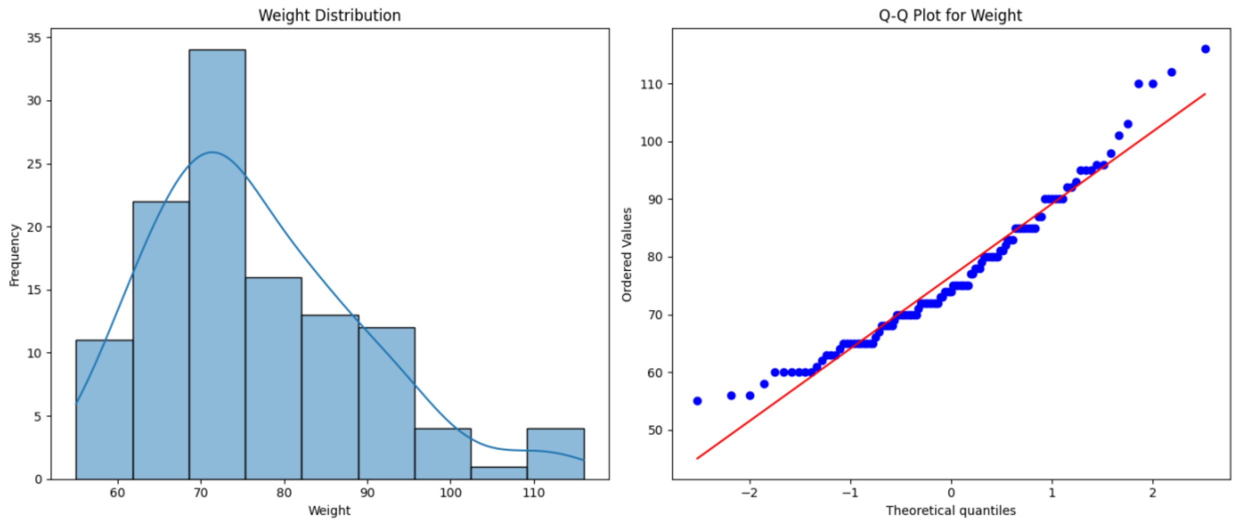


Figure 5. Normality test of weight

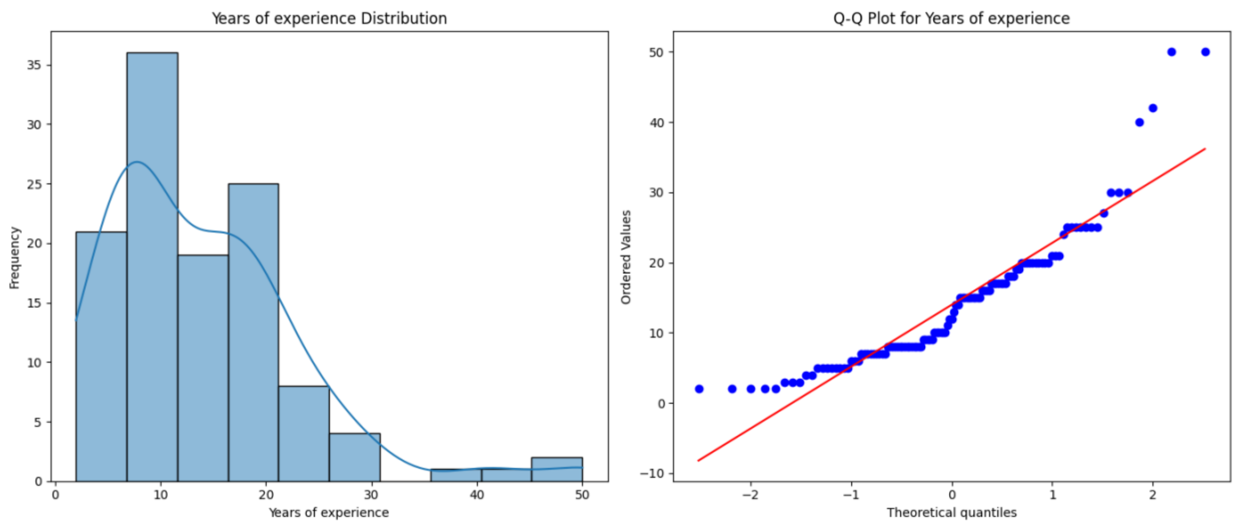


Figure 6. Normality test of years

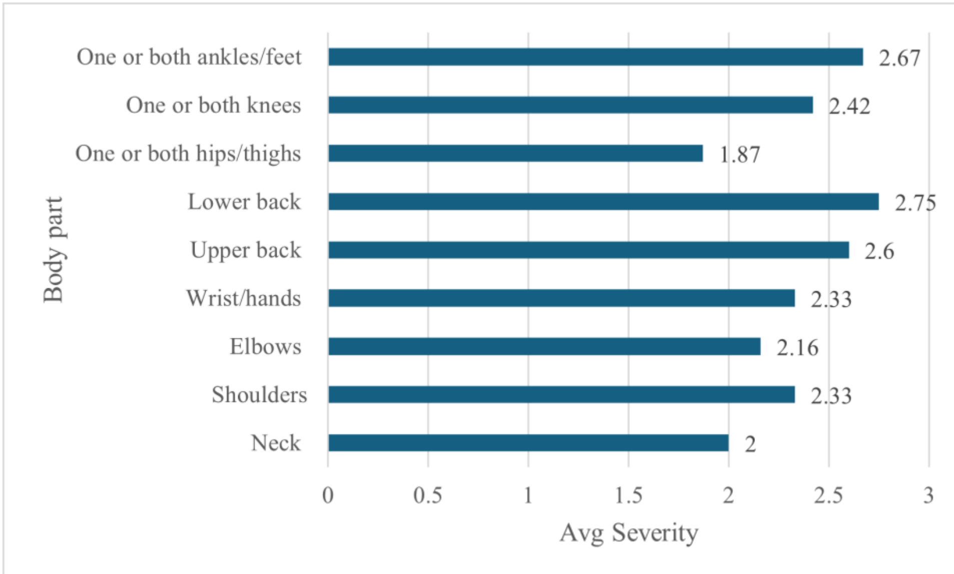


Figure 7. Average pain severity per body part

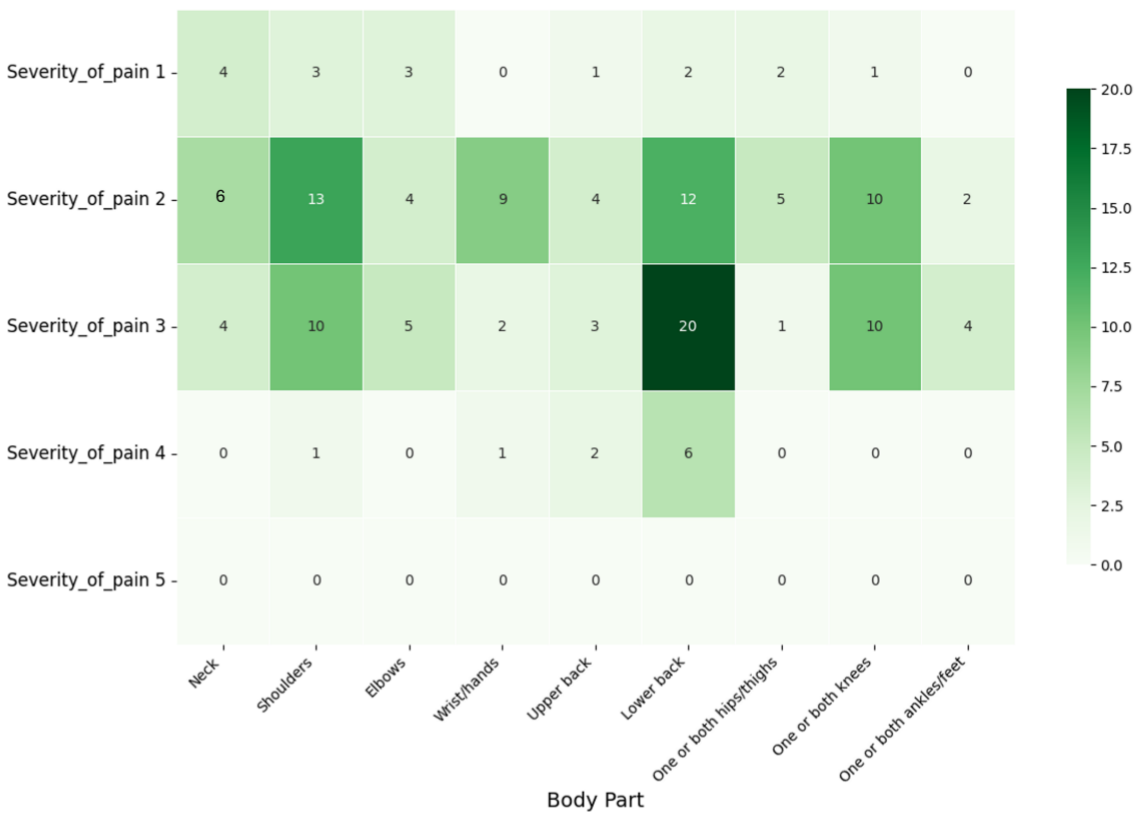


Figure 8. Heatmap of pain levels by body part

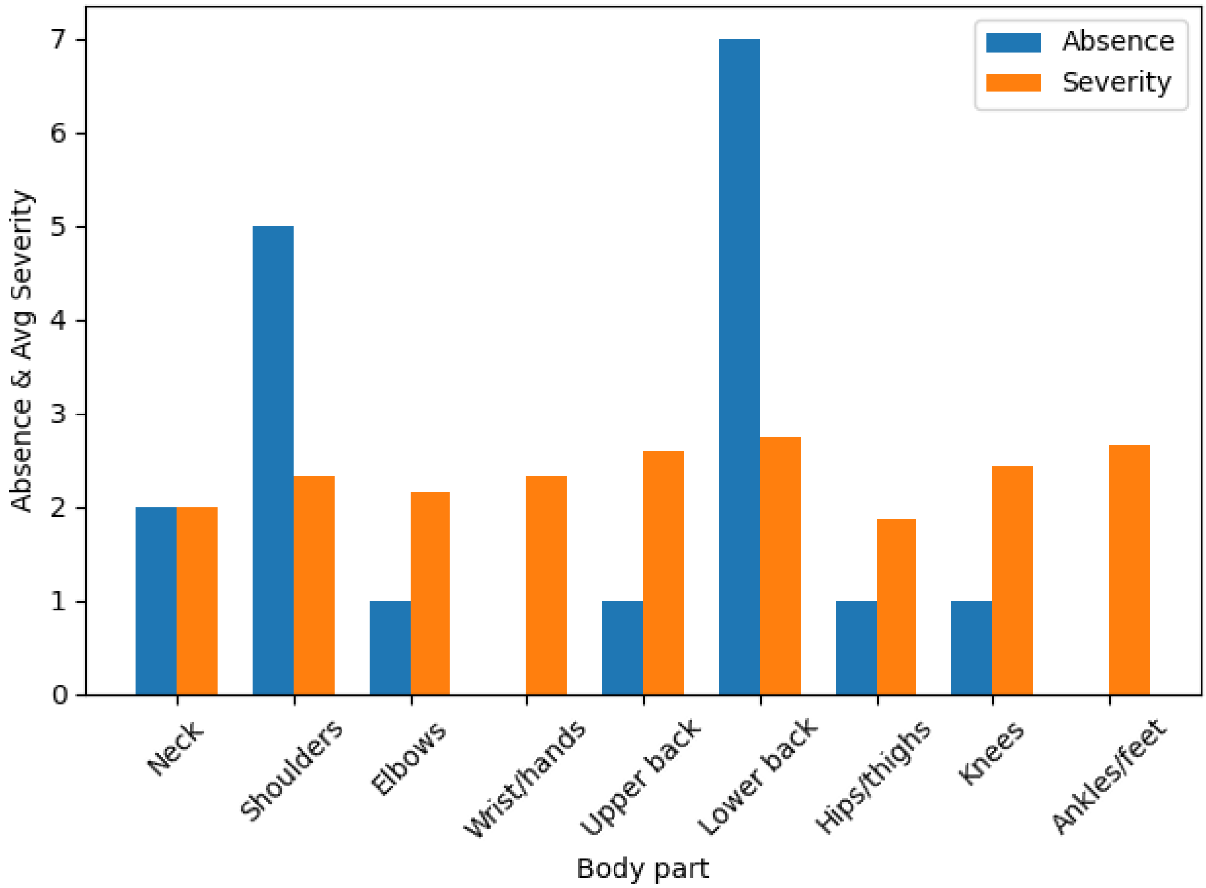


Figure 9. Frequency of absences per body part and average severity

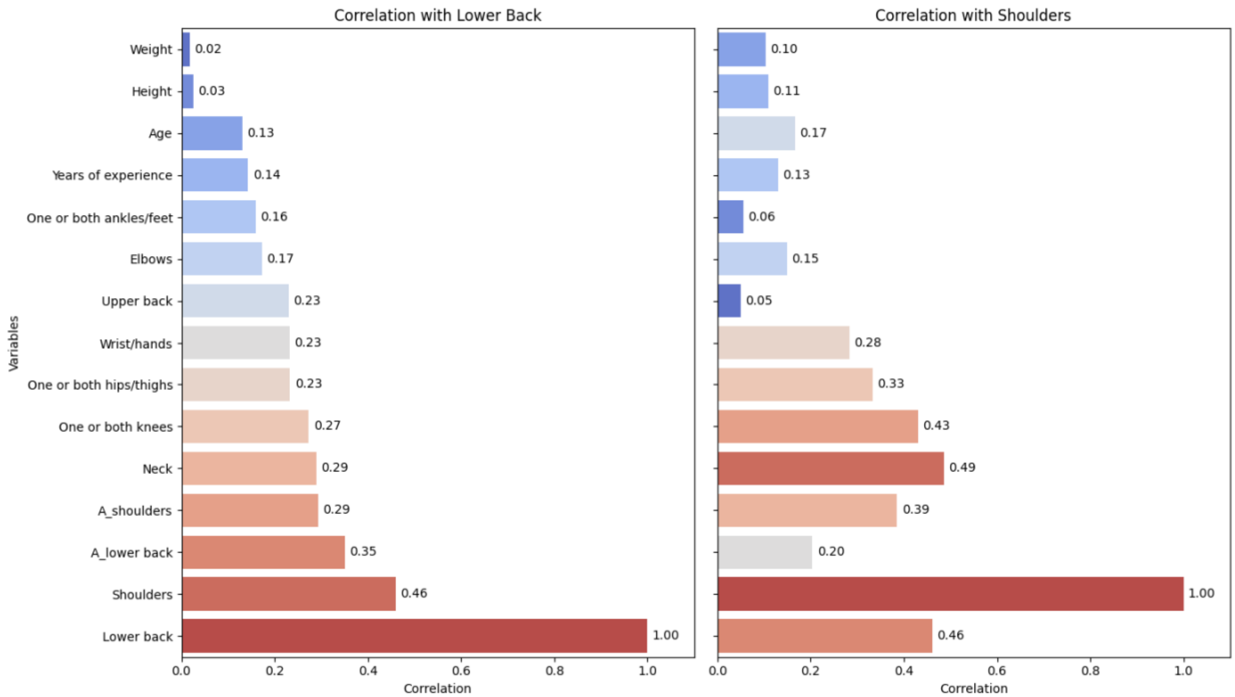


Figure 10. Kendalls' τ correlation coefficient for lower back and shoulder reported WMSDs*