

Risk of Occupational Respiratory Disorders Among Workers in Diwaniya City-Iraq.

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الخلاصة

لغرض قياس مخاطر الإصابة بأمراض الجهاز التنفسي المهنية بين العمال في مدينة الديوانية، تم شمول ثلاث مواقع عمل وطبق تصميم الدراسة الراجعة للدفع في موقعين منها، بينما طبق تصميم الحالة الضابطة في الموقع الثالث.

بين العمال المعرضين للهواء الملوث بالأتربة وغبار الرملي وغبار الاسمنت في مواقع البناء فإن الاختطار النسبي كان 3 مرات ما بين غير المعرضين وأن الاختطار النسبي بين المعرضين كان أكثر بـ 12 (12) مرة ما بين غير المعرضين وأن النسبة السنوية للاختطار المنسوب للتعرض كانت (66,67%).

بين العمال المعرضين للهواء الملوث بالكربون ومركباته والبودرة في صناعة المطاط كان الاختطار بـ (6,67) مراتما بين غير المعرضين وأكثر بـ (56,66) ونسبة (85,01%) على التوالي. أما بين العمال المعرضين لغبار القطن في معمل النسيج فكانت نسبة الاحتمالات لحصول الاضطرابات هي (12) مرة ما بين غير المعرضين.

يوضح البحث وجود اختطار لحدوث الاضطرابات التنفسية لدى العاملين في مواقع العمل المشمولة بالبحث مما يتطلب زيادة الرقابة المهنية وتفعيل التشريعات المتعلقة بالعمل وتطبيق الإجراءات الصحية الوقائية التي تتناسب مع كل موقع عمل.

Abstract

To calculate the risk of developing respiratory disorders among workers in Diwaniya, three occupational settings were included and a retrospective cohort studies were applied in two of them, while a case control study was applied in the third.

Among workers exposed to air pollution by sand and cement in construction settings the relative risk was 3 times the risk among non exposed, the attributable risk was 12 more, and the attributable risk percent was 66.67%.

Among workers exposed to air pollution by particulates of carbon and talc in rubber industry, the risks were: 6.67 times, 56.66 more, and 85.01% respectively.

While among workers exposed to dust of cotton in textile factory the odd ratio was 12 times that of those not exposed.

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More supervision and revitalization of enactments related to work is needed and proper preventive health measures are to be applied for each setting.

Key words: Epidemiology. Risk assessment. Occupational medicine. Air Pollution. Respiratory disorders

Introduction

Occupational respiratory disorders are work-related acute or chronic respiratory morbidities manifested by symptoms as cough, nasal discharge, expectoration and difficult respiration, or groups of diseases as occupational asthma, Chronic obstructive pulmonary disease (COPD), silicosis, coal-worker s pneumoconiosis, byssinosis, Rhinitis, bronchitis and occupational cancer (1-5).

Respiratory diseases represent one of the leading causes for morbidity and mortality world wide. Every year more than 4 millions die because of and hundreds of millions are affected by chronic respiratory diseases. 1.6 million people die as a result of being exposed to solid fuels (6,7). Occupational agents are one of the major and most important modifiable risk factors for these diseases (8).

Hundreds of millions of people suffer every day from chronic respiratory diseases. According to WHO estimates for the year (2007), 300 million people have asthma, 210 million people have (COPD) while millions have allergic rhinitis and other often under-diagnosed chronic respiratory diseases (9).

The first steps in attempting to reduce the burden of disease are to quantify health risks (10).

The aim of this study is to measure the occupational risk to the health of workers with special reference to respiratory disorders in three settings in Diwaniya. The first is construction workplace, where air is polluted by sand and cement. This environment makes workers at risk of silicosis. The second is rubber industry, in which workers are at risk of coal-worker s pneumoconiosis. The third is textile factory, where cotton is the main material used and so exposed workers are at risk of developing byssinosis (11).

Materials and Methods

A retrospective cohort study was designed (12,13). Occupational questionnaire administered by interviewer were applied with workers in Diwaniya city in Iraq (14,15). Exposed group are those interviewees who are working in places with known air pollution by silica in dusts of sand and cement used in construction settings, or by particulates, carbon and talc in rubber industry (16,17). Exposed workers were asked as a follow up in the past for the development of symptoms of any respiratory disorder from the exposure after they started their work. Medical chest examinations were made to validate the answers. The same questionnaire and the same procedure were also applied for those interviewees who are not exposed. The degrees of associations between the exposures and the occurrence of respiratory disorders were measured by calculating the relative risks (12,13). The risks of development of respiratory disorders in the exposed groups were measured by calculating the attributable risks and the attributable risk percents (12,13). This study was carried out during the period from September 2008 to May 2009 in construction workplaces, and during the period from September 2006 to May 2007 in Diwaniya rubber industry factory.

A case – control study was designed (18). The same questionnaire was applied. Interviewees who are recorded as patients attending the local health center complaining of respiratory disorders, diagnosed and registered as such (cases) were asked for history of exposure to dust of cotton in the textile factory. The same questionnaire and the same procedure were also applied for those interviewees who are not complaining of respiratory disorders (controls) (19). The degree of association between the exposure and the occurrence of respiratory disorders were measured by calculating the odd ratio which is a simulation to the relative risk (18). This study was carried out during the period from September 2007 to May 2008 in Diwaniya Textile industry factory.

Results were statistically analyzed by the use of the chi-square test (20,21).

Results

Table (1) 2 by 2 table for calculation of the risks of development of respiratory disorders among workers in construction setting in Diwaniya.

| | Respiratory Disorder | | | | Total | |
|-------------|----------------------|-----|--------------|-----|-------|---------|
| | Developed (present) | | Not (Absent) | | | |
| Exposed | 18 | a | 82 | b | 100 | a+b |
| Not exposed | 6 | c | 94 | d | 100 | c+d |
| Total | 24 | a+c | 176 | b+d | 200 | A+b+c+d |

Chi-square:6.818
Degrees freedom:1
P-value:0.00902436
Yates' chi-square:5.729
Yates' p-value:0.01668698

Table (2) 2×2 table for calculation of the risks of development of respiratory disorders among workers in rubber industry in Diwaniya.

| | Respiratory disorders | | | | Total | |
|-------------|-----------------------|-----|--------------|-----|-------|---------|
| | Developed (present) | | Not (Absent) | | | |
| Exposed | 20 | a | 10 | b | 30 | a+b |
| Not exposed | 3 | c | 27 | d | 30 | c+d |
| Total | 23 | a+c | 37 | b+d | 60 | a+b+c+d |

Chi-square: 20.376
Degrees of freedom: 1
P-value: 0.00000636
Yates chi-square:18.049
Yates p-value: 0.00002153

Among workers exposed in construction settings the relative risk was 3 times that of the risk among non-exposed, the attributable risk was 12 more, and the attributable risk percent was 66.67%.

Among workers in rubber industry, the risks were: 6.67 times, 56.67 more, and 85% respectively

Table (2×2)table for calculation of the risk of development of respiratory disorders among workers in textile factory in Diwaniya.

| | Respiratory disorders | | | | Total | |
|-------------|-----------------------|-----|----|-----|-------|---------|
| | | | | | | |
| Exposed | 100 | a | 25 | b | 125 | a+b |
| Not exposed | 10 | c | 60 | d | 70 | c+d |
| Total | 110 | a+c | 85 | b+d | 195 | a+b+c+d |

Chi-square: 78.804

Degrees of freedom: 1

P-value: 0.00000142

Yates' chi-square:76.155

Yates' p-value: 0.00003172

Among workers exposed to dust of cotton in textile factory the odd ratio for developing respiratory distress was 20 times that of those not exposed.

Discussion

The relative risk and the odd ratio are measures of the degree of association between exposure and the occurrence of health related event. Healthy working environment is free from any harmful exposure (22,23). The results showed that workers in the three settings were at variable risks of getting respiratory disorders. The highest risk was associated with exposure to dust of cotton in textile factory. This could be explained by the enormous damage that took place in this factory during the war in 2003 and the shortages in equipments for ventilation because of the preceding embargo. Workers were exposed to a heavily polluted air by the dust of cotton.

The attributable risk and attributable risk percent are measures for the fractions of those affected by a health related event that could be attributed to the exposure and the percent of which that could be prevented by modifying this exposure (24,25). These measurements were shown to be higher in rubber industry than in construction which could be explained by the difference in their environments. The former is nearly in closed relatively with poor ventilation compartments and so occupationally environmental pollution was greater than in the second which is in an open environment (26).

Workers in all the three settings are at high risks of developing respiratory disorders. and two thirds of those affected could be prevented by suitable health measures in each workplace.

More supervision and revitalization of enactments related to work is needed and proper preventive health measures are to be applied for each setting.

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