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Editorial

We start this pioneering work, which do not seek perfection as much as aiming to provide a scientific window that opens a wide area for all the distinctive pens, both in the University of Sabratha or in other universities and research centers. This emerging scientific journal seeks to be a strong link to publish and disseminate the contributions of researchers and specialists in the fields of applied science from the results of their scientific research, to find their way to every interested reader, to share ideas, and to refine the hidden scientific talent, which is rich in educational institutions. No wonder that science is found only to be disseminated, to be heard, to be understood clearly in every time and place, and to extend the benefits of its applications to all, which is the main role of the University and its scholars and specialists. In this regard, the idea of issuing this scientific journal was the publication of the results of scientific research in the fields of applied science from medicine, engineering and basic sciences, and to be another building block of Sabratha University, which is distinguished among its peers from the old universities.

As the first issue of this journal, which is marked by the Journal of Applied Science, the editorial board considered it to be distinguished in content, format, text and appearance, in a manner worthy of all the level of its distinguished authors and readers.

In conclusion, we would like to thank all those who contributed to bring out this effort to the public. Those who lit a candle in the way of science which is paved by humans since the dawn of creation with their ambitions, sacrifices and struggle in order to reach the truth transmitted by God in the universe. Hence, no other means for the humankind to reach any goals except through research, inquiry, reasoning and comparison.

Editorial Committee

Notice

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Publications are arranged according to technical considerations, which do not reflect the value of such articles or the level of their authors.

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Publication instructions

The journal publishes high quality original researches in the fields of Pure Science, Engineering and Medicine. The papers can be submitted in English or Arabic language through the Journal email (jas@sabu.edu.ly) or CD. The article field should be specified and should not exceed 15 pages in single column.

All submitted research manuscripts must follow the following pattern:

- Title, max. 120 characters.
- Author Name, Affiliation and Email
- Abstract, max. 200 words.
- Keywords, max. 5 words.
- Introduction.
- Methodology.
- Results and Discussion.
- Conclusion.
- Acknowledgments (optional).
- References.

Writing Instructions:

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Invitation

The Editorial Committee invites all researchers "Lectures, Students, Engineers at Industrial Fields" to submit their research work to be published in the Journal. The main fields targeted by the Journal are:

- Basic Science.
- Medical Science & Technology.
- Engineering.

Refereeing

The Editorial Committee delivers researches to two specialized referees, in case of different opinions of arbitrators the research will be delivered to a third referee.

Editorial Committee

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CONTENTS

MUSCULOSKELETAL DISORDER AMONG WORKERS IN MISURATA STEEL FACTORY

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Abstract

Musculoskeletal disorders (MSDs) have emerged as a leading cause of occupational illness and disability in developing nations, intricately linked to socioeconomic factors impacting individuals, organizations, and communities. Recent observations highlight an increasing prevalence of musculoskeletal issues across diverse populations, prompting calls from medical policymakers and experts for comprehensive national prevention strategies tailored to MSDs. The steel industry, particularly in emerging economies like Libya, has gained prominence. Workers in this sector frequently engage in manual material handling and adopt awkward postures, significantly increasing their risk for MSDs. Despite extensive research on MSD prevalence among specific worker cohorts, comprehensive data regarding the broader working population remains limited, beyond common conditions like back and shoulder pain, which severely impair work capability. This study investigates the prevalence of musculoskeletal disorders among steelworkers at the Misurata Steel Factory. It identifies the most prevalent types of MSDs affecting specific body regions—shoulders, upper extremities, back, and lower extremities. Additionally, it evaluates the risk factors associated with work-related MSDs and explores potential treatment options for effective management.

Keywords: Musculoskeletal disorders (MSDs); steelworkers; occupational health; risk factors; Misurata Steel Factory.

Introduction

Musculoskeletal disorders (MSDs) are soft tissue disorders that affect various body structures, commonly involving the shoulders, neck, elbows, wrists, and lumbar region. These disorders are generally not associated with acute incidents such as falls or slips but rather result from chronic stressors (Fesharaki, 2019).

According to the International Labor Organization (ILO), approximately 160 million work-related illnesses occur globally each year, with MSDs ranking as the second most prevalent work-related disorder (Babaei Pouya et al., 2019). Environmental factors, including poor ergonomics and repetitive tasks, play a significant role in the

development of MSDs, impacting muscles, tendons, ligaments, bones, and joints (Rabiei et al., 2021).

In recent years, attention has increased toward understanding the causes of MSDs and developing preventive measures. Employers, employees, and government agencies are recognizing the connection between workplace factors and MSDs, which can lead to absenteeism and reduced productivity (Singh, Kocher, and Lal, 2013). Workplace risk factors, including repetitive tasks, awkward postures, heavy physical labor, and exposure to vibration, are well-documented contributors to MSDs. Additionally, individual factors such as age, gender, smoking habits, and psychosocial stressors significantly influence the risk of developing these disorders. In the steel manufacturing industry, workers face elevated risks due to forceful exertion, awkward postures, and repetitive tasks inherent in the production process (Choi et al., 2009).

Work-related MSDs (WMSDs) have profound implications for employability, organizational productivity, and the sustainability of health and social security systems. Preventing job-related MSDs is a national priority in many countries. Industrial hygienists and occupational health specialists are instrumental in reducing absenteeism and addressing the root causes of work-related injuries and illnesses (Habibi and Fereidan, 2008).

The National Institute for Occupational Safety and Health (NIOSH) has identified MSDs as a priority for prevention due to their high prevalence, severity, and potential for mitigation. WMSDs are second only to work-related respiratory illnesses in terms of occupational health importance (Babaei Pouya et al., 2019).

In Europe, the European Occupational Diseases Statistics (EODS) reported that MSDs accounted for 38.1% of occupational illnesses in 2005. MSDs also constitute 31% and 44% of reported occupational illnesses in Finland and the United States, respectively. Improper work postures are recognized as a major contributing factor, with posture analysis emerging as a critical tool for evaluating workplace ergonomics and reducing the incidence of WMSDs (Choi et al., 2009).

Methods and Materials

1 Study Subjects

This study involved 138 workers employed at the Misurata Steel Factory.

2 Questionnaire

A self-structured questionnaire was developed in both English and Arabic to ensure clarity and comprehension among workers. The questionnaire consisted of three sections:

Sociodemographic Data: Included details on age, gender, and work experience.

Types of MSDs: Focused on symptoms and pain in specific anatomical regions.

Treatment Management Options: Assessed the availability and utilization of treatment, including physiotherapy.

The questionnaire included a body map divided into four anatomical regions: upper limbs, lower limbs, neck, and trunk, where participants reported pain, discomfort, and other symptoms. Internal consistency was confirmed with a Cronbach's alpha range of 0.53–0.808. Workers found the questionnaire straightforward and completed it in approximately 10 minutes.

3 Data Analysis

Data were analyzed using SPSS IBM version 21. Descriptive statistics were employed to summarize demographic characteristics and the prevalence of MSDs, expressed as frequencies and percentages. Cross-tabulations were used to identify relationships between variables such as age, work type, and MSD prevalence.

4 Ethics Approval and Consent to Participate

The study was approved by the Faculty of Medical Technology. Permission was obtained from factory management, and informed consent was secured from all participants after explaining the study's purpose, procedures, and potential risks in Arabic. All responses were anonymized to protect participants' privacy.

Results

The response rate for the study was 70%, with 138 out of 200 distributed questionnaires completed. All participants were male workers. The age distribution of the respondents is summarized in Table (1).

Table (1): Age Distribution of Workers.

Age of workers	Number	Percentage
less than 40	22	15.9%
40-60	116	84.1%
Total	138	100%

Table (2) estimates the work experiences of 138 workers at the Misurata Steel Factory. The majority of workers (81%, n = 112) have up to 10 years of work experience,

representing the largest group. On the other hand, the smallest group consists of workers with 4–6 years of experience, accounting for only 1.5% (n = 2).

Table (2): Years of Workers Experience.

Years of workers experiences	Number	Percentage
Less than 1 year	6	4.3%
2-4	3	2.1%
4-6	2	1.5%
6-8	8	5.7%
8-10	7	5.3%
Up to 10	102	81.8%
Total	138	100%

Table (3) presents the prevalence of musculoskeletal disorder (MSD) symptoms among workers by body parts. The prevalence was highest in the back (26%) and lower extremities (24%), followed by the shoulder (17%), neck (15%), elbow (10%), and wrist (8%). Among the total number of workers who participated in the questionnaire, 100 workers (72%) reported experiencing MSD symptoms, irrespective of their job title.

Table (3): Prevalence of Musculoskeletal Symptoms.

Specific body region	Number	Percentage
Neck	**15**	**15%**
shoulder	**17**	**17%**
Elbow	**10**	**10%**
Wrist	**8**	**8%**
back	**26**	**26%**
Hip	**12**	**12%**
Knee	**9**	**9%**
ankle	**3**	**3%**
Total	**100**	**100%**

Table (4) shows the number of workers who received therapy for musculoskeletal disorder (MSD) symptoms. These symptoms ranged from mild pain, severe pain, and chronic pain to difficulty and limitation in movement. The results indicate that 89% of

workers received some form of treatment, while 11% did not seek or receive any therapy.

Table (4): Number of Workers Received Therapy.

Workers received treatment	Number	Percentage
Yes	**80**	**89%**
No	**20**	**11%**
Total	**100**	**100%**

Table (5) presents the data regarding workers who received medications for musculoskeletal disorder (MSD) symptoms. The results indicate that 62.5% of workers reported taking medications to address MSD symptoms, with most using painkillers and anti-inflammatory drugs. Conversely, 37.5% of workers did not take any form of medication.

Table (5): Workers Receiving Medications for MSD Symptoms.

Medication	Number	Percent
Yes	**50**	**62.5**
No	**30**	**37.5**
Total	**80**	**100%**

Table (6) illustrates the data regarding workers' enrollment in physiotherapy sessions as a treatment for musculoskeletal disorder (MSD) symptoms. The results indicate that 60% of workers participated in physiotherapy sessions. Additionally, 83% of the total workers reported experiencing some improvement in their physical health related to MSD symptoms.

Table (6): Physiotherapy Sessions and Health Improvement Among Workers.

P.T sessions	Number	Percentage
Yes	**48**	**60%**
Improve in symptoms	**40**	**83%**

Discussion

Musculoskeletal disorders (MSDs) are a widespread concern worldwide, with significant variations between developed and developing countries regarding their causes and associated risk factors. This study identified a high prevalence of MSDs among workers in the Misurata Steel Factory and highlighted age as a significant factor correlating with the incidence. Consistent with previous findings, younger workers exhibited a notable prevalence of MSD symptoms (Akter, Maruf, and Chowdhury, 2015).

Additionally, this study found that the most affected body parts were the upper and lower limbs, followed by the back. These findings align with results from other studies conducted in developing countries. However, some research has reported a higher prevalence of neck and shoulder discomfort, often associated with neck stiffness and tenderness in the trapezius muscle's descending section (Khavanin, 2007).

The workers in this study were categorized into groups based on their management of MSD symptoms. One group reported using medications, primarily analgesics and anti-inflammatory drugs, to alleviate symptoms ranging from mild pain to chronic conditions and, in some cases, difficulties with movement.

Comprehensive management strategies for musculoskeletal problems include education, psychological support, physical interventions, and, in severe cases, surgical procedures. A critical component of this approach involves analgesic drugs to manage pain effectively. Musculoskeletal disorders impose significant financial burdens on individuals and organizations, including costs related to medical care, absenteeism, and productivity losses. For instance, in 1998, the UK's direct healthcare costs for back pain were estimated at over £1.6 billion, with additional informal care and productivity losses amounting to £10 billion. Despite these costs, there is a pressing need for improvement in the effective use of analgesics for managing MSDs (Ndlovu et al., 2014).

Moreover, this study revealed that 60% of workers reported undergoing physiotherapy treatment, with a significant proportion experiencing reduced pain and improved physical conditions. These findings are consistent with literature demonstrating that physiotherapy positively impacts maintaining physical health and alleviating pain (Desmeules et al., 2012).

Let me know if further refinements are needed!

Conclusion

The prevalence of musculoskeletal disorders (MSDs) among workers in the Misurata Steel Factory is notably high, primarily impacting the upper extremities, lower extremities, and back. Contributing factors include poor posture, the demanding nature

of the work, and insufficient job experience. Effective management strategies, including medical treatment and physiotherapy, play a crucial role in alleviating pain and enhancing workers' physical health. To address this issue, factory management should implement measures to reduce the prevalence of MSDs, such as improving workplace ergonomics and providing comprehensive worker education on proper body mechanics and preventive practices. These efforts are essential for fostering a healthier and more productive workforce.

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