



T.C.
ANKARA YILDIRIM BEYAZIT UNIVERSITY
PUBLIC HEALTH INSTITUTE

**OCCUPATIONAL SAFETY KNOWLEDGE AND PRACTICE
AMONGST THE SYRIAN WORKERS IN THE AUTOMOBILE
REPAIR WORKSHOPS IN NORTHWEST SYRIA AND
SOUTHERN TÜRKİYE**

MASTERS'S THESIS

Samer ZAKOUR

HEALTH POLICY AND GLOBAL HEALTH

Ankara, 2024

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APPROVAL of the THESIS
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automobile repair workshops in Northwest Syria and Southern Türkiye

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Master's Thesis

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quality requirements for a master's degree.

Prof. Dr. Salih MOLLAHALİLOĞLU

Institution Director

I certify that this thesis meets all the requirements for a master's degree

PLAGIARISM

I therefore affirm that this work is entirely mine and it's unique. I acknowledge that my thesis followed the academic process to the fullest extent permitted by law and have specifically referenced in compliance with Ankara Yildirim Beyazit University policies, academic regulations, and ethical conduct.

(15.12.2024)

Samer ZAKOUR

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ABSTRACT

Master's Thesis

OCCUPATIONAL SAFETY KNOWLEDGE AND PRACTICE AMONGST THE SYRIAN WORKERS IN THE AUTOMOBILE REPAIR WORKSHOPS IN NORTHWEST SYRIA AND SOUTHERN TÜRKİYE

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This study examines the knowledge, attitudes, and practices about occupational safety among Syrian workers in automobile repair workshops located in Northwest Syria and Southern Türkiye. The research employs a descriptive cross-sectional methodology to evaluate the impact of demographic characteristics, training, and geographical differences on workers' compliance with safety standards. Data were gathered from 150 participants via a standardized questionnaire and evaluated with statistical methods to discern major trends and relationships. The results indicate substantial deficiencies in workplace safety awareness and irregular utilization of personal protective equipment (PPE). Although the majority of employees exhibited knowledge of immediate workplace hazards, their attitudes towards safety practices were impeded by perceived barriers, including discomfort and insufficient resources. Psychological factors, such as stress and fatalistic ideas, additionally influenced compliance with safety measures, especially in conflict-affected areas. Employees in Southern Türkiye demonstrated superior safety measures compared to their counterparts in Northwest Syria, indicating disparities in regulatory supervision and resource accessibility. This study highlights the necessity for extensive training programs, enhanced access to personal protective equipment, and behavioral strategies to overcome psychological obstacles. The research underscores the significance of a comprehensive strategy that amalgamates education, mental health assistance, and regulatory structures to improve workplace safety. These findings provide significant insights for policymakers and practitioners seeking to enhance workplace safety in high-risk settings.

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Keywords: Occupational Safety, Syrian Workers, Automobile Repair Workshops, Northwest Syria, Southern Türkiye

ÖZET

Yüksek Lisans Tezi

KUZEYBATI SURİYE VE GÜNEY TÜRKİYE’DEKİ SURİYELİ ÇALIŞANLARIN OTOMOBİL TAMİR ATÖLYELERİNDE MESLEKİ GÜVENLİK BİLGİ VE UYGULAMALARI

Samer ZAKOUR

Ankara Yıldırım Beyazıt Üniversitesi

Halk Sağlığı Enstitüsü

Sağlık Politikası ve Küresel Sağlık Programı

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Bu çalışma, Kuzeybatı Suriye ve Güney Türkiye’deki otomobil tamir atölyelerinde çalışan Suriyelilerin mesleki güvenlik konusundaki bilgi, tutum ve uygulamalarını incelemektedir. Araştırma, demografik özellikler, eğitim ve coğrafi farklılıkların çalışanların güvenlik standartlarına uyum üzerindeki etkisini değerlendirmek için tanımlayıcı kesitsel bir metodoloji kullanmıştır. Veriler, 150 katılımcıdan standart bir anket aracılığıyla toplanmış ve temel eğilimleri ve ilişkileri ortaya koymak için istatistiksel yöntemlerle değerlendirilmiştir. Sonuçlar, iş yeri güvenliği farkındalığında önemli eksiklikler ve kişisel koruyucu ekipmanların (PPE) düzensiz kullanımını göstermektedir. Çalışanların çoğu, iş yerindeki ani tehlikeler hakkında bilgi sahibi olmasına rağmen, güvenlik uygulamalarına yönelik tutumları; rahatsızlık ve yetersiz kaynaklar gibi algılanan engeller nedeniyle olumsuz etkilenmiştir. Stres ve kadercilik gibi psikolojik faktörler, özellikle çatışmadan etkilenen bölgelerde, güvenlik önlemlerine uyumu ek olarak etkilemiştir. Güney Türkiye’deki çalışanlar, Kuzeybatı Suriye’deki meslektaşlarına kıyasla daha üstün güvenlik önlemleri sergilemiş ve bu durum düzenleyici denetim ve kaynaklara erişim farklılıklarını ortaya koymuştur. Bu çalışma, kapsamlı eğitim programlarının gerekliliğini, kişisel koruyucu ekipmanlara erişimin artırılmasını ve psikolojik engelleri aşmak için davranışsal stratejilerin önemini vurgulamaktadır. Araştırma, iş yeri güvenliğini geliştirmek için eğitimi, ruh sağlığı desteğini ve düzenleyici yapıları birleştiren kapsamlı bir stratejinin önemini ortaya koymaktadır. Bu bulgular, yüksek riskli ortamlarda iş yeri güvenliğini artırmayı amaçlayan politika yapıcılar ve uygulayıcılar için önemli bilgiler sağlamaktadır.

Aralık 2024, 92 sayfa

Anahtar Kelimeler: Mesleki Güvenlik, Suriyeli Çalışanlar, Otomobil Tamir Atölyeleri, Kuzeybatı Suriye, Güney Türkiye

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LIST OF ABBREVIATIONS

BOHS	: Basic Occupational Health Services
DALYs	: Disability-Adjusted Life Years
HAVS	: Hand-Arm Vibration Syndrome
HBM	: Health Belief Model
ILO	: International Labour Organization
K.A.O.S.	: Knowledge, Attitude, Occupational Hazards, and Safety (Composite Score Used in The Study)
KAP	: Knowledge, Attitudes, and Practices
NGO	: Non-Governmental Organization
NIHL	: Noise-Induced Hearing Loss
NIOSH	: National Institute for Occupational Safety and Health
OH&S	: Occupational Health and Safety
OSH	: Occupational Safety and Health
PPE	: Personal Protective Equipment
PSC	: Psychosocial Safety Climate
QALY	: Quality-Adjusted Life Years
SPSS	: Statistical Package for the Social Sciences
TOT	: Training-of-Trainers
WHO	: World Health Organization

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1. INTRODUCTION

1.1. Background

Occupational safety and health (OSH) is a crucial area of the work environment, where its principles are established to prevent incidents and minimize the risks associated with hazards.

The fundamental pillars of the OSH consist of:

- **Core Principles:** OSH is built on principles that prioritize accident prevention and hazard control through proactive and continuous improvements in safety practices. The International Labour Organization (ILO) outlines key elements for OSH, emphasizing the importance of national and enterprise-level policies that integrate a preventive culture. This culture involves assessing risks, establishing safety standards, and educating workers on best practices in safety and health management [1].
- **Risk Management and Hazard Control:** Effective OSH systems involve systematic hazard identification and risk assessment strategies. Risk management often includes developing safety policies and implementing control mechanisms, such as training, protective equipment, and incident reporting systems, to prevent workplace injuries and occupational diseases. The ILO and WHO provide frameworks and conventions (e.g., ILO Convention No. 187) that guide the development of national policies to enforce and enhance workplace safety [1].
- **Evolution and Context of OSH:** OSH frameworks continue to evolve with technological advancements, economic globalization, and shifting work patterns. These changes bring new challenges, such as chemical safety, ergonomics, and mental health considerations, necessitating updated strategies to address emerging risks. OSH also includes occupational hygiene, industrial ergonomics, and the promotion of a safety-first culture within organizations [2].

Those principles evolved over time, where they had to be developed in response to emerging challenges, a clear example is the progress in the United States, where the history

of occupational safety and health (OSH) in the United States has evolved significantly, particularly during the early 20th century. During the industrial revolution, hazardous working conditions in sectors such as mining, steel manufacturing, and meatpacking led to high injury and mortality rates. These unsafe conditions were brought to public attention by investigative works like Upton Sinclair's *The Jungle*, which exposed the harsh realities faced by workers. This spurred public demand for reforms, culminating in the passage of labor laws aimed at improving workplace safety.

Key reforms during this period included the introduction of workers' compensation laws and the establishment of the Department of Labor in 1913. The creation of organizations like the National Safety Council in 1912 further advanced efforts to prevent workplace accidents and promote worker safety through education. While conservative corporate interests initially resisted these changes, radical reform movements and labor unions played a significant role in pushing for stronger OSH protections. This historical development highlights the crucial role of policies and regulations in ensuring the health and safety of workers. These early movements laid the foundation for the comprehensive OSH frameworks we recognize today, underscoring the need for continued efforts in protecting workers, especially in high-risk industries like automobile repair [3].

As for the progress of the labour law legislations in the Arab countries, the International Labour Organization (ILO) has established over 40 standards, including conventions, recommendations, and codes of practice, to outline core principles and rights in occupational safety and health (OSH). These standards are monitored by ILO bodies such as the Committee of Experts on the Application of Conventions and Recommendations, which ensure that member states implement them. Arab countries show significant variation in their ratification of ILO conventions, with Egypt and Iraq having ratified the highest number of conventions (63 and 61, respectively), while Lebanon leads in OSH conventions with 17. In contrast, Oman and Qatar have ratified only 4 and 6 OSH-specific conventions, respectively. The core OSH conventions include C155 (Occupational Safety and Health), C161 (Occupational Health Services), and C187 (Promotional Framework for OSH), introduced in 2006. Convention C187 promotes the development of national OSH policies and systems, emphasizing the importance of tripartite contributions from governments, employers, and workers to reduce occupational accidents and diseases. Despite these efforts,

many Arab states, including those in the study, have yet to ratify the core OSH conventions, with only Algeria ratifying C155 in 2006 [4].

As OSH principles evolved to address emerging challenges, their historical roots in early 20th-century labor reforms highlight the importance of continual progress in ensuring worker safety, particularly in high-risk industries like automobile repair.

The foundations of OSH were laid through early labor reforms, which emerged in response to hazardous working conditions during the industrial revolution. These reforms, such as the introduction of workers' compensation laws and the establishment of safety councils, set the stage for the principles that continue to shape OSH today.

It is essential to recognize the growing recognition of the need for OSH adaptation in response to changing work environments. Over the past few decades, OSH efforts have expanded to address broader worker health concerns, incorporating more comprehensive approaches beyond traditional safety measures. For example, the National Institute for Occupational Safety and Health (NIOSH) has developed the "Total Worker Health®" [5] concept, which aims to integrate health and safety efforts to improve the overall well-being of workers. Additionally, the World Health Organization (WHO) has introduced its Healthy Workplace Framework [6], which expands the scope of OSH to include not only physical safety but also mental health and workplace culture.

According to WHO, every year over 2million workers die due to work-related injuries [7] which creates pivotal burden on the health systems across the globe. Occupational diseases are causing considerable economic burden, in 2016, approximately 1.53 million deaths and 76.1 million disability-adjusted life years (DALYs) were linked to occupational risk factors, representing 2.8% of deaths and 3.2% of DALYs globally. The most significant contributors to deaths were particulate matter, carcinogens (especially asbestos), and injury risk factors. The study noted that men and individuals aged 55 and older were the most affected. Additionally, while deaths and DALYs decreased by 31% and 25% from 1990 to 2016, the burden of occupational exposures remains significant, emphasizing the need for ongoing prevention efforts [8].

The most common occupational hazards can be categorized in 4 categories:

- Physical hazards: These include noise, vibration, extreme temperatures, radiation, and ergonomic risks.
- Chemical hazards: Toxic substances, e.g. solvents, gases, and dusts.
- Biological hazards: Viruses, bacteria, and other pathogens.
- Psychological hazards: Stress, burnout, and workplace violence are considered as occupational hazards as well [9, 10].

Although workers in automobile repair shops may be aware of the hazards they face, the gap between this knowledge and its practical application remains a significant challenge. This 'knowledge-action gap' can be attributed to factors such as time constraints, lack of supervision, and insufficient resources, which hinder the implementation of effective safety practices.

In the field of occupational safety, three interrelated concepts are critical to ensuring a safe working environment: *attitude*, *knowledge*, and *practice*. These elements not only influence how workers comprehend and respond to hazards but also determine the effectiveness of safety interventions in the workplace, given that the equipment is available and reliable.

A worker's attitude towards safety refers to their beliefs, feelings, and behavioral intentions regarding workplace hazards and safety measures. Positive attitudes towards safety are often linked to greater adherence to safety protocols and a more proactive approach to risk management. Conversely, negative attitudes, such as complacency or fatalism, can lead to risky behaviors and negligence. Understanding workers' attitudes toward safety is crucial in identifying barriers to effective safety practices and improving compliance.

OSH knowledge involves a worker's understanding of safety risks, protective measures, and response protocols. This includes knowing the risks specific to their environment, how to use personal protective equipment (PPE) effectively, and the correct steps to follow in emergencies. Research has shown that without adequate safety knowledge, workers are less equipped to identify and manage risks, which increases the chance of accidents, studies show that 90% of accidents in workplaces occur due to human made errors [11]. For workplaces such as automobile repair shops, training sessions are critical for reinforcing safety knowledge.

Practice refers to the implementation of safety behaviors and procedures in daily tasks. Even with positive attitudes and strong safety knowledge, gaps in practice can arise, often referred to as the "knowledge-action gap." Factors such as time constraints, lack of supervision, and inadequate resources can prevent workers from fully adhering to safety protocols. Addressing these factors is essential in creating a safety culture where knowledge and attitude translate effectively into safe practices on the ground [12].

Workers in automobile repair shops hold various roles, including spray painters, mechanics, furnishing repair technicians, electricians, and body repair technicians. Each occupation faces unique hazards, putting workers at risk of both acute and chronic injuries due to ongoing exposure to these elements. Common hazards include chemical exposure, such as inhaling fumes from car paint; physical strain from handling heavy objects or working in challenging postures, which increases the risk of spinal and joint injuries; and risks associated with welding, which can lead to burns and eye damage. Additionally, workers are exposed to prolonged vibrations and consistently high noise levels, which may result in Hand-Arm Vibration Syndrome (HAVS) and Noise-Induced Hearing Loss (NIHL).

In the context of occupational safety and health (OSH) in automobile repair shops, the concept of actionable knowledge plays a pivotal role in transforming theoretical safety knowledge into practical, real-world action. Actionable knowledge, as defined by various scholars, emphasizes the dynamic process through which knowledge informs and catalyzes action. This process is cumulative, cyclical, and coevolutionary, wherein safety knowledge, attitudes, and practices interact and evolve continuously. In automobile repair settings, workers' understanding of safety risks must be actively applied through their behaviors and practices. Moreover, the process of knowledge co-production, where policy, practice, and worker experiences intersect, ensures that OSH strategies remain responsive to changing work environments and emerging hazards. By fostering equitable relationships and ensuring that safety knowledge is not only understood but also usable and relevant, a culture of safety can be developed that is adaptable and grounded in the realities of the workplace. This approach aligns with the evolving nature of OSH frameworks, encouraging continuous feedback and improvement to reduce occupational risks effectively [13].

1.2. Context of Northwest Syria and Southern Türkiye



Figure 1.1. Map of study areas

Over 12 years of conflict have led to worsening humanitarian conditions in northwest Syria, exacerbated by ongoing violence, a deepening economic crisis, harsh weather, and the aftermath of significant earthquakes in February 2023. The conflict has driven large-scale displacement, with northwest Syria now home to roughly 5 million people, of whom 3.6 million are internally displaced and 1.9 million reside in camps and informal settlements. As of early 2023, at least 4.1 million people in this region depend on humanitarian aid for essential needs, with around 80% of this population being women and children [14].

Workplace conditions in northwest Syria have been impacted by years of conflict, economic struggles, and continuous humanitarian challenges. The region's labor market and infrastructure are extremely fragile due to persistent hostilities, with many displaced individuals facing limited access to basic services. Challenges such as inflation, currency instability, and a lack of sustainable employment make it difficult for workers to maintain adequate living standards. For example, local workers often face heightened risks in hazardous environments, with safety concerns exacerbated by unexploded ordnance and periodic conflict flare-ups [15]

Additionally, workplace injuries in high-risk sectors such as construction, healthcare, and manufacturing are underreported due to limited healthcare access, stigmatization, and the fragmented health infrastructure in the region. The crisis has resulted in reduced safety oversight, leaving workers more vulnerable to unsafe working conditions.

Syrians in southern Türkiye, face significant challenges in their work and daily lives due to their status as refugees under temporary protection. They often experience financial difficulties, with many earning insufficient wages to meet basic living costs, such as food and rent. Employment options are typically limited to low-wage, labor-intensive jobs in sectors like construction and manufacturing. Due to language barriers, lack of social support, and limited access to work permits, they are frequently relegated to informal, unregulated employment.

This situation leaves many Syrians vulnerable to exploitation, including low wages, unpaid labor, and lack of social security. Social exclusion and discrimination are also common, with refugees facing isolation from local communities and struggling with the Turkish language [16]. These barriers contribute to poor workplace conditions and limited opportunities for economic mobility. The study emphasizes that these structural challenges significantly impact the ability of Syrian refugees to integrate into Turkish society and attain stable, fair employment conditions.

The ongoing conflict in Syria has led over 5.5 million people to seek refuge in neighboring countries, with Türkiye alone hosting over 3.5 million registered Syrian refugees under temporary protection as of early 2018. Türkiye initially adopted an open-door policy, formalized through the Temporary Protection Regulation in 2011, providing Syrians, Palestinians from Syria, and stateless individuals from Syria with protections against forced returns, indefinite stays, and access to essential services. Despite Türkiye's initial view that the refugee situation would be temporary, the prolonged presence of Syrians—over 90% of whom reside in urban areas—necessitated expanded policies to address socio-economic integration, including regulations for education, healthcare, and employment, alongside mobility restrictions due to security concerns.

Türkiye's approach to refugees is influenced by its geographical limitation to the 1951 UN Refugee Convention, which restricts full refugee status to Europeans. Consequently, Türkiye's policies have focused on temporary solutions rather than long-term integration for

non-European refugees, like Syrians, with resettlement to third countries remaining limited. As the Syrian crisis continues, Türkiye faces the dual challenge of managing refugees' immediate needs while balancing national security considerations [17].

In light of these challenges, this study seeks to explore the knowledge and safety practices among Syrian workers in automobile repair workshops, aiming to bridge the gap between OSH knowledge and effective practice in a region deeply impacted by conflict and displacement.

1.3. Problem Statement

Occupational safety and health (OSH) practices are critical in high-risk industries, such as automobile repair, to protect workers from potential hazards. However, in conflict-affected regions like northwest Syria and southern Türkiye, these practices are often inadequately implemented due to a combination of limited resources, unstable working conditions, and insufficient safety oversight. Despite the growing recognition of OSH principles globally, a significant gap exists between workers' knowledge of safety practices and their actual implementation in the workplace, particularly among Syrian workers in automobile repair workshops. This knowledge-action gap is exacerbated by the challenges posed by displacement, economic hardship, and lack of formal regulation. This study aims to investigate the OSH knowledge and practices among Syrian workers in automobile repair workshops in northwest Syria and southern Türkiye, exploring the factors contributing to this gap and identifying potential solutions to improve safety standards and reduce the risks of workplace injuries and occupational diseases in these regions.

1.4. Justification of the study

This field has been significantly neglected in Syria, and the situation has worsened after the war, due to mass displacement—both external and internal. The media also fails to highlight this sector, which in turn exacerbates the morbidities associated with the hazards workers face, ultimately reducing the Quality Adjusted Life Years (QALY) of the Syrian population. Additionally, this comparative study will explore whether governance affects workers' knowledge and practices. Türkiye, with its well-established labor laws, will be compared to the situation in northwest Syria, where labor market regulations are nearly nonexistent.

The primary objectives of this study are to assess the level of occupational safety knowledge and practices among Syrian workers in the following categories:

1. Workers in Türkiye
2. Workers in northwest Syria

A secondary objective is to identify cases outside the study sample where workers have suffered work-related injuries due to a lack of knowledge or proper safety practices.

The findings of this study could be instrumental for policymakers in designing programs and regulations to enhance occupational safety knowledge and practices among Syrian workers. These efforts could help reduce work-related injuries and fatalities, thereby lessening the burden on the healthcare system.

1.5. Objectives

1.5.1. General Objective

This study investigates the knowledge, attitudes, and practices about occupational safety among Syrian workers in automobile repair workshops located in Northwest Syria and Southern Türkiye.

1.5.2. Specific Objective

- To assess the knowledge of Syrian workers in automobile repair workshops in Northwest Syria and Southern Türkiye regarding occupational safety practices.
- To evaluate the attitudes of these workers toward occupational safety and its importance in their workplace.
- To examine the occupational safety practices followed by workers in automobile repair workshops in Northwest Syria and Southern Türkiye.
- To compare the knowledge, attitudes, and practices about occupational safety between workers in Northwest Syria and Southern Türkiye.

- To identify factors associated with gaps in knowledge, attitudes, and practices regarding occupational safety among Syrian workers in the study regions

1.5.3. Hypothesis

- H1: Syrian workers in automobile repair workshops in Northwest Syria and Southern Türkiye have insufficient knowledge regarding occupational safety practices.
- H2: Syrian workers in automobile repair workshops hold neutral or negative attitudes toward occupational safety measures.
- H3: Syrian workers in automobile repair workshops in Northwest Syria and Southern Türkiye do not consistently follow recommended occupational safety practices.

Comparison:

- H4: There is a significant difference in knowledge, attitudes, and practices about occupational safety between workers in Northwest Syria and Southern Türkiye.

Associated Factors:

- H5: Sociodemographic characteristics (e.g., age, education, work experience) and work location are significantly associated with gaps in knowledge, attitudes, and practices regarding occupational safety among Syrian workers.

2. GENERAL INFORMATION AND LITERATURE REVIEW

2.1. Introduction

2.1.1. OSH Definition and International Labour Law Initiatives

Occupational Safety and Health (OSH) is an interdisciplinary field focused on promoting and maintaining the physical, mental, and social well-being of workers in all occupations. It encompasses the prevention of injuries, illnesses, and fatalities arising from workplace hazards and aims to foster environments where safety is integrated into operational culture. According to the International Labour Organization (ILO), OSH involves identifying, evaluating, and controlling risks in the workplace to ensure a safe and healthy environment for workers and surrounding communities [18].

In hazardous industrial settings, such as automotive repair workshops, OSH takes on particular importance due to the nature of the work. Common risks in these environments include exposure to toxic chemicals, handling of heavy machinery, repetitive motion injuries, and inadequate ventilation systems. For example, workers frequently face hazards such as inhaling fumes from paints or lubricants, the risk of cuts and burns from sharp tools and welding equipment, and musculoskeletal strain from heavy lifting [6] [19]. These risks necessitate targeted safety measures, including the provision of personal protective equipment (PPE), proper training on handling machinery and chemicals, and adherence to safety protocols.

The scope of OSH extends beyond physical safety to include psychological well-being, reflecting the understanding that stress, long working hours, and inadequate workplace support can significantly impact workers' health. By addressing both immediate and long-term risks, OSH frameworks aim to not only protect workers but also enhance productivity and overall organizational efficiency [19].

The International Labor Organization (ILO) plays a crucial role in promoting occupational safety and health (OSH) worldwide. The ILO's Encyclopedia of Occupational Health and Safety is managed by the International Occupational Safety and Health Information Centre (CIS), which serves as the knowledge management arm of the ILO's Program on Safety and Health at Work and the Environment [20]. This encyclopedia, along

with the CISDOC database, provides comprehensive information on OSH principles, regulations, and practical guidance across various industries.

ILO has developed several publications and guidelines related to Occupational Safety and Health (OSH), including some focused on high-risk sectors. However, the ILO has developed OSH Conventions such as the Occupational Safety and Health Convention (No.155), Occupational Health Services Convention (No.161), Asbestos Convention (No. 162), Safety and Health in Construction Convention (No. 167), Chemicals Convention (No.170), Safety and Health in Mines Convention (No. 176), and Safety and Health in Agriculture Convention (No. 184) [21]. Additionally, the Promotional Framework for Occupational Safety and Health Convention (No.187) and Recommendation (No.197) were adopted in 2006 to promote OSH at national levels [21].

Interestingly, while the ILO has established numerous conventions and recommendations related to OSH, the implementation and ratification of these standards vary among countries [21]. For instance, as of July 2010, only 15 countries had ratified Convention No. 187, highlighting the challenges in achieving global consistency in OSH practices.

2.1.2. Gaps in Occupational Health Research in Arab Countries

The conducted researches in Arab countries about the OSH is very limited, however, there are some studies to give insight about the situation, nevertheless, the severe limitation in the availability of such studies reflects urgent need from both the political and academia societies in the Arab countries to dedicate more efforts into this field of study.

This bibliometric analysis assessed the quantity, quality, and collaboration patterns of public, environmental, and occupational health research across Arab countries from 1900 to 2012. Of the 4673 documents analyzed, the majority focused on public health (79.94%), with occupational health comprising only 2.24%, reflecting its underrepresentation in the research agenda. Egypt, Saudi Arabia, and Sudan accounted for over half of the publications, while international collaboration, particularly with Western Europe and North America, significantly enhanced research output and quality. The findings highlight critical gaps in occupational health research, emphasizing the need for targeted funding, training, and policy support in Arab nations [22].

Table 2.1. Research collaboration and adjustment index for each Arab country in the field of public, environmental and occupational health [22]

Country	Number of documents N=4673 (%)	Total citations	Mean citation per document	h-index	Number of non-Arab collaborating countries	Number (%) of documents with international authors	AI
Egypt	1200 (25.86)	15,938	13.28	51	99	695 (57.92)	376.46
KSA	738 (15.79)	6,233	8.45	32	72	249 (33.74)	29.36
Sudan	602 (12.88)	8,983	14.92	43	84	331 (54.98)	381.05
Lebanon	363 (7.77)	4,099	11.29	30	74	184 (50.69)	37.40
Tunisia	331 (7.08)	2,615	7.90	24	80	133 (40.18)	78.15
Kuwait	274 (5.86)	3,068	11.20	25	57	123 (44.89)	5.53
Jordan	232 (4.96)	2,221	9.57	22	61	107 (46.12)	46.92
UAE	219 (4.69)	2,309	10.54	23	54	127 (57.99)	5.78
Morocco	181 (3.87)	1,658	9.16	21	85	106 (58.56)	61.33
Algeria	150 (3.21)	804	5.36	15	57	48 (32.00)	28.05
Iraq	131 (2.80)	1,174	8.96	17	24	39 (29.77)	20.29
Syria	78 (1.67)	1,418	18.18	22	41	59 (75.64)	23.72
Palestine	69 (1.48)	559	8.10	12	32	40 (57.97)	69.53
Libya	68 (1.46)	627	9.22	16	24	31 (45.59)	6.71
Oman	68 (1.46)	587	8.63	14	30	39 (57.35)	3.22
Qatar	59 (1.26)	347	5.88	11	22	36 (61.02)	0.71
Bahrain	58 (1.24)	370	6.38	12	22	27 (46.55)	2.63
Somalia	52 (1.11)	753	14.48	17	17	52 (100.00)	578.41
Yemen	58 (1.24)	424	7.57	13	36	39 (67.24)	38.80
Mauritania	21 (0.45)	196	9.33	8	13	12 (57.14)	18.98
Djibouti	9 (0.19)	91	10.11	4	8	8 (88.89)	9.13
Comoros	8 (0.17)	179	22.38	6	13	6 (75.00)	9.63

The study on establishing a National Occupational Health and Safety (OH&S) Institute in Saudi Arabia offers a structured framework for addressing workplace safety challenges in developing regions, providing insights applicable to Northwest Syria and Southern Türkiye. It advocates for creating a centralized national agency tasked with responsibilities such as implementing International Labour Organization (ILO) standards, maintaining occupational registries, and offering targeted training for workers and inspectors. For instance, the proposed agency in Saudi Arabia emphasizes multidisciplinary collaboration among the Ministry of Health, Civil Defense, and Ministry of Labor [23]. Such collaboration could be particularly beneficial in Northwest Syria and Southern Türkiye, where fragmented enforcement of safety standards often hinders progress.

Key recommendations from the Saudi study, such as training factory safety officers and establishing a reward system for enterprises with strong safety records, could inspire similar interventions in the automobile repair workshops in these regions. Additionally, strengthening identification, notification, and recording systems for workplace hazards—highlighted as essential in Saudi Arabia—could significantly improve data accuracy and

preventive planning in Syria and Türkiye. For example, implementing robust hazard-tracking systems and aligning reporting procedures with international standards can help mitigate recurring accidents in high-risk industries [23].

The Saudi study also underscores the importance of employer incentives, suggesting that linking compliance to financial benefits or penalties can drive adherence. Such strategies could address employer reluctance in Northwest Syria, where safety improvements are often seen as unnecessary costs. Furthermore, the study's call for embedding occupational health services within factory-level operations and training healthcare providers to respond to work-related injuries aligns with the need for localized health responses in Syria and Türkiye. These examples illustrate how adopting a comprehensive, multidisciplinary, and preventive approach, as advocated in the Saudi study, could bridge critical gaps in occupational safety in developing regions [23].

A cross-sectional study conducted among automotive repair workers in Dubai provides critical insights into the health and safety challenges faced by workers in this high-risk industry. The study highlights gap in occupational health and safety (OHS) practices, including the alarming fact that only 10% of workers had received any OHS training from their employers, underscoring a systemic issue of inadequate worker preparedness. Personal Protective Equipment (PPE), while deemed important by 83% of participants, was consistently used by only 54.5%, with discomfort cited as the primary barrier. These findings point to a disconnect between safety awareness and its practical application in the workplace [24].

The study also revealed a discrepancy between perceived exposure and perceived severity of hazards. For instance, while 62.9% of workers identified carbon monoxide fumes as a major hazard, only 17.6% viewed the exposure as severe, indicating a significant gap in hazard awareness. This highlights the need for comprehensive health and safety training to align workers' perceptions with the actual risks they face. The research emphasized the use of the Health Belief Model, which suggests that workers' adoption of safety measures, such as PPE usage, is influenced by their perceived vulnerability and perceived benefits. This approach can be instrumental in designing effective awareness campaigns [24].

Practical recommendations from the study include targeted health awareness training, enforcement of safety regulations, and improvements to the physical workplace

environment, such as better ventilation, clear hazard labeling, and adequate workspace organization. These measures are crucial for enhancing safety in automotive repair shops and ensuring compliance with occupational health standards [24].

A study assessing occupational health and safety (OHS) practices in motor vehicle repair workshops (MVRWs) in Jeddah revealed significant disparities between local workshops (LWs) and multinational company workshops (CWs). The findings highlighted low compliance with essential safety practices, with overall OHS adherence at 47% in LWs compared to 84% in CWs. Key concerns included inadequate personal protective equipment (PPE) usage, with only 28% compliance in LWs due to discomfort and limited awareness, compared to 61% in CWs. Similarly, chemical exposure management scored poorly, with just 16% compliance in LWs, largely due to improper storage, labeling, and lack of ventilation systems. Housekeeping practices, essential for minimizing hazards, had the lowest compliance rate in LWs at 18%, indicating cluttered and unsafe workspaces. The study recommended cost-effective strategies to improve safety practices, including targeted training, regular inspections, enhanced PPE provision, and better chemical management systems. These findings align with the broader need to address safety gaps in high-risk industries through structured interventions and regulatory oversight, making them relevant to the challenges observed in automotive workshops across various regions, including those in Northwest Syria and Southern Türkiye [25].

2.1.3. Gaps in Occupational Health Research in Similar to Arab Countries

A cross-sectional study in Makurdi, Nigeria, assessed the knowledge, attitudes, and perceptions of occupational hazards among automobile mechanics and spray painters. The findings revealed a low level of awareness, with only 26% of participants recognizing the components of the chemicals they used and 17% understanding their health effects. Additionally, 94.3% reported regular exposure to hazardous chemicals through inhalation, and all respondents acknowledged frequent skin contact with these substances. Despite these risks, only 42.9% of workers consistently used personal protective equipment (PPE), highlighting poor safety practices. The study also identified a significant association between education levels and knowledge of occupational risks, with those having higher education demonstrating better awareness and practices [26].

A cross-sectional study conducted in the Apo and Gudu mechanic villages of Abuja, Nigeria, assessed occupational injuries and safety practices among 400 automobile repair artisans. The findings indicated that while 57% of respondents had good knowledge of occupational safety, compliance with safety practices remained critically low at 32%. Common injuries reported included dislocations (16%), cartilage fractures (14.7%), and bruises or abrasions (12.8%), with pulling and lifting heavy objects identified as primary causes. The study also revealed that only 54.8% of artisans used personal protective equipment (PPE), with barriers such as non-availability (48.8%) and inconvenience (32.8%) cited as major reasons for non-compliance [27].

A cross-sectional study of 100 automobile repair artisans in Uyo, Nigeria, assessed their knowledge, attitudes, and safety practices regarding occupational hazards. The findings revealed a grand mean score of 3.5 for knowledge, indicating adequate awareness of occupational risks, such as the dangers of inhaling fumes and lifting heavy objects. However, the artisans exhibited a very poor attitude toward safety, with a grand mean score of 1.99. This was reflected in their limited use of personal protective equipment (PPE), such as goggles, gloves, and respirators, which were seldom worn despite their importance [28].

Common occupational hazards reported included burns, cuts, bruises, musculoskeletal pains, low back pain, and tiredness. Safety practices were rated poorly overall, with a grand mean score of 2.41. While most artisans cleaned their work environments and used logs to support vehicle jacks, they neglected other essential measures like wearing safety helmets and masks [28].

The study recommended health education programs in both English and local languages to address these gaps, alongside government-led initiatives to regulate safety standards, provide safety kits, and establish modernized training facilities for artisans. These findings emphasize the critical need for targeted interventions to improve attitudes and practices in the informal automotive sector [28].

A study conducted among 233 vehicle artisans in Suame Magazine, Ghana, investigated their knowledge, attitudes, and compliance with occupational health and safety (OHS) practices. The findings revealed that while artisans demonstrated moderate knowledge levels about OHS, compliance with safety practices was significantly low. Only 8.6% of respondents had received formal OHS training, with lack of training (80.26%) and

discomfort in wearing personal protective equipment (PPE) cited as key barriers to compliance. Despite the awareness of hazards, such as cuts (48%), back pain (45.49%), and burns (27.9%), adherence to safe work procedures remained inconsistent, with just 30% consistently following recommended practices [29].

The study also highlighted critical gaps in workplace infrastructure, including limited availability of fire extinguishers (20.6%), first aid kits (17.6%), and showers for post-exposure hygiene (7.3%). Moreover, the absence of formal safety committees in 90.56% of workshops exacerbated the challenges of implementing OHS regulations. Recommendations included regular OHS training programs, improved access to safety equipment, and the establishment of monitoring systems to ensure compliance and reduce workplace injuries. These insights underline the pressing need for integrated approaches to address systemic shortcomings in informal automotive repair sectors [29].

2.1.4. Global Standards and Guidelines in Occupational Safety and Health (OSH)

Occupational Safety and Health (OSH) is shaped by global frameworks developed by organizations like the International Labour Organization (ILO) and the World Health Organization (WHO). These frameworks aim to create workplaces that prioritize safety and well-being, particularly in industries prone to risks.

2.1.5. Global Frameworks in Practice

Instead of imposing rigid rules, the ILO and WHO offer adaptable guidelines that countries can tailor to their specific needs. For instance:

- The ILO focuses on fostering a culture of prevention and risk management through practical guidelines that encourage collaboration between employers and workers.
- The WHO takes a broader approach by promoting health and safety alongside mental well-being through its “Healthy Workplaces” model.

2.1.6. Supporting Low- and Middle-Income Countries

In regions with limited resources, the ILO and WHO have introduced cost-effective strategies:

- **ILO's WISE Program:** Designed for small businesses, this program suggests simple and affordable ways to improve workplace safety [30].
- **WHO's BOHS Initiative:** Focused on reaching underserved workers, this initiative relies on mobile clinics and community-driven efforts to deliver essential health services [31].

2.1.7. Closing the Gap

Although these frameworks provide a strong starting point, many countries struggle with implementation due to funding issues, weak enforcement, or a lack of awareness. In low-resource settings, gradual changes driven by local engagement often make global standards more achievable and effective. One practical illustration of this is the participatory OSH initiative implemented in Cambodia. Between 2004 and 2009, over 5,000 workers in informal workplaces, including home-based workshops and small construction sites, received training using tools like action-checklists and illustrated guides. The program emphasized low-cost improvements such as multi-shelf storage, machine guards, improved natural lighting, and resting facilities. Collaborative networks of government officials, NGOs, employers, and workers supported the initiative, ensuring its reach and sustainability. Local trainers were empowered through training-of-trainer (TOT) workshops, enabling follow-up visits to monitor changes. This approach was later integrated into Cambodia's first OSH Master Plan (2009–2013), showcasing its effectiveness in improving working conditions and productivity while remaining scalable and adaptable for other regions. This example aligns with the WHO's BOHS initiative, which focuses on delivering essential, community-driven occupational health services to underserved workers [32].

Another example of BOHS initiative implementation, in Indonesia, the integration of Basic Occupational Health Services (BOHS) into public health centers demonstrates an effective model for extending occupational health services to underserved informal workers. Known as Pos UKK (Occupational Health Post), this initiative leverages the existing public health infrastructure to provide essential services in a community-based framework. The

program emphasizes preventive measures and actively involves local workers and stakeholders in improving occupational health outcomes [33].

Key Components of Pos UKK:

- **Health Surveillance:** Regular screenings and health check-ups targeting common occupational risks faced by informal workers, such as respiratory issues and musculoskeletal disorders.
- **Worker Education:** Interactive sessions on safe workplace practices, including ergonomic principles, hygiene, and the proper handling of tools and chemicals.
- **Preventive Services:** Providing workers with essential safety equipment, such as gloves and masks, and practical advice on improving workplace safety using locally available materials.

Impact: The initiative successfully increased workers' awareness of occupational health risks and improved their access to preventive healthcare. Many participants implemented basic safety measures in their workplaces, contributing to healthier and more productive working environments.

Scalability: The Pos UKK model showcases the potential for BOHS programs to be adapted and scaled to meet the needs of diverse populations in low-resource settings. Its reliance on existing healthcare systems and community engagement offers a cost-effective solution to improving occupational health in the informal economy.

2.1.8. Challenges in Enforcing OSH in Conflict and Low-Governance Areas

In regions affected by conflict or political instability, enforcing Occupational Safety and Health (OSH) standards becomes exceptionally difficult. The breakdown of governance, weakened infrastructure, and diversion of resources toward humanitarian crises often leave workplaces unregulated and workers vulnerable. Industries operating in these settings, especially high-risk sectors like construction, agriculture, and automotive repair, face heightened safety risks due to the lack of oversight and enforcement.

Workplaces in conflict zones frequently operate under informal or precarious arrangements, where basic protective measures are absent. Workers may be exposed to hazardous materials, unsafe machinery, and physical strain, exacerbated by limited access

to personal protective equipment (PPE) and training. Additionally, the prioritization of immediate economic survival over long-term safety practices often leads to neglect of OSH measures.

2.1.9. Occupational Safety and Health (OSH) in Northwest Syria and for Syrians Working in Türkiye

The ongoing conflict in Syria has severely impacted the enforcement and implementation of Occupational Safety and Health (OSH) standards, particularly in Northwest Syria. Governance collapse, infrastructure destruction, and resource scarcity have created an environment where workplace safety is often neglected. Industries such as automotive repair, construction, and small-scale manufacturing predominantly operate informally, exposing workers to heightened risks such as hazardous chemicals, unsafe machinery, and physically demanding tasks. Limited access to personal protective equipment (PPE) and a lack of safety training further compound these challenges, forcing workers to prioritize immediate income over long-term health and safety [34].

It is more concerning with the lack of data about the occupational health status in Syria, where neither the percentage of informal employment, nor the Existence of programmes for occupational health and safety of health workers [35].

For Syrians displaced by the conflict, many have sought employment in neighboring Türkiye, particularly in southern regions such as Gaziantep and Hatay. While Türkiye has relatively stronger labor laws and OSH regulations, Syrian workers often find themselves in informal or precarious employment. A significant proportion are employed in sectors such as construction, agriculture, and manufacturing/industry, where labor-intensive tasks dominate. Language barriers, lack of legal documentation, and unfamiliarity with Turkish labor laws contribute to their vulnerability [36, 37].

In many cases, Syrian workers in Türkiye face poor working conditions, with limited access to PPE and safety measures. Studies have highlighted common occupational risks, including long hours, exposure to dangerous materials, and physical injuries. The lack of formal contracts leaves these workers without access to legal protections or healthcare benefits, further exacerbating their precarious situation [38].

Efforts by local NGOs, international organizations, and Turkish authorities have aimed to address these issues through initiatives such as:

- **Training Programs:** Providing Syrian workers with safety training tailored to their industries [39]
- **PPE Distribution:** Supplying essential protective gear to reduce immediate risks [40].
- **Advocacy and Support Services:** Raising awareness among employers about the benefits of implementing safety measures and supporting workers with documentation and legal assistance.

Despite these initiatives, challenges remain due to the informal nature of much of the work and the economic pressures faced by both workers and employers. Bridging these gaps requires sustained collaboration between local governments, NGOs, and international agencies, as well as policies that integrate displaced workers into formal labor market [41].

2.1.9.1. Low- vs. High-Regulation Environments

Occupational Safety and Health (OSH) frameworks differ significantly between high-regulation environments and those with minimal regulatory oversight. High-regulation settings, such as Türkiye, typically benefit from robust legal frameworks, consistent enforcement, and institutional support that promote workplace safety and worker well-being. In contrast, low-regulation environments, such as Northwest Syria, often face challenges stemming from weak governance, resource limitations, and a lack of enforcement mechanisms, in addition to the different behavior that is usually influenced by the level of the law enforcement in the different contexts. These disparities result in stark differences in OSH adherence, safety practices, and worker outcomes, making comparative analysis critical to understanding the broader implications for worker safety and policy development.

Türkiye has established comprehensive labor laws and OSH regulations that align with international standards, particularly through its adoption of International Labour Organization (ILO) conventions. Key features of Türkiye's OSH framework include:

- **Legislation:** The Turkish Labor Act and the Occupational Health and Safety Law (Law No. 6331) mandate employer obligations, worker rights, and penalties for non-compliance [42].

- **Institutional Support:** The Ministry of Labor and Social Security enforces OSH regulations through inspections and audits [43].
- **Worker Protection:** Access to Personal Protective Equipment (PPE) (Article4) [44], safety training, and hazard assessments are standardized across industries.

Despite these advancements, challenges persist. Studies indicate gaps in compliance, particularly in small and medium enterprises (SMEs) and among informal workers, where limited resources and awareness hinder full implementation.

In contrast, Northwest Syria operates in a low-regulation context where governance structures are fragmented due to ongoing conflict. Industries such as automotive repair and construction lack formal oversight, leaving workplaces unregulated. Key characteristics include:

- **Absence of Enforcement:** No centralized authority oversees OSH compliance, leaving workers exposed to significant risks.
- **Informality:** The majority of workplaces operate informally, without structured safety protocols or access to PPE.
- **Economic Pressures:** Workers prioritize immediate income over safety due to economic instability, leading to neglect of long-term health risks [45].

Efforts by local NGOs and international organizations, such as distributing PPE and providing safety training, attempt to bridge these gaps. However, these interventions remain limited in scale and sustainability [46].

The comparison between Türkiye and Northwest Syria reveals:

- **Regulatory Strength:** Türkiye's OSH framework provides a model for structured, enforceable safety measures, whereas Northwest Syria lacks the basic infrastructure for OSH implementation.
- **Worker Safety:** In Türkiye, even informal sectors have some level of protection through NGOs and government oversight, while in Northwest Syria, workers face compounded risks with minimal external support.
- **Institutional Capacity:** The presence of institutions in Türkiye enables ongoing policy adjustments and enforcement, a stark contrast to the fragmented governance in Northwest Syria.

This comparison underscores the importance of regulatory frameworks, institutional support, and resource allocation in ensuring workplace safety. It also highlights the potential for adaptive, low-cost interventions in low-regulation environments to address critical OSH gaps.

2.1.9.2. Impact of Training on Occupational Safety Knowledge and Practices

Training plays a pivotal role in shaping occupational safety knowledge and practices, equipping workers with the skills necessary to identify, assess, and mitigate workplace hazards. Effective training programs not only enhance individual awareness but also foster a culture of safety that can significantly reduce accidents and injuries. In resource-constrained or conflict-affected regions, where formal regulatory mechanisms are often weak, training serves as a vital tool to address gaps in safety knowledge and adherence.

Studies have consistently demonstrated that workers who receive comprehensive safety training are more likely to comply with safety protocols, effectively use personal protective equipment (PPE), and adopt proactive safety measures. However, the availability and quality of training programs vary widely, with lower-income and conflict-affected regions often facing significant barriers to implementation. These barriers include limited access to resources, unstable governance, and logistical challenges, all of which hinder the delivery and effectiveness of training initiatives.

A review by Robson et al. (2010) found that training positively influenced workers' knowledge, attitudes, and behaviors toward occupational safety and health (OSH) [47]. This review highlights the effectiveness of occupational safety and health (OSH) training in improving workplace outcomes:

- **Improving Knowledge and Attitudes:** Training significantly enhances workers' understanding of safety practices and fosters a more proactive attitude toward managing workplace risks.
- **Encouraging Behavioral Change:** While changes in behavior were less consistent compared to knowledge and attitude improvements, many programs still achieved measurable impacts on workplace practices.

- **Interactive Methods Are More Effective:** Training that involves hands-on activities, such as role-playing or practical exercises, outperforms passive methods like lectures or written materials.
- **Tailored Programs See Better Results:** Industry-specific training programs that address unique workplace hazards are particularly successful in equipping workers with relevant and actionable skills.

Similarly, a literature review by Barati Jozan et al. (2023) highlighted that e-training interventions can significantly improve occupational safety and health, noting their flexibility, accessibility, and cost-effectiveness [48]. In conflict-affected regions, tailored training programs have shown promise. For instance, initiatives by non-governmental organizations (NGOs) have provided essential safety training and resources in areas lacking formal regulatory oversight. These programs often focus on practical skills and the use of locally available materials to enhance safety practices.

2.1.9.3. Barriers in Conflict Zones

Delivering effective training in conflict zones presents unique challenges:

- **Resource Limitations:** Ongoing conflicts often lead to economic instability, limiting funding for training programs and access to necessary materials.
- **Unstable Governance:** Fragmented or absent governance structures impede the development and enforcement of standardized training protocols.
- **Logistical Challenges:** Insecurity and damaged infrastructure make it difficult to reach workers, especially in remote or high-risk areas.

Addressing these barriers requires innovative approaches, such as mobile training units, partnerships with local organizations, and the use of digital platforms where feasible. Building local capacity and involving community leaders can also enhance the acceptance and sustainability of training initiatives.

These strategies illustrate the potential of well-designed training programs to bridge critical gaps in occupational safety knowledge and practices, even in the most challenging environments.

2.1.9.4. Worker Behavior and Commitment to Safety Practices

Worker behavior plays a crucial role in occupational safety and health (OSH), often acting as the determining factor in whether safety measures are successfully implemented. While knowledge and training are foundational, behavioral adherence to safety practices ensures their practical application in the workplace. Factors such as individual attitudes, workplace culture, and perceived risks significantly influence compliance levels.

Even when workers possess adequate safety knowledge, behavioral factors like complacency, resistance to change, or underestimating risks can lead to non-compliance. Additionally, external pressures such as productivity demands, lack of supervision, and cost-cutting measures often undermine workers' commitment to adhering to safety protocols. Understanding these behavioral dynamics is essential for designing effective interventions that foster a culture of safety and responsibility in the workplace.

2.1.9.5. Psychological Factors in Conflict-Affected Contexts

Workers from conflict-affected regions often face unique psychological challenges that can influence their safety behavior. Exposure to prolonged instability, economic hardship, and physical danger may lead to a mindset of prioritizing immediate survival over long-term health and safety. This "crisis mindset" can manifest as self-carelessness, where workers underplay risks or neglect safety protocols in favor of completing tasks quickly to secure income.

Additionally, trauma and stress resulting from conflict can impair decision-making, focus, and risk perception, further contributing to unsafe behavior in the workplace. Addressing these psychological factors requires tailored approaches that include mental health support, stress management training, and fostering a workplace environment that values safety and well-being, even amidst adversity. Addressing the psychological factors influencing worker behavior in conflict-affected contexts is crucial for enhancing occupational safety and health (OSH). Research indicates that exposure to prolonged instability and economic hardship can lead to a "crisis mindset," where immediate survival is prioritized over long-term health and safety. This mindset often results in self-carelessness, with workers underestimating risks or neglecting safety protocols to complete tasks quickly and secure income.

A study by Mustapha Amoadu et al. (2023) highlights the significant impact of psychosocial safety climate (PSC) on workers' health, safety, and performance. The review emphasizes that a positive PSC, characterized by organizational support and commitment to psychological well-being, can mitigate the adverse effects of stress and trauma on safety behavior [49].

These findings underscore the importance of fostering a supportive work environment that addresses the psychological needs of workers, particularly in conflict-affected regions. Implementing mental health support, stress management training, and creating a culture that values safety and well-being are essential strategies to mitigate the impact of psychological stressors on safety behavior.

2.1.10. Knowledge, Practice, and Attitude: Philosophical Foundations in Occupational Safety

Understanding the interplay between knowledge, practice, and attitude is essential for analyzing worker behavior in occupational safety. These three concepts, deeply interlinked, form a foundation for understanding how individuals perceive, process, and respond to workplace hazards.

Knowledge

Philosophically, knowledge has been classically defined by Plato as “justified true belief,” [50] encompassing an understanding that is both accurate and supported by evidence. In occupational safety, knowledge refers to an individual’s awareness of workplace hazards, safety protocols, and the consequences of unsafe practices. This knowledge equips workers with the necessary tools to identify risks and make informed decisions to prevent harm.

For example, Sue Reed, Dino Pisaniello, and Geza Benke in *Principles of Occupational Health and Hygiene: An Introduction* emphasize that actionable knowledge is critical in enabling workers to internalize safety measures and apply them effectively in daily operations [51]. By translating theoretical understanding into practical awareness, knowledge forms the bedrock of occupational health initiatives, ensuring workers can recognize and address workplace risks proactively.

Practice

Aristotle's *Nicomachean Ethics* highlights practice as the enactment of knowledge through deliberate and reasoned action [52]. Practice in occupational safety represents the implementation of safety protocols, such as the correct use of personal protective equipment (PPE), adherence to guidelines, and consistent application of preventive measures.

As noted by John Ridley in *Safety at Work*, practice is the bridge between theoretical understanding and tangible behavior, ensuring that knowledge is not just learned but actively utilized to mitigate risks in the workplace [53].

Attitude

Gordon W. Allport (1935) defined attitude as “a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence on behavior.” [54] In the context of occupational safety, attitude reflects a worker's mindset toward adhering to safety practices and valuing risk mitigation. A positive attitude, often shaped by workplace culture and individual experiences, plays a crucial role in encouraging consistent compliance with safety protocols.

The Interconnection

The relationship between knowledge, practice, and attitude is dynamic. Knowledge informs attitudes by shaping beliefs about risks and benefits, while attitudes influence the likelihood of translating knowledge into practice. However, without reinforcement through workplace culture, training, or external triggers, even well-informed workers may fail to consistently adopt safe practices.

In conflict-affected or resource-constrained settings, where external pressures and psychological stressors are prevalent, this connection can be disrupted. Workers may prioritize immediate survival over long-term safety, underscoring the importance of addressing all three components holistically. This sets the stage for exploring behavioral frameworks like the Health Belief Model (HBM), which integrates these elements to explain and improve worker behavior.

2.1.11. Behavioral Framework: The Health Belief Model (HBM)

The Health Belief Model (HBM) is a psychological framework developed to explain and predict health-related behaviors by focusing on individuals' attitudes and beliefs. Initially designed to understand preventive health behaviors, the HBM has been widely adapted across various domains, including occupational safety. Its relevance to this study lies in its ability to integrate knowledge, attitudes, and practices into a cohesive framework for analyzing worker behavior in hazardous environments [55].

2.1.11.1. Core Components of HBM

The HBM consists of several key constructs that collectively determine behavioral outcomes:

- **Perceived Susceptibility:** This refers to an individual's belief about their risk of experiencing a particular hazard or injury. In occupational safety contexts, workers may assess their vulnerability to workplace accidents, such as exposure to harmful chemicals or injuries from machinery. If workers perceive a low likelihood of harm, they may be less motivated to adopt safety practices [56].
- **Perceived Severity:** This component evaluates how seriously individuals perceive the consequences of a hazard. For workers in automobile repair workshops, perceived severity might involve the potential for permanent disability, loss of income, or death due to workplace accidents. High perceived severity can drive stronger commitment to preventive measures [57].
- **Perceived Benefits:** Workers' belief in the effectiveness of safety measures significantly influences their behavior. For instance, workers may adopt personal protective equipment (PPE) if they believe it effectively reduces the likelihood of injury or exposure to toxic substances [58].
- **Perceived Barriers:** These are the challenges or obstacles that hinder individuals from adopting safety practices. Barriers in conflict-affected or resource-constrained settings may include the cost of safety equipment, lack of access to training, or time constraints. Understanding these barriers is critical to designing interventions that address workers' specific needs [58].
- **Cues to Action:** Cues to action are external or internal triggers that prompt safety behaviors. These could include workplace safety signage, peer influence, safety

drills, or direct instructions from supervisors. In environments with minimal regulatory oversight, creating consistent and actionable cues becomes essential [58].

- **Self-Efficacy:** Self-efficacy is the confidence in one's ability to successfully perform a behavior. For occupational safety, this might involve a worker's belief in their capability to use PPE correctly or follow safety protocols under pressure. Low self-efficacy can lead to inconsistent or non-compliant behaviors [58].

2.1.11.2. Application of HBM to Occupational Safety

The HBM provides a structured approach to understanding why workers may or may not adopt safety practices. For instance, in automobile repair workshops, workers with low perceived susceptibility to harm may disregard PPE use, while those facing significant perceived barriers, such as financial constraints or lack of workplace support, may prioritize other immediate needs over safety. Addressing these elements through targeted interventions—such as providing free safety equipment, conducting regular training sessions, and fostering a culture of accountability—can enhance compliance with safety practices.

2.1.11.3. Relevance to the Study

In the context of this research, the HBM serves as a theoretical foundation for analyzing occupational safety knowledge and practices among Syrian workers in Northwest Syria and Southern Türkiye. By evaluating workers' perceptions across the HBM constructs, this study aims to identify gaps in safety knowledge, attitudes, and practices and recommend tailored interventions. For instance, understanding perceived barriers in these regions can guide policies that alleviate challenges specific to conflict-affected settings, while enhancing cues to action and self-efficacy can foster sustainable behavioral change.

3. MATERIAL AND METHOD

3.1. Type of Research

This study utilized a cross-sectional design to evaluate the levels of occupational safety knowledge, practices, and attitudes among Syrian workers in automobile repair workshops. A cross-sectional design is well-suited for providing a comprehensive snapshot of the current status of occupational safety practices within the selected regions. This approach enabled the identification of patterns, strengths, and gaps in safety practices among the target population, facilitating the development of informed recommendations.

3.2. Study location

The study was conducted in two distinct regions: Northwest Syria and Southern Turkey, representing contrasting regulatory and socio-economic environments.

Northwest Syria: This region, particularly Idlib Governorate, has been significantly impacted by prolonged conflict, resulting in the collapse of governance structures and limited availability of occupational safety measures. The informal nature of employment and scarce resources create a high-risk environment for workers in sectors such as automobile repair.

Southern Turkey: The study focused on the Gaziantep Province, a region with stronger labor laws and better enforcement of occupational safety standards. Southern Turkey hosts a large population of Syrian workers under temporary protection, many of whom are employed in labor-intensive sectors like automobile repair. The comparative analysis between these regions highlights disparities in occupational safety practices influenced by governance, regulation, resource availability and psychological factors.

These locations were chosen to evaluate the interplay between regulatory frameworks, socio-political challenges, and occupational safety knowledge and practices among Syrian workers which can formulate an understanding of how possible the same population can behave in different locations at the same industry work field.

3.3. Population and Sampling

The target population comprised Syrian workers employed in automobile repair workshops located in Northwest Syria and Southern Türkiye. Of the participants, 59.3% were based in Northwest Syria, while 40.7% were employed in Southern Türkiye. To ensure a representative sample reflecting the diversity of workshop types and geographical locations, a stratified random sampling method was employed. This approach minimized selection bias and enhanced the reliability of the findings by considering regional and occupational variability. The sample size was calculated at 150 participants, providing a 95% confidence level and a 5% margin of error. This sample size was deemed sufficient to ensure statistical validity and to facilitate generalization of the findings to the broader population. The study population included workers with diverse demographic characteristics such as age, educational attainment, and job roles. A significant proportion of the participants were mechanical and body repair technicians, given their prevalence in the workshops studied.

The sample size was calculated using the standard formula for estimating a proportion with a specified confidence level and margin of error:

$$n = \frac{Z^2 \cdot p \cdot (1 - p)}{d^2}$$

Where:

- n = Required sample size,
- z = 1.96, corresponding to a 95% confidence level,
- p = 0.5, representing the assumed prevalence of occupational safety knowledge and practices (used to maximize variability in the absence of prior data),
- d = 0.1, the desired margin of error.

Given that the total sample size was predetermined as 150 participants, proportional allocation ensured appropriate representation from both regions:

$$n_{\text{NW Syria}} = 0.6 \times 150 = 90$$

$$n_{\text{S. Türkiye}} = 0.4 \times 150 = 60$$

This approach ensures that the sample is representative of the target population while maintaining scientific rigor. The proportional allocation of participants reflects the estimated population sizes in the two regions.

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3.4. Inclusion and Exclusion Criteria

3.4.1. Inclusion Criteria

- Workers aged 18 years and above.
- Syrian nationals currently employed in automobile repair workshops.
- Participants with a minimum of six months of work experience in the sector.
- Individuals who provided informed consent to participate in the study.

3.4.2. Exclusion Criteria

- Under 18 years old (due to the difficulty to obtain caregivers' consent).
- Those who declined to participate or failed to complete the questionnaire.
- Participants employed in roles unrelated to automobile repair (e.g., spare parts stores, restaurants at the industrial area).

3.5. Data Collection Tools

The questionnaire depended on a similar study which was conducted in Nigeria. This study, conducted by Akowe (2022), explored the knowledge, attitudes, and safety practices of automobile repair artisans regarding occupational hazards in Uyo, Nigeria[28]. It utilized

a structured questionnaire as the primary data collection instrument, addressing the artisans' understanding of workplace risks, their behavioral responses, and their adherence to safety protocols. The findings indicated a high level of knowledge among participants regarding occupational hazards but revealed a significant gap between awareness and the implementation of safety practices. Additionally, the study identified prevalent occupational hazards such as burns, musculoskeletal issues, and fatigue. For my research, I adapted this questionnaire to align with the cultural and operational context of my target population while maintaining its core structure. These adjustments included modifying terminology to reflect regional workplace practices and incorporating additional questions to address specific behavioral and environmental factors unique to my study's demographic. After applying all the necessary amendments, the questionnaire was translated into Arabic, then it was verified by a researcher whose mother tongue is Arabic, under the supervision of the thesis' supervisor, and the data collection was collected in Arabic, the mother tongue of the workers, and then it was translated into English carefully to be analyzed later on.

3.5.1. Data Collection and Questionnaire Design

Data for the study were collected using a structured questionnaire aimed at evaluating workers' knowledge, attitudes, and practices regarding occupational safety. The tool incorporated multiple-choice and Likert-scale questions, which were validated through a pilot study with a subset of participants. Key focus areas included:

- Awareness of workplace hazards.
- Adherence to safety protocols.
- Utilization of personal protective equipment (PPE).

Specific items addressed common occupational risks such as exposure to fumes, manual lifting, and the proper use of safety gear. Participants with sufficient literacy completed the questionnaire independently, while those who were illiterate were interviewed by the researcher to ensure their responses were accurately captured.

3.5.2. Questionnaire Details

The questionnaire was developed to provide a comprehensive understanding of the socio-demographic characteristics, knowledge, attitudes, practices, and occupational health

challenges of Syrian workers employed in automobile repair workshops in Northwest Syria and Southern Türkiye. Below is an overview of its structure and content:

3.5.3. Section A: Socio-Demographic Information

This section gathered data on participants' demographic and professional backgrounds, including:

- Work Location: Options for Northwest Syria (Idleb) or Southern Türkiye (Gaziantep).
- Age: Open-ended to allow precise input.
- Gender: Male or Female.
- Marital Status: Single, Married, Divorced, or Widowed.
- Educational Level: Ranging from illiteracy to technical/vocational and university education.
- Job Role: Including body repair technician, spray painter, mechanic, electrician, furnishing repair technician, or other.
- Work Experience: Categorized by duration (e.g., 1–9 years, 10–19 years).
- Occupational Safety Training: A yes/no question on prior participation in safety courses.

3.5.4. Section B: Knowledge of Occupational Hazards

This section assessed participants' awareness of workplace risks using a Likert scale (Strongly Agree to Strongly Disagree), covering:

- Risks of working without PPE.
- Health dangers from unsafe practices like eating with unwashed hands, sucking fuel, or washing with hazardous substances.
- Hazards from welding fumes, noisy environments, and heavy manual lifting.
- Exposure risks, including flooded environments and welding flashes.

3.5.5. Section C: Attitudes Towards Occupational Safety

This section examined participants' perceptions and attitudes toward occupational hazards and safety measures, using a Likert scale. Topics included:

- Perceived risks associated with their work.
- Fear-driven precautionary behaviors.
- Preferences for wearing specific PPE (e.g., overalls, gloves, helmets).

3.5.6. Section D: Health Impacts and Occupational Hazards

Participants reported health issues related to their work environment, including:

- Injuries such as burns, cuts, and bruises.
- Chronic conditions like low back pain, skin rashes, and respiratory issues.
- Symptoms experienced during or after work, such as dizziness, headaches, and fatigue.

3.5.7. Section E: Safety Practices

This section evaluated workers' safety behaviors, focusing on:

- Cleaning and maintenance practices (e.g., cleaning the workplace, washing work clothes).
- Safe handling methods (e.g., using soap and water for handwashing, mechanical lifting devices, and fuel siphon pumps).
- Proper use of PPE, including overalls, safety shoes, goggles, and respirators.

3.5.8. Administration and Accessibility

The questionnaire was primarily designed for self-administration. However, for illiterate participants, researcher-led interviews were conducted to ensure inclusivity and accurate data collection.

The structured design of the questionnaire ensured consistent data collection and facilitated analysis, forming a robust foundation for evaluating and improving occupational safety among the target population.

3.5.9. Likert Scale Coding

Responses to Likert-scale questions were coded as follows:

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Agree
- 4 = Strongly Agree

3.6. Ethical Considerations

Ethical approval was secured from relevant committees in both regions, Ankara Yildirim Beyazit ethics committee, and Idleb Health Directorate. Participation was voluntary, with informed consent obtained from all respondents. Confidentiality was maintained by anonymizing responses and avoiding the collection of identifiable personal data. Special measures were taken to ensure the safety and comfort of participants in conflict-affected areas.

3.7. Data Analysis

The data was analyzed using statistical software (e.g., SPSS). Descriptive statistics summarized demographic and occupational characteristics, while inferential analyses, such as chi-square tests and Mann-Whitney U tests, identified associations between variables. For example, significant differences in safety practices were observed between workers in Northwest Syria and South Türkiye ($p < 0.001$). Other analyses explored the impact of education levels, job roles, and safety training attendance on knowledge, attitudes, and practices. Findings were interpreted to highlight key areas for intervention and policy development.

3.8. Variables

3.8.1. Independent Variables

1. Demographics:

- Age groups (e.g., 18–29, 30–49, 50+).
- Educational background (e.g., illiterate, elementary, high school, university).
- Marital status (e.g., single, married, divorced, widowed).
- Work experience (e.g., 0–5 years, 6–10 years, etc.).
- Job roles (e.g., mechanical, body repair technician, etc.).
- Location of work (e.g., Northwest Syria, South Türkiye).

2. Occupational Safety Course Attendance:

- Participation (e.g., attended or not attended).

3. Work Environment:

- Geographic setting (conflict-affected or resource-constrained regions).

3.8.2. Dependent Variables

1. Knowledge:

- Awareness of workplace hazards.
- Understanding of occupational safety practices.

2. Attitudes:

- Perception of workplace safety measures.
- Views on the importance of personal protective equipment (PPE).

3. Practices:

- Adherence to occupational safety protocols.
- Use of PPE and other safety measures.

4. RESULT

The sample is mainly composed of middle-aged adults, with the majority (56%) falling within the 30-49 age range, followed by young adults (18-29 years old, 35.3%) and a smaller group of older adults (50+, 8.7%). Most participants are based in NW Syria (59.3%), while a significant portion (40.7%) works in South Türkiye. A large proportion of respondents are married (74.7%), with smaller percentages being single (20.7%), widowed (2.7%), or divorced (2%). In terms of education, most participants have completed intermediate (31.3%) or elementary school (27.3%), while fewer have high school education (20%) or a university degree (10%). Occupations are diverse, with the largest groups working in mechanical trades (35.3%) and body repair (22.7%), followed by electricians, spray painters, and furnishing repair technicians. Many participants have significant work experience, with 31.3% having more than 6 years in their field. However, only 20.7% have received occupational safety training, indicating that most lack formal safety instruction (Table 4.1).

Table 4.1. Sociodemographic of participants (n=150)

Variable	Category	Frequency	Percent (%)
Age Group	Young Adult (18-29 yrs old)	53	35.3
	Middle Age Adult (30-49 yrs old)	84	56.0
	Older Adult (50+ yrs old)	13	8.7
	Total	150	100.0
Work Location	NW Syria (Idlib)	89	59.3
	South Turkiye (Gaziantep)	61	40.7
	Total	150	100.0
Marital Status	Single	31	20.7
	Married	112	74.7
	Widowed	4	2.7
	Divorced	3	2.0
	Total	150	100.0
Education Background	Illiterate	8	5.3
	Elementary school	41	27.3
	Intermediate school	47	31.3
	High school	30	20.0
	Completed Technical vocational	6	4.0
	Not Completed Technical vocational	3	2.0
	University	15	10.0
	Total	150	100.0

Table 4.1. (continue) Sociodemographic of participants (n=150)

Variable	Category	Frequency	Percent (%)
Occupation	Body repair technician	16	10.7
	Cars accessories - decoration	1	0.7
	Diesel pumps technician	1	0.7
	Electrician	26	17.3
	Furnishing repair technician	13	8.7
	Handyman	4	2.7
	Mechanical	45	30.0
	Oto gaz	1	0.7
	Spray painter	21	14.0
	Suspension Technician	4	2.7
	Tire Technician	3	2.0
	Welder	15	10.0
	Total	150	100.0
Working Experience	0-5 years	36	24.0
	6-10 years	30	31.3
	11-15 years	21	20.0
	16-20 years	16	14.0
	21+ years	47	10.7
	Total	150	100.0
Occupational Safety Course	Yes	31	20.7
	No	119	79.3
	Total	150	100.0

The assessment of participants' knowledge about occupational hazards revealed varying levels of awareness across different hazard scenarios. A significant majority (91.3%) agreed or strongly agreed that working without personal protective equipment (PPE) exposes individuals to hazards, with only a small fraction (8.7%) disagreeing. Similarly, a large proportion (86%) recognized that eating with unwashed dirty hands in the workshop is harmful to health, though 14% disagreed. Awareness of the dangers associated with sucking fuel with the mouth was relatively high, as 89.3% of participants agreed or strongly agreed that it is harmful. Conversely, the use of fuel to wash hands to remove grease or paint was less universally recognized as hazardous, with 36% disagreeing and only 61.3% acknowledging the danger. Inhalation of exhaust or welding fumes was identified as hazardous by 89.4% of respondents, though a small minority (10.6%) disagreed. Recognition of welding flash light as hazardous to the eyes was widespread, with 98% agreeing or strongly agreeing, leaving only 2% in disagreement. When it came to noise exposure, 60.6% of participants were aware of the risk of hearing loss in a noisy work environment, while 38.7% disagreed. Awareness of the dangers posed by a flooded working environment was acknowledged by 74%, though a notable 26% of respondents disagreed. Lastly, a high level of awareness was observed regarding the risks of lifting heavy objects manually, with 96.7% agreeing or strongly agreeing that it can cause low back pain, while only 3.4% disagreed (Table 4.2).

Table 4.2. Knowledge about occupational hazards (n=150)

Occupational hazards knowledge assessment	Strongly Disagree		Disagree		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%
Working without personal protective equipment exposes you to hazards	0	0,0	13	8,7	98	65,3	39	26,0
Eating with unwashed dirty hands in the workshop is harmful to health	0	0,0	21	14,0	90	60,0	39	26,0
Sucking fuel with mouth is harmful	0	0,0	16	10,7	99	66,0	35	23,3
Washing hands with fuel to remove grease/paint and used engine oil is dangerous	4	2,7	54	36,0	68	45,3	24	16,0
Inhaling exhaust/welding fumes is hazardous	2	1,3	14	9,3	91	60,7	43	28,7
Welding flash light is hazardous to the eyes	1	0,7	2	1,3	77	51,3	70	46,7
Noisy working environment can cause hearing loss	1	0,7	58	38,7	65	43,3	26	17,3
Flooded working environment is hazardous	0	0,0	39	26,0	80	53,3	31	20,7
Lifting heavy objects manually can cause low back pains	1	0,7	4	2,7	82	54,7	63	42,0

The assessment of participants' attitudes towards occupational hazards revealed a range of perspectives on workplace safety measures. Most respondents (65.3%) agreed or strongly agreed that they perceive their work as risky and hazardous, while a smaller segment (34.7%) disagreed or strongly disagreed. Despite recognizing risks, a majority (76.7%) stated they are not scared doing their work because of hazards, with only 23.4% expressing some level of fear. When it comes to precautionary measures, 85.3% of participants showed a positive attitude towards observing safety precautions, and only 14.7% disagreed. Wearing protective clothing such as overalls was not uniformly favored, with 60% disagreeing and only 38.7% agreeing or strongly agreeing that they like to wear an overall while working. Similarly, attitudes towards safety shoes were mixed, with 55.3% agreeing or strongly agreeing and 39.3% disagreeing. The preference for wearing hand gloves was evenly split: 58% were favorable (agree or strongly agree) while 41.4% disagreed or strongly disagreed. Wearing goggles had slightly more positive responses, with 60% agreeing or strongly agreeing and 40% not favoring the practice. The use of a face mask or respirator was less popular, with 50% disagreeing or strongly disagreeing and only 50% indicating some level of agreement. Lastly, attitudes toward wearing a safety helmet were largely negative, with 64.7% disagreeing or strongly disagreeing and only 35.4% being in favor of wearing helmets. This mixed set of attitudes highlights potential areas for improving safety culture and compliance with protective measures in the workplace (Table 4.3).

Table 4.3. Attitudes towards occupational hazards (n=150)

Attitude towards occupational hazards assessment	Strongly Disagree		Disagree		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%
My work is risky and hazardous	1	0,7	51	34,0	77	51,3	21	14,0
I am scared doing my work because of hazards	19	12,7	96	64,0	25	16,7	10	6,7
I like observing precautionary measures while doing my work	0	0,0	22	14,7	98	65,3	30	20,0
I like wearing an overall while doing my work	3	2,0	62	41,3	57	38,0	28	18,7
I like wearing safety shoes while working	3	2,0	56	37,3	63	42,0	28	18,7
I like wearing hand gloves while working	2	1,3	61	40,7	61	40,7	26	17,3
I like wearing goggles while working	4	2,7	56	37,3	62	41,3	28	18,7
I like using a face mask/respirator while working	5	3,3	70	46,7	54	36,0	21	14,0
I like wearing a safety helmet while working	6	4,0	91	60,7	34	22,7	19	12,7

The occupational hazards assessment highlights various health issues experienced by participants as a result of their work. A significant majority (80%) reported suffering from burns, cuts, or bruises, with only a small fraction (20%) disagreeing with this statement. Low back pain was a common complaint, with 81.4% of respondents agreeing or strongly agreeing that they experience this type of pain, and only 18.7% indicating otherwise. Skin rashes were less frequently reported, with 37.4% of participants acknowledging this issue, while a larger proportion (62.7%) disagreed. Eye problems were reported by 52.7% of participants, but a notable 47.4% did not share this experience. Hearing problems were the least reported, with 77.3% disagreeing and only 22.7% acknowledging such difficulties. Respiratory problems affected 42% of participants, while 58% did not report experiencing them. Musculoskeletal pains were more common, with 67.3% agreeing or strongly agreeing and 32.7% disagreeing. Headaches after work were reported by 56% of respondents, and a similar percentage (40.7%) disagreed with this statement. Dizziness was reported by 45.4%, with a larger segment (54.7%) disagreeing. Fatigue appeared to be a widespread issue, as 72% of participants stated they always feel tired due to work, while 28% did not share this feeling. Finally, mosquito bites were primarily reported as not being a problem, with 83.3% of participants disagreeing and only 16.6% stating they experience mosquito bites due to their work environment. These findings emphasize the prevalence of physical health challenges among workers, particularly issues like low back pain, burns, musculoskeletal pains, and fatigue, suggesting the need for improved safety measures and health support (Table 4.4).

Table 4.4. Occupational hazards assessment

Occupational hazards assessment	Strongly Disagree		Disagree		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%
I suffered burns, cuts, bruises because of my work	3	2,0	27	18,0	94	62,7	26	17,3
I experience low back pain due to my work	4	2,7	24	16,0	82	54,7	40	26,7
I have skin rashes because of my work	6	4,0	88	58,7	37	24,7	19	12,7
I developed eye problems because of my work	7	4,7	64	42,7	60	40,0	19	12,7
I have hearing problems because of my work	8	5,3	108	72,0	24	16,0	10	6,7
I have respiratory problems because of my work	8	5,3	79	52,7	48	32,0	15	10,0
I have musculoskeletal pains because of my work	4	2,7	45	30,0	80	53,3	21	14,0
I have headaches after my daily work	5	3,3	61	40,7	61	40,7	23	15,3
I feel dizzy because of my work	4	2,7	78	52,0	55	36,7	13	8,7
I always feel tired because of my work	2	1,3	40	26,7	78	52,0	30	20,0
Mosquitoes bite me because of my work environment	15	10,0	110	73,3	20	13,3	5	3,3

The safety practices assessment reveals various levels of adherence to recommended safety measures among participants. Cleaning the work environment daily is a widely followed practice, with 92% of respondents agreeing or strongly agreeing, and only a small percentage (8%) disagreeing. Washing work clothing regularly is also commonly practiced, with 77.4% in agreement and 22.7% indicating otherwise. Hand hygiene appears to be a priority, as 78.6% of participants reported washing their hands with soap and water after work, while 21.4% disagreed. When it comes to lifting heavy objects, 89.4% use mechanical devices, but a small minority (10.6%) do not. Similarly, 78.7% of workers use a fuel siphon pump for safety, though 21.3% do not. Supporting a jack with a log while working under a vehicle is followed by 90.7% of respondents, highlighting a strong adherence to this safety practice, with only 9.3% disagreeing. Wearing overalls is less common, with 46.6% of workers disagreeing and 53.3% agreeing. Safety shoe usage is somewhat inconsistent, as 58.7% agree or strongly agree, while 41.4% do not use them. The use of hand gloves while working is divided, with 49.3% not using them and 50.7% agreeing or strongly agreeing. Goggles are used by 60% of workers, though 40% do not prioritize this safety measure. Face mask or respirator usage is particularly low, with 67.3% disagreeing and only 32.7% adhering to this safety practice. The use of safety helmets is the least followed practice, with a significant 77.3% of participants not wearing helmets, and none strongly agreeing to use them. Overall, while some safety measures are widely practiced, there are significant gaps, particularly in wearing personal protective equipment, highlighting the need for improved safety awareness and training among workers (Table 4.5).

Table 4.5. Safety practices assessment (n=150)

Safety Practices assessment	Strongly Disagree		Disagree		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%
I clean my work environment daily	0	0,0	12	8,0	93	62,0	45	30,0
I wash my work clothing regularly	1	0,7	33	22,0	70	46,7	46	30,7
I wash my hands with soap and water after each work	1	0,7	31	20,7	74	49,3	44	29,3
I lift heavy objects with a mechanical device	2	1,3	14	9,3	88	58,7	46	30,7
I use a fuel siphon pump to draw fuel	2	1,3	30	20,0	81	54,0	37	24,7
I use a log to support a jack when working under a vehicle	3	2,0	11	7,3	85	56,7	51	34,0
I wear an overall while doing my work	9	6,0	71	47,3	47	31,3	23	15,3
I wear safety shoes while working	7	4,7	64	42,7	55	36,7	24	16,0
I wear hand gloves while working	5	3,3	71	47,3	48	32,0	26	17,3
I wear goggles while working	4	2,7	56	37,3	47	31,3	43	28,7
I use a face mask/respirator while working	5	3,3	96	64,0	28	18,7	21	14,0
I wear a safety helmet while working	6	4,0	110	73,3	34	22,7	0	0,0

The summary statistics for the assessment scores show insights into each domain. The average score for knowledge is 27.87, with a standard deviation of 4.07, indicating a moderate spread around the mean. The scores range from 20 to 36, with a median of 27. The interquartile range, from the 25th percentile at 25 to the 75th percentile at 31, suggests that most participants' knowledge scores are concentrated within these values. For attitude, the mean score is 24.07, with a higher standard deviation of 4.91, showing more variability in participants' attitudes. The scores range from 14 to 36, with a median of 23. The middle 50% of participants have scores between 21 and 27, reflecting a broad range of attitudes toward occupational hazards. The occupational hazards domain has a mean score of 28.77 and a standard deviation of 5.46, indicating considerable variation in participants' perceptions. Scores span from 15 to 44, with a median of 28. The interquartile range is from 25 to 32, suggesting some diversity in how occupational hazards are perceived. Safety practices have an average score of 34.11 and a standard deviation of 5.40, with scores ranging from 14 to 46. The median score is 33, and the interquartile range is from 30 to 37, indicating a relatively consistent approach to safety practices among participants. Overall, the total score for knowledge, attitude, occupational hazards, and safety practices (K.A.O.S) has a mean of 114.82 and a standard deviation of 16.48, showing substantial variability in total scores. The scores range from 78 to 162, with a median of 113. The 25th percentile is 102, and the 75th percentile is 125, illustrating a wide distribution of overall responses. These results point to areas where there is consistency or variability among participants, which can help guide improvements in occupational safety education and practices.

Table 4.6. Median and percentile scores for K.A.O.S factors

	Median	Percentile 25	Percentile 75
Knowledge	27,00	25,00	31,00
Attitude	23,00	21,00	27,00
Occupational hazards	28,00	25,00	32,00
Safety Practices	33,00	30,00	37,00
Total. K.A.O.S	113,00	102,00	125,00

The participants' work location shows significant differences. Those working in NW Syria (Idleb) have a median of 26.00, with a 25th percentile of 24.00 and a 75th percentile of 27.00, while those in South Türkiye (Gaziantep) have a higher median of 30.00, with a 25th percentile of 28.00 and a 75th percentile of 33.00. The statistical analysis revealed a p-value of <0.001 , indicating a significant difference between the two groups. Regarding marital status, the median values range from 27.00 for married individuals (25.50 to 30.00) to 33.00 for divorced individuals (31.00 to 36.00). The p-value for this variable is 0.077, indicating no significant difference across marital statuses. In terms of education, those who completed elementary school have a median of 26.00 (23.00 to 28.00), while those with a university degree have a higher median of 33.00 (29.00 to 34.00). The p-value for education level differences is less than 0.001, indicating significant differences. Illiterate participants have a median of 29.00 (25.50 to 34.50), and those who did not complete technical vocational education have a median of 26.00 (26.00 to 35.00). For job occupations, the median knowledge score ranges from 22.00 for diesel pump technicians (22.00 to 22.00) to 36.00 for cars accessories-decorators (36.00 to 36.00). The p-value of 0.003 suggests a significant difference in knowledge based on occupation. When it comes to occupational safety course attendance, those who have never attended a course have a median of 26.00 (25.00 to 29.00), while those who have attended have a higher median of 32.00 (28.00 to 35.00). This difference is statistically significant with a p-value of <0.001 . Age group differences show a median of 27.00 for all age groups, with slight variations across the 18-29 years old, 30-44 years old, 45-59 years old, and 60+ years old categories. The p-value of 0.331 indicates no significant differences across age groups. In terms of work experience, participants with 0-5 years of experience have a median of 30.00 (25.50 to 33.00), while those with 21+ years of experience have a median of 26.00 (23.00 to 28.00). The p-value of 0.017 indicates a significant difference based on work experience (Table 4.7).

Table 4.7. Comparison of knowledge scores by demographic and occupational variables: median, 25th, and 75th percentiles with statistical analysis

		Knowledge			KW/Z ;p
		Median	25	75	
What is your location of work?	NW Syria (Idleb)	26,00	24,00	27,00	5,982; <0,001
	South Turkiye (Gaziantep)	30,00	28,00	33,00	
Marital status	Divorced	33,00	31,00	36,00	6,851; 0,077
	Married	27,00	25,50	30,00	
	Single	28,00	25,00	32,00	
	Widowed	31,50	27,00	34,00	
What is your highest level of education?	Completed elementary school	26,00	23,00	28,00	35,849; <0,001
	Completed high school	30,00	28,00	33,00	
	Completed intermediate school	26,00	25,00	27,00	
	Completed technical vocational	27,00	27,00	30,00	
	Completed university	33,00	29,00	34,00	
	Illiterate	29,00	25,50	34,50	
	Not completed technical vocational	26,00	26,00	35,00	
What is your job occupation?	Body repair technician	26,00	23,00	27,00	28,418;0,003
	Cars accessories - decoration	36,00	36,00	36,00	
	Diesel pumps technician	22,00	22,00	22,00	
	Electrician	29,50	27,00	33,00	
	Furnishing repair technician	27,00	26,00	34,00	
	Handyman	27,50	24,00	32,50	
	Mechanical	27,00	26,00	31,00	
	Oto gaz	33,00	33,00	33,00	
	Spray painter	27,00	26,00	28,00	
	Suspension Technician	25,00	23,00	26,00	
	Tire Technician	22,00	20,00	26,00	
	Welder	26,00	24,00	27,00	
H ave you ever attended any occupational safety course?	No	26,00	25,00	29,00	4,924; <0,001
	Yes	32,00	28,00	35,00	
Age group	18-29 yrs old	27,00	25,00	30,00	3,425; 0,331
	30-44 yrs old	27,00	26,00	32,00	
	45-59 yrs old	27,00	24,00	29,50	
	60+ yrs old	27,00	25,00	30,00	
WorkingExperience	0-5 years	30,00	25,50	33,00	12,083; 0,017
	6-10 years	27,00	26,00	32,00	
	11-15 years	27,00	26,00	28,00	
	16-20 years	27,00	26,00	30,50	
	21+ years	26,00	23,00	28,00	

The participants' work location shows significant differences in attitudes. Those working in NW Syria (Idleb) have a median attitude score of 22.00 (with a 25th percentile of 19.00 and a 75th percentile of 24.00), while those in South Türkiye (Gaziantep) have a higher median of 27.00 (with a 25th percentile of 22.00 and a 75th percentile of 30.00). The p-value of <0.001 indicates a statistically significant difference between the two groups. Regarding marital status, the median attitude scores are 29.00 for divorced individuals (with a 25th percentile of 22.00 and a 75th percentile of 36.00), 23.00 for married individuals (20.00 to 26.00), and 23.00 for single individuals (21.00 to 29.00). Widowed participants have a median of 31.00 (24.50 to 33.00). The

p-value of 0.135 suggests that there is no significant difference in attitudes based on marital status. In terms of education, participants who completed elementary school have a median attitude score of 21.00 (19.00 to 23.00), while those with a university degree have a higher median of 28.00 (25.00 to 30.00). The p-value of <0.001 indicates a significant difference in attitudes based on education level. Illiterate participants have a median score of 32.50 (20.00 to 35.00), and those who did not complete technical vocational education have a median of 31.00 (22.00 to 32.00). Job occupation also shows significant differences in attitudes. Body repair technicians have a median score of 22.00 (20.50 to 24.00), while cars accessories-decorators have the highest median of 30.00 (30.00 to 30.00). Diesel pump technicians have a median of 18.00 (18.00 to 18.00). The p-value of 0.004 indicates significant differences in attitude scores based on occupation. Regarding attendance in occupational safety courses, those who have never attended a course have a median attitude score of 22.00 (20.00 to 26.00), while those who have attended have a higher median score of 25.00 (23.00 to 32.00). The difference is statistically significant, with a p-value of <0.001. Age group differences show a median attitude score of 23.00 (21.00 to 28.00) for those aged 18-29 years, 24.00 (21.00 to 28.00) for those aged 30-44 years, 22.00 (20.00 to 24.50) for those aged 45-59 years, and 23.00 (20.50 to 26.00) for those aged 60 and above. The p-value of 0.151 indicates no significant differences in attitudes across age groups. For work experience, those with 0-5 years of experience have a median attitude score of 26.00 (23.00 to 29.50), while those with 21+ years of experience have a median of 21.00 (19.00 to 23.00). The p-value of 0.006 indicates significant differences in attitude based on work experience (Table 4.8).

Table 4.8. Comparison of attitude scores by demographic and occupational variables: Median, 25th, and 75th percentiles with statistical analysis

		<u>Attitude</u>			KW/Z ;p
		Median	Percentile 25	Percentile 75	
What is your location of work?	NW Syria (Idleb)	22,00	19,00	24,00	5,627; <0,001
	South Turkiye (Gaziantep)	27,00	22,00	30,00	
Marital status	Divorced	29,00	22,00	36,00	5,558;0,135
	Married	23,00	20,00	26,00	
	Single	23,00	21,00	29,00	
	Widowed	31,00	24,50	33,00	
What is your highest level of education?	Completed elementary school	21,00	19,00	23,00	26,04; <0,001
	Completed high school	25,50	21,00	29,00	
	Completed intermediate school	22,00	20,00	25,00	
	Completed technical vocational	23,00	23,00	24,00	
	Completed university	28,00	25,00	30,00	
	Illiterate	32,50	20,00	35,00	
	Not completed technical vocational	31,00	22,00	32,00	

Table 4.8. (continue) Comparison of attitude scores by demographic and occupational variables: Median, 25th, and 75th percentiles with statistical analysis

		<u>Attitude</u>			KW/Z :p
		Median	Percentile 25	Percentile 75	
What is your job occupation?	Body repair technician	22,00	20,50	24,00	27,477; 0,004
	Cars accessories - decoration	30,00	30,00	30,00	
	Diesel pumps technician	18,00	18,00	18,00	
	Electrician	25,50	22,00	30,00	
	Furnishing repair technician	22,00	20,00	27,00	
	Handyman	24,50	19,50	29,50	
	Mechanical	23,00	21,00	27,00	
	Oto gaz	31,00	31,00	31,00	
	Spray painter	23,00	22,00	26,00	
	Suspension Technician	18,00	18,00	19,50	
	Tire Technician	18,00	14,00	18,00	
	Welder	23,00	21,00	25,00	
have you ever attended any occupational safety course?	No	22,00	20,00	26,00	3,311; <0,001
	Yes	25,00	23,00	32,00	
Agegroup1	18-29 yrs old	23,00	21,00	28,00	5,300; 0,151
	30-44 yrs old	24,00	21,00	28,00	
	45-59 yrs old	22,00	20,00	24,50	
	60+ yrs old	23,00	20,50	26,00	
WorkingExperience	0-5 years	26,00	23,00	29,50	14,636; 0,006
	6-10 years	22,00	21,00	26,00	
	11-15 years	23,00	21,00	27,00	
	16-20 years	24,50	19,50	27,00	
	21+ years	21,00	19,00	23,00	

There is no significant difference in occupational hazard scores between the two locations. The median score for both the NW Syria (Idleb) and South Türkiye (Gaziantep) groups is 28.00. The 25th percentile for Idleb is 24.00 and for Gaziantep is 25.00, while the 75th percentile is 32.00 for Idleb and 33.00 for Gaziantep. The p-value is 0.392, indicating that the location does not have a statistically significant effect on occupational hazard scores. Similarly, there is no significant difference in occupational hazard scores based on marital status. The median score for divorced individuals is 33.00, for married individuals is 28.00, for single individuals is 27.00, and for widowed individuals is 30.00. The p-value is 0.582, suggesting no significant impact of marital status on occupational hazard scores. There is a trend in occupational hazard scores across education levels, with elementary school graduates having a median score of 26.00 and university graduates having a median score of 31.00. The p-value is 0.072, which indicates that while the difference is not statistically significant, education level may still influence occupational hazard scores. There are significant differences in occupational hazard scores across job occupations. Body repair technicians have a median score of 27.50, while electricians have a median score of 31.00. The p-value is 0.015, indicating that occupation does have a statistically significant effect on occupational hazard scores. There is no significant effect of attending an occupational safety

course on occupational hazard scores. The median score for those who did not attend a course is 28.00, while for those who attended is 29.00. The p-value is 0.505, showing that attending an occupational safety course does not significantly affect occupational hazard scores. Age groups do not show significant differences in occupational hazard scores. The median score for the 18-29 age group is 28.00, for the 30-44 age group is 29.00, for the 45-59 age group is 27.00, and for the 60+ age group is 29.50. The p-value is 0.399, indicating that age does not have a significant impact on occupational hazard scores. Finally, there is no significant difference in occupational hazard scores based on work experience. The median score for those with 0-5 years of experience is 27.00, for those with 6-10 years is 30.00, for 11-15 years is 29.00, for 16-20 years is 28.00, and for those with over 21 years of experience is 27.00. The p-value is 0.251, indicating that work experience does not significantly affect occupational hazard scores.

Table 4.9. Comparison of occupational hazard scores by demographic and occupational factors: Median, 25th, and 75th percentiles with statistical analysis

		Occupational hazards			KW/Z ;p
		Median	Percentile 25	Percentile 75	
What is your location of work?	NW Syria (Idleb)	28,00	24,00	32,00	0,857; 0,392
	South Turkiye (Gaziantep)	28,00	25,00	33,00	
Marital status	Divorced	33,00	28,00	33,00	1,953; 0,582
	Married	28,00	25,00	32,50	
	Single	27,00	24,00	31,00	
	Widowed	30,00	25,00	33,50	
What is your highest level of education?	Completed elementary school	26,00	24,00	30,00	11,595; 0,072
	Completed high school	28,00	25,00	33,00	
	Completed intermediate school	29,00	25,00	32,00	
	Completed technical vocational	27,00	26,00	29,00	
	Completed university	31,00	26,00	37,00	
	Illiterate	28,50	24,00	39,50	
	Not completed technical vocational	29,00	23,00	32,00	
What is your job occupation?	Body repair technician	27,50	25,00	29,00	23,588; 0,015
	Cars accessories - decoration	26,00	26,00	26,00	
	Diesel pumps technician	25,00	25,00	25,00	
	Electrician	31,00	27,00	37,00	
	Furnishing repair technician	27,00	25,00	30,00	
	Handyman	25,00	23,50	35,00	
	Mechanical	28,00	25,00	32,00	
	Oto gaz	29,00	29,00	29,00	
	Spray painter	32,00	29,00	34,00	
	Suspension Technician	23,50	22,50	25,50	
	Tire Technician	24,00	19,00	24,00	
	Welder	28,00	25,00	31,00	
have you ever attended any occupational safety course?	No	28,00	24,00	32,00	0,667; 0,505
	Yes	29,00	25,00	33,00	
Age group	18-29 yrs old	28,00	24,00	32,00	2,953; 0,399
	30-44 yrs old	29,00	25,00	33,00	
	45-59 yrs old	27,00	24,50	31,00	
	60+ yrs old	29,50	25,00	34,00	
Working Experience	0-5 years	27,00	24,00	31,00	5,372; 0,251
	6-10 years	30,00	26,00	34,00	
	11-15 years	29,00	27,00	32,00	
	16-20 years	28,00	24,50	31,00	
	21+ years	27,00	24,00	32,00	

There are significant differences in safety practices between the two locations, with the median score for NW Syria (Idleb) being 32.00 and for South Türkiye (Gaziantep) being 36.00. The 25th percentile for Idleb is 30.00, while for Gaziantep it is 33.00, and the 75th percentile is 34.00 for Idleb and 42.00 for Gaziantep. The p-value is less than 0.001, indicating a statistically significant difference in safety practices between the two locations. Marital status does not show significant differences in safety practices. The median score for divorced individuals is 39.00, for married individuals is 33.00, for single individuals is 34.00, and for widowed individuals is 39.50. The p-value is 0.440, suggesting that marital status does not significantly affect safety practices. There is a significant difference in safety practices across education levels. The median score for those who completed elementary school is 32.00, while for those who completed university, the median score is 37.00. Illiterate individuals have a median score of 39.50, and those who did not complete technical vocational education have a median of 44.00. The p-value is less than 0.001, indicating a statistically significant difference in safety practices based on education level. There is no significant difference in safety practices across job occupations. Body repair technicians have a median score of 33.00, and other occupations like cars accessories-decoration, diesel pump technicians, electricians, and others show a variety of median scores, with some occupations like "Handyman" and "Oto gaz" having higher scores. The p-value is 0.121, indicating that occupation does not significantly affect safety practices. There is a significant difference in safety practices based on whether an individual has attended an occupational safety course. Those who have attended a course have a median score of 37.00, while those who have not attended a course have a median score of 32.00. The p-value is less than 0.001, indicating that attending an occupational safety course significantly improves safety practices. Age group does not show significant differences in safety practices. The median score for those in the 18-29 age group is 34.00, for those in the 30-44 age group is 33.00, for those in the 45-59 age group is 32.00, and for those in the 60+ age group is 34.00. The p-value is 0.685, suggesting that age does not significantly affect safety practices. There is a trend toward significance in safety practices based on work experience. The median score for those with 0-5 years of experience is 35.00, for those with 6-10 years of experience is 32.00, and for those with 21+ years of experience is 32.00. The p-value is 0.054, which is close to the significance threshold, suggesting that work experience may influence safety practices.

Table 4.10. Comparison of safety practices scores by demographic and occupational factors: Median, 25th, and 75th percentiles with statistical analysis

		Safety Practices			KW/Z :p
		Median	Percentile 25	Percentile 75	
What is your location of work?	NW Syria (Idleb)	32,00	30,00	34,00	4,746; <0,001
	South Turkiye (Gaziantep)	36,00	33,00	42,00	
Marital status	Divorced	39,00	28,00	43,00	2,701;0,440
	Married	33,00	30,00	37,00	
	Single	34,00	30,00	36,00	
	Widowed	39,50	34,00	42,50	
What is your highest level of education?	Completed elementary school	32,00	30,00	34,00	23,373; <0,001
	Completed high school	34,50	31,00	41,00	
	Completed intermediate school	32,00	30,00	34,00	
	Completed technical vocational	33,00	31,00	36,00	
	Completed university	37,00	35,00	42,00	
	Illiterate	39,50	33,50	45,00	
	Not completed technical vocational	44,00	30,00	45,00	
What is your job occupation?	Body repair technician	33,00	30,50	35,00	16,567;0,121
	Cars accessories - decoration	44,00	44,00	44,00	
	Diesel pumps technician	32,00	32,00	32,00	
	Electrician	34,50	31,00	39,00	
	Furnishing repair technician	33,00	31,00	36,00	
	Handyman	38,00	22,50	45,50	
	Mechanical	34,00	31,00	37,00	
	Oto gaz	43,00	43,00	43,00	
	Spray painter	33,00	32,00	35,00	
	Suspension Technician	29,50	29,00	31,00	
	Tire Technician	29,00	23,00	30,00	
	Welder	31,00	29,00	35,00	
have you ever attended any occupational safety course?	No	32,00	30,00	36,00	3,787; <0,001
	Yes	37,00	33,00	43,00	
Age group	18-29 yrs old	34,00	31,00	35,00	1,490; 0,685
	30-44 yrs old	33,00	30,00	38,00	
	45-59 yrs old	32,00	30,00	36,00	
	60+ yrs old	34,00	30,50	37,00	
Working Experience	0-5 years	35,00	32,50	40,00	9,300; 0,054
	6-10 years	32,00	30,00	36,00	
	11-15 years	33,00	30,00	38,00	
	16-20 years	33,50	31,00	36,50	
	21+ years	32,00	30,00	35,00	

There is a significant difference in the total "K.A.O.S" score based on location, with the median score for NW Syria (Idleb) being 110.00, compared to 123.00 for South Türkiye (Gaziantep). The 25th percentile for Idleb is 99.00, and for Gaziantep, it is 111.00, with the 75th percentile for Idleb at 117.00 and for Gaziantep at 133.00. The p-value is less than 0.001, indicating a statistically significant difference in the total "K.A.O.S" score between the two locations. Marital status does not show significant differences in total "K.A.O.S" scores. The median score for divorced individuals is 132.00, for married individuals is

113.00, for single individuals is 114.00, and for widowed individuals is 134.00. The p-value is 0.240, suggesting that marital status does not significantly affect the total "K.A.O.S" score. There is a significant difference in total "K.A.O.S" scores based on education level. The median score for individuals who completed elementary school is 105.00, while for those who completed university, the median score is 129.00. Illiterate individuals have a median score of 133.50, and those who did not complete technical vocational education have a median of 134.00. The p-value is less than 0.001, indicating a statistically significant difference in total "K.A.O.S" scores based on education level. Job occupation also shows significant differences in total "K.A.O.S" scores. Body repair technicians have a median score of 109.00, while other occupations such as "Cars accessories-decoration" and "Oto gaz" have higher median scores of 136.00. Diesel pump technicians, suspension technicians, tire technicians, and welders have lower median scores. The p-value is 0.006, indicating a significant difference in total "K.A.O.S" scores across job occupations. There is a significant difference in total "K.A.O.S" scores based on whether individuals have attended an occupational safety course. Those who have attended a course have a median score of 123.00, while those who have not attended a course have a median score of 111.00. The p-value is less than 0.001, indicating that attending an occupational safety course significantly impacts the total "K.A.O.S" score. Age group does not show significant differences in total "K.A.O.S" scores. The median score for those in the 18-29 age group is 115.00, for those in the 30-44 age group is 116.00, for those in the 45-59 age group is 108.50, and for those in the 60+ age group is 113.00. The p-value is 0.231, suggesting that age does not significantly affect the total "K.A.O.S" score. There is a trend toward significance in total "K.A.O.S" scores based on work experience. The median score for those with 0-5 years of experience is 119.50, for those with 6-10 years of experience is 115.00, and for those with 21+ years of experience is 110.00. The p-value is 0.054, suggesting that work experience may influence the total "K.A.O.S" score.

Table 4.11. Comparison of total K.A.O.S scores by demographic and occupational factors: Median, 25th, and 75th percentiles with statistical analysis

		Total. K.A.O.S			KW/Z :p
		Median	Percentile 25	Percentile 75	
What is your location of work?	NW Syria (Idleb)	110,00	99,00	117,00	4,847; <0,001
	South Turkiye (Gaziantep)	123,00	111,00	133,00	
Marital status	Divorced	132,00	111,00	148,00	4,205;0,240
	Married	113,00	102,00	122,00	
	Single	114,00	101,00	126,00	
	Widowed	134,00	110,50	143,00	
What is your highest level of education?	Completed elementary school	105,00	96,00	115,00	30,157; <0,001
	Completed high school	122,00	111,00	132,00	
	Completed intermediate school	111,00	101,00	118,00	
	Completed technical vocational	110,00	109,00	117,00	
	Completed university	129,00	121,00	140,00	
	Illiterate	133,50	103,00	149,00	
	Not completed technical vocational	134,00	107,00	134,00	
What is your job occupation?	Body repair technician	109,00	100,50	117,50	26,307;0,006
	Cars accessories - decoration	136,00	136,00	136,00	
	Diesel pumps technician	97,00	97,00	97,00	
	Electrician	121,00	111,00	130,00	
	Furnishing repair technician	113,00	102,00	123,00	
	Handyman	113,50	91,50	140,50	
	Mechanical	114,00	103,00	125,00	
	Oto gaz	136,00	136,00	136,00	
	Spray painter	115,00	109,00	126,00	
	Suspension Technician	97,50	93,00	101,50	
	Tire Technician	91,00	82,00	94,00	
	Welder	110,00	99,00	121,00	
have you ever attended any occupational safety course?	No	111,00	99,00	122,00	3,612; <0,001
	Yes	123,00	110,00	136,00	
Age group	18-29 yrs old	115,00	107,00	123,00	4,299; 0,231
	30-44 yrs old	116,00	106,00	127,00	
	45-59 yrs old	108,50	98,50	117,50	
	60+ yrs old	113,00	101,50	128,00	
WorkingExperience	0-5 years	119,50	110,00	129,50	9,282; 0,054
	6-10 years	115,00	107,00	124,00	
	11-15 years	111,00	106,00	130,00	
	16-20 years	113,00	98,00	126,00	
	21+ years	110,00	98,00	120,00	

5. DISCUSSION

The findings of this study reveal critical insights into the occupational safety knowledge, attitudes, and practices of Syrian workers in automobile repair workshops in Northwest Syria and Southern Türkiye. By interpreting these findings within the framework of the Health Belief Model (HBM), this section contextualizes the observed behaviors and highlights their implications for policy and practice.

5.1. Knowledge of Occupational Hazards

Participants demonstrated high awareness of immediate risks, such as welding flash light (98%) and manual lifting of heavy objects (96.7%), reflecting a baseline understanding of occupational hazards. These results are consistent with findings from Khadka et al. (2021) [60], where easily observable dangers, such as burns and cuts, were well recognized by automobile workers in Nepal. However, awareness of less visible dangers, such as noise exposure (39.4%) and harmful chemical exposure from using fuel for cleaning hands (61.3%), was markedly lower [61]. Similar gaps have been documented in studies in Nigeria, where less obvious risks like chemical toxicity and long-term noise-induced hearing loss were underappreciated [62].

These findings suggest that while workers are aware of the immediate threats, they lack understanding of cumulative or long-term risks. This highlights the need for comprehensive training programs that not only address immediate hazards but also emphasize the latent risks associated with their work environment. Such programs should employ practical demonstrations and culturally adapted content to ensure workers grasp the full spectrum of hazards [63].

5.2. Attitudes Towards Occupational Safety

This study found significant ambivalence among workers regarding protective measures, particularly regarding helmets (64.7% negative) and face masks (50% negative). These attitudes reflect common barriers, including perceived discomfort, cultural norms, and workplace culture [64]. For instance, the Health Belief Model (HBM) identifies perceived barriers as a major hindrance to translating knowledge into practice. Studies such as

Okechukwu et al. (2022) similarly found that ergonomic discomfort and cultural resistance often prevent workers from using PPE [65].

To mitigate these issues, interventions should focus on:

- Redesigning PPE to be more comfortable and culturally acceptable.
- Encouraging workplace leaders to model safety practices.
- Raising awareness about the tangible benefits of compliance.

By addressing these barriers, it may be possible to shift attitudes and create a culture of safety.

5.3. Psychological Dimensions of Non-Adherence

Psychological factors significantly influence workers' non-compliance with safety practices. In many cases, financial stress and unstable environments, particularly in conflict-affected regions, reduce the capacity of workers to prioritize long-term safety measures. Białowolski et al. (2021) argue that financial insecurity often compels individuals to focus on immediate productivity, leading to neglect of protective measures [66].

Job insecurity and fear of workplace penalties further exacerbate this issue. Zhang et al. (2023) demonstrate that workers frequently perceive personal protective equipment (PPE) as a hindrance to efficiency, discouraging its use despite known risks [67].

Fatalistic beliefs regarding the inevitability of workplace accidents also contribute to low adherence to safety protocols. Boua et al. (2023) found that such attitudes diminish workers' motivation to engage in preventative behaviors, underscoring the importance of addressing these perceptions [68]. Mental health interventions and workplace counseling programs have proven effective in mitigating these barriers. Gao et al. (2023) identified that targeted stress management initiatives and safety awareness campaigns significantly enhance compliance with safety practices [69].

Addressing these psychological dimensions is critical for improving occupational safety. Employers and policymakers must prioritize the integration of psychological support and behavior-focused interventions into workplace safety strategies to ensure sustained adherence to safety protocols.

5.4. Safety Practices

The findings reveal significant variability in safety practices among workers, highlighting both strengths and areas requiring intervention. Routine practices such as maintaining cleanliness in the work environment (92%) were widely adopted, demonstrating an awareness of basic hygiene and its importance in occupational safety. However, adherence to personal protective equipment (PPE) use was inconsistent, with low usage rates for gloves (50.7%) and goggles (60%).

The variability in PPE use suggests challenges related to accessibility, affordability, and prioritization. Studies such as Hanna et al. (2020) indicate that when workers perceive PPE as costly or impractical, they are less likely to use it consistently, and its usage tends to decrease, even when the risks are well understood. Additionally, the lack of prioritization for PPE usage in workplace routines may contribute to these inconsistencies.

Addressing these challenges requires interventions focused on improving the availability and affordability of PPE. Training programs should also emphasize the importance of consistent PPE usage, integrating it into daily workplace routines to ensure greater adherence.

5.5. Influence of Demographics and Training

The analysis revealed that demographic factors, such as education level and work location, significantly influenced workers' knowledge, attitudes, and practices regarding occupational safety. Workers in Southern Türkiye demonstrated better safety practices compared to their counterparts in Northwest Syria, with 78% consistently adhering to safety protocols, compared to only 42% in Northwest Syria ($p < 0.001$). This discrepancy may be attributed to differences in regulatory environments and resource availability. Regions with more robust enforcement of safety standards and better access to resources tend to have higher compliance rates [70].

Education level and prior training also played pivotal roles. Among workers with a secondary education or higher, 67% showed consistent adherence to safety measures, compared to 38% among those with primary education or less. Similarly, 72% of workers who had undergone prior occupational safety training adhered to safety protocols, compared

to 45% of those without training. These findings align with studies emphasizing the critical role of education and training in enhancing workplace safety practices [71].

To address these disparities, context-specific interventions are essential. For workers in resource-limited settings, targeted training programs that are culturally adapted and accessible can bridge knowledge gaps and improve safety practices. Policymakers should prioritize educational initiatives and ensure the equitable distribution of resources to enhance safety compliance across all regions.

6. STRENGTHS AND LIMITATIONS

6.1. Strengths

- **Cross-Regional Comparison:**

This study's inclusion of two distinct regions—Northwest Syria and Southern Türkiye—provides a unique opportunity to examine occupational safety in conflict-affected settings with differing regulatory environments. The comparison between these regions enhances the understanding of the impact of local policies and resources on workers' safety behaviors, and it possibly raises a careless behavior correlated to the psychological factors related to the conflict, which opens the floor for further studies to identify the correlation by evidence and advocate to enhance the work conditions of people who suffer from prolonged crises in their countries.

- **Relevance to Policymakers:**

The study's focus on conflict-affected regions and its practical findings have direct relevance for policymakers and organizations operating in similar settings. The results offer actionable insights that can inform targeted interventions to improve safety standards in areas with limited resources.

- **Targeting neglected area of research:**

This research might be the first of its kind in Syria, this country has very limited research studies in general, and the occupational safety and health of workers is even more neglected, thus, this study can by a baseline for more possible studies after the end of the Syrian crises, to compare the results before and after.

6.2. Limitations

- **Cross-Sectional Design:**

The study's cross-sectional nature means that it cannot establish causality. While correlations between variables such as training and compliance were observed, it is not possible to determine the cause-and-effect relationships away from assumptions.

- **Self-Reported Data:**

As the study relied on self-reported data, there is a risk of social desirability bias, where participants may overstate their adherence to safety practices or underreport unsafe behaviors. While efforts to ensure confidentiality and anonymity were made, self-reporting can still impact the accuracy of the findings.

- **Lack of Direct Observation for PPE Compliance:**

While the study gathered self-reported data on PPE use, the absence of direct observational data limits the accuracy of the compliance rates reported. Future studies to include direct observations in addition to qualitative interviews with the workers to provide a more comprehensive reflection of safety behaviors in the workplace.

- **Excluding under 18 years old:**

In future studies, the age group of under 18 should be included, and to conduct comparison studies with adults' data to identify the correlations and conclude deeper results that can provide further recommendations to improve this public health area, where under 18 age group is possibly a large age group in this kind of industry especially in the middle east and north Africa.

7. CONCLUSION

The findings of this study highlight several critical aspects regarding occupational health and safety among workers in NW Syria and South Türkiye. The sample mainly comprises middle-aged adults, with a predominance of married individuals, and a significant majority with relatively low educational attainment. This demographic context emphasizes the need for targeted occupational safety training programs, especially given that only a minority of participants reported having received such training.

The assessment of participants' knowledge about occupational hazards revealed a generally high level of awareness regarding certain risks, such as the dangers of working without personal protective equipment (PPE) and the health hazards associated with poor hygiene practices. Nonetheless, significant gaps in awareness existed, especially regarding the use of fuel for cleaning and understanding the risks associated with noise exposure and lifting heavy objects. These findings suggest an urgent need for enhanced educational initiatives focused on comprehensive hazard awareness and specific risk mitigation strategies.

Attitudes toward occupational safety were mixed. While many respondents recognized the risks associated with their work, a substantial portion expressed a lack of fear or a reluctance to engage in preventive safety behaviors, such as wearing PPE consistently. This contradiction points to a complex interplay between knowledge and behavior, indicating that mere awareness is not sufficient to prompt action. The discrepancies in attitude toward the use of safety equipment highlight crucial areas for improvement in workplace safety culture.

Health issues reported by the participants, primarily musculoskeletal injuries and fatigue, further emphasize the pressing need for better safety practices and health support mechanisms. Despite a high rate of adherence to hygiene practices and daily cleaning of the work environment, the reluctance to wear PPE demonstrates a significant challenge in fostering a proactive safety culture among workers.

Statistical analyses indicated significant variation in knowledge, attitudes, and safety practices based on factors such as work location, education level, and previous training on occupational safety. These findings underscore the need for tailored interventions that

consider these demographic and occupational variables to enhance overall safety compliance and health outcomes in the workforce.

In summary, this study provides valuable insights into the state of occupational health and safety practices among workers in NW Syria and South Türkiye, highlighting the need for targeted education, improved safety culture, and the emphasis on practical application of safety measures. Future research is essential to track progress and effectiveness of implemented interventions, ensuring a safer work environment for all workers.

8. RECOMMENDATIONS

8.1. Policy Recommendations

8.1.1. Strengthen OSH Regulations in Conflict-Affected Areas

- Collaborate with international organizations like the ILO to adopt internationally recognized OSH standards and customize them to local contexts.
- Develop a centralized framework for monitoring and enforcement with the involvement of local authorities, NGOs, and industry representatives.
- Implement strict penalties for non-compliance with safety regulations to ensure accountability among employers.

8.1.2. Introduce Mandatory Training Programs for Workers

- Enforce the requirement of basic occupational safety training before employment in high-risk industries like automobile repair.
- Develop partnerships with local vocational training centers to deliver low-cost, hands-on safety workshops.
- Require periodic refresher training sessions to ensure continuous learning and adaptation to emerging risks.

8.1.3. Enhance Reporting and Incident Tracking Systems

- Establish a centralized reporting system for workplace injuries and near-misses to monitor trends and inform policy decisions.
- Ensure anonymity and protection for workers who report unsafe practices or incidents to encourage participation.

8.2. Workplace Interventions

8.2.1. Improve Access to Ergonomic, Comfortable PPE

- Work with PPE manufacturers to design equipment tailored to the needs of automobile repair workers, such as lightweight helmets, durable gloves, and breathable face masks.
- Subsidize the cost of PPE for small businesses and individual workers to ensure affordability.
- Create a distribution network with local suppliers and NGOs to ensure regular access to PPE in remote and conflict-affected areas.

8.2.2. Implement Safety Supervision and Inspections

- Assign safety officers in large workshops and train them to oversee daily compliance with safety protocols.
- Conduct surprise inspections at workshops to identify and rectify safety violations.
- Provide workshops with visible safety signage and posters highlighting proper procedures and hazard warnings.

8.2.3. Improve Physical Work Environments

- Upgrade workshop infrastructure, including better ventilation, sufficient lighting, and organized storage spaces to reduce risks.
- Provide subsidies or grants to employers willing to invest in workplace improvements.

8.3. Behavioral and Psychological Interventions

8.3.1. Design Workplace Mental Health Programs

- Provide access to trained counselors or psychologists for workers dealing with stress and trauma.
- Introduce peer-led mental health support groups where workers can share experiences and coping strategies.

- Include stress management workshops that teach relaxation techniques and practical solutions for handling workplace pressures.

8.3.2. Address Fatalistic Attitudes Through Behavior Change Campaigns

- Use community-based campaigns to highlight the preventability of workplace injuries and the benefits of proactive safety measures.
- Share success stories of workers who benefited from adopting safety practices to build confidence and motivation.

8.3.3. Leverage Technology for Psychological Support

- Develop mobile apps or hotlines where workers can confidentially report stress or seek psychological assistance.
- Integrate motivational messages and safety tips into workers' daily routines using text or voice messaging services.

8.4. Training Initiatives

8.4.1. Develop Culturally Tailored Safety Education Programs

- Work with local community leaders and experts to design training materials that resonate with workers' cultural beliefs and practices.
- Use visual aids, hands-on demonstrations, and local languages to ensure effective communication of safety concepts.
- Include modules on gender-specific needs and challenges, particularly for women in the workforce.

8.4.2. Incorporate the Health Belief Model (HBM) into Training Sessions

- Focus on building workers' perceived susceptibility to workplace hazards by showing real-life examples of injuries and their consequences.
- Highlight the benefits of safety practices through case studies and practical demonstrations.

- Address perceived barriers to safety compliance by brainstorming solutions with workers during training.

8.4.3. Introduce Train-the-Trainer Programs

- Train supervisors and experienced workers to become safety champions who can guide and mentor others.
- Create a cascading training model to ensure knowledge transfer within workshops, even in remote locations.

8.4.4. Leverage Digital Learning Platforms

- Develop online or mobile-based training modules that workers can access at their convenience.
- Include interactive quizzes and rewards to make learning engaging and reinforce key safety principles.

8.4.5. Track Training Effectiveness

- Introduce pre- and post-training assessments to measure knowledge gains and behavior changes.
- Follow up with participants after six months to evaluate the impact of training on workplace practices.

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10. APPENDIXES

Appendix 1. Informed Consent

نموذج الموافقة

عزيزي المشارك،

أنت مدعو للمشاركة في دراسة البحث "المعارف والممارسات المتعلقة السلامة المهنية بين العمال السوريين في ورش إصلاح السيارات في شمال غرب سوريا وجنوب تركيا" التي يجريها د. سامر زكور، طالب ماجستير في جامعة أنقرة يلدرم بيازيد - معهد الصحة العامة. تهدف هذه الدراسة إلى استكشاف معرفة وممارسات السلامة المهنية بين السوريين في ورش إصلاح السيارات في كل من شمال غرب سوريا وجنوب تركيا، مما يُعد ضرورياً لتحسين معايير السلامة في المنطقة ومساعدة العمال على تحسين سلامتهم وظروف عملهم المهنية.

المشاركة اختيارية تماماً ولن يكون هناك تعويض مالي لمشاركتك. ستُعامل ردودك بسرية تامة لضمان راحتك، يمكنك الإجابة على كل عنصر/سؤال بصراحة وانفتاح.

ستساهم مشاركتك بشكل كبير في فهمنا للسلامة المهنية بين العاملين في قطاع إصلاح السيارات. ومع ذلك، يرجى ملاحظة أن لديك الحق في الانسحاب من الدراسة في أي وقت دون أي عواقب سلبية.

شكراً لتعاونك.

مع أطيب التحيات،

د. سامر زكور

Appendix 2. Ethical Approval AYBU



ANKARA YILDIRIM BEYAZIT UNIVERSITY (AYBU) HEALTH SCIENCE ETHICS COMMITTEE RESEARCH PROJECT APPROVAL FORM



THE TITLE OF THE RESEARCH PROJECT					
Occupational Safety Knowledge and Practice Amongst The Syrian Workers in the automobile repair workshops in Northwest Syria and Southern Turkey					
RESEARCHER/S*					
	Title	Name-Surname	Position	Phone	e-mail
1**	Student	SamerZakour	Aybu, public health institute, department of health policy and global health	+905059912354	sammerzakkour@gmail.com
2	Assistant Professor	Fahad Ahmed	Aybu, faculty of medicine, public health department	+905536906091	drfahadahmed@yahoo.com
3					
4					
The researcher's affiliation with AYBU***: Student *The academic advisor's signature is not required for the research studies under the supervision of an advisor. ** The name of the person who applies directly to the ethics committee should be listed first. ***In this section, at least one of the researcher/s must be clearly related to AYBU. The AYBU Health Science Ethics Committee reviews only the applications of employees or students in our university.					
THE RESEARCH PERIOD					
Start Date*: _01_/_Aug_/_2022_			End Date: 31_/_Oct_/_2022_		
*In this section, the start and the end of the data collection process should be given. The date of data collection can not begin before the approval of the Ethics Committee. Therefore, it is recommended to apply at least 1 month before the start of the project.					
THE TYPE OF RESEARCH					
☐	Academic Staff Research				
☐	Doctoral Thesis				
☒	Master's Thesis				
☐	Other _____ (Please specify)				
RESEARCH SUPPORT / GRANT					
☒	No				
	Yes				
		University			

Appendix 3. Ethical Approval Idleb Health Directorate

Ethical Approval Request

To: Directorate of Health in Idleb

Subject: Ethical Approval Request for Data Collection

Dear Respected Members of the Health Directorate,

I am writing to seek your esteemed approval to conduct a research study titled:

"Occupational Safety Knowledge and Practice Amongst the Syrian Workers in the Automobile Repair Workshops in Northwest Syria and Southern Türkiye."

The primary objective of this study is to evaluate the knowledge and practices regarding occupational safety among workers in the automobile repair workshops, with the aim of identifying gaps and proposing recommendations to improve workplace safety.

I kindly request permission to collect data from workers in the industrial area of Idleb city. The study will involve anonymous surveys and/or interviews, ensuring full confidentiality and voluntary participation. All ethical considerations, including informed consent and data protection, will be strictly adhered to.

Your approval is essential for conducting this research effectively, as it will help contribute to the understanding of occupational safety and public health in this sector.

Thank you for considering this request. I am happy to provide further information or clarification if needed.

Sincerely,

1 August 2024

Samer Zakour



Idleb Health Director

3 August 2024



Appendix 4. Questionnaire

English:

Instruction: please read carefully and respond to the following statement by selecting your position.

SA = Strongly Agree, **A**= Agree, **D**= Disagree, **SD**= Strongly Disagree

SECTION A: SOCIO-DEMOGRAPHIC DATA

1. What is your location of work?
 - NW Syria (Idleb)
 - Southern Türkiye (Gaziantep)
2. How old are you?
3. Gender:
 - Male
 - Female
4. Marital status:
 - Single
 - Married
 - Divorced
 - Widowed
5. What is your highest level of education?
 - Completed university
 - Completed high school
 - Completed intermediate school
 - Completed elementary school
 - Not completed elementary school
 - Illiterate
 - Completed technical vocational
 - Not completed technical vocational
6. What is your job occupation?
 - Body repair technician
 - Spray painter
 - Mechanical
 - Electrician
 - Furnishing repair technician
 - Welder
 - Other: please specify.....
7. How long have you been working in automobile repair shops (in years)?
8. have you ever attended any occupational safety course?
 - Yes
 - No

SECTION B: Occupational hazards knowledge assessment:

1. **Working without personal protective equipment exposes you to hazards**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
2. **Eating with unwashed dirty hands in the workshop is harmful to health**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
3. **Sucking fuel with mouth is harmful**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
4. **Washing hands with fuel to remove grease/paint and used engine oil is dangerous**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
5. **Inhaling exhaust/welding fumes is hazardous**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
6. **Welding flash light is hazardous to the eyes**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
7. **Noisy working environment can cause hearing loss**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
8. **Flooded working environment is hazardous**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
9. **Lifting heavy objects manually can cause low back pains**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree

SECTION C: Attitude towards occupational hazards assessment

1. **My work is risky and hazardous**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
2. **I am scared doing my work because of hazards**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
3. **I like observing precautionary measures while doing my work**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
4. **I like wearing an overall while doing my work**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
5. **I like wearing safety shoes while working**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
6. **I like wearing hand gloves while working**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
7. **I like wearing goggles while working**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
8. **I like using a face mask/respirator while working**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree
9. **I like wearing a safety helmet while working**
 - Strongly Agree
 - Agree
 - Disagree
 - Strongly Disagree

SECTION D: Occupational hazards assessment

1. **I suffered burns, cuts, bruises because of my work**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
2. **I experience low back pain due to my work**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
3. **I have skin rashes because of my work**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
4. **I developed eye problems because of my work**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
5. **I have hearing problems because of my work**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
6. **I have respiratory problems because of my work**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
7. **I have musculoskeletal pains because of my work**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
8. **I have headaches after my daily work**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
9. **I feel dizzy because of my work**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
10. **I always feel tired because of my work**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
11. **Mosquitoes bite me because of my work environment**
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree

SECTION E: Safety Practices assessment

1. I clean my work environment daily

- Strongly agree
- Agree
- Disagree
- Strongly disagree

2. I wash my work clothing regularly

- Strongly agree
- Agree
- Disagree
- Strongly disagree

3. I wash my hands with soap and water after each work

- Strongly agree
- Agree
- Disagree
- Strongly disagree

4. I lift heavy objects with a mechanical device

- Strongly agree
- Agree
- Disagree
- Strongly disagree

5. I use a fuel siphon pump to draw fuel

- Strongly agree
- Agree
- Disagree
- Strongly disagree

6. I use a log to support a jack when working under a vehicle

- Strongly agree
- Agree
- Disagree
- Strongly disagree

7. I wear an overall while doing my work

- Strongly agree
- Agree
- Disagree
- Strongly disagree

8. I wear safety shoes while working

- Strongly agree
- Agree
- Disagree
- Strongly disagree

9. I wear hand gloves while working

- Strongly agree
- Agree
- Disagree
- Strongly disagree

10. I wear goggles while working

- Strongly agree
- Agree
- Disagree
- Strongly disagree

11. I use a face mask/respirator while working

- Strongly agree
- Agree
- Disagree
- Strongly disagree

12. I wear a safety helmet while working

- Strongly agree
- Agree
- Disagree
- Strongly disagree

Arabic:

القسم أ: البيانات الاجتماعية الديموغرافية

1- ما هو مكان عملك (الجغرافي)؟ -

شمال غرب سوريا (إدلب)

- جنوب تركيا (غازي عنتاب)

2- كم عمرك؟

3- الجنس: -

ذكر

- أنثى

4- الحالة الاجتماعية: -

أعزب

- متزوج -

مطلق -

أرمل

5- ما هو أعلى مستوى تعليمي وصلت إليه؟ - أكملت

الجامعة

- أكملت المدرسة الثانوية - أكملت

المدرسة الإعدادية - أكملت المدرسة

الابتدائية

- لم أكمل المدرسة الابتدائية - أ'مي

- أكملت التعليم المهني التقني

- لم أكمل التعليم المهني التقني

6- ما هي مهنتك؟ -

ص'واج

- ب 'خاخ
- ميكانيكي -
- كهربائي
- ف 'راش (تجيد) - ل
- حام
- آخر: يرجى التحديد.....

7- كم سنة قضيت في العمل في ورشات إصلاح السيارات؟

8- هل سبق لك أن حضرت أي دورة في السلامة المهنية؟ - نعم

- لا

القسم ب: تقييم مدى المعرفة بالمخاطر المهنية

- 1 - العمل بدون معدات/أدوات الحماية الشخصية يعرض للمخاطر - أوافق
- بشدة
- أوافق
- لا أوافق
- لا أوافق بشدة

- 2 - الأكل بأيدي غير مغسولة في الورشة مضر بالصحة - أوافق بشدة
- أوافق
- لا أوافق
- لا أوافق بشدة

- 3- شطف الوقود بالفم مضر - أوافق
- بشدة
- أوافق

- لا أوافق

- لا أوافق بشدة

4 - غسل الأيدي بالوقود لإزالة الشحوم/الطلاء وزيت المحرك المستخدم خطير - أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

5 - استنشاق أبخرة العادم/اللحام خطر - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

6 - ضوء اللحام خطر على العينين - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

7 - بيئة العمل الصاخبة يمكن أن تسبب فقدان السمع - أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

8 - بيئة العمل المغمورة بالمياه خطيرة - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

9 - رفع الأجسام الثقيلة يدوياً " يمكن أن يسبب آلام الظهر - أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

القسم ج: تقييم السلوك والموقف تجاه المخاطر المهنية

1 - عملي محفوف بالمخاطر وخطير -

أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

2 - أنا خائف من القيام بعملية بسبب المخاطر - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

3 - أحب اتباع الإجراءات الوقائية أثناء عملي - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

4 - أحب ارتداء الزي الكامل (الذي يؤمن الحماية) أثناء عملي - أوافق

بشدة

- أوافق

- لا أوافق
- لا أوافق بشدة

5 - أحب ارتداء أحذية الأمان أثناء العمل -

- أوافق بشدة
- أوافق
- لا أوافق
- لا أوافق بشدة

6 - أحب ارتداء القفازات أثناء العمل - أوافق

- بشدة
- أوافق
- لا أوافق
- لا أوافق بشدة

7 - أحب ارتداء النظارات الواقية أثناء العمل - أوافق

- بشدة
- أوافق
- لا أوافق
- لا أوافق بشدة

8 - أحب استخدام قناع الوجه/جهاز التنفس/ القناع الواقي أثناء العمل - أوافق بشدة

- أوافق
- لا أوافق
- لا أوافق بشدة

9 - أحب ارتداء خوذة الأمان أثناء العمل -

- أوافق بشدة
- أوافق
- لا أوافق
- لا أوافق بشدة

القسم د: تقييم المخاطر المهنية

1 - عانيت من حروق، جروح، كدمات بسبب عملي - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

2 - أعاني من آلام الظهر بسبب عملي -

أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

3 - لدي طفح جلدي بسبب عملي - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

4 - أصبت بمشاكل في العين بسبب عملي - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

5 - لدي مشاكل في السمع بسبب عملي - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

6 - لدي مشاكل في الجهاز التنفسي بسبب عملي - أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

7 - لدي آلام عضلية هيكلية بسبب عملي - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

8 - أعاني من الصداع بعد عملي اليومي - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

9 - أشعر بالدوار بسبب عملي - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

10 - أشعر دائماً بالتعب بسبب عملي - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

11 - تلدغي الحشرات بسبب بيئة عملي - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

القسم هـ: تقييم ممارسات السلامة العامة والشخصية

1 - أنظف بيئة عملي يوميا" - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

2 - أغسل ملابس عملي بانتظام - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

3 - أغسل يدي بالصابون والماء بعد كل عمل / مهمة - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

4 - أرفع الأجسام الثقيلة باستخدام جهاز ميكانيكي - أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

5 - أستخدم مضخة لشطف الوقود - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

6 - أستخدم خشبة/دعامة لدعم الرافعة أثناء العمل تحت السيارة - أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

7 - أردي الزي الكامل أثناء عملي -

أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

8 - أردي أحذية الأمان أثناء العمل -

أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

9 - أردي القفازات أثناء العمل - أوافق

بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

10- أردي النظارات الواقية أثناء العمل

- أوافق بشدة - أوافق

- لا أوافق

- لا أوافق بشدة

11- أرندي قناع الوجه/جهاز التنفس/ القناع الواقي أثناء العمل - أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

12- أرندي الخوذة أثناء العمل -

أوافق بشدة

- أوافق

- لا أوافق

- لا أوافق بشدة

Appendix 5. Curriculum Vitae

Samer Zakour

Marital Status: Married

Gender: Male

Education

- Global Health & Health Policies Master's degree – 2025 – Ankara Yıldırım Beyazıt University
- Doctor of Medicine since 2010 – Faculty of Medicine – Aleppo University

Professional Experience

Senior Programs Manager at SAMS Foundation (Syrian American Medical Society Foundation) – NW Syria/Turkey office – Turkey/Gaziantep

01 June 2023 to Current

Role purpose:

Leading and managing the units of programs, including the technical, project implementation, and MEAL/IM units. Responsibilities include project design, monitoring, evaluation, and representing the organization in various forums. Staff management includes performance evaluations, job descriptions, and fostering a positive, collaborative work environment.

Health & Nutrition Projects Manager at SAMS Foundation – NW Syria/Turkey office – Turkey/Gaziantep

03 Apr 2023 to 31 May 2023

Role purpose:

Projects management responsibilities included project assessments, stakeholder analysis, resource coordination, ensuring timely and budgeted project delivery, and maintaining project documentation. Staff management responsibilities included setting performance objectives, conducting evaluations, and building an effective team approach.

Health Project Manager at IDA (Independent Doctors Association) – NW Syria/Turkey office – Turkey

22 Nov 2021 to Apr 2023

Role purpose:

Overseeing the implementation of primary and secondary health care projects, managing grants, budget oversight, recruitment, procurement, and capacity building for field teams.

Freelancer - Health & Nutrition Technical Expert

2021 – Current (Syria, Yemen, Iraq)

Role purpose:

Providing technical support for third-party monitoring of humanitarian projects, developing tools, training data collectors, conducting technical analysis, and contributing to reports and recommendations.

Health & Nutrition Projects Manager at Save the Children International – NW Syria Country Office – Turkey

15 Jan 2017 to 23 Aug 2019

Acting Health & Nutrition Projects Manager at Save the Children International –
NW Syria Country Office – Turkey
15 Nov 2016 to 15 Jan 2017

Health Programme Technical Coordinator at Save the Children International – Syria
Country Office – Turkey
14 Mar 2016 to 15 Nov 2016

Role purpose:

Responsibilities included programme planning, partner proposal development, monitoring programme activities, building partner capacity, and ensuring community engagement.

Medical Coordinator at GOAL Turkey

04 Jan 2016 to 11 Mar 2016

Role purpose:

Operational supervision of a new primary health care centre, working with the provincial MOH, programme implementation, monitoring and evaluation, and preparation of proposals for future projects.

Health Officer at Save the Children International – Turkey

17 Mar 2014 to 31 Dec 2015

Role purpose:

Ensuring quality implementation of the health programme, technical assessments, health data collection, monitoring, documentation, and partner support.

E.N.T Resident Doctor at the National Hospital Idleb – Syria

May 2011 to Dec 2012

Responsibilities:

Managing outpatient and inpatient departments, assisting in the theatre room, handling emergency cases, and overseeing wards.

General Surgery Resident Doctor at the Red Crescent Hospital Idleb – Syria

Sep 2010 to Apr 2011

Responsibilities:

Managing emergency cases, patient preparation, and regular observation of cases in wards.

Member of Public Council at Syrian Family Planning Association

June 2007 to June 2010

General Description:

Raising health awareness in the community, targeting adolescents in Idleb governorate.

Languages

- Arabic (native)
- English (fluent)
- Turkish (beginner)

Skills

Organizational Skills:

- Planning (fixed and emergency roving projects)
- Prioritization
- Detail orientation
- Logistics cycle experience
- Logistics procedures experience (Supply chain & Procurement, especially medical)
- Finance procedures experience

- Reporting experience
- Emergency preparedness planning
- Managing emergency response projects (Health, Nutrition, food and non-food distribution)

Management:

- Relationship and team building (capacity and staffing)
- Time management proficiency
- Deadline-driven
- Staffing management ability
- Budget management

Technical:

- Primary & Secondary health care components experience
- Reproductive health knowledge
- Epidemiology wide knowledge
- Vaccination programmes experience (campaigns and expanded programs)
- Nutrition overall technical knowledge
- Procedures of response to outbreaks experience
- Health outreach component experience

Training / Workshops

- Project Management Essentials – 23 Oct 2022
 - Emergency Response Training – 23–27 Jan 2017
 - Managing for High Performance – 28 Nov–1 Dec 2016
 - Humanitarian Health & Nutrition Training – 26 Sep–30 Sep 2016
 - Conflict Sensitivity & Diversity – 2–4 Aug 2016
 - Complying with the 2014 FPA for a DG ECHO Action – 14 Jan 2016
 - Protection Workshop – 04 Feb 2016
 - Humanitarian Technical Response – 16–20 Aug 2015
 - SPHERE Introductory – 27–29 Jul 2015
 - PMD Pro Level 1 – 11–14 May 2015
 - Fraud Awareness Session – 5 May 2015
 - Budget Coding Session – 25 Mar 2015
 - CMAM – 15–19 Dec 2014
 - Integrated Management of Childhood Illness – 20–31 Oct 2014
 - Stress Management – 26 Aug 2014
 - Child Safeguarding – 19–20 Nov 2014
 - Peer Support – 4–9 Dec 2013

Computer Skills

- MS Word: very good
 - MS Excel: very good
 - Internet applications: very good

References

Available upon request