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\textbf{Abstract}

\textbf{Background}: The ongoing industrial and infrastructural development in Saudi Arabia carries a high risk of occupational injuries/diseases.

\textbf{Aims}: To compare trends in occupational injuries and diseases among Saudi and non-Saudi insured workers.

\textbf{Methods}: We used the index values method and slope (S) calculation to analyse the occupational injuries/diseases trends from data in the annual statistical reports published by the General Organization for Social Insurance between 2004 and 2014. Data for 10 565 993 (18.5\%) Saudi insured workers (SIWs) and 46 402 079 (81.5\%) non-Saudi insured workers (NSIWs) and 896 627 occupational injuries/diseases were analysed.

\textbf{Results}: The distribution of incidences of occupational injuries/diseases among NSIWs (93.5\%) was 14 times higher than that of SIWs (6.5\%). Occupational injuries/diseases were more likely
to increase among NSIW than SIWs, particularly in the construction, trade, financing and real estate economic activities, and engineering, technicians and service workers occupations. There was a general decreasing trend in occupational injuries/diseases until 2013.

**Conclusions:** Non-Saudi insured workers were at high risk of occupational injuries/diseases, therefore, implementation of an effective injury prevention programme is required.

Keywords: occupational injuries, occupational diseases, insured workers, Saudi Arabia, migrant workers


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**Introduction**

The incidence of occupational injuries among migrant workers is reported as high as compared to that of the native working population (1–5). In a recent review of migrant workers of 16 countries, the percentage of occupational injuries was twice that of native workers (6). Migrant workers are also less aware of workplace safety and have little knowledge about their occupational rights (injury compensation or other financial benefits) (7). Saudi Arabia has > 9 million migrant workers according to a recent Labor Force Survey (2016_Q2) (8). The Population Division of the United Nations ranked Saudi Arabia in fourth position regarding number of migrant workers. Previously, a 4 times higher incidence of occupational injuries/diseases was found among migrant workers as compared to native Saudi workers in Saudi Arabia.
The present study analysed and compared the trends in occupational injuries/diseases between non-Saudi insured workers (NSIWs) and Saudi insured workers (SIWs) between 2004 and 2014 in Saudi Arabia.

**Methods**

We used an open data source in the form of published annual statistical reports between 2004 and 2014 available on the website of General Organization for Social Insurance (GOSI) (http://www.gosi.gov.sa/). The original data for occupational injuries from Arabic statistical reports were translated into English and transformed into MS Excel format for analysis. The index value calculation method was used to determine the trends in occupational injuries/diseases in NSIWs and SIWs between 2004 and 2014. The index values calculation method had 2 different types of implications: (1) the occupational injuries/diseases trends based on the reference year 2004; and (2) occupational injuries/diseases trends for NSIWs based on the occupational injuries/diseases of SIWs for each variable. Index value yearly trends in occupational injuries/diseases of both SIWs and NSIWs were calculated for each type of economic activity and major occupation in 2004 and 2014 by considering the respective occupational injuries/diseases value of the year 2004, and calculation of the slope value (S) displayed the upward and downward trends in occupational injuries/diseases. S was used to describe both direction and steepness of the data (9). A negative value of S showed a decline in occupational injuries/diseases, and a positive value of S showed an increase. According to GOSI, occupational (employment) injuries are: (1) any accident incurred by the worker during performance or because of work; (2) any accident incurred by the worker on their way from their dwelling to their workplace and return, or on their way from their workplace to the place where they usually take their meal or attend prayer, and return; (3) any accident incurred by the worker during movements they make for the purpose of doing an assignment required by their employer; and (4) any disease established to be caused by work, as well as any occupational disease diagnosed in accordance with the Schedule of Occupational Diseases (10).

**Results**

Data analysis showed the higher percentages of NSIWs in terms of employment (80.9%) and suffering of occupational injuries/diseases (93.5%) as compared to SIWs’ employment (19.1%) and occupational injuries/diseases (6.5%). Figure 1 shows the overall decreasing trend of occupational injuries/diseases between 2004 and 2013, but the decrease was greater in SIWs. Index value trends of insured workers increased due to their higher share in employment and occupational injuries/diseases.

Index value trends in occupational injuries/diseases in SIWs and NSIWs according to economic
activities, based on 2004 as a reference, are shown in Table 1. Trends in occupational injuries/diseases in SIWs and NSIWs decreased for all types of economic activities except financing and real estate. Index value trends in occupational injuries/diseases in NSIWs based on SIWs according to economic activities are shown in Table 2. When we took values of occupational injuries/diseases in SIWs as a reference, occupational injuries/diseases among NSIWs increased in construction, followed by trade, financing and real estate, post and communications, and manufacturing, but decreased in agriculture and fishing, and social services.

Index value trends in occupational injuries/diseases in SIWs and NSIWs according to occupation, based on 2004 as a reference, are shown in Table 3. Trends in occupational injuries/diseases in NSIWs increased in engineering, followed by services workers, sales workers and industrial, chemical and food workers. In SIWs, there were increases in industrial, chemical and food workers followed by other occupations and technicians.

Index value trends in occupational injuries/diseases in NSIWs based on SIWs according to major occupations are shown in Table 4. When we took values of occupational injuries/diseases in SIWs as a reference, occupational injuries/diseases among NSIWs increased most for engineering, followed by technicians, administrative and managerial workers, services workers and specialists.

Discussion

This is believed to be the first national level comparison of occupational injuries/diseases between SIWs and NSIWs. The index value calculation method has already been used in different studies conducted in Turkey, Republic of Korea and Pakistan to determine trends in occupational injuries (9,11,12). Overall, this study found a clear higher percentage share of NSIW with SIW by employment (4 times) and occupational injuries/diseases (14 times). Involvement of NSIWs in more hazardous jobs and higher employment share could explain the higher number of occupational injuries/diseases as higher rates of accidents/disability have been observed among migrant workers in Qatar and the United Arab Emirates (UAE) (13,14). A higher share of employment and occupational injuries have also been found in other Gulf countries such as Qatar (15) and UAE (16).

The greater decrease in occupational injuries/diseases among SIWs as compared to NSIWs is consistent with another study (17). The downward trend in index values of occupational injuries could also have been due to the steps taken by GOSI such as: awarding occupational health and safety (OHS) prizes to establishments, providing technical and regulatory assistance,
training programmes, OHS workshops, field studies about OHS and strict inspection of premises.

The outcomes of this study illustrate that, as compared to SIWs, the increased index value trends in occupational injuries/diseases of NSIWs show the related suffering from work conditions or unsafe practices. The global construction sector is the most hazardous for occupational accidents/injuries, with extensive involvement of migrant workers. It has been shown that migrant workers in the construction sector have a significantly high proportion (42%) of severe occupational injuries, which is consistent with our study (18). After construction, trade and manufacturing economic activities were the second and third most problematic groups, respectively, regarding incidence of occupational injuries/diseases among NSIWs. This could be associated with the growing industrial activities in Saudi Arabia.

Between 2004 and 2014 occupational injuries/diseases increased in mining and quarrying in SIWs and NSIWs, which could be associated with the hazardous nature of oil exploration activities. Increased trends in occupational injuries/diseases in NSIWs in trade, financing and real estate, manufacturing, and agriculture and fishing may have been due to the high level of NSIW involvement in blue collar jobs and lack of interest in these jobs from SIWs.

The distribution of occupational injuries/diseases among migrant workers varied with the nature of the occupation. The most hazardous occupations regarding injuries/diseases were engineering and services among SIWs and NSIWs. The increased trend in occupational injuries for SIWs and NSIWs among industrial, chemical and food workers could have been due to inadequate preventive measures. A recent study reported that occupational injuries among migrant workers were due to stress and depression, which may have been due to job choice and being away from their home country (18). Trends in occupational injuries/diseases increased in Saudi and non-Saudi technicians.

Our study had some limitations regarding types of occupational injuries, age of the working population, and gender and nationality distribution of the migrant workers. A major strength of our study was that the findings are of national importance concerning occupational injury/disease burden among SIWs and NSIWs.

**Conclusions**

We found a high level of occupational injuries/diseases among NSIWs, which needs to be addressed through an effective injury prevention programme, especially for the construction
sector, and engineering and services workers. The decline in overall occupational injuries/diseases burden could be associated with positive steps taken by GOSI. The burden of occupational injuries/diseases among NSIWs could be reduced over time through government and private sector partnerships, occupational safety education, and minimizing language barriers. Future studies could be designed to investigate the severity of occupational injuries/diseases among SIWs and NSIWs.

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Tendances des accidents du travail et des maladies professionnelles chez les travailleurs assurés saoudiens et non saoudiens

**Résumé**

**Contexte**: Le développement actuel des industries et des infrastructures en Arabie saoudite est associé à un risque élevé d'accidents du travail et de maladies professionnelles.

**Objectif**: La présente étude avait pour objectif de comparer les tendances des accidents du travail et des maladies professionnelles chez les travailleurs assurés saoudiens et non saoudiens.

**Méthodes**: Nous avons utilisé la méthode des valeurs d'indice et le calcul de la pente pour analyser les tendances des accidents du travail et des maladies professionnelles à partir des données des rapports statistiques annuels publiés par l'Organisation générale de l'assurance sociale entre 2004 et 2014. Nous avons analysé les données portant sur 10 565 993 travailleurs assurés saoudiens (18,5 %) et 46 402 079 travailleurs assurés non saoudiens (81,5 %) ainsi que sur 896 627 accidents du travail et maladies professionnelles.

**Résultats**: La distribution des incidences des accidents du travail et des maladies
professionnelles chez les travailleurs assurés non saoudiens (93,5 %) était 14 fois plus importante que chez les travailleurs assurés saoudiens (6,5 %). Les accidents du travail et les maladies professionnelles étaient plus susceptibles d’augmenter chez les travailleurs assurés non saoudiens que chez les travailleurs assurés saoudiens, en particulier dans les secteurs économiques de la construction, du commerce, de la finance et de l’immobilier, dans les professions d’ingénieur et de technicien et dans le secteur des services. Jusqu’en 2013, on observait une tendance globale à la baisse des accidents du travail et des maladies professionnelles.

Conclusions: La mise en place d’un programme de prévention efficace s’impose donc pour réduire le risque élevé d’accidents du travail et de maladies professionnelles auquel sont exposés les travailleurs assurés non saoudiens.
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A كثر من العاملين السعوديين عليهما، لاسيما في أعمال البناء والتجارة، والتمييز ونقص الرعاية في الأنشطة الاقتصادية، والهندسة، ومن أعمال الخدمة. هنا كنا.

2013 انخفاض عام في الإصابات/الرمضات المهنية حتى العام النتهج.

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