

ALLERGIES IN THE WORKPLACE

REFLECTIONS ON THE RECENT OCCUPATIONAL ALLERGY WORKSHOP HELD AT THE NATIONAL INSTITUTE FOR OCCUPATIONAL HEALTH (NIOH)

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"Occupational allergies constitute around 15% of all occupational diseases. Common manifestations are rhinitis, conjunctivitis, asthma, urticaria and dermatitis. Work-related factors are responsible for one-third of adult asthma, which is often severe enough to cause considerable inconvenience, discomfort, and even abandonment of trade. Occupational asthma is the third most common occupational lung disease reported in South Africa, originating mainly from the health care, food processing, motor and metal refining industry. Worldwide, the most common causes of occupational asthma are cereal flours, enzymes, natural rubber latex, laboratory animals and chemicals (isocyanates and acid anhydrides)..." These were the opening words of Professor Mohamed Jeebhay's overview on occupational allergy and asthma at the recent occupational allergy workshop hosted by the National Institute of Occupational Health (NIOH) and the Allergy Society of South Africa (ALLSA).

The National Institute for Occupational Health (NIOH) hosts the Webster Memorial Day annually in honour of the late Professor Ian Webster, the former director who had made a significant contribution to occupational health both nationally and internationally.



Prof M Ross of the NIOH welcomes Dr J Webster at the occupational allergy workshop

occupational health practice.

The programme covered various aspects including the World Allergy Organisation (WAO) revised nomenclature for allergy; tests for allergy that can be used in the occupational context; the use of local allergens in the evaluation of allergies; worker's compensation for occupational allergy, smoking and occupational allergy; and the vexing question of whether atopics should be excluded from allergen-exposed jobs. The findings of

Professor Mary Ross, Director of the NIOH, welcomed Drs Joan Webster and Phillip Webster (Professor Webster's wife and son). The theme chosen for 2004 was occupational allergies because of its increasing importance and relevance for modern-day

various epidemiological studies of occupational allergies done in the Western Cape and KwaZulu-Natal were also presented. The highlight of the day was the personal testimony of health-care workers with latex allergy. The event was attended by about 150 delegates from various industries and organisations including some of the trade unions. Highly knowledgeable speakers authoritative in their fields from Gauteng, KwaZulu-Natal, Western Cape and the North West provinces added a national feel to the day.

The importance of standardising the allergy nomenclature forms the basis for researchers and clinicians being able to define allergic disease and draw the correct conclusions from clinical research and communicate these to their patients. Ms Tanusha Singh (Senior Medical Scientist, Immunology/Microbiology) from the NIOH presented an overview of the World Allergy Organisation (WAO) revised nomenclature for allergic diseases, with the aim of familiarising delegates with the revised nomenclature and thus improving communication in the field of allergy. The report of the WAO's revised nomenclature covers two broad categories, viz. general terms (hypersensitivity, allergy, atopy) and allergic diseases (asthma, rhinitis, conjunctivitis, urticaria, anaphylaxis, dermatitis, drug, food and insect sting/bite hypersensitivity). 'Hypersensitivity' is defined as an umbrella term; 'allergy' involves a hypersensitivity reaction initiated by an immunological mechanism; and 'atopy' is an individual or familial tendency to produce IgE antibodies in response to low doses of allergens and is accompanied by the typical symptoms or asthma, rhino-conjunctivitis or eczema/dermatitis. It is envisaged that the revised nomenclature will be



Ms Tanusha Singh

used globally by health-care professionals in education, research and patient care, as well as patients and other lay persons interested in allergy.

In addition to understanding the terminology used for allergy it is fundamentally important to know which tests are appropriate in order to diagnose the various allergic diseases. Dr Andreas Lopata (Senior Medical Scientist, Division of Immunology, NHLS) from the University of Cape Town gave a detailed overview of



Dr Andreas Lopata

the various tests used for allergy in the occupational context. He emphasised that before deciding on the appropriate diagnostic tests the potential sensitising agents in the workplace need to be identified. This can be supported by *in vivo* or *in vitro* laboratory tests for workplace agents

(e.g. grain dust, storage mites, latex). *In vivo* tests, such as skin-prick test (SPT), skin-patch test or bronchial provocation studies (limited application in South Africa) can be conducted using the appropriate allergens, provided the clinician has been trained in proper technique. Tests like the SPT are very sensitive (and specific especially for high-molecular-weight agents) and inexpensive, but may cause severe reactions in some individuals (e.g. latex allergy). Typical *in vitro* assays such as the RAST (e.g. CAP-RAST) assay for the quantification of specific IgE antibodies (for immediate hypersensitivity reactions) or precipitating IgG antibodies (for allergic alveolitis due to organic dust, e.g. pigeons) can be a useful alternative but are more expensive. CAP-RASTs are frequently used for the detection of sensitivity to high-molecular-weight allergens (such as proteins present in food, animals, insects, fungi). Once the diagnosis is made and appropriate interventions initiated, the laboratory analysis can also assist in the management of workers. Evaluation of the workplace environment for specific allergens can confirm the reduction of exposure while absent or reduced allergic sensitisation in an exposed worker using SPT or RAST can confirm removal from exposure. Importantly the results of diagnostic tests should not be viewed in isolation but rather within the context of the worker's clinical history and examination. Dr Lopata stressed that the correct diagnosis of sensitisation to unknown or novel agents often includes 'detective' work and is most efficiently conducted by close collaboration between laboratory analyst and occupational health practitioners.

The question commonly arises, should local allergens be used for the allergy diagnostic tests or are commercial allergens suitable? Ms Anna Fourie (Senior Medical Scientist, Immunology/Microbiology, NIOH) addressed these issues referring to a study being conducted by



Ms Anna Fourie

the NIOH in the soybean milling industry. Workers exposed to soybean dust and its products are at risk of developing allergic disease. As there are no well-defined methods for monitoring these workers, it was decided to investigate which tests of sensitisation would be the most useful for this

purpose. The tests used included skin-prick tests (SPT) for common aeroallergens and for soybean (both commercial and in-house preparations) and the UniCAP RAST for specific IgE to soybean.

The study demonstrated that there was a substantial increase in the number of positive tests using the in-house soybean extract (4.7-22.5%) over a 2.5-year period. Using the commercial soybean extract the prevalence of sensitisation increased minimally from 3.6 to 4.8%. While the prevalence of sensitisation using the in-house extract was high, only 14% of workers reported symptoms related to soybean exposure. Ten of 17 workers who reported work-related symptoms had positive SPT reactions to the in-house soybean extract. The 7 with negative SPT to the in-house extract were also negative to other tests used. Ms Fourie concluded that since the health significance of a positive test of sensitisation to soybean was uncertain these workers should be closely evaluated for the future development of adverse health outcomes to better understand the usefulness of the various battery of tests.

In the South African setting, the incidence and/or preva-

lence of occupational allergies is undoubtedly underestimated and underdiagnosed because of a host of reasons including reluctance of the worker to complain for fear of losing his/her job, lack of expertise within the medical profession in recognising and diagnosing allergies and apathy in reporting these cases for purposes of compensation. Every medical practitioner has a statutory obligation to report occupational diseases according to the Compensation for Occupational Injuries and Diseases Act (COIDA) of 1993. Employers on the other hand are legally obliged to protect the health and safety of their employees under the Occupational Health and Safety Act (OHSA) of 1993.

Unfortunately this has not translated into better workplace conditions or better recognition of occupational allergies. Many cases still go undetected and employers still subject workers to dangerous working conditions, making the development of occupational diseases inevitable. But what happens if you have been diagnosed with an occupational allergic disease?

Dr Spo Kgalamono (Occupational Medicine Practitioner, NIOH) gave an overview of the compensation process for occupational allergies. The South African compensation law (COIDA, 1993) has now made provision for compensation of occupational allergies and new circular instructions on how to diagnose, rate impairment and submit cases for compensation have been published on the Compensation Fund website and in the



Dr Spo Kgalamono

Government Gazette.

Furthermore, schedule 3 of the Act has been recently revised and provides a comprehensive list of compensable occupational diseases. The South African

compensation system is a disability insurance system that only pays out compensation for an occupational disease for a medically proven level of impairment. It does not cater for loss of job, retraining, pain and suffering. This becomes important in patients who develop occupational allergies as often they have to be relocated to a new job in a different department or are compelled to leave their existing job as the affected worker cannot be accommodated elsewhere in the workplace. Currently, patients with proven allergic asthma (e.g. latex allergy) but not on medication and without lung function impairment receive 15% disablement, while those with established disease can receive up to 100% permanent disablement (equivalent to 75% of the individual's earnings). Dr Kgalamono concluded from her experience in dealing with compensation for occupational allergic diseases that compensation is not the final answer as patients are never compensated fully – prevention is the best option.

The question now arises: are there factors that play a role in the prevention of occupational allergy and if so are these stressed enough? This issue was the focus of the presentation by Professor David Rees (Director of Occupational Medicine and Epidemiology Division, NIOH) entitled 'Is smoking cessation stressed enough in the prevention of occupational allergy?' A review of the literature indicated that while smoking inconsistently increases the risk of sensitisation to occupational allergens, it is important in some settings, usually when the exposure is to high-molecular-weight agents.

He presented the findings of the effect of smoking on sensitisation to occupational allergens from four concurrent recent South African occupational allergy studies. These included: a soybean plant (n=115 workers), a maize-processing plant (n = 74), a fish-processing plant (n = 513) and a pine sawmill (n = 96). Smoking history was ascertained by questionnaire and atopic status and occupational sensitisation by skin-prick tests (positive test = 3mm > negative control; atopic = positive to at least 1 common aeroallergen). The results showed that atopic smoking workers comprised a relatively large proportion of these workforces (14-22%) and smokers invariably had the highest proportion of sensitised subjects (soybean 83%, maize 80%, fish 12%, pine 31%). An interaction with atopy was suggestive in some settings. The population attributable fraction for sensitisation due to smoking ranged from 1.3% (pine) to 42% (fish) and in atopic workers from 6.5% (pine) to 75% (soybean). He concluded that the smoking effect was inconsistent and weak overall, but substantial in some settings, particularly in atopic workers. He proposed that controlling allergen exposure and prohibiting smoking may markedly reduce sensitisation in these settings.



Prof David Reese

The immediacy of sensitisation may therefore be an inducement for discouragement of smoking during vocational training and at work.

In addition to the prevention of occupational allergy Dr Rob Dowdeswell (Occupational Medicine Practitioner, Anglo American Platinum Corporation) addressed the question of whether atopics should be excluded from allergen-exposed jobs. This idea was first mooted by Haldane in 1938 when he suggested 'sorting out workers according to their susceptibility to occupational hazards', in relation to bronchitis in potters.

The practice of rejecting atopic job applicants was also an issue in platinum refineries at a point in time. He suggested that following spectacular advances in the field of molecular genetics over that last decade our traditional concepts of atopy, allergen exposure and occupational sensitisation are in need of review. Completion of the Human Genome Project has moved the cutting edge in this field from atopy, defined by simple skin-prick testing, to the unravelling and characterisation of gene functions and their relationship to individual susceptibility to a wide range of possible harmful environmental exposures. A brief review of the historical literature on the subject was presented and Dr Dowdeswell concluded that current genetic, epidemiological and ethical concepts did not support exclusion of atopic job applicants in industries with potential exposure to sensitisers.

Dr Nceba Gqaleni (Director of the Centre for Occupational and Environmental Health, University of KwaZulu-Natal) and Prof Mohamed Jeebhay (Associate Professor and Associate Director of the Occupational and Environmental Health Research Unit in the School of Public Health and Family Medicine, University of Cape Town (UCT)) shared some light on studies of occupational allergies done in KwaZulu-Natal and the Western Cape, respectively.

Dr Gqaleni presented a survey of 6 (2 public, 2 semi-private and 2 private) hospitals in Durban, which aimed to establish indoor environmental conditions, allergy and

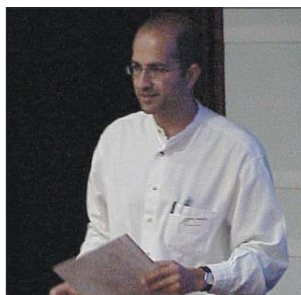
stress among 280 staff. The presence of bioaerosols, surface moulds, allergy stressors, potential for discomfort from levels of carbon dioxide, temperature, relative humidity and air movement were determined. In each of the hospitals certain areas had a potential of exceeding the 1000 ppm CO₂ level, which suggested that ventilation systems in those sections were not performing adequately by ensuring sufficient air changes. All the



Dr Nceba Gqaleni

hospitals had sources of fungal growth. Many of the ceilings and walls in these public hospitals had areas greater than 3 m² contaminated with fungi. The most predominant organisms included *Aspergillus* spp., *Cladosporium* spp., *Penicillium* spp., and other fungal species. More than 50% of staff were stressed according to the criteria applied while 32.5% of the staff reported that they experienced some form of allergy. Of the 123 staff tested, 18% were sensitised to house-dust mite, 10% were sensitised to mould, 2% to the *Penicillium* mould mixture and 1.6% reacted to cockroach allergens.

Data from recent studies in the Western Cape presented by Professor Mohamed Jeebhay indicated a much higher prevalence of atopy among urban factory workers (45%) than rural farm workers (25%). Allergic sensitisation prevalence patterns demonstrated a



Prof Mohamed Jeebhay

spectrum of putative inhalant allergens in the general environment: house-dust mite (16-41%), cockroach (11-22%), rye grass (11-20%) and bermuda grass pollen (5-10%). The prevalence of sensitisation to occupational allergens varied: 26% to cereal flours (grain mill and bakery workers), 22% to spider mite

(grape farm workers), 9% to latex (health care workers), and 6% sensitised to fish (seafood processors). The importance of occupational allergy and its impact on health could not have been better stressed than through the personal testimonies of two ex-nurses who were latex sensitive and subsequently had to change career paths.



Sr Amina Laanabi – an ex-nurse with latex allergy

It emerged that latex gloves in the health-care setting are still preferred over other glove types because of their excellent barrier properties. From their testimonies it became evident that the adverse health effects latex has on sensitised individuals outweighs its advantages.

This is attributed to the increased demand for latex gloves that resulted in increased production associated with decrease in quality, as well as widespread use resulting in increased

exposure and therefore increased risk of sensitisation to latex proteins. The ex-nurses spoke about their experiences relating to victimisation in the workplace, problems with worker's compensation, and the cost implications to themselves as well as to their company. They also stressed that the lack of awareness and ignorance of latex allergy among health-care workers are contributory factors to the high risk of health-care workers becoming sensitised to latex.

Professor Mohamed Jeebhay in his concluding remarks emphasised that with the rising incidence of occupational allergies globally there is a need for a greater focus on preventive activities through a national action programme to deal with occupational allergies and asthma. He proposed that strategies should focus

on the introduction of strict regulatory exposure standards, workplace intervention and control measures, as well as implementation of surveillance programmes. Manufacturer responsibility for product stewardship by detailed product labeling of allergen content was also important to ensure overall public health and safety. Maintaining a high index of suspicion of the role of common inhalant allergens as well as occupational and para-occupational allergens in symptomatic workers was crucial. Professor Jeebhay suggested that further research needs to focus on developing novel approaches to the prevention, identification and management of occupational allergies in general and occupational asthma in particular in the South African setting.

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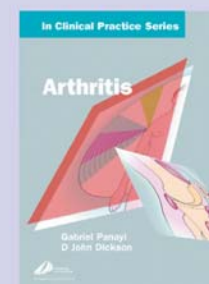
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