Employees' Occupational Health and Safety Awareness in Riyadh, Saudi Arabia

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Abstract:

• Background:

Occupational hazards are extremely pervasive and preventive community-related incidents occurring in occupations all over the world. In fact, the majority of developed countries impose national policies to provide their employees with Occupational Health and Safety (OHAS) guidelines and recommendations to avoid these hazards. Maintaining and monitoring employee health through following (OHAS) laws in turn has a positive impact on the economic status of the country.

Our study was conducted in Riyadh, KSA to fill a research gap on OHAS in the country, and to collect evidence-based OHAS recommendations by focusing on three main occupational health domains: stress, musculoskeletal and respiratory symptoms.

• Methods:

A validated structured questionnaire was administered on a cross-section of 319 randomly selected employees aged 18 - 64 years in Riyadh for two weeks in Oct 2018. The survey was conducted on site of 11 locations for different occupations. Information was sought on their socio-demographic characteristics, first aid training and their awareness of major occupational illnesses; stress, respiratory and musculoskeletal disorders. Factors such as underlying diseases and confounding factors such as smoking were also taken into consideration.

• Results:

A total of 319 employees were surveyed from eleven occupational backgrounds. Among all the involved workplaces only 51.3% of them offered First Aid training for the employees. The prevalence of musculoskeletal disorders was 24.1% for weakness followed by 16% for pain. Around 70% of respondents denied suffering from stress at work, neither experiencing

stress- related symptoms such as headache, sleeplessness or anxiety attacks as a result of their work.

Conclusion:

This student-led community engaging study aimed to evaluate employees' awareness of illnesses related to their occupations and their practices to prevent them. Under the supervision of College of Medicine faculty members at Alfaisal University, 1st and 3rd year medical students visited different worksites including schools, dental clinics, car shops, airport terminals, and others to present a brief presentation to promote occupational health and safety proceeded by the distribution of a brief survey. Although musculoskeletal, respiratory and mental illnesses are commonly observed occupation- related complaints, yet this wasn't evident in our study. This could be explained by employees' lack of awareness or fear of reporting their health concerns. This observed gap in our study will help in recommending national guidelines to promote occupational health and safety across different occupations.

Background:

The International Labor Organization defines Occupational health and safety (OHAS) as “the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations”¹. Recently, OHAS has become increasingly important and challenging due to several prominent influences, including technology-generating hazards, increased level of workplace violence, and other financial and environmental factors². Occupational hazards is one of the causes of morbidity and mortality worldwide, ranking 11th for men and 13th for women in terms of disability-adjusted life years (DALYs)³. An estimated 2.3 million occupationally related deaths are reported each year globally (4).

The primary purpose of this study is to obtain an insight into the awareness and prevalence of the top 3 reported occupational hazards in different work environments. The top 2 leading

health hazards are stress and musculoskeletal disorder in recent years (5). With changing environmental exposures and increasing rate nationally, asthma was included as occupational asthma as the most prevalent lung disease. Occupational health and safety concerns and measurement has increased internationally while few have been initiated at a national level. Our literature review showed very few studies focused on occupational health and safety. Of the studies conducted each found in general a gap in awareness and preventive measures in place to reduce occupational hazards. Our study wanted to assess the awareness and presence of OHAS measures in different work settings and the rate of the occupational hazards reported by profession. To the best of our knowledge there is no published article on occupational asthma for the Saudi population. Whereas, occupational stress was studied in 2003 to assess work-related characteristics of paramedical stress in PHC employees (6). The study took place in Abha, evaluating the employee perspective of occupational stress factors. The study concluded that workload, limited decision autonomy, and language barrier were the primary factors of occupational stress. Regarding musculoskeletal disorders, our literature review found three published articles in different regions of the country; Jizan, Makkah, and Dammam. The study population assessed were hospital staff. The level of postural awareness was evaluated using self-administered questionnaires. Each has concluded that awareness and preventive measures were a significant factor in occupational musculoskeletal disorders 7,9.

Summary of existing Literature:

OHAS areas of focus:

The Occupational Health and Safety (OHAS) Program mandates specific rules of conduct to ensure optimal workplace conditions entitled to all workers without compromising their protection factors in their work environment. The following defines the protocol for securing

120 occupational health and safety measures for respiratory, musculoskeletal, and stress in
121 workers of the appropriate environment where they are to be implemented.

122 **Respiratory:**

123 The recommended OHAS implementations for Respiratory Protection Program (RPP)
124 encompass nine components which are “evaluation of respiratory hazards; selection of
125 respiratory protective equipment (RPE); medical evaluation; fit testing; training; use of RPE;
126 inspection, cleaning, and maintenance of RPE; program evaluation; and recordkeeping.” (10).

127 Now the rapid economic growth in developed and developing countries has produced a
128 paradigm shift in occupational health; due to the construction of the vast industrial sector,
129 which introduced a deluge of work-related silica and asbestos (11,13). Low-dose allergens and
130 chemical irritants exposure necessitated the importance of surveillance programs, standard
131 occupational exposure limits and OHAS protocol backed up by evidence-based research (11-
132 13). Today, fortunately, the rise of climate change mitigation policies has led to a decrease in
133 dependence on fossilized fuels from coal mining, declining coal mine dust exposure and
134 consequently the frequency of pneumoconiosis. The global population who get unregulated
135 and unrecognized exposure in the workplace contribute to a heavy burden of disease (11-13).

136 Among the general population, the most afflicted vulnerable population include the aged, low
137 socio-economic class, and migrants. New emerging respiratory hazards from recent
138 technological leaps include nanomaterials, called manufactured carbon nanotubes. Their
139 functionality in health outcomes is not fully understood, but has physical and chemical
140 properties similar to asbestos, causing pulmonary inflammation and fibrosis. They are found
141 in laser printers and photocopiers and are also classified as potentially carcinogenic. (12, 14).

142 Ever since the incidence of immunologic, interstitial and mutagenic lung diseases had been
143 highly unacceptable in the past decades, the mainstay OHAS focus now is on occupational
144 asthma among other pulmonary diseases due to growing statistical evidence of its adverse

work disadvantages. Generic methods to control and prevent asthma and its exacerbating events have been taken, but there is still much to be done in terms of informal hazard detection and continued evaluation of asthma safety in workplaces (11, 12, 15, 16). It is a legal requirement to carry out health surveillance in various circumstances, as it is recommended by the WHO to put in place “systematic, regular and appropriate procedures to detect early signs of work-related ill-health among employees exposed to certain health risks; and acting on the results.” Despite that, surveillance is quite often overlooked in workplaces and requires standardization to reinforce employee education and training (13, 17).

Musculoskeletal:

Work-related musculoskeletal disorders (WMSD) represent a wide array of pathological conditions that, after repeated physical stressors to the soft tissues, affect the health and work performance of the employees, even leading to temporary or permanent disabilities (18). It may also include fractures, cuts, strains, loss of limbs, or repetitive motion disorders (19). Irrespective of the field of work or gender, the most common musculoskeletal symptoms (MSS) include lower back, shoulders, and neck. In gender terms, females had hand or wrist pain, hip, and thigh pain, apart from the general MSS whereas the males had more symptoms of pain in elbows and knees (20).

The incidence of WMSD in dentists and orthodontists is especially high due to prolonged, forced, awkward, and mostly incorrect positions; straining the muscles, joints, and tendons, increased muscle tension, and spinal problems. Also, lower back pain, neck pain, and visual strains are not uncommon symptoms in such professionals with most reporting pain in more than one part of the body (21, 22).

The key to effective implementation is based on proper education and ergonomic training, effective communication, participation and support, and effective and efficient implementation (18). Moreover, there should be a basic facility for biofeedback training and

170 job stress management training (23). In evaluating WMSD, however, it should be noted to
171 factor cultural bias for pain assessment due to the nocebo effect, by negatively assuming
172 adverse health situations, and manifesting more harmful effects (24).

173 **Stress:**

174 Occupational stress and adverse mental health effects can cause detrimental effects on
175 workers and the organization as a whole. It may lead to career uncertainty, high turnover,
176 poor performance, low morale, health problems, and absenteeism (25). Burnout is a
177 psychological condition stemming from chronic stress, leading to a lack of commitment,
178 emotional and physical exhaustion, and job dissatisfaction. It is a risk factor for various
179 diseases and comorbidities, such as coronary artery disease, hypercholesterolemia, sleep
180 disorders, obesity, sedentarism, depression, and increased alcohol consumption. It is
181 characterized by emotional depletion, lack of energy, cynicism, depersonalization, inefficacy,
182 poor job performance, and poor coping skills. The job demand-resources (JDR) model states
183 that increased work stressors and burnout lead to adverse outcomes; whereas work resources
184 and support lead to positive outcomes and greater motivation (26). Psychological stress has
185 been one of the biggest OHAS concerns after WMSD. Work overload, interpersonal conflict,
186 and organizational constraints have been proven universal.

187 Research shows that mindfulness plays a beneficial role in lowering the risk of mental
188 disorders, leading to higher interpersonal and intrapersonal well-being (27, 28). There is an
189 increased need for laying down job stress management strategies in workplaces, and they can
190 be classified as primary, secondary, and tertiary based on their implementations. Primary
191 interventions are organizational preventative strategies that optimize work and health
192 outcomes. They include job redesigns for reducing stressors by providing flexible hours.
193 Secondary interventions aim to provide assistive tactics for stress-coping, like stress

management or employee wellness programs, social and recreational facilities. On the other hand, tertiary interventions, like counseling and rehabilitative programs, are curative.^(25, 29, 30).

OHAS Laws of KSA:

Local requirements of OHAS focuses primarily on the general laws and regulations set out for the employers that mandate the protection of OHAS and employees' health by the employers. They have not provided an in-depth, comprehensive framework of guidelines to follow for general and occupation-specific OHAS issues. The local KSA laws are grouped and summarized into the following points:

1. The employer shall not terminate the worker's contract without remuneration, notice, or compensation, except in cases where there is a major violation of the contract's statement. (Article 80)
2. The employer is mandated to provide break times during work which should not exceed the maximum number of hours, hygienic environment, and clear instructions on using equipment. (Article 101, and 121 to 124)
3. The employer must provide fire and accident prevention OHAS services, and cover employee expenses due to occupational accidents. They are required to provide partial financial aid for temporary cases for a designated period. If total disability or death occurs due to occupational causes, then employees are entitled to wage compensation for three years. (Article 125, 135, 137, and 138)
4. Article 139 states that articles 133, 137, and 138 are inapplicable in cases of deliberate self-injury, injury due to misconduct or refusal of treatment.
5. The workplace must have first aid cabinets, access to physician for occupational health issues, and preventive and management procedures put forward by the employer in accordance with the Ministry of Labor laws. (Article 142, 143)

218

219 **Methods:**

220 • **Design and Setting of Study:** A validated structured questionnaire was administered on
221 a cross-section of 319 randomly selected employees aged 18 - 64 years in Riyadh for two
222 weeks in Oct 2018. The survey was conducted on site of 11 locations for different
223 occupations. Information was sought on their socio-demographic characteristics, first aid
224 training and their awareness of major occupational hazards; stress, respiratory and
225 musculoskeletal disorders. Factors such as underlying diseases and confounding factors
226 such as smoking were also taken into consideration This study was descriptive and cross-
227 sectional in design. A sample size of 319 was obtained based on the following
228 assumptions; 95% confidence level, and a 5% margin of error. The random sampling
229 technique was used in selecting respondents from the study population during random
230 visits to 11 locations for different occupations. Occupations included were: teachers,
231 dentists, lab technicians, medical technologists, forensics, salon workers, cleaning
232 workers, policemen, airport workers, construction workers, and carshop repairmen.
233 Verbal consent was obtained from prospective respondents prior to administration of the
234 surveys. Approval for the study was obtained from the institutional review board at
235 Alfaisal University.

236 • **Characteristics of Participants:** The study was carried out among employees aged 18 -
237 64 years working in Riyadh in Oct 2018

238 • **Description:**

239 In this study, we focused on three aspects of the occupational hazards, the psychological,
240 respiratory, and musculoskeletal, due to their high prevalence in Saudi Arabia and the
241 minimal research on them that is specific for certain exposures and demographics in most
242 of the studies. According to a local study, some respiratory problems (wheezing and

shortness of breath) are related to the levels of occupational exposure to chemicals and dust while other symptoms (cough and phlegm) are usually caused by smoking which make it a major confounder for respiratory symptoms (31, 32). Stress seemed to be of concerning levels, especially among nurses in the health-care sector (33, 34). Moreover, a study was conducted on computer users of three public institutions in Saudi Arabia using an international standardized form entitled “Ergonomics Rating of Computer Applications” to assess the ergonomic status, found an increased musculoskeletal symptoms in relation to decreased ergonomic score of computer workstation (35-36). A validated structured self-administered questionnaire containing closed-ended questions was used. Information was sought on respondents’ socio-demographic characteristics, their awareness of major occupational hazards and their first aid training. Major occupational diseases included were: respiratory disorders, musculoskeletal disorders, and stress. In order to avoid a discussion regarding the questions among the respondents, the questionnaire was distributed to each of them and when answered, it was collected personally by one of the authors immediately. The data was cleaned and analyzed using EXCEL version 2005. Quantitative variables were analyzed using mean and standard deviation. Categorical variables were summarized using percentages and frequencies. Bivariate analysis was used for testing the significance of associations between categorical variables. The level of significance was set at $P < .05$.

Results:

Our study has shown that almost 60 % of respondents completed undergraduate education (See Fig-1). Moreover 37% confirmed a smoking history either currently or in the past, with the majority working as a "carshop repairmen", "policemen" and "construction workers" (See Fig-2). The prevalence of musculoskeletal disorders was 24.1% for weakness followed

by 16 % for pain (See Fig-4). The self-reported stress among the population was 20.1%, with cleaning workers demonstrated the highest percent of employees' stress (See Fig-6). Furthermore, there is almost equal distribution in the sample, between those who attended an occupational safety orientation seminar and those who did not. From among the attendees, "medical technologists" and "Forensics " were the majority. Also, almost half of the respondents confirmed receiving first aid training, with the majority from the "dentist" group (See Fig-3). In parallel to the previous finding, the availability of first aid kits at the workplace was acknowledged mostly by "dentists". Additionally, the majority of respondents reported they did not suffer from respiratory symptoms like asthma(see Fig 5), or chronic problems including diabetes, hypertension, chronic musculoskeletal complaints, and mental illnesses like anxiety etc. This was found among all occupations included in this study. Unexpectedly, almost 70 % of respondents denied suffering from stress at work, neither experiencing stress- related symptoms such as headache, sleeplessness or anxiety attacks as a result of their work with the highest percent being among cleaning workers (See Fig-6).

Discussion:

Our paper clearly elucidated a significant gap in the attention given to the health of employees in the city of Riyadh, Saudi Arabia, and further steps need to be undertaken in order to move forward. Many workplaces offer occupational safety orientation seminars, yet the quality of such seminars and if appropriate measures are being implemented from the employees' end is questionable. Also, the fact that dentist and lab technicians' groups confirmed receiving first aid training was quite expected due to the contract renewal requirement of BLS "Basic Life Support" course for all medical and dental facilities in Saudi Arabia. It is needed to attain accreditation through International and National accrediting

bodies, like Joint Commission International (JCI) and Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI) respectively. This observation could be suggested as an awareness of the lack of occupational health & safety measures, like first aid training, across other non-health sectors to the Ministry of Labor for implementation and enforcement of occupational safety laws. Furthermore, such observation can also instigate production of improved occupational health and safety legislation.

The survey inquired specifically about occupation-induced respiratory symptoms such as wheezing, phlegm production, breathlessness, yet respondents from all groups denied experiencing any. Furthermore, it was similarly the case with musculoskeletal and dermatology-related complaints. These symptoms are often observed in the literature as a common occupational-related presentations, but this wasn't the case in this study (40-43). This odd link may be due to the respondents' concern of victimization, as disclosing any health-related complaints might make them susceptible to criticism from employers, along with its sequelae of penalties, salary reduction, non-renewal, or even immediate termination of their contracts.

Limitations:

Our study was conducted as part of an undergraduate medical students' project for their Primary Care and Public Health course. The course took place over the fall semester only, imposing a major time limitation. In addition, students had to balance between attending lectures at university and allocating proper time slots to visit different workplaces and coordinate it with their schedules. Another limitation was to gain the workplace owners' trust and gain approval to allow students to visit the sites and survey the employees. This alone required several visits and attempts to convince that no data will be shared with any authority or third party; as well as reassurance of proper handling of the data with confidentiality.

Despite the small sample size and the fact representation from each occupation varied which limits compatibility between them, yet our study is considered unique in a sense that it also engaged the first and third year medical students with their local community. It has provided vital practical experience from the community through live lessons of cases, the likes of which they will manage in their future professional practice. Moreover, Occupational Health is a topic rarely discussed at the undergraduate level. Hence, this project has created an opportunity to introduce this field to some, while building on existing understanding for others.

Conclusion:

Our study has shed light on an essential yet overlooked public health concern for many employees working in Riyadh. In order to achieve the Kingdom's latest 2030 vision goals, with Riyadh being the epicenter of development, this issue should not be taken lightly, as efficient employees are the nation's golden resource. Although the focus being assessment of employees' awareness of occupation-related health presentations, the identified gap was primarily in areas of commonly observed occupation-related presentations, which were not reflected by respondents of our study. This could partly be due to the restricted scale of study. A work environment which doesn't support employees' feedback, as well as cultural limitations, or language barriers are other potential explanations. Hence calling the need to conduct further study in this particular field.

Keywords:

Occupational health and safety, occupational health awareness, OHAS, occupational health in Saudi Arabia, employees safety, employees first-aid training, employees health promotion, employees health in Saudi Arabia.

List of Abbreviations:

OHAS: Occupational Health and Safety

CBAHI: Saudi Central Board for Accreditation of Healthcare Institutions

WMSD: Work-related Musculoskeletal Disorders

JCI: Joint Commission International

KSA: Kingdom of Saudi Arabia

ILO: International Labour Organisation

Declarations:

1. Ethics approval and consent to participate: attached IRB approval.

2. Consent for publication: Not applicable

3. Availability of data and materials: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

4. Competing interests: The authors declare that they have no competing interests

5. Funding: Hereby declare that the funding is contributed personally by the main author.

6. Authors' contributions: BG conceptualized, supervised all the team, discussed, concluded the whole project; analyzed, interpreted the data; overseeing all the participating individuals; TAE prepared the introduction and literature review, MMW, FMM, RNA ASB, ARA, RJA, MIK, AOB, FA, SAE participated in various interviews with the participants and conducted surveys; AA Offered her expertise in biostatistics to supervise and guide the team around data management and analysis.

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Figures, Tables and additional Files:

1. Fig-1: Graph showing Age Group and Educational level

Education level distribution per age group; percentage of grand total for each category

2. Fig-2: Smoking

3. Fig-3: Safety Training

501 4. Musculoskeletal (MSK) Symptoms

502 MSK occupation- related Symptoms; percentage of occupation total for Pain (blue) and Weakness (orange).

503

504 5. Respiratory Symptoms

505 Respiratory occupational hazards; percentage of occupation total for Asthma (blue), Cough (orange) and Phlegm (purple).

Stress and Anxiety; percentage of grand total (blue), percentage of occupation total (orange).

Table 1. Distribution of Occupation based on gender:

Occupations	Count of Occupation	% of Occupation
Females	172	53.92%
Dentist	61	35.47%
Salon	32	18.60%
Cleaning workers	28	16.28%
Teachers	22	12.79%
lab/research technician	11	6.40%
Airport	10	5.81%
Medical Technologist	8	4.65%
Males	147	46.08%
Construction worker	37	25.17%
Carshop Repairman	30	20.41%
Dentist	26	17.69%
policeman	20	13.61%
Airport	12	8.16%
Cleaning workers	10	6.80%
Forensics	10	6.80%
Medical Technologist	2	1.36%
Grand Total	319	100.00%

Figures

Education level distribution per age group; percentage of grand total for each category

Figure 1

Age group and Educational Level (N=319)

Figure 2

SMOKING HISTORY (N=319)

Safety training; percentage of occupation total for OHS seminars (blue) and First Aid training (red).

Figure 3

SAFETY TRAINING

MSK occupation- related Symptoms; percentage of occupation total for Pain (blue) and Weakness (orange).

Figure 4

Musculoskeletal (MSK) Symptoms

Respiratory occupational hazards; percentage of occupation total for Asthma (blue), Cough (orange) and Phlegm (purple).

Figure 5

RESPIRATORY SYMTOMS

Stress and Anxiety; percentage of grand total (blue), percentage of occupation total (orange).

Figure 6

PSYCHIATRIC SYMPTOMS

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [EmployeesHealthAwarenessSurveyR.pdf](#)
- [EmployeesHealthAwarenessSurveyR.pdf](#)