

SUNDAY, SEPTEMBER 2ND 2012

107. Occupational asthma

P1015

Chemical exposure and lung function in the fragrance industry: A multi-site cross-sectional study

Garry Dix^{1,2}, ¹School of Health Sciences and Social Work, University of Portsmouth, Hampshire, United Kingdom; ²Regulatory Dept., CPL Aromas, Brixworth, Northants, United Kingdom

Introduction: Fragrance production employees are exposed to large quantities of chemical mixtures, at exposure levels significantly higher than the final consumer.

Aims and objectives: To answer the research question:

In fragrance industry employees, is occupational respiratory exposure to chemicals linked to a reduction in lung function?

Methods: A cross-sectional study was designed, using an exposed group (fragrance production) and a control group (non-exposed industry employees). 5 UK fragrance companies took part, total sample size was 112 (exposed n=60, controls n=52), calculated as sufficient to achieve 80% power and 5% significance. Spirometric measurements (FEV₁, FVC, PEF) were taken pre- and post-shift, and cross-shift decline was calculated. Questionnaires were completed regarding potential confounding factors (smoking, body mass index, personal or family history of respiratory problems). Analysis of covariance (ANCOVA) was performed using the statistical package SPSS (v18).

Results: Adjusted mean difference between groups (exposed vs. control) for each outcome was not observed to be statistically significant (table below).

Family history of respiratory problems was observed to have a significant effect on PEF (p=0.043).

Adjusted mean differences between Exposed and Control groups*

| Outcome | Adjusted mean difference* | 95% CI | p-value |
|------------|---------------------------|--------------|---------|
| FEV1 %pred | 0.256 | -1.383-1.895 | 0.757 |
| FVC %pred | -0.236 | -2.410-1.937 | 0.830 |
| PEF %pred | 0.619 | -2.518-3.756 | 0.696 |

*Adjusted for smoking, body mass index, personal history of respiratory problems, family history of respiratory problems.

Conclusions: Occupational respiratory exposure to chemicals used in fragrance production did not have a significant effect on lung function.

P1016

Across-shift decrease in fractional exhaled nitric oxide among Tanzanian cement production workers

Alexander Tunu^{1,2}, Magne Bråtevit², Simon Mamuya³, Bente Moen^{2,4}, ¹Centre for International Health, University of Bergen, Hordaland, Norway; ²Department of Public Health and Primary Health Care, Section for Occupational Medicine, University of Bergen, Hordaland, Norway; ³Department of Environmental and Occupational Health, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania, United Republic of; ⁴Department of Occupational Medicine, Haukeland University Hospital, Bergen, Hordaland, Norway

Background: There is limited information on fractional exhaled nitric oxide (FE_{NO}), a marker of respiratory inflammation, among cement production workers.

Aim: To explore possible across-shift changes in FE_{NO} over an 8h shift among dust exposed cement production workers in Tanzania.

Methods: We examined 48 cement production workers (exposed) and 27 workers from a mineral water factory (controls), all non-smokers. Pre-shift and post shift FE_{NO} measurements (parts per billion, ppb) were performed using a NIOX MINO machine, for 2 day shifts among controls and 3 day shifts among exposed. Full shift personal total dust samples were collected in participants' breathing zone.

Results: Baseline geometric mean (GM) of FE_{NO} for the respective days of examination were 20.4 ppb, 20 ppb and 19.1 ppb among exposed, and 16.3 ppb and 16.2 ppb among controls. There was a significant across shift decrease in FE_{NO} for the three days of examination among the exposed (2.9 ppb, 2.4 ppb and 3.4 ppb, respectively, paired t-test, p<0.05), while the decrease was not significant among controls (1.4 ppb and 0.2 ppb). The change in across shift FE_{NO} was not significantly different between exposed and controls. The GM for total dust exposure among exposed was 9.4 mg/m³ and 0.28 mg/m³ among controls. There was no correlation between the across shift FE_{NO} change and total dust exposure.

Conclusion: The across-shift FE_{NO} decrease in cement production workers was not significantly associated with occupational dust exposure, and the reason for this change should be determined in future studies.

P1017

Causes of work-exacerbated asthma

Paul Henneberger¹, Kjell Torén², ¹Division of Respiratory Disease Studies, NIOSH/CDC, Morgantown, WV, United States; ²Department of Public Health and Community Medicine, Sahlgrenska Academy at Gothenburg University, Gothenburg, Sweden

Rationale: A 2011 Statement of the American Thoracic Society concluded that work-exacerbated asthma (WEA) is common in industrialized nations, with a prevalence of 21.5% in adults with asthma. While there are published lists of workplace agents that can cause occupational asthma, there are no comparable lists for WEA. We reviewed published articles to prepare such a list.

Methods: We systematically searched the peer-reviewed medical literature to identify articles about WEA published during 1980–2011. We selected articles that reported WEA agents determined case-by-case (from clinical case series, surveillance and worker compensation programs) or in risk-set analyses that used statistical models to determine occupational exposures associated with exacerbation of asthma or WEA.

Results: The literature search identified 13 articles that reported exposures for work-related exacerbation of asthma, including 3 risk-set studies. The studies were conducted in several countries in North America and Europe, and used various criteria for WEA and methods to determine exposures. From studies with WEA identified on a case-by-case basis, the more common types of agents included miscellaneous chemicals, dust, paint, smoke, indoor air quality, and cleaning products. From two risk-set studies conducted in general population settings, exposures with statistically significant (p≤0.05) relative risks of 2.0 or greater included dusts, high exposure to gas and fumes, indoor air quality, physically strenuous work, and probable daily occupational exposure to dust, gases, or fumes.

Conclusions: Various types of workplace exposures can exacerbate asthma, including irritants, agents with sensitizing traits, and physical factors such as strenuous exercise.

P1018

Nasal symptoms, lung function changes, and sensitization to work-related allergens in hairdressers

Dragan Mijakoski¹, Jovanka Karadzinska Bislimovska², Saso Stoleski², Jordan Minov², Mimoza Marsenic¹, ¹Allergy Center, Institute for Occupational Health of RM, GA2LEN CC, WHO CC, Skopje, Macedonia, The Former Yugoslav Republic of; ²Dpt for Functional Respiratory Diagnostics, Institute for Occupational Health of RM, GA2LEN CC, WHO CC, Skopje, Macedonia, The Former Yugoslav Republic of

Objective: To assess the occurrence of nasal symptoms in hairdressers and their relation to respiratory symptoms, bronchial hyperresponsiveness (BHR), and positive patch testing.

Methods: Cross-sectional study was conducted at the Institute for Occupational Health of RM, Skopje, including 50 female hairdressers (mean age 32.1±7.3 years, mean job duration 12.6±8.4 years) and 50 office workers, matched by gender, age, job duration and smoking status. Evaluation of examined subjects included completion of questionnaire on nasal and respiratory symptoms in last 12 months, spirometry, histamine challenge (PC20 ≤ 8 mg/mL), and patch testing to work-related allergens.

Results: Prevalence of overall nasal symptoms in last 12 months among examined hairdressers was 36% (varying from 40% for rhinorrhoea to 32% for nasal itching) and it was significantly higher than its prevalence in office workers (36% vs. 14%, P < 0.05). Nasal symptoms were significantly related to respiratory symptoms in both hairdressers and office workers. Spirometry showed lower parameters in hairdressers with significant difference for MEF25 and MEF50. Significant association was registered between nasal symptoms and BHR in hairdressers (P < 0.05). Prevalence of BHR was higher in hairdressers with significantly higher severity (P < 0.05). Patch testing to ammonium persulfate, ammonium thioglycolate, paraphenylenediamine, and pyrogallol was positive in 72%, 22%, 18%, and 4% of all hairdressers reporting nasal symptoms, respectively.

Conclusion: Our data indicate high prevalence of nasal symptoms in hairdressers and their significant relation to respiratory symptoms, BHR and sensitization to work-related allergens.

P1019

Therapeutic potential of mesenchymal stem cells modified to secrete anti-inflammatory protein sST2 in a model of occupational asthma

Xavier Munoz¹, Itziar Martínez-González², Josep-Maria Aran², Oriol Roca¹, Ferran Morell¹, Maria-Jesus Cruz¹, ¹Respiratory, Hospital Vall d'Hebron, Barcelona, Spain; ²Grup de Genètica Molecular, Institut d'Investigacions Biomèdiques de Bellvitge, Barcelona, Spain

Background: The aim of this study was to evaluate the ability of mesenchymal stem cells modified to secrete sST2 to attenuate the inflammatory and respiratory symptoms in an animal model of occupational asthma (OA) to persulfate salts.

Methods: Occupational asthma was induced in BALB/c mice (I). Twenty-four hours after induction of asthma, the animals received intravenously 1 × 10⁶ of mesenchymal stem cells (MSC Group), mesenchymal stem cells genetically modified with a lentiviral vector expressing the gene sST2 (ST2 group) or saline (group S). Bronchial hyperresponsiveness was assessed using methacholine provocation.

SUNDAY, SEPTEMBER 2ND 2012

Pulmonary inflammation and levels of immunoregulatory cytokines were determined in BAL. Total serum IgE was measured in blood. The analyzes were made on days 2, 4 and 7 after induction of asthma.

Results: Animals sensitized to persulfate salts showed an increase in bronchial hyperresponsiveness to methacholine and in the % of neutrophils and total IgE after inhalation of persulfate salts, compared with the control group. The animals treated with mesenchymal stem cells showed a decrease of the bronchial hyperresponsiveness to methacholine and the percentage of neutrophils and total IgE compared to the control group S. There were significant differences between groups MSC and ST2 in the levels of IFN- γ , IL-13 and IL-6 that were lower in the ST2 group on day 4 after induction of asthma.

Conclusions: In the described model of OA mesenchymal stem cells modified to secrete sST2 have shown anti-inflammatory capacity and attenuation of bronchial hyperresponsiveness.

(1) De Vooght V, et al. *Thorax* 2010; 65(3):252-7

Study funded by Fis P110/00782.

P1020

Serial PEF measurements detect occupational alveolitis and occupational asthma due to metal-working fluid

Vicky Moore¹, Arun Dev Vellore¹, Alastair Robertson¹, Wendy Robertson², Sherwood Burge¹. ¹Occupational Lung Disease Unit, Birmingham Heartlands Hospital, Birmingham, United Kingdom; ²Warwick Medical School, University of Warwick, Coventry, United Kingdom

Introduction: Serial measurements of Peak Expiratory Flow (PEF) are the most appropriate and available method for confirming occupational asthma. Changes in PEF might also occur in alveolitis.

Aims: To compare work-related changes in PEF between workers with allergic alveolitis and occupational asthma with exposure to the same metal-working fluid aerosols.

Methods: Symptomatic workers with restday improvement from an engineering factory were asked to measure PEF 8 times daily for 4 weeks at home and at work before remedial action in the workplace. Allergic alveolitis was diagnosed by an expert panel from combinations of systemic symptoms with breathlessness, audible crackles in the lungs, CXR or CT scan showing compatible interstitial changes and reduced DLCO. Occupational asthma was diagnosed from work-related wheeze or breathlessness and confirmed with physiological tests including serial PEF measurements. The Oasys PEF plotter was used to calculate differences between rest and workdays for mean PEF, diurnal variation and the scores used to confirm occupational asthma (Oasys, ABC and timepoint).

Results:

Table 1

| | Occupational alveolitis (n=15) | Occupational asthma (n=39) | p |
|--|--------------------------------|----------------------------|-----|
| Mean difference in PEF rest-workdays (litres/min) (SD) | 22.5 (30.8) | 26.1 (26.9) | 0.5 |
| Mean diurnal variation on workdays (% mean) (SD) | 14.9 (7.7) | 14.9 (6.0) | 0.8 |
| Mean diurnal variation on restdays (% mean) (SD) | 9.7 (6.9) | 11.6 (5.9) | 0.2 |
| % with mean workday diurnal variation >20% predicted | 20 | 23.1 | 0.8 |
| Oasys score >2.5 (%) | 53.3 | 71.8 | 0.2 |
| ABC score >15 (%) | 46.7 | 57.9 | 0.5 |
| Positive timepoint analysis (%) | 66.7 | 69.2 | 0.9 |

Conclusion: Changes in serial PEF measurements are similar in workers with occupational allergic alveolitis and occupational asthma.

P1021

Decrease in respiratory symptoms in the Danish furniture industry is associated to a decline in wood dust exposure – Results from two cross sectional studies 5 years apart

Vivi Schlünssen¹, Gitte Jacobsen^{1,2}, Inger Schaumburg³, Torben Sigsgaard¹.

¹Department of Public Health, Section of Environmental and Occupational Medicine, Aarhus University, Aarhus, Denmark; ²Department of Occupational Medicine, Herning Hospital, Herning, Denmark; ³Neuro Centre, Aarhus Sygehus, Aarhus University Hospital, Aarhus, Denmark

Objective: To investigate associations between wood dust exp. and resp. symptoms in two studies 5 years apart from the same area.

Methods: 2,032 woodworkers from 54 plants in study 1 and 1,889 woodworkers

Prevalence and unadjusted OR of respiratory symptoms

| | Prevalence % (n) | | OR (95% CI) |
|--------------------|------------------|------------|------------------|
| | Study 1 | Study 2 | |
| Ever asthma | 6.2 (120) | 8.2 (149) | 1.35 (1.10–1.69) |
| Wheeze ever | 20.2 (399) | 17.8 (328) | 0.85 (0.73–0.99) |
| Daily Coughing | 32.8 (637) | 27.9 (507) | 0.79 (0.69–0.90) |
| Chronic Bronchitis | 9.5 (166) | 7.5 (125) | 0.78 (0.62–0.97) |
| Any Nose symptom | 48.8 (956) | 42.8 (788) | 0.78 (0.70–0.88) |

from 52 plants in study 2 returned a questionnaire on resp. symptoms, employment and smoking habits. Assessment of wood dust exp. was based on job exposure matrices including factory size, task and personal dust measurements (2,217 in study 1 and 1,355 in study 2).

Results: The median (range) of inhalable dust conc. was 0.8 (0.4–1.6)mg/m³ in study 1 and 0.6 (0.3–1.1)mg/m³ in study 2. The prev. of selfrep. asthma was higher, but the prev. of resp. symptoms were lower in study 2 vs. study 1.

In adj. logistic regression analyses wood dust exposure explained the difference in symptom prevalence between study 1 and study 2, but no effect was found for selfrep. asthma. No influence of sex, smoking and age was seen.

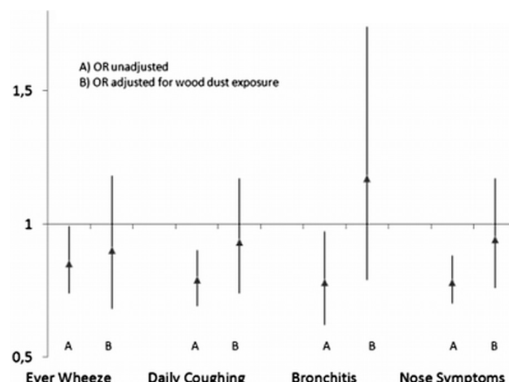


Figure 1. Change in OR for study 2 vs. study 1, unadjusted and adjusted for wood dust exposure.

Conclusion: An association between respiratory symptoms and wood dust exposure was confirmed.

P1022

Irritative respiratory symptoms and ventilatory function to workers exposed to man made mineral fibres

Micaela Margineanu, Eugenia Danulescu, Felicia Gradinariu, Carmen Croitoru, Madalina Ipatu. *Occupational Health, National Institute of Public Health - Public Health Regional Center, Iasi, Romania*

We conducted a case-control study of 43 subjects who use Man Made Mineral Fibres (MMMF) to isolate cookers: 25 male and 18 female, aged 29–55, average of exposure 17.7±4.1 years and a matched control group. Clinical, respiratory, skin and eye symptoms were recorded by questionnaire, pulmonary functional tests (PFT); MMMF mean concentration in the workplace air was measured.

Prevalence of chronic respiratory symptoms in exposed workers was insignificantly higher (32% vs. 21%).

Significantly higher prevalence was found for irritative symptoms of the upper airways ($r=0.32$, $p<0.05$), itching eye ($r=0.35$, $p<0.05$) and cutaneous symptoms such as itching, erythema or urticarial reactions. Irritative anomalies of the upper airways in exposed workers were significantly associated with duration of exposure ($r=0.57$, $p<0.005$). A significant correlation between symptoms and PFT values was found in workers having more than 10 years exposure. Values of FVC, FEV1, FEV1/FVC and small airways indices in exposed workers were significantly lower ($r=0.42$, $p<0.01$). Small airways changes in exposed workers were strongly linked to duration of exposure ($r=0.37$, $p<0.05$) whereas relation of cutaneous symptoms and professional age was not significantly linked. We found that irritative ocular or tegumentary syndrome was more frequently revealed at the exposed subjects, especially in the first 10 years of activity.

Our data suggest interactive influence of workplace exposure to MMF in development of irritative anomalies of the upper airways with predominantly smaller airways affecting.

P1023

Blood oxidative markers in glass industry workers and related respiratory outcomes

Felicia Gradinariu, Eugenia Danulescu, Razvan Danulescu, Micaela Margineanu, Carmen Croitoru, Viorel Cazuc. *Occupational Medicine Department, Regional Centre of Public Health, Iasi, Romania*

Aim: Workers from a glass factory were investigated by a longitudinal study to detect respiratory outcomes and their relations with working conditions.

Material/Methods: 229 nonsmoker workers (40% men) with mean age 35±9 yrs and mean exposure in glass industry 14±9 yrs were examined by clinical, spirometric and biochemical tests. Blood superoxide dismutase (SOD), glutathione peroxidase (GSHPx) and serum lipoperoxides (LP) were assayed as effect markers. Occupational risk was estimated by workplace air contaminants (WAC), Pb in blood, urine (U-Pb), and by urinary delta-aminolevulinic acid (ALA).

Results: Although WAC (inorganic Pb, acetone, toluene, white spirit, varnishes) ranged under TLVs, cumulative toxic index was 2.6, indicating a potential hazard risk. 33% of subjects had respiratory changes: 28% cough, 19% sputum production, 8% dyspnea, 18% reported all three symptoms and 15% had obstructive

SUNDAY, SEPTEMBER 2ND 2012

distal sd. In the subgroup of glass painters (n=35), SOD and GSHPx activities correlated significantly ($r=0.77$, $p<0.001$), each of them depending of exposure length ($r=0.32$, $p<0.05$). U-Pb correlated with ALA releases ($r=0.52$, $p<0.01$). SOD activity varied directly with U-Pb ($r=0.36$, $p<0.05$) and ALA content ($r=0.38$, $p<0.05$) showing the link between oxidative imbalance and Pb exposure. Respiratory symptoms incidence correlated with LP level in subjects with > 15 yrs exposure in glass industry ($r=0.29$, $p<0.05$, $n=45$), revealing how the increase of this oxidative marker parallels respiratory consequences.

Conclusions: Glass workers encounter cumulative occupational risks which affect their health. Though non-specific, oxidative stress markers are useful as early signals which could foresee health impairment.

P1024

Absence of nonspecific bronchial responsiveness (NSBR) in occupational asthma (OA): A case-series study

Jacques André Pralong, Jocelyne L'Archevêque, Manon Labrecque, Catherine Lemière, André Cartier. *Chest Medicine, Hôpital du Sacré-Coeur, Montréal, Canada*

Background: Although increased NSBR is a key component of OA it may be absent in rare occasions as previously shown.

Objective: Describe the prevalence of confirmed OA with normal NSBR before and after specific inhalation challenge (SIC).

Methods: We retrospectively reviewed our database containing all SIC done in our laboratory or at work between 1997 and 2011. OA was defined by a positive SIC with a $\geq 20\%$ sustained decrease in FEV1; normal NSBR was defined by PC20Methacholine (PC20M) > 16 mg/ml.

Results: 373/1193 workers tested had confirmed OA. 22/373 (5.9%) had normal NSBR before and after SIC. The mean \pm SD delay between cessation of exposure at work and SIC was 96.2 ± 81.7 days. However, 10 subjects had at least one PC20M < 16 mg/ml during their investigation while symptomatic and at work for 9 of them. The remainder 12 had normal NSBR on all tests but only 3 subjects had such a test while at work (2 while symptomatic). Among the 22 cases, 20 were atopic, 15 were exposed to a high molecular weight agent, 4 to a low molecular weight chemical and 3 to various agents during workplace challenge. Seventeen, 4 and 1 subjects had an early, late and atypical asthmatic reaction respectively. However, even if NSBR was always within the normal range, 3 subjects had a significant drop in PC20M (> 3.2 fold) post-SIC and 13/14 showed an increase in sputum eosinophils count after SIC (mean increase of $9.9 \pm 16.7\%$).

Conclusions: We describe 22 cases of confirmed OA despite normal NSBR before and after SIC. This is however rare (5.9% of confirmed cases of OA by SIC). In our experience, it is exceptional to have normal NSBR while symptomatic and at work in cases of confirmed OA.

P1025

Does FENO predict FEV₁ response to exposure cessation in occupational asthma?

Arun Dev Vellore¹, Vicky Moore¹, Wendy Robertson², Cedd Burge¹, Alastair Robertson³, Jon Ayres⁴, P. Sherwood Burge¹. ¹Occupational Lung Disease Unit, Heart of England NHS Foundation Trust, Birmingham, West Midlands, United Kingdom; ²Warwick Medical School, University of Warwick, Coventry, Warwickshire, United Kingdom; ³Dept of Occupational Health, University Hospital, Birmingham, West Midlands, United Kingdom; ⁴Institute of Occupational and Environmental Medicine, University of Birmingham, West Midlands, United Kingdom

Introduction: The prognosis in workers with occupational asthma following cessation of exposure is very variable. We investigated whether FENO measured while exposed to metal-working fluid affects Δ FEV₁ post-cessation of exposure in workers from a single factory with an outbreak of occupational asthma.

Methods: A cross sectional study of engine manufacturers identified 75 workers with occupational asthma. 68 workers had Δ FEV₁ calculated from linear regression of individual lung function measurements for a total of 5 years after the plant closed. FENO was measured while exposed and and after removal.

Results: See Table 1.

| | FENO <24 ppb | FENO >24 ppb |
|--|----------------|-----------------|
| Number | 36 | 32 |
| Δ FEV ₁ | -36.8 ml/yr | -8.02 ml/yr |
| Mean FENO while exposed (SD) | 15.2 (5.2) ppb | 49.7 (32.8) ppb |
| Mean FENO post exposure (SD) | 17.9 (7.2) ppb | 34.8 (24.4) ppb |
| Baseline FEV ₁ % predicted (SD) | 92.3 (15.6) | 100.6 (13.8) |
| NSBR % | 8.3 | 21.9 |
| Current smokers % | 36 | 19 |
| Atopy % | 36 | 56 |
| Never on ICS % | 45 | 50 |
| Latent period in years (SD) | 11.6 (6.7) | 11.0 (7.0) |

Conclusion: Workers with normal FENO at presentation appeared to have increased Δ FEV₁ compared to those with FENO raised levels. The differences were not statistically significant and needs investigation in larger worker groups.

P1026

Increased exhaled nitric oxide among workers exposed to metalworking fluid aerosol

Marianne Andersson, Jonas Brisman, Oscar Hammar, Anna Dahlman-Högglund, Anna-Carin Olin. *Public Health and Community Medicine, Medicine, Gothenburg, Sweden*

Background: Recent outbreaks of respiratory symptoms among workers, including dry cough, asthma symptoms and pneumonitis, exposed to metal working fluids (MWF), has initiated a cohort-study of 200 exposed and 75 unexposed workers. The exposure is complex and it is yet unknown what causes the respiratory symptoms, i.e. the levels of aerosol exposure, chemical or bacterial components of the MWF.

Aim: The overall aim is to identify and reduce harmful exposures among machine workers exposed to MWF aerosols. In this subproject we wanted to examine if repeated measurement of fractional exhaled nitric oxide (FENO) discriminate subjects who develop airway inflammation after exposure.

Methods: A subgroup of 16 exposed workers, in whom personal exposure measurements were performed, were examined with FENO directly after summer vacation and after a working period of at least 8 continues days. Subjects with upper respiratory tract infection within three weeks were excluded, as well as smokers and snufflers. FENO was measured with NIOX MINO®.

Results: FENO increased in 13 out of 16 subjects, the median FENO directly after holidays was 14 ppb and 16.5 ppb after the working-period. The increase was higher among those who had an initial higher FENO value. The mean increase of FENO was 38% (95% CI 16-60%), analyzed with a paired t-test.

Conclusions: FENO increased substantially after exposure to MWF in most subjects. Repeated measurements of FENO in workers seem to be a relevant method to identify subjects with airway inflammation after exposure to MWF. When more subjects have been included in the study, FENO may also help to sort out what characteristics of the exposure can be associated with airway inflammation.

P1027

Respiratory symptoms and lung function tests among the goldsmith engaged in jewellery manufacturing industries in India

Subhabrata Moitra, Subhashis Sahu. *Department of Physiology, University of Kalyani, West Bengal, India*

Introduction: The goldsmiths are exposed to various acidic and metallic fumes at work. But no study has been reported on goldsmiths neither on the Indian jewellery industries evaluating the relationship between occupational exposure and respiratory health.

Aim: The study was carried out to see if there is a cause and effect relationship between the exposure to metallic and acidic fumes and respiratory health effects among workers engaged in Indian jewellery manufacturing industries.

Methods: 134 males participated in the study among which 100 were the industry workers (mean age 34 ± 4.2 years) and 34 were front desk office executives (mean age 37 ± 5.2) of the same industry. Evaluation of examined subjects included completion of a standardized questionnaire on respiratory symptoms and spirometry. Data were analyzed using odds ratio with 95% confidence interval and logistic regression adjusting for age, smoking status, second hand smoke exposure and parental atopy/asthma.

Results: The goldsmiths had significantly higher prevalence of chronic cough (OR = 3.5, 95% CI = 1.2-8.2), nasal allergy (OR = 2.9, 95% CI = 1.1-4.8), production of phlegm (OR = 3.2, 95% CI = 1.4-6.2) and tightness in chest (OR = 2.7, 95% CI = 1.7-4.7) compared to the office workers. Results of spirometry showed significantly lower percent predicted values of FVC ($p<0.05$), FEV₁ ($p<0.001$), FEV₁/FVC ($p<0.01$) and FEF₂₅₋₇₅ ($p<0.001$).

Conclusion: Due to exposure to various sensitizers and irritants (metallic and acidic fumes) in the workplace the goldsmiths had higher prevalence of respiratory disturbances and a reduced lung functions compared to the front office staffs.

P1028

Case control study to assess the prevalence of obstructive airway disease in flour mill workers

Madhura Fadnis¹, Sharad Agarkhedkar², Tushar Sahasrabudhe¹. ¹Department of Pulmonary Medicine, Padmashree Dr. D.Y. Patil Medical College, Pimpri, Pune, Maharashtra, India; ²Department of Paediatrics, Padmashree Dr. D.Y. Patil Medical College, Pimpri, Pune, Maharashtra, India

In India, the grain flour required for household cooking is made by grinding grains in machine operated flour mills, which are usually small sized unventilated rooms. These machines are operated by a single unskilled worker who works in shift duties of 6 hours. During operation, the machine generates large amount of flour or grain dust and produces clouds of flour that surrounds the worker thus predisposing him to obstructive airway disease. 46 flour mills in the city were visited. Customers of the mills with short exposure to flour dust served as controls who were matched for age and sex. Those with active lung infection or scarring and tobacco smokers were excluded from both groups. On site measurement of PEFR was done, using Mini Wright's peak flow meter for a total of 44 workers and 44 controls. The intention of using a peak flow meter instead of spirometry was to evaluate usefulness of this simple modality which can be easily applied in villages where flour mills are more common and spirometry is not available. The

SUNDAY, SEPTEMBER 2ND 2012

peak flow readings between >100%, 80-99%, 50-79% and <50% predicted value were labelled as normal, green, yellow and red zone respectively. 22/44 workers had normal PEFR as against 38/44 controls. 19 and 3 workers were in green and yellow zone respectively whereas 6/44 controls were in green zone. 19/27 workers using a face mask had normal PEFR as against only 3/17 not using the mask ($P<0.0001$). Only 1/46 mills had enclosed machine with dust filter and the worker was in green zone even after 15 years of work duration. The study indicates a potential occupational hazard to the flour mill workers. Use of face mask or enclosure of machine can potentially reduce the risk.

P1029

Acute bronchitis morbidity in railway and subway train machinists

Elena Amelchenko¹, Tatyana Rybina¹, Oksana Omelyanenko². ¹*Clinical Laboratory of Occupational Diseases, Republican Scientific and Practical Center of Hygiene, Minsk, Belarus;* ²*1st Department of Internal Diseases, Belarusian State Medical University, Minsk, Belarus*

Background: Upper respiratory tract diseases takes the first place in personified morbidity structure in Minsk (Belarus) subway train machinists. We aimed to reveal the probable reasons for high rate of acute bronchitis (AB) in subway train machinists.

Methods: Prospective, longitudinal study included 2 comparable groups: the 1st – 1068 subway train machinists, mean age 33.9±8.9 years, mean length of service 8.84±6.6 years; the 2nd – 1212 railway train machinists, mean age 43.3±6.8 years, mean length of service 12.0±9.9 years. AB personified morbidity was assessed during 2005-2008.

Results: AB personified morbidity in the 1st group was higher than in the 2nd group (29.7 cases and 286.4 days per 100 workers vs. 4.87 cases and 46.6 days per 100 workers respectively, $p<0.05$). Odds ratio (OR) for subway train machinists was 6.1±0.14 (OR±m), 95% confidence interval - [4.68; 7.95], etiological portion - 83.6%. The highest morbidity level in the 1st group was established in the age interval of 30-39 years and length of service range 5-9 years compared with those in other age intervals (37.2 cases per 100 workers, $p<0.01$). We found statistically reliable morbidity decrease among subway train machinists in summer in comparison with the other seasons (4.78 vs. 8.3 cases per 100 workers, $p<0.01$). No any correlation has been found between the AB morbidity and age, length of service and season in the 2nd group.

Conclusions: AB morbidity risk in subway train machinists could probably be related to the occupational exposure of the biological factor in underground work environment. Biological factor influence in underground could derive from the lack of ultraviolet insolation and large volume of passenger traffic.

P1030

Cof a 1 – Identification of the first coffee allergen

Cordula Bittner¹, Nikolay Manavski², Ulrike Peters², Marcus Oldenburg¹, Xaver Baur¹, Reinhold Brettschneider². ¹*University Medical Center Hamburg Eppendorf, Institute for Occupational Medicine and Maritime Medicine (ZfAM), Hamburg, Germany;* ²*University of Hamburg, Biocenter Klein Flottbek and Botanical Garden, Hamburg, Germany*

Introduction: Dust of green coffee beans is known to be a relevant cause for occupational respiratory disorders. There is evidence for type I-sensitization as the underlying pathomechanism. Up to now no single coffee allergen has been described on molecular level. Identification of coffee allergens is warranted for standardization of allergological diagnostics.

Methods: From 17 coffee industry workers complaining about work-related rhinitis, conjunctivitis, and airway obstruction during exposure to coffee dust we obtained sera for IgE immunodetection. The participants were all male and had an average age of 40 years. A *Coffea arabica* pJufO cDNA phage display library was created and screened for IgE binding to coffee proteins with 2 sera with sensitization to green coffee beans detected by ImmunoCAP (Phadia, Freiburg, Germany). By sequence analysis, a new coffee allergen (Cof a 1) was identified, expressed in *E. coli*, and evaluated by Western blots. The frequency of sensitization was investigated by ELISA (Enzyme-linked Immunosorbent Assay) screening.

Results: The cDNA encoding Cof a 1 was identified as a 32 kDa *Coffea arabica* class III chitinase. Serum IgE antibodies to recombinant Cof a 1 were found in 3 out of 17 symptomatic coffee workers (18%), whereas only 2 of them reacted to the commercial specific IgE test to green coffee beans (k70, Phadia). After submitting the present data, Cof a 1 has been assigned by the WHO/IUIS Allergen Nomenclature Sub-Committee.

Conclusion: A class III chitinase of *Coffea arabica* Cof a 1 was identified as an important coffee allergen. It may have a relevant potential for diagnostics of green coffee-induced respiratory disorders.

P1031

Prevalence of work-related asthma among adult asthmatics referred to pulmonary clinics

Khosro Sadeghnia¹, Omid Aminian¹, Arezu Najafi¹, Sussan Salehpour², Alireza Eslaminejad², Gholamreza Derakhshan Deilami³, Keramat Nourijany⁴, Susan Tarlo⁵. ¹*Occupational Medicine Department, Center for Research on Occupational Diseases (CROD), Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran;* ²*Chronic Respiratory Diseases Research Center*

(NRITLD), Shahid Beheshti University of Medical Sciences, Masih Daneshvari Hospital, Tehran, Islamic Republic of Iran; ³*Department of Internal Medicine, Tehran University of Medical Sciences, Imam Khomeini Hospital, Tehran, Islamic Republic of Iran;* ⁴*Department of Epidemiology and Biostatistics, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran;* ⁵*Department of Medicine, University of Toronto, Canada*

Background: The most common occupational lung disease reported in industrial countries is occupational asthma. There are limited data about the prevalence of work-related asthma among asthmatics in Iran.

Objectives: The aim of this study was to assess prevalence of work-related respiratory symptoms (WRS) and occupational exposures in asthmatic adults at pulmonary clinics.

Material and methods: A cross sectional study was performed. All ≥17 year old asthmatics were recruited into the study. A questionnaire mainly based on one developed by NIOSH was completed by each participant. Currently employed subjects were subdivided into two groups by WRS status. Subjects' occupation and workplace exposures were evaluated using an asthma specific job exposure matrix (JEM). Statistical analyses were conducted using the Student's T-test for continuous data and Chi square for categorical data. Prevalence ratios (PRs) were calculated, using a Cox regression model.

Results: 39 (21.8%) of 179 current employed asthmatics (11% of all 339 adult asthmatics) had WRS. Subjects with WRS were more likely to have self-reported allergy (PR:2.7 Pvalue:0.003) and low molecular weight antigens' exposure (PR:2.7 Pvalue: 0.0001). According to the JEM, those with WRS had more high risk occupational exposures (PR: 2.2 Pvalue:0.003). The two most frequent occupational classes for asthmatics with WRS were trades, transport and equipment operators (33%), and processing, manufacturing and utilities (31%).

Conclusion: Prevalence of WRS in the current study is consistent with previous reports of work-attributed asthma. Study results emphasize further need for taking complete occupational histories in adult asthmatics.

P1032

Effects of exposure to flour dust on respiratory symptoms and pulmonary function of mill workers

Hamdy Ali Mohammadien Mahmoud¹, Mona Taha Hassien¹, Raaft Talaat Ibrahim². ¹*Chest Department & Tuberculosis, Sohag University Hospital, Sohag, Egypt;* ²*Chest Department & Tuberculosis, Assuit University Hospital, Assuit, Egypt*

Background: Exposure to flour dust is associated with development of respiratory symptoms and varying degree of reduction in lung function. The aim of the study was to assess the effect of Exposure to flour dust on respiratory symptoms and lung function of flour mill workers and to estimate the additive effect of smoking on pulmonary functions.

Methods: This study was carried out at flour mills in Sohag Governorate. Two hundred male workers with current exposure to flour dust and Two hundred non-exposed male as a control group were interviewed and self designed study questionnaire was administered to them and the parameters of their pulmonary function were measured.

Results: Respiratory symptoms such as cough, expectoration, wheezing, and shortness of breath, were significantly ($p<0.0001$) more common in exposed workers as compared to unexposed counterparts. Furthermore significant ($p<0.001$) decrements in the pulmonary function of exposed subjects were noted. The additive effect of smoking was clearly noticed as there was a highly statistically significant decline of FEV1% and FVC% in smokers compared to non-smokers ($p<0.0001$). COPD, asthma and chronic bronchitis were significantly ($p<0.0001$) higher among workers compared with control subjects. Statistically significant association between COPD, asthma, chronic bronchitis and age ($p<0.02$), smoking ($p<0.002$), duration of employment ($p<0.0001$), level of exposures ($p<0.0001$) was found.

Conclusions: Flour mill workers were at an increased risk of developing pulmonary symptoms & a strong association exists between exposure to flour dust and the prevalence of respiratory symptoms and functional impairments of the lungs.