ON THE LIST OF APPROVED SOUTH AFRICAN JOURNALS

ISSN 1024-6274

occupational health

SOUTHERN AFRICA

Vol 15 No 3 May/June 2009

Official Journal of *The SA Society of Occupational Health Nursing Practitioners, The SA Society of Occupational Medicine, The Southern African Institute for Occupational Hygiene* and the *Mine Medical Professionals' Association.*

AUDIOMETRY, SPIROMETRY, VISION

EasyOne

SPIROMETRY

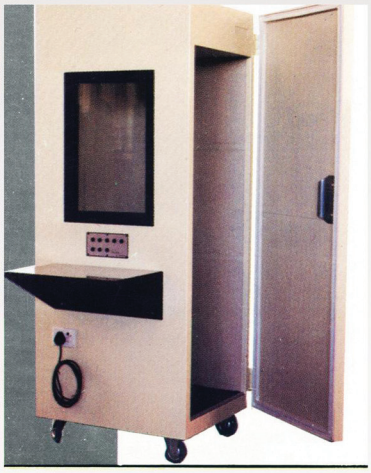
- Ultrasonic flow measurement
- 700 test session storage
- 64x160 pixel graphical display
- Hygienic disposable spirette
- Automated quality control
- Graphic curve display
- Clinical interpretation
- PC data transfer
- Customizable configuration
- Calibration check with syringe

Total integrated management software for Audiometer, Spirometry and Vision

African Management Software

Audiometry Spirometry Vision

TITMUS i400™
Premium Vision Screening



AX1 High Performance Super Booth

SABS Compliant

- Acuity - Left, Right and Both Eyes.
- Lateral and Vertical Phoria.
- Stereo Depth.
- Binocularity.
- Colour Blindness (Ishihara Plates)
- Peripheral (Field) Test.
- Day and Night Modes
- Far and Near testing
- Automatic or Manual versions
- Computerised

TRE METRICS

True Hughson Westlake Method
Provides valid hearing tests automatically
High volume testing

- **Complies to Regulation 171**

RA300 Audiometer
Accurate, reliable audiogram in as little as 3 minutes

RA650 Audiometer
Test 1 to 16 people simultaneously with one operator

Call us for Audiometer Calibrations, Booth Certification and Services

Amtronix PTY LIMITED

Amtronix - breaking the sound barrier

0861 Amtronix
0861 26876649
International: +27 11 622 3228

info@amtronix.co.za
www.amtronix.co.za

Editor:
Linda Grainger PhD, DNEd
e-mail: occhealthsa@technews.co.za
Please submit all correspondence and editorial to the above address.

Production by Technique Design
Jenny Gent
Tel: +27 (0)31 764 0593
Fax: +27 (0)31 764 0386
e-mail: jennyg@dbn.technews.co.za

Advertising:
Leigh Scott
Tel: +27 (0)31 764 0593
Fax: +27 (0)31 764 0386
e-mail: leigh@dbn.technews.co.za

Subscription services:
Jenny Gent
Tel: +27 (0)31 764 0593
Fax: +27 (0)31 764 0386
e-mail: jennyg@dbn.technews.co.za

Subscriptions:
Members: R200,00 per annum (includes VAT)
Non-members: R270,00 per annum (includes VAT)

Publisher:
Kevin Beaumont

Published by Technique (Pty) Ltd
technique DESIGN
3 Haygarth Road, Kloof, KwaZulu-Natal
Box 626, Kloof 3640
Tel: +27 (0)31 764 0593, Fax: +27 (0)31 764 0386
e-mail: jennyg@dbn.technews.co.za

Web address: www.occhealth.co.za

occupational health
SOUTHERN AFRICA
ISSN 1024-6274

May/June 2009 Vol 15 No 3

CONTENTS

Scientific papers

Back to basics

Regulars

The SA Society of Occupational Health Nursing Practitioners (SASOHN)
Linda Stokes
Tel: +27 (0)11 892 3174
sasohnoffice@mweb.co.za
www.sasohn.org.za

The SA Society of Occupational Medicine (SASOM)
Jenny Acutt
Tel: +27 (0)12 803 7418 or 0861 11 4417
sasomdm@iafrica.com
www.sasom.org.za

The Southern African Institute for Occupational Hygiene (SAIOH)
Ray Strydom
Tel: +27 (0)12 654 8349
ray@raysaf.co.za
www.saioh.co.za

Mine Medical Professionals' Association (MMPA)
Shirli Geere
Tel: +27 (0)11 498 7377
sgeere@bullion.org.za
www.mmoa.org.za

This journal is on the list of Approved South African Journals, and authors qualify for a subsidy for their affiliated tertiary institutions.

From the Editor....

Linda Grainger, Editor

Since our last issue there have been changes in our member organisations. Firstly, SAIOH has a new President – Melinda Venter – who was elected at their March AGM. She has worked in the field of occupational hygiene for 15 years, initially for NOSA in the Ohtec Division, and now with Safetech as the Gauteng Regional Manager and Occupational Hygienist. Melinda has played an active role in SAIOH, having been a SAIOH Council member since 2004 and the SAIOH Vice President since 2007. In addition to her demanding work responsibilities, she is the mother of two boys who, she says, keep her busy with all their activities.

Secondly, another of our member organisations has had a name change and a new President since our last issue. The Mining Medical and Other Health Care Professionals Association, abbreviated to the MMOA, has adopted a new name – The Mine Medical Professionals' Association, or the MMPA for short. At their AGM in April, Vanessa Govender was elected as the new President. She obtained her MBBCh, DOH and MPH at the University of the Witwatersrand. An experienced occupational medicine and public health physician, she is now focusing on improving OH&S through the adoption of leading practices in the mining industry. Currently seconded from Gold Fields to the Chamber of Mines, she is the Chairperson of the Mining Industry Occupational Safety and Health (MOSH) Silica Dust.

There are four articles in this issue. The first concerns agricultural workers, who are a vulnerable group, especially those exposed to pesticides. Research on these workers is therefore important. Diab and Mash report the results of their study which investigated the short-term, seasonal effects that crop-spraying pesticides had on the respiratory system of workers on farms in the Eshowe/Ntumeni area of KwaZulu-Natal. They also assessed the level of awareness of farm workers as to the potential risks that are involved in handling the chemicals and the use of protective gear to reduce these risks.

An increasing number of women are being employed in jobs that have traditionally been performed by men. When these jobs involve heavy physical work, occupational health practitioners become concerned as women have a greater risk of musculo-skeletal injuries. To deal with this problem, organisations seek to determine fitness for work, but the criteria for minimum physical ability requirements for such jobs do not appear to be well defined. Given the lack of research on the topic, Lubbe, Malan and Wilders conducted a study to determine the role of gender on the physical work capacity profile of workers in an organisation based on the minimum physical ability task requirements of their job. The study is important as the results highlight the gender differences in physical work capacity and the approach can be used in other settings.

Our March/April 2009 issue featured a prospective study by Uebel, Rae, Joubert and Hiemstra of low back pain (LBP) in nurses in a district hospital in KwaZulu-Natal. LBP is a significant health problem world-wide. In fact, the results of a multi-year study of 10 organisations employing more than 150 000 workers by Loeppke et al., published in the April 2009 issue of the Journal of Occupational & Environmental Medicine, indicate that chronic conditions such as depression/anxiety, obesity, arthritis, and back/neck pain are especially important causes of productivity loss. They also found that comorbidities have significant non-additive effects on both absenteeism and presenteeism. In this issue, Naude, Mudzi, Mamabolo and Becker present the findings of their study which determined the point prevalence for LBP and the factors associated with its presence amongst staff employed at a district hospital in Tshwane, Gauteng. The factors which were investigated were demographics, recreation, occupation, perceived stress experienced at work, general health and the presence of LBP. Useful recommendations on dealing with LBP are provided.

In the second of our new category of 'Back to basics' articles, Ferrie explains what is meant when occupational health legislation requires employers to provide employees with a working environment that is safe and without risk to their health "as far as is reasonably practicable". He outlines what is involved and how employers can be sure that they are doing all that they need to in this regard.

Please visit our website to find out more about DB de Villiers and Vanessa Govender (Personality profile page) and to read news from Beatrice Peloagae, OHS Co-ordinator for Sedibeng District Health Service about their OHS Awareness event.

Linda Grainger

Acknowledgement of SSEM Mthembu Medical

SASOHN would like to acknowledge SSEM Mthembu Medical who were accidentally omitted from the list of sponsors in the previous Journal. SSEM was also a generous sponsor who contributed to the successful SASOHN/SCOHN ICOH 2009 pre-conference workshop.

Use of copyrighted material at the SASOM 2008 Annual Congress

The Editorial Board received a complaint about a handout distributed at the SASOM 2008 Annual Congress. It accompanied a presentation given by Ms Marilize Smith, and contained an audiometry screening audit tool named as "City of Tshwane, Occupational Health, Audiometry Screening Audit Form". The problem was that it was virtually identical to the one devised by Ms Karen Michell, published in the May/June 2007 issue of *Occupational Health Southern Africa* (pages 16 – 21), yet did not acknowledge the source of the tool or indicate that permission had been obtained from the journal for the use of the material.

In response to the complaint, we have received a letter from Dr Danie Ungerer, Head of Occupational Health at the City of Tshwane, and Sr Smith who was employed in the unit at the time. It explains that they had implemented an occupational health audit process, in which various audit tools were investigated and customised, including the article by Ms Michell. Dr Danie Ungerer requested Sr Smith to present the audit process that was developed for their purposes. They state that it was neither the intention to use copyright material without permission or acknowledgment nor indicated in the presentation that it was developed solely by Occupational Health, City of Tshwane. It was presented as the tool adapted, customised and used by them. They apologised for not acknowledging the source.

This incident highlights the importance of remembering to acknowledge the sources of materials that we use in our practice. The Editorial Board was not concerned that the tool has been used, since the very purpose of the journal is to provide resources that will enhance the provision of occupational health services. In fact, when material is used and adapted we would very much appreciate feedback on this process, in order to increase our knowledge base.

Upcoming events

INTERNATIONAL CONFERENCES

Date	Place	Topic	More information
19–22 July 2009	Cape Town, South Africa	5th IAS Conference on HIV Pathogenesis, Treatment and Prevention (IAS 2009)	http://www.ias2009.org
2–6 August 2009	Venice, Italy	19th Intl. Symposium on Shiftwork and Working Time	http://www.shiftwork2009.it
9–14 August 2009	Beijing, China	The 17th Congress of the International Ergonomics Association	Congress secretariat: +86-10-8280-1728 E-mail: iea09secretariat@bjmu.edu.cn
17–20 August 2009	Boston, MA	X 2009 – Sixth International Conference on Innovations in Exposure Assessment	Robert Herrick E-mail: contedu@hsph.harvard.eduExternal link: http://www.x2009.org/
26–29 August 2009	Helsinki, Finland	4th International Conference on Nanotechnology – Occupational and Environmental Health	http://www.tsr.fi
6–10 September 2009	Sun City, South Africa	7th Congress of Toxicology in Developing Countries	Rina du Toit http://www.7ctdc.co.za/
27–30 September 2009	Cracow, Poland	Fifth International Conference on Work Environment and Cardiovascular disease	E-mail: alab@sunlib.p.lodz.pl
21–25 April 2010	Taipai, Taiwan	Medichem – Occupational health under globalization and new technology	E-mail: epicohmedichem2010@gmail.com
14–17 June 2010	Amsterdam, Netherlands	The changing world of work – 4th International Conference on Psychosocial factors at Work	E-mail: paog@vumc.nl

LOCAL CONFERENCES

Date	Topic	Region	Target	Cost	ContactName
29 July 2009	HASS Group Conference: Hearing health in mining and industry.	Pretoria	OH&S professionals	R750.00	Tel: +27 (0)12 333 3131 Fax: +27 (0)12 333 7332 E-mail: communications@hass.co.za
1–4 Oct 2009	MMPA Annual Congress	Glenburn Lodge, Magaliesburg	OH&S professionals	To be announced	Shirli Geere E-mail: SGeere@bullion.org.za
4–6 Nov 2009	SASOHN Annual Conference: Conducting the Occupational Orchestra	Boardwalk Casino, Port Elizabeth	OH&S professionals	To be announced	Linda Stokes SASOHN National office E-mail:sasohnoffice@mweb.co.za Tel: +27 (0)11 892 3174 Daily from 08h00–14h00

2009 SAIOH COUNCIL AND CERTIFICATION BOARD MEETING AND EXAMINATION DATES

3 July	07h00	Cert. Board/Oral Exams
7 August	07h00	Council/Written Exams
9 October	07h00	Cert. Board/Oral Exams

HEALTH AWARENESS DAYS, WEEKS AND MONTHS

JULY

Mental Illness Awareness Month

Day	Topic
11	World Population Day
16	World Hepatitis Day

AUGUST

National Women's Month
Organ Donor Month

Day	Topic
1–7	World Breastfeeding Week
3–9	Cancer Prevention Week
3–9	National Immunisation Awareness Week
3–7	Rheumatic Fever Week
9	National Women's Day
12	International Youth Day
24–31	African Traditional Medicine Week
31	African Traditional Medicine Day
31 Aug – 5 Sep	Deaf Awareness Week

Respiratory effects of pesticides amongst farm workers in Eshowe/ Ntumeni District, South Africa

Dr Paula Diab,
MBChB MFamMed,
Family Physician,
Eshowe District Hospital

Prof. Bob Mash,
MBChB MRCGP PhD,
Professor,
Family Medicine and
Primary Care,
Stellenbosch University

Corresponding author:
Prof. Bob Mash,
PO Box 19063,
Tygerberg
7505
Tel: +27 (0)21 938 9170
Fax: +27 (0)21 938 9153
E-mail: rm@sun.ac.za

Abstract

Setting: **Eshowe, KwaZulu-Natal.**

Aim: **Investigate short-term, seasonal effects of crop-spraying pesticides on farm workers' respiratory systems and assess their level of awareness of potential risks involved in handling the chemicals and use of protective gear to reduce these risks.**

Methods: **Cohort design with 110 farm workers at baseline in three groups at different risks of exposure to sprayed pesticides. Confounding factors, availability and use of protective equipment were measured at baseline and changes in respiratory function and symptoms before and during the spraying season.**

Results: **Followed up 82 workers. The high-risk group showed a significant deterioration in terms of irritant and obstructive respiratory symptoms, but no difference in FEV_1 or FVC. The groups did not differ in any of the confounding factors. Protective equipment was available in at least 80% of high-risk workers and moderate rates of use were reported.**

Conclusions and recommendation: **Irritant and obstructive effects of pesticides on the respiratory tract were demonstrated with a moderate use of protective equipment. Any changes in lung function were not large enough to be recorded by spirometry. Further analysis of lung function over a longer period of time is recommended.**

Key words: pesticides; short-term seasonal effects; respiratory system; protective equipment; level of awareness

Introduction

Respiratory disease in South Africa is a major public health issue as tuberculosis, lower respiratory infections and asthma are all within the top ten most important conditions contributing to the burden of disease.[1] South Africa also has a high prevalence rate for chronic obstructive airways disease (COPD).[2] While attention has been given to the effects of risk factors such as indoor[3] and urban outdoor pollution,[4] little attention has been paid to the effects of occupational exposure to pollution in a rural context. Agricultural workers are recognised as a particularly vulnerable group in South Africa who have received little attention from researchers.[5]

Farm workers are exposed to a number of different substances that may affect their respiratory health. Environmental irritants and allergens, such as dust and pollens, as well as chemical fumes, found in fuels and paint, are common. Pesticide exposure is also typical and has been linked to the development of Parkinson's disease,[6] hormonal changes,[7] deterioration in lung function,[8] and development of respiratory symptoms, such as tightness in the chest, breathlessness and wheezing.[9] Deterioration in lung function over prolonged exposure has been mainly of a restrictive pattern due to fibrosis,[10] while short term irritant effects may be of a more obstructive nature.[9]

Farm workers are amongst those who are particularly vulnerable as they are often poorly educated and may be unaware of the potentially harmful side effects of the chemicals used.[5] Seasonal changes in farm workers' lung function have been linked to environmental and occupational exposure to chemicals such as pesticides and the duration of exposure has also been linked to deterioration in lung function.[11] Non-smokers, as compared to similarly matched smokers, are known to show a more exaggerated decline in respiratory function when exposed to pesticides.[8,5]

Assessment of workers' knowledge of, attitude towards and practice of pesticide use amongst pesticide sprayers in Ethiopia[12] indicated that cautious use of pesticides was seen as important by 93% of workers, but only 7% suggested the use of protective equipment. Worn-out gloves and unfit masks were noted to be used on some farms and maintenance of such equipment was poor, yet experience of symptoms and decline in lung function are reduced when

Table 1. Commonly used chemicals and their known effects on human health*

Chemical	Type of chemical	Known health effects	Crops	References
Methomyl	Pesticide	Ear, eye, nose, throat and pulmonary irritant. Gastrointestinal irritant	Tomatoes, citrus	American Conference of Governmental Industrial Hygienists. Documentation of Threshold Limit Values for chemical substances and physical agents and biological exposure indices for 2001. Cincinnati, OH: ACGIH; 2001; p. 2.
Metribuzin	Pesticide	Pulmonary and eye irritant	Tomatoes	Wolfe HR. In Lee RI Jr, ed. Air Pollut Pest Agric Processes. Cleveland, OH: CRC Press;1976. p. 137-63); Crop protection chemicals reference 8th ed. NY, NY: John Wiley & Sons; 1992. p. 770-6.
Paraquat	Pesticide	Irritant to skin, eyes, respiratory tract	Avocado, citrus	Mackison FW, Stricoff RS and Partridge LJ.Jr., editors. NIOSH/OSHA – Occupational health guidelines for chemical hazards. DHHS(NIOSH) Publication No. 81-123 (3 Vols). Washington, DC: U.S. Government Printing Office; Jan. 1981. p. 1.
Phosdrin	Pesticide	Respiratory system, skin irritant	Avocado	Mackison FW, Stricoff RS and Partridge LJ.Jr., editors. NIOSH/OSHA – Occupational health guidelines for chemical hazards. DHHS(NIOSH) Publication No. 81-123 (3 Vols). Washington, DC: U.S. Government Printing Office; Jan. 1981. p. 2.
Mancozeb	Pesticide	Skin irritation	Tomatoes, citrus	Tomlin CDS, editor. The pesticide manual – world compendium. 10th ed. Surrey, UK: The British Crop Protection Council, 1994; p. 636.
Hexazinone	Weedicide	Dermal irritant	Sugarcane	Health advisories for 50 pesticides;1988. p. 513 PB88-245931
Carbendazim	Pesticide	Potential hormonal effects	Citrus, avocado	Lewis RJ. Sax's dangerous properties of industrial materials. 9th ed. Vols 1-3. New York, NY: Van Nostrand Reinhold; 1996. p. 2189.

* Derived from the US National Library of Medicine. Toxicology Data Network[16]

protective equipment is well utilised.[5,13] Even when workers are encouraged to use protective measures, adherence may be poor as the protective gear is cumbersome, expensive and hot to wear during a tropical summer season.[8] The use of specific suits and gloves by male farm workers in apple and pear orchards in the Western Cape has been shown to reduce exposure to pesticides by up to 65%.[14] Spraying pesticides from a protected environment, such as a sealed aeroplane cockpit, has also been shown to prevent deterioration in lung function from pesticide exposure and confirms the advantages of protective equipment.[15]

The setting for this study was the Eshowe/Ntumeni area of KwaZulu-Natal where local farm residents had anecdotally reported an increase in the incidence of respiratory illness during the crop-spraying season (September to January). Principal crops in the area include sugar cane, citrus and vegetables. Of these, sugar cane is sprayed with a weedicide, while, citrus and vegetables are sprayed with pesticides (Table 1). A search of TOXNET[16] revealed that the listed weedicide has only minor side effects recorded, but pesticides are irritant to the respiratory system (Table 1). The chemicals used are usually sprayed via individual workers' backpacks or by tractor in the bigger fields and not by aerial means. On some farms, individual labourers are specifically trained to use the chemicals and this is thought to be beneficial in terms of limiting the exposure to these chemicals.

The aim of this study was to investigate the short-term, seasonal effects that crop-spraying pesticides have on the respiratory system of workers on the farms. It also aimed to assess the level of awareness of farm workers as to the potential risks that are involved in handling the chemicals and the use of protective gear to reduce these risks.

Methods

This study followed the design of a short-term cohort study with workers on the farms making up the control and study populations. The district comprised 25 farms and 11 out of the 18 possible farmers that attended the local farmer's meeting agreed to participate. From these farms 110 workers consented to participate in the study. Assignment to control (low risk) and study groups (high and medium risk) was based on the known toxicity profile of the chemicals used by these farm workers. Sample size was determined pragmatically by the number of farms willing to participate and the number of workers in each risk category. A minimum sample size of 14 per group would give 90% power (alpha 0.05) to detect an effect size of 0.7, while a maximum sample size of 41 per group would give a 90% power (alpha 0.05) to detect an effect size of 0.4.

All farm workers lived on the farms with similar proximity to the crops being sprayed:

- *Low risk:* Those who worked in the household, dairy or did clerical or supervisory work.
- *Medium risk:* Workers spraying weedicides and ripener, which are not harmful to the respiratory system in humans, but could still be exposed to the drift effect of pesticides.
- *High risk:* Those directly involved in spraying pesticides on citrus and cash crops. This would include those using back-packs who were also responsible for mixing their own chemicals and disposing of the canisters when empty. When tractor spraying occurred, the tractor drivers were also in close contact with the chemicals. No aerial spraying was used on any of the farms.

Each group was then followed over a period of time that extended from prior to the known spraying season (July 2006) and concluded at the end of the pesticide spraying season on the farms (November 2006).

Sprayers were all supplied with and advised to make use of long sleeved shirts and long trousers when spraying. These garments were usually conventional cotton/polyester blends and were worn with a vinyl or rubber jacket and boots. The use of rubber gloves and face masks was also advocated to those in contact with the chemicals.

A questionnaire was adapted from a previously published and validated tool[17,18] and administered in Zulu during an interview to elicit basic demographic details, medical history, exposure to other environmental pollutants and use of protective equipment when spraying occurred. Known confounding factors advocated by the South African Thoracic Society[19] for respiratory symptoms and function, were assessed across the three risk categories in order to account for potential differences among the groups that might be responsible for any differences in respiratory outcomes:

- age;
- gender;
- length of service in current position[20];

"…little attention has been paid to the effects of occupational exposure to pollution in a rural context."

- annual income;
- level of education;
- smoking history[8];
- medical history of chronic disease (e.g.: asthma, bronchitis, TB, HIV)[21];
- current medications used; and
- exposure and response to known allergens or irritants[22].

Questions on protective equipment related to what protective gear was available to workers and how often they actually used it. Their motivation to use the protective gear was further assessed by asking them how important it was for them to use the gear and how easy they found it. Their attitudes and beliefs regarding the gear were explored in an open question.

In the questionnaire workers were asked to score symptoms of rhinitis, cough or wheeze and each symptom was scored on a scale of 1 to 5 (1 = "never experienced" to 5 = "often experienced"). Symptoms were scored once before the spraying season (July) and once during the spraying season (November). The difference in scores, for each symptom, was then used to show an improvement or deterioration.

Lung function in the form of Forced Vital Capacity (FVC) and Forced Expiratory Volume in one second (FEV_1) were measured on the recommendation of the Respiratory Research Centre at Stellenbosch University as they would give a more sensitive measure of changes in lung function than a ratio or percentage predicted. Farm workers were all tested within a 1-week period and at the end of their daily shift. The machine used was a portable Schiller SP260 spirometer and initial testing was performed subsequent to each participant completing the questionnaire. All tests were carried out by the author herself after receiving technical training on the specific machine by the company representatives. New mouthpieces were used for each person and the filter was changed after every ten people as recommended by the manufacturers. The machine was calibrated using a 2 litre syringe attached to the machine after every ten people or half an hour. Ambient temperature and humidity were measured on site using a Casella thermometer.

Data was analysed by the Centre for Statistical Consultation at Stellenbosch University, using Statistica Version 7. Nominal data was compared by cross-tabulation and the maximum-likelihood chi-square test. Analysis of variance (ANOVA) was then used to investigate if the means of the ordinal or continuous variables differed between the three different risk groups. The Kruskal-Wallis test was used to determine a p-value.

Ethical approval was obtained from Stellenbosch University.

Results

The low-risk group comprised 50 workers, the medium-risk group, 40 and the high-risk group, 20. Before and after data were obtained for 82 workers (74.6%). Five workers died whilst on the study, a further five reported "sick" at the time of the follow-up measurements. The exact reasons for their demise or illness was not available at follow up but "HIV", "TB" and "umkhuhlane"

(unspecified cough) were given by the co-workers. Four participants had left work without reason and 14 were temporary workers who were no longer present.

There was no significant difference at baseline for any of the measured confounding factors between the three groups (Table 2). In particular there were no differences in exposure or reactivity to other respiratory irritants or allergens and no differences in the presence of chronic diseases between the groups. At baseline normal lung function patterns (determined by the FEV_1/FVC ratio) were found in 71.1%, restrictive patterns in 24.0% and obstructive patterns in 3.5%. There were no significant differences between the groups in terms of the mean FEV_1/FVC ratio or lung function patterns.

Although respiratory function deteriorated in all three groups over the study period there was no significant difference in respiratory function, as measured by a change in the FEV_1 or FVC values, between the three risk groups (Table 3). The low- and high-risk groups differed significantly (Kruskal Wallis $p<0.01$) for daytime, night-time and nasal symptoms, with low-risk workers improving and high-risk workers deteriorating over the study period. The low- and the medium-risk groups also differed significantly (Kruskal Wallis $p=0.04$) for nasal symptoms.

Frequency of use of protective equipment was scored on a scale from 1 which indicated "never" to a value of 5 for those who "always" used the equipment. Gloves were almost universally available in all risk categories and all protective equipment was reported to be available in at least 80% of workers

Table 2. Distribution of confounding factors amongst the risk categories

		Low risk (N=50)		Medium risk (N=40)		High risk (N=20)		
Confounding factor	**Categories**	**N**	**%**	**N**	**%**	**N**	**%**	**p-value**
Gender	Women (%)	36	72.00	21	52.50	13	65.00	0.16
Age	<18yrs	0	0.00	1	2.50	1	5.00	0.06
	18–25	7	14.00	11	27.50	4	20.00	
	25–30	8	16.00	5	12.50	8	40.00	
	31–35	9	18.00	9	22.50	1	5.00	
	>36 yrs	26	52.00	14	35.00	6	35.00	
	<1yr	9	18.00	6	15.00	5	25.00	
Duration of service	2–3 yrs	9	18.00	12	30.00	3	15.00	0.53
	4–6yrs	9	18.00	10	25.00	3	15.00	
	>6yrs	23	46.00	12	30.00	9	45.00	
Education	None	17	34.00	15	37.50	6	30.00	0.93
	Primary school	20	40.00	15	37.50	7	35.00	
	High school	13	26.00	10	25.00	7	35.00	
Annual income	R1000–4999	1	2.00	1	2.50	0	0.00	0.15
	R5000–9999	19	38.00	20	50.00	14	70.00	
	>R10000	30	60.00	19	47.50	6	30.00	
Chronic diseases	Asthma	4	8.00	1	2.50	0	0.00	0.18
	Bronchitis	4	8.00	1	2.50	2	10.00	0.39
	COAD	9	18.00	3	7.50	2	10.00	0.30
	TB	7	14.00	7	17.50	2	10.00	0.72
	Hay fever	11	22.00	7	17.50	2	10.00	0.47
	Eczema	7	14.00	5	12.50	5	25.00	0.45
	Cardiac problems	13	26.00	7	17.50	1	5.00	0.09
	HIV	0	0.00	1	2.50	0	0.00	0.36
	Usage of chronic medication	26	52.00	15	37.50	9	45.00	0.39
Smoking history	Smoker	9	18.00	11	27.50	3	15.00	0.43
	Ex-smoker	5	10 .00	3	7.50	0	0.00	0.17
Exposure to	Animals	4	8.00	3	7.50	1	5.00	0.90
	Diesel	33	66.00	27	67.50	13	65.00	0.98
	Mould	4	8.00	2	5.00	0	0.00	0.24
	Smoke	25	50.00	16	40.00	12	60.00	0.32
	Paint	39	78.00	31	77.50	19	95.00	0.14
	Paraffin	30	60.00	22	55.00	9	45.00	0.52
Known reaction to	Animals	47	94.00	38	95.00	20	100.00	0.35
	Diesel	32	64.00	27	67.50	17	85.00	0.19
	Mould	46	92.00	36	90.00	20	100.00	0.18
	Smoke	26	52.00	21	52.50	16	90.00	0.06
	Paint	39	78.00	29	72.50	18	90.00	0.26
	Paraffin	31	62.00	22	55.00	11	55.00	0.76

Table 3. Changes in lung function and respiratory symptoms across risk categories

	Low risk of exposure				Medium risk of exposure				High risk of exposure			
	n	Mean before	Mean after	Mean difference (CI)	n	Mean before	Mean after	Mean difference (CI)	n	Mean before	Mean after	Mean difference (CI)
FVC (litres)	37	3.06	2.75	-0.31 (-0.44 to 0.19)	31	3.45	3.26	-0.19 (-0.32 to 0.05)	15	3.22	2.90	-0.32 (-0.51 to 0.12)
FEV_1 (litres)	28	2.82	2.64	-0.18 (-0.30 to 0.07)	29	3.30	3.04	-0.26 (-0.38 to 0.15)	11	2.79	2.63	-0.16 (-0.34 to 0.03)
Daytime symptoms (score)	45	2.04	2.44	0.40 (0.19 to 0.61)	34	2.15	2.12	-0.03 (-0.27 to 0.21)	17	2.00	1.65	-0.35 (-0.70 to 0.08)
Night-time symptoms (score)	45	2.35	2.93	0.58 (0.35 to 0.81)	34	2.41	2.50	0.09 (-0.18 to 0.35)	17	2.76	2.41	-0.35 (-0.73 to 0.02)
Nasal symptoms (score)	45	2.18	2.71	0.53 (0.37 to 0.69)	34	2.27	2.53	0.26 (0.08 to 0.44)	17	2.41	2.12	-0.29 (-0.56 to 0.03)

"Farm workers are exposed to a number of different substances that may affect their respiratory health."

Table 4. Availability of protective equipment across risk categories

Availability of:	Low risk (N=50)		Medium risk (N=40)		High risk (N=20)		
	N	%	N	%	N	%	p-value
Mask	10	20.00	30	75.00	16	80.00	0.00
Gloves	46	92.00	35	87.50	20	100.00	0.12
Long shirt	21	42.00	36	90.00	16	80.00	0.00
Trousers	23	46.00	37	92.50	16	80.00	0.00

Table 5. Protective equipment usage across risk categories

	Low risk (N=50)		Medium risk (N=40)		High risk (N=20)		
	Mean	CI	Mean	CI	Mean	CI	p-value
Mask usage	1.48	1.08–1.88	2.08	1.63–2.52	2.90	2.27–3.53	<0.01
Gloves usage	2.60	2.06–3.14	2.90	2.30–3.50	3.25	2.40–4.10	0.40
Shirt usage	1.60	1.17–2.03	3.68	3.19–4.16	3.85	3.16–4.54	<0.01
Trouser usage	2.00	1.50–2.50	3.73	3.17–4.28	3.85	3.06–4.64	<0.01

in the high-risk category (Table 4). Masks, shirts and trousers were used significantly more in the high-risk category (Table 5).

Of all respondents, 42.7% reported that the use of protective equipment was "essential", with 19.1% reporting it to be "very important", 20.0% reporting it to be "quite important", 0.9% of "little importance" and 17.3% giving no response. Most workers also reported that they had attended numerous meetings and presentations on the usage of this equipment and they were aware of the dangers of some of the chemicals they used and the reasons for using it.

Most (56.4%) reported that it was "easy" or "very easy" for them to use this equipment whilst 21.8% reported it difficult to use and a further 21.8% offered no comment.

When considering the advantages and disadvantages of using this equipment, protection against chemical inhalation and skin protection were given as the most common reasons for its usage. Other reasons given were eye protection and prevention of cuts to the skin. Seventy percent of respondents did not report any negative effects from using the equipment. The remainder reported some of the disadvantages, which were that it was difficult to breathe when using a mask, that the plastic overcoats and trousers were uncomfortable and the gloves cumbersome.

Education of the workers with regard to safety when handling hazardous materials was evident by the fact that 75.0% of the high risk group reported they washed their hands after using the spraying equipment.

Discussion

The study showed that farm workers, who were exposed to pesticides, experienced an increase in irritant and obstructive respiratory symptoms, although this was not reflected in an accompanying deterioration of FEV_1 or FVC. This discrepancy may be due to the higher sensitivity of symptoms to changes in the respiratory tract and the lower sensitivity of spirometry to detect small short-term changes in lung function.[23] In addition the effects of pesticides may have been partly ameliorated by the reported moderate use of protective equipment. There were no significant differences between the groups in any of the measured confounding factors, which therefore cannot provide an alternative explanation for these findings.

Protective equipment was widely available and workers had received training in the importance of and techniques involved in using the equipment. Masks and gloves were used on average "some of the time" in the high-risk group, while shirts and trousers were used "most of the time". Previous studies have shown that instruction, provision and usage of protective equipment is often poor.[12,13] A study on agrichemical practices also highlighted that while protective equipment was widely available, gloves and masks were seldom used.[24]

An increase in irritant and obstructive symptoms in this study is consistent with the findings elsewhere that farm workers who spray pesticides have a higher prevalence of asthma and COPD.[5,9] A significant increase in respiratory symptoms, especially allergic rhinitis, was also found in studies done on vineyard and orchard workers.[20,22]

Other studies have shown that prolonged pesticide exposure may result in a decline in lung function and an increase in respiratory symptoms over time.[11,20,21] Unfortunately no pre-existing measurements were available in these farm workers. A condition described as "biocide lung" – comprising pneumonia, radiological changes and chronic progressive lung fibrosis – has been reported after chronic exposure to pesticides.[10] Although almost a quarter of all the workers had a restrictive abnormality at baseline consistent with fibrosis, this did not differ between the risk groups and could also be due to poor effort when performing spirometry. It would therefore be useful to conduct a study such as this over a longer time period and assess the possible effects of ongoing pesticide exposure. The measurements made in this study, however, would not reliably detect fibrosis or restrictive lung disease and chest radiographs as well as plethysmography should be considered.

Testing lung function accurately is a difficult task, especially with a poorly educated test population, however any difficulty with technique should have affected the groups equally. One of the limiting factors, over which there was unfortunately no control, was the 25.4% drop-out rate and inability to accurately assess illness or cause of death in this group. The small number of workers in the high-risk category, especially those who managed to complete both sets of spirometric readings, limited the power of the study to detect differences between the groups. Although not all of the farms were included in the study, there is no reason to believe that the excluded farms are in any way different from the ones that took part.

Lessons learned

- The pesticide-exposed farm workers experienced an increase in irritant and obstructive respiratory symptoms, although this was not reflected in an accompanying deterioration of respiratory function.
- This discrepancy may be due to the higher sensitivity of symptoms to changes in the respiratory tract and the lower sensitivity of spirometry to detect small short-term changes in lung function.
- The significant increase in respiratory symptoms, especially allergic rhinitis, was also found in studies done on vineyard and orchard workers.
- Although protective equipment was available for the high-risk group, most only used it some of the time.

"Irritant and obstructive effects of pesticides on the respiratory tract were demonstrated..."

Conclusions and recommendation

Irritant and obstructive effects of pesticides on the respiratory tract were demonstrated with a moderate use of protective equipment. Any changes in lung function were not large enough to be recorded by spirometry. Further analysis of lung function over a longer period of time is recommended.

Acknowledgements

This study would not have been possible without the enthusiastic and generous support of the farmers of the Eshowe / Ntumeni community; in particular, the chairman, Ryder Lee and all the farmers who participated. Grateful thanks are also extended to Prof. Daan Nel at the Centre for Statistical Analysis and to Prof. Elvis Irusen, Head of the Respiratory Unit at Stellenbosch University.

References

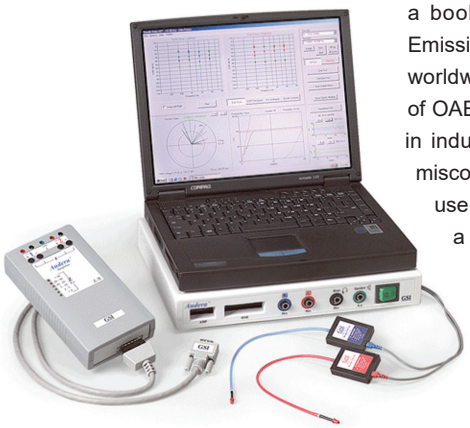
1. Bradshaw D, Norman R, Schneider M. A clarion call for action based on refined DALY estimates for South Africa. S Afr Med J. 2007 Jun;97(6):438, 440.
2. Buist AS, McBurnie MA, Vollmer WM, Gillespie S, Burney P, Mannino DM, et al. BOLD Collaborative Research Group. International variation in the prevalence of COPD (the BOLD Study): a population-based prevalence study. Lancet. 2007 Sep 1;370(9589):741-50.
3. Norman R, Barnes B, Mathee A, Bradshaw D. South African Comparative Risk Assessment Collaborating Group. Estimating the burden of disease attributable to indoor air pollution from household use of solid fuels in South Africa in 2000. S Afr Med J. 2007 Aug;97(8 Pt 2):764-71.
4. Norman R, Cairncross E, Witi J, Bradshaw D; South African Comparative Risk Assessment Collaborating Group. Estimating the burden of disease attributable to urban outdoor air pollution in South Africa in 2000. S Afr Med J. 2007 Aug;97(8 Pt 2):782-90.
5. London L, Nell V, Thompson ML, Myers JF. Health status among farm workers in the Western Cape: collateral evidence from a study of occupational hazards. SAMJ. 1998;88:1096-1101.
6. Tuchsen F, Jensen AA. Agricultural work and the risk of Parkinson's disease in Denmark, 1981-1993. Scand J Work Environ Health. 2000;26(4):359-62.
7. Guillette EA, Conard C, Lares F, Aguilar MG, McLachlan J, Guillette LJ Jr. Altered breast development in young girls from an agricultural environment. Environ Health Perspect. 2006;114(3):471-5.
8. Mekonnen Y, Agonafir T. Effects of pesticide applications on respiratory health of Ethiopian farm workers. Int J Occup Environ Health. 2002;8(1):35-40.
9. Faria NMX, Facchini A, Fassa AG, Tomasi E. Pesticides and respiratory symptoms among farmers. Rev Saúde Pública. 2005;39(6):973-81.
10. Lings S. Pesticide lung: a pilot investigation of fruit-growers and farmers during the spraying season. Br J Ind Med. 1982;39(4):370-6.
11. Salameh P, Waked M, Baldi I, Brochard P. Spirometric changes following the use of pesticides. East Mediterr Health J. 2005;11(1-2):126-36.
12. Mekonnen Y, Agonafir T. Pesticide sprayers' knowledge, attitude and practice of pesticide use on agricultural farms of Ethiopia. J of Occup. Med. 2002:52(6):311-15.
13. Jørs E, Morant RC, Aguilar GC, Huici O, Lander F, Bælum J, et al. Occupational pesticide intoxications among farmers in Bolivia: a cross-sectional study. Environmental Health. 2006;5:10-19.
14. Barnes J. Occupational health aspects of deciduous fruit farm workers in certain areas of the Western Cape exposed to agricultural pesticide spray materials [MSc Thesis[Stellenbosch: Stellenbosch University; 1995.
15. Jones SM, Burks AW, Spencer HJ, Lensing S, Roberson PK, Gandy J, et al. Occupational asthma symptoms and respiratory function among aerial pesticide applicators. Am J Ind Med. 2003;43(4):407-17.
16. US National Library of Medicine. Toxicology Data Network. Bethesda, USA: US National Library of Medicine, National Institutes of Health, Health & Human Services. Accessed on 21 April 2009. Available at http://www.toxnet.nlm.nih.gov.
17. Kistnasamy EJ. The relationship between asthma and outdoor air pollutant concentrations of sulphur dioxide, oxides of nitrogen, ozone, total reduced sulphates, carbon monoxide and respirable particulate matter less than 10 microns in learners and teachers at Settlers primary school in Merebank, South Durban [M. Tech. dissertation]. Durban: Durban Institute of Technology; 2005. 122 p.
18. Jones PW, Quirk FH, Baveystock CM. The St. George's Respiratory Questionnaire. Resp Med. 1991;85(suppl):25-31.
19. Van Scalkwyk EM, Schultz C, Joubert JR, White NW. (South African Thoracic Society Standards of Spirometry Committee.) Guideline for Office Spirometry in Adults. SAMJ. 2004;94:576-87.
20. Zuskin E, Mustajbegovic J, Schachter EN, Kern J, Pavicic D. Respiratory function in vineyard and orchard workers. Am J Ind Med. 1997;31(2):250-5.
21. Zuskin E, Schachter EN, Mustajbegovic J. Respiratory function in greenhouse workers. International Archives of Occupational and Environmental Health. 1993;64(7):521-26.
22. Chatzi L, Prokopakis E, Tzanakis N, Alegakis A, Bizakis I, Siafakas N, et al. Allergic rhinitis, asthma and atopy among grape farmers in a rural population in Crete, Greece. Chest. 2005;127:372-8.
23. Townsend M. ACOEM Position statement. Spirometry in the occupational setting. J Occup Environ Med. 2000; 42(3):228-45.
24. London L. Agrichemical safety practices on farms in the Western Cape. SA Med Journal. 1994;84(5):273-8.

Conference on hearing health – A must to attend!

Tuberculosis (TB), HIV, Noise Induced Hearing Loss (NIHL) and Oto-Acoustic emission testing (OAEs) are part of the everyday life in any medical or safety officer's job in the mining or manufacturing industry.

The H.A.S.S. Group will be presenting a conference for industry on the 29 July 2009 at which local and international experts will update delegates on the latest developments in these various fields. The international speakers are from the USA and three local speakers will also present papers.

Prof. James W. Hall III is a world expert on Oto-Acoustic Emission testing. He has written numerous journal articles on the subject and is the author of a book, Handbook of Oto-Acoustic Emissions, that is used by Universities worldwide. He will speak on the role of OAEs in the early detection of NIHL in industry. Currently there are many misconceptions in the market on the use of OAEs in industry. OAEs are a very sensitive, clinically feasible measure of cochlear (outer hair cell) function. They can play an important role in early identification of hearing loss. However, OAE tests are not tests of hearing. In fact, there are a number of reasons why OAE will never replace the audiogram in hearing assessment. Dr Hall will discuss these important reasons as well as the truly unique contribution that OAEs have to play in NIHL. OAEs can for example provide early and reliable "warning sign" of cochlear dysfunction due to noise exposure before any problem is evident in the audiogram.



Dr Haase is a world expert on micro-nutrients and the use of micronutrient products (vitamins / antioxidants) in the management of NIHL / dust / HIV and radiation. In healthy physiologic systems, the oxidants and antioxidants in the body cells are in balance and electrons move along in a systematic fashion. However, if oxidants overwhelm the system either by increased generation or decreased anti-oxidant levels, cells can be damaged and/or die. Depending on where it happens the result may be a hearing loss, an illness or even a new "laugh line" on your face. Dr Haase will discuss these processes and will bring a new and fresh breath to the management of these problems specifically in the mining industry. The strategy that he will discuss includes the most comprehensive, multiple micro-nutrient preparation available as a biological addition to the standard care of hearing disorders.

Prof. De Wet Swanepoel from the University of Pretoria has an interest in objective measures of assessing auditory functioning and special populations such as persons infected with HIV/AIDS. He is the recipient of several awards and research grants for his work in these areas. He has published numerous peer-reviewed articles and recently edited the first comprehensive book on HIV/AIDS related communication disorders and co-authored a book on objective assessment of hearing. Prof. Swanepoel will update delegates on these matters.

Mrs Susan Strauss (Chief Research Officer at the Ear Institute and PhD student at the University of Pretoria) will give an update on NIHL in SA goldmines. She will talk about preliminary results from a study done in conjunction with Anglogold Ashanti, looking at their audiogram data. The study investigates NIHL in goldmines, how common it is, how fast the progression is, and what individual factors might play a part in the onset, severity or progression of NIHL. She will also discuss the different ways in which hearing impairment can be calculated and controversial issues that might affect compensation for NIHL, such as the role of age in NIHL.

Mr Pieta van Deventer, Director and CEO of H.A.S.S. Industrial, will give an update on custom-made hearing protection in SA and abroad. The H.A.S.S. Group was instrumental in introducing custom-made hearing protection devices into the South African market. They were also the first company awarded the SABS Approved Mark of Performance and they are still the only company with the ISO 9001:2000 approval for custom-made hearing protection devices in South Africa.

We look forward to sharing this vital information about hearing health with you. For registration and directions to the conference venue contact Christina at communications@hass.co.za or on +27 (0)12 333 3131.

HASS GROUP

conference

HEARING HEALTH
in mining and industry

29 July 2009

EDUPLEX Auditorium, Queenswood, Pretoria

Cost: R 750, lunch and refreshments included

An update on the current situation in South African mines will be highlighted with emphasis on new research data on noise-induced hearing loss (NIHL), information on HIV, TB and hearing conservation. The role of oto-acoustic emissions (OAE's) in the early detection of hearing loss in industry and the role of micronutrients in the management of NIHL/Dust/HIV/Radiation will be discussed by leading international experts in the field.

[programme & speakers]

- **Dr JW Hall III**, Clinical Professor and Associate Chair in the Department of Communicative Disorders at the University of Florida in Gainesville

Dr JW Hall III

The role of OAE's in the early detection of hearing loss in mines

- **Dr G Haase**, Chief Medical Officer of Premier Micronutrient Corporation and a world renowned medical expert on micronutrients

Dr G Haase

The role of micronutrients in the management of NIHL/ Dust/ HIV/ Radiation

- **Prof DCD Swanepoel**, Associate Professor, University of Pretoria, Adjunct Professor, University of Texas at Dallas. Co-edited a 2009 book on HIV/AIDS and associated communication, swallowing, hearing and balance disorders

Prof DCD Swanepoel

Update on HIV/ TB

- **Ms S Strauss**, PhD student at the University of Pretoria, and Chief Research Officer at the Pretoria Ear Institute

Ms S Strauss

Update on NIHL in SA goldmines

- **Mr P van Deventer**, Director and CEO H.A.S.S. Industrial

Mr P van Deventer

Update on custom-made hearing protection in SA

REGISTER with Christina at

TEL: (012) 333-3131

FAX: (012) 333-7332

E-MAIL: communications@hass.co.za

no later than 10 July 2009

E-mail us for registration form and map to venue

This event is sponsored by:

HASS HEALTH (Pty) Ltd

EAR INSTITUTE

HASS INDUSTRIAL (Pty) Ltd

Noise-Ban
Custom-made hearing protection

chil0905hass

The role of gender on the physical work capacity profile of workers in an electricity supply company

JPH Lubbe, DDJ Malan,[1] and CJ Wilders[1]

[1]School for Biokinetics, Recreation and Sport Science (North West University), Potchefstroom, South Africa

Corresponding author: JPH Lubbe, E-mail: japie.lubbe@wellnessafrica.com

Abstract

Female workers are increasingly entering traditionally 'male occupations', yet they are more likely to experience a musculoskeletal problem in physically demanding jobs than male workers. The aim of this cross-sectional study in an electricity supply company was to determine the role of gender on the physical work capacity profile of workers, based on the minimum physical ability task requirements of their job. All 3752 males and 71 females in the study population participated. The mean overall physical work capacity scores for males exceeded that of females by 22.3% There were practically significant differences between male and female workers for eight of the ten inherently required essential physical abilities. Male workers were more likely to meet the physical work capacity profile than female workers (OR 7.04). The fact that many of the female electricity utility workers did not meet the minimum physical ability task requirements of their job could explain their high injury rate and poor performance reported in other studies.

Key words: physical work capacity; gender, female workers, electricity supply company

1. Introduction

The lack of sufficient physical work capacity of females entering physically demanding jobs in increasing numbers is of global concern.[1-5] The World Health Organization estimates that approximately 42% of the global working population are females and they are expanding into male-dominated trade and craft occupations.[1] In South Africa, labour legislation has accelerated this increase by forcing organisations to employ more females even in physically demanding jobs, without considering the impact on the overall productivity.[6] Both the Employment Equity Act[7] and the Promotion of Equality and Prevention of Unfair Discrimination Act[8] aim to prevent unfair discrimination and promote a more representative workforce. Most of these physically demanding jobs are usually designed with the male physique in mind, thus making them more suited to male workers.[1,9,10] Some industries where the manual labour has traditionally been performed by male workers are mining, construction, fire fighting and timber. In South Africa, most of these industries are experiencing a large influx of female workers.[6] As a result, there are now more females in jobs that historically experienced higher injury rates due to the physically demanding nature and manual labour involved in these jobs.[10] This also places additional physical demands on female workers and can thus contribute to increased injury rates and other musculoskeletal ailments.[10] In general, the literature on musculoskeletal involvement in the workplace reveals that female workers

are more likely to experience a musculoskeletal problem in physically demanding jobs than male workers.[9-12] A common reason is that neither the tasks nor the equipment they use have been adapted to their physical build and functional ability.[13,14] For example, females are frequently required to move objects almost half their body weight. This implies that the physical demand of the job will probably exceed their physical ability.[9,15] It has been stated that, although there is no difference in strength per lean body weight between males and females, the absolute strength of males is higher, mostly due to the higher muscle volume.[16-18] This lower strength of female workers could place them at higher risk for injury or musculoskeletal ailments, while performing physically strenuous work tasks usually performed by male workers.[19] Several organisations are implementing more aggressive pre-employment medical screenings to determine fitness for work, as a means to reduce injury and poor performance.[6] However, criteria for minimum physical ability requirements for jobs with inherent physical task demands are still weakly defined in most industries.[6,17]

The increased numbers of females entering physically demanding jobs has forced an electricity supply company (hereafter referred to as "the company") to improve the occupational management of these people. They developed minimum physical ability task requirements for all jobs with inherent physical task demands in order to "fit the right person to the job".[17,20] These minimum requirements enable the company to determine which workers do not have the physical work capacity to perform their work duties effectively and are at risk for work related injuries or disability irrespective of their gender.[17,21] A concern of the company was whether the increased number of female workers entering these physically demanding jobs have the physical work capacity based on the minimum physical ability task requirements of their job. Only one study on gender differences in physical work capacity and injury prevalence amongst electricity utility workers was identified.[10] In this study, Kelsh and Sahl report that female workers performing physically intensive electricity utility duties, were at higher risk for both acute and chronic injuries than their male co-workers. No research, however, could be found that determined the differences in physical work capacity profile between male and female workers in physically demanding jobs based on the minimum physical ability task requirement of their job. Understanding these differing profiles could give the company insight into the future occupational management of male and female workers in physically demanding jobs. The aim of this study was, therefore, to determine the role of gender on the physical work capacity profile of workers in the company based on the minimum physical ability task requirements of their job.

2. Method

2.1 Study design

A cross sectional study design was used, focusing on determining the differences in physical work capacity between male and female workers.

"...labour legislation has accelerated this increase by forcing organisations to employ more females even in physically demanding jobs..."

2.2 Study population

The research was conducted on workers in jobs for which the company had developed minimum physical ability task requirements. Table 1 lists the task outputs that involve physical ability demands for the study population. In summary, the physical requirements of their work is to build, repair and maintain electrical power lines and female workers are required to perform the same physical task outputs as their male co-workers. Ethical clearance was obtained for the study from the North West University and the company involved. All the employees actively performing their work in these jobs were subjected to a physical work capacity assessment, once they had given an informed consent to participate in the study.

2.3 Apparatus and test protocol

The apparatus and test protocol used to measure and determine the physical work capacity profile of the workers is shown in Table 2.[17]

2.4 Testing procedure

The male and female workers were tested by the company biokineticists (specialised exercise therapists who function in professional alliance to health and medicine, and are recognised by and registered with the Health Professions Council of South Africa[22]) using a physical work capacity testing and classification procedure to determine the physical work capacity profile for each participant. According to this procedure, they were first screened for readiness to perform physical work capacity testing, to identify their risks and the test components to be excluded from the test battery. After completion of the tests, their physical work capacity was calculated as a percentage score. This percentage score rates the overall physical work capacity of the worker according to the outcome of the 10 essential physical abilities tested (see Table 1). These were physical abilities inherently required by the related jobs. Their physical work capacity score (%) was then compared to the minimum physical ability task requirements of their job to determine the physical work capacity profile of the worker.

The profile of each worker was then classified as either meeting or not meeting the minimum physical ability task requirement.

3. Results

The physical work capacity profile of 3752 male workers and 71 female workers was assessed. The reason for the small number of female workers (1.9%) was that physically demanding jobs had only recently been made available to female workers, in accordance with the equal opportunity labour legislation[1] (Employment Equity[6]). Furthermore, several of the female applicants who had applied for physically

Table 1. List of task outputs that involve physical ability demands

Perform vegetation control by:
- Operating vegetation control machines.
- Clearing vegetation encroaching on clearance distances and structures by manual labour. (Environmental care).
- Applying prescribed growth control chemicals.

Maintain access routes and security infrastructure by :
- Installing fences and gates.
- Inspecting fences and gates.
- Restoring fences and gates.
- Restoring and maintaining of roads and drainage systems.
- Reporting conditions of roads and drainage systems.

Maintain lines and structures by:
- Replacing, securing and cleaning line components, electrical connections and anti-oxidation measures.
- Conductor stringing, binding in and jointing.
- Excavating, back filling and compacting to secure trenches and structures.
- Executing foot patrols to identify and report faulty plant.

Maintain substations and control rooms by:
Inspecting performance of security and safety lighting.

Executing vegetation control
Respond to call outs and prompts from dispatcher during abnormal conditions and power supply interruptions on a 24 hour basis to minimise customer outage by:
- Being on standby.

Restoring equipment and structures on lines and substations by:
- Replacing, securing and cleaning plant and equipment under supervision.
- Executing foot patrols to identify and report faulty plant.

Creates assets on urban and rural lines by:
- Dressing, erecting, installing and dismantling poles and structures.
- Installing/ dismantling reticulation and urban transformers, reclosers, sectionalisers, metering points, isolators and drop out fuse links.
- Conductor stringing, binding in and jointing.
- Excavating, back filling and compacting to secure trenches and structures.

Maintain an ergonomically sound and hygienic workplace by:
- Cleaning of work sites, work stations and infrastructures.
- Executing site restoration in accordance with environmental control measures.
- Executing safe handling and economic stacking and storing of material.

Assisting with site preparation under supervision by:
- Erecting barricades and danger notification.
- Preparing system earthing.

Table 2. Summary of apparatus and test protocol[17]

Test	Apparatus	Protocol
Blood pressure: systolic and diastolic measurements	Sphygmomanometer and stethoscope	Systolic- and diastolic blood pressure is measured in the sitting position after 5 minutes of rest.
3 min. step-up	25 cm. High step bench; metronome; stethoscope	Step up and down a bench at a rate of 100 steps per min. A metronome gives the rate of stepping. Heart rate is taken after 3 min. for 15 sec. and multiplied by 4 for 1 min. heart rate.
Grip strength: Right and left	Takai hand grip dynamometer	One maximal isometric contraction of the right- and left hand with the palms facing inwards.
Back muscle strength	Takai back/leg dynamometer; ergonomically developed platform to ensure correct execution	One maximal isometric contraction of the back muscles in a bent-over-straight-leg position with a harness fitted over the lower back and hooked to the dynamometer on a platform.
Leg muscle strength	Takai back/leg dynamometer; ergonomically developed platform to ensure correct execution	One maximal isometric contraction of the leg muscles in a 100-110 degrees squat position with a harness fitted over the upper back and hooked to the dynamometer on the platform.
Arm-/shoulder muscle strength	Takai back/leg dynamometer; ergonomically developed platform to ensure correct execution	One maximal isometric contraction of the arm/shoulder muscles in a pick-up-from-the-floor position with a handlebar fitted to the dynamometer on the platform, legs spread out backwards and the chest resting on a cushion.
Flexibility	Flexibility box	Push a marker (wooden block) horizontally as far as possible over a fixed ruler while sitting in a straight leg position.
1-min. sit-up	Stop watch	Perform as many sit-ups as possible in 1 min. with the body in a sitting posture with the legs 90° bent.

"...female workers are more likely to experience a musculoskeletal problem in physically demanding jobs than male workers."

demanding jobs in the company, failed to meet the minimum physical ability task requirements of these jobs, and could thus not be appointed and were therefore not included in this study.[27]

Statistical analyses were performed using the STATISTICA software package.[23] As this study used a selected population, statistical significance calculations, for instance the Chi-squared tests, generally used for random groups, were not relevent.[24,25] Practical significance tests as described by Steyn, that are applied to determine the effect size of the difference between populations, were therefore used.[26] Cohen indicates that practical significance implies a large enough difference to have an effect in practice.[25]

The effect size of the difference in physical work capacity as a percentage (see section 2.4) between male and female workers was determined through the formula:

$$d = \frac{p_1 - p_2}{\sqrt{p(100 - p)}}$$

where p_1 is the percentage mean for the male workers, p_2 the percentage mean for the female workers and p the average percentage mean of male and female workers.[25] Cohen provides the following guideline values to interpret d:

a) small effect: d=0.2,
b) medium effect: d=0.5 and
c) large effect: d=0.8.[25]

Results with d=0.8 or more were considered as practically significant as they had a large effect.[25]

The mean overall physical work capacity scores according to gender are shown in Figure 1. The score for males exceeded that of females by 22.3% (67.4% compared to 45.1%). The difference was of large practical significance (d≥±0.99). Table 3 compares the results for the individual tests by gender. (The differences in the number of participants per individual test displayed in Table 3 are due to the exclusion of certain test components as a result of the identification of risks in some participants.) Although the female workers were a small section of the population, practically significant differences between male and female workers could still be observed. There were practically significant (d≥±0.8) differences between male and female workers for eight of the ten physical abilities required. Males had superior abilities over females in cardiovascular endurance (3 min. step-ups) and all the strength tests (grip; back muscle; leg muscle; arm/shoulder muscle). Females however, had greater flexibility than male workers. No practically significant difference in abdominal muscle endurance (1 min. sit-ups) and blood pressure occurred between male and female workers.

The physical work capacity of male and female workers in relation to the minimum physical ability task requirements is shown in Figure 2. More male workers had a "Meet" physical work capacity profile than a "Not meet" physical work capacity profile (70.5% compared to 29.5%). For female workers the opposite was observed, 25.4% of them had a "Meet" physical

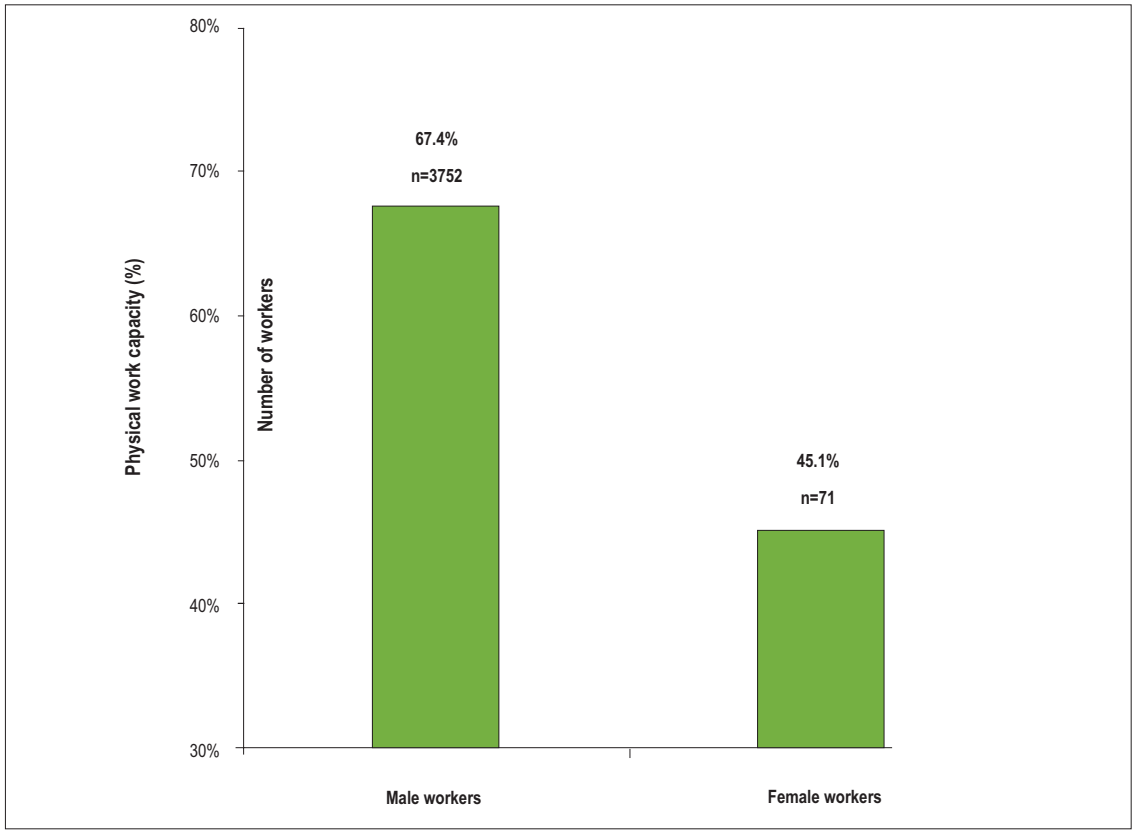


Figure 1. Comparison of the mean overall physical work capacity scores of male and female workers

Table 3. Comparison of the test results for male and female workers

Tests	Females			Males			Cohen's effect size (d≥±0.8)
	N	Mean	Standard deviation	N	Mean	Standard deviation	
Systolic blood pressure (mmHg)	71	116.9	18.8	3748	129.1	21.9	*
Diastolic blood pressure (mmHg)	71	74.7	13.4	3748	82.2	12.9	*
3 min. Step-up (beats/min)	65	141.8	18.0	3445	120.3	20.3	*
Grip strength – right (kg)	69	31.0	6.4	3713	43.6	9.1	
Grip strength – left (kg)	69	29.9	6.4	3705	41.9	8.6	*
Back muscle strength (kg)	62	75.8	26.8	2767	94.6	28.7	*
Leg muscle strength (kg)	62	145.2	36.5	3384	211.5	61.3	*
Arm/shoulder muscle strength (kg)	67	60.0	14.6	3499	92.9	25.1	
Flexibility (cm)	67	44.6	8.7	3656	36.9	9.9	*
1 min. Sit-up (reps)	59	20.6	9.0	3006	24.8	9.7	*
Physical Work Capacity score (%)	71	45.1	17.0	3752	67.4	22.1	*

"*" Indicates practical significance, since it indicates that the difference in test results between male and female workers has a large effect according to Cohen's effect size statistics.[25]

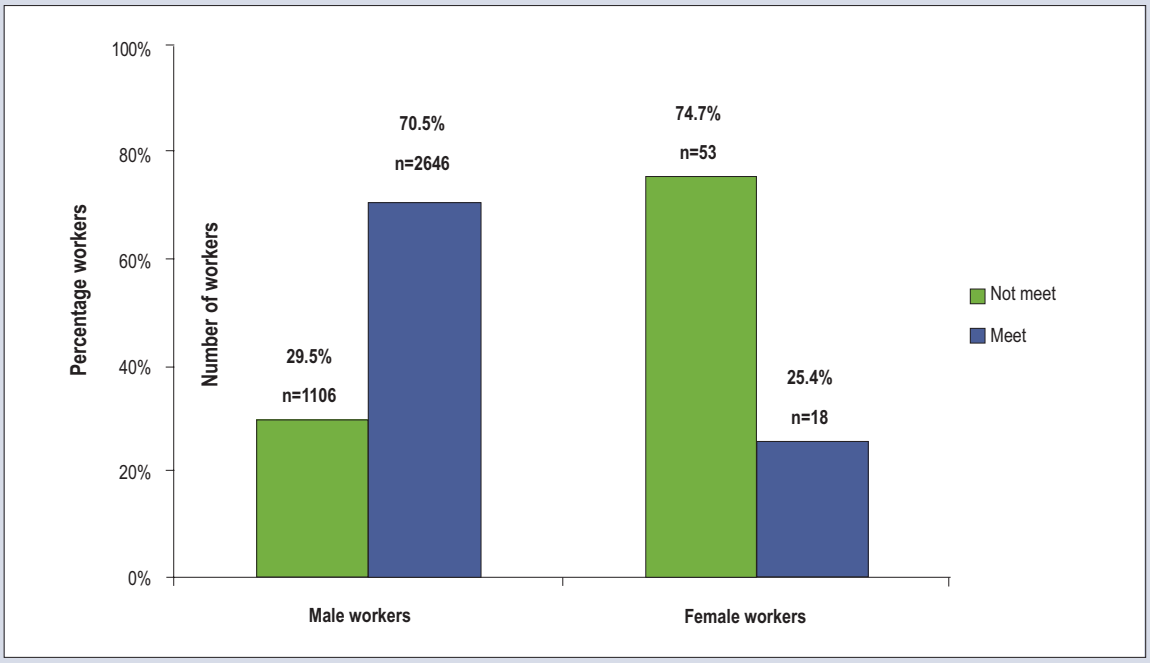


Figure 2. The percentage of male and female workers that had a "Not meet" or "Meet" physical work capacity profile

work capacity profile, while 74.7% had a "Not meet" physical work capacity profile. According to the odds ratio statistic, the odds for a male worker to receive a "Meet" physical work capacity profile was 2.39 and for a female worker it was 0.34, yielding an odds ratio of 7.04 between male and female workers. Therefore, male workers were more likely to receive a "Meet" physical work capacity profile than female workers. The result was of large practical significance.[26]

4. Discussion of results

Large practically significant differences between the physical work capacity of males and females were found in this study. Male workers were more likely to receive a "Meet" physical work capacity profile than female workers. Males had a greater mean overall physical work capacity than females. They also had superior abilities over females in cardiovascular endurance and all the strength tests. Conversely, females had greater flexibility than male workers. The findings are in accordance with the literature on physical and physiological differences between male and female workers.[16-18] Literature on physical strength, which is a component of the physical work capacity, assessed in this study, indicates that female workers have lower absolute upper and lower body strength than male workers and could partially explain the differences reported.[16-18]

Unlike the female workers, the majority of male workers met the minimum physical ability task requirements. To some extent, this supports the argument by Shephard that the average female is less likely than an average male to meet standards specified for recruitment and continuing employment.[19] However, it could be argued that this group of females was not an average group, given that 25.4% of them were able to meet the physical ability task requirements in this male prone occupation. Large individual differences amongst the females could account for this. Furthermore, the study group excluded those female applicants who were not appointed. It is possible that if they had been included, the physical work capacity differences could have been larger.

The results imply that most female workers are at greater risk than their male co-workers in this company due to their inability to perform their contracted tasks, based on

the inherent physical ability task requirements. In a similar work environment, Kelsh and Sahl reported a higher risk for work-related injuries amongst female electricity utility workers than for their male co-workers in the same job, but did not provide a reason for this.[10] It is possible that the cause could be partially explained by the results of this study, namely that the physical work capacity profile of a practically significant number of female electricity utility workers did not meet the minimum physical ability task requirements of their job.

Conclusion and recommendations

Males had a greater physical work capacity than females for the same job-related minimum physical ability task requirements, and more female workers did not have the minimum physical work capacity required by their job than male workers. This is the first time, to our knowledge, that the physical work capacity profiles of male and female workers in relation to the minimum physical ability task requirements of their job have been examined. The value of this study lies in the fact that it could partially explain the high injury rate and poor performance amongst female workers in physically demanding jobs observed by researchers.[1,2,11,12] It is, therefore, recommended that companies should more effectively manage the physical work capacity of their female employees in physically demanding jobs. Through determining the physical work capacity profile of female workers in physically demanding jobs, companies could make more informed decisions related to pre-placement-, job re-design-, job accommodation- and, work hardening opportunities. Given the recent increased entry of females into male-dominated trade and craft jobs, further research is required on the role of gender and job experience on the physical work capacity profile of workers in physically demanding jobs.[1,12]

Lessons learned textbox

1. Physical work capacity needs to be assessed according to the minimum inherent physical ability task requirements of the job and not a generalised physical fitness standard or international focus group norm.
2. Female workers along with all other applicants for jobs with inherent physical demanding tasks need to be assessed for physical fitness for work according to the minimum physical ability task requirements of the job.
3. Females should not be excluded by default from jobs with inherent physical demanding tasks as this would contravene non-discrimination labour law legislation and the individual abilities of some females exceeds the minimum physical ability task requirements.
4. According to labour legislation it is clear that analysing the physical work capacity based on the minimum physical ability task requirements is seen as fair and that such assessments are necessary to determine if employees working in jobs with inherent physical requirements are at risk.

References

1. World Health Organization. Occupational health: ethically correct, economically sound. Fact sheet No 84. Geneva:WHO;1999.
2. Shrey D. Worksite disability management and industrial rehabilitation: an overview. In Shrey D, Lacerate M, editors. Principles and practices of disability management in industry. Florida: GR Press inc.;1997. p. 3-53.
3. Islam S, Velilla AM, Doyle EJ, Ducatman AM. Gender differences in work-related injury/illness: analysis of workers compensation claims. Am J Ind Med. 2001; 39(1):84-91.
4. Lagerlöf E. Global gender issues in relation to health and industrial work. Geneva: World Health Organization; 2005.
5. International Labour Organization. Global employment trends for women 2004. Geneva: International Labour Office; March 2004.
6. Lubbe JPH. The relationship between age, gender, physical work capacity profile and a worksite wellness program for workers in an electricity supply company. [Ph.D. Thesis]. Potchefstroom: North-West University; 2007.
7. Department of Labour, South Africa. Employment Equity Act. No. 55 of 1998. Pretoria: Government Press; 1998. Accessed 15 May 2009. Available at: http://www.labour.gov.za/docs/legislation
8. Department of Labour, South Africa. Promotion of Equality and Prevention of Unfair Discrimination Act, No. 4 of 2000. Pretoria: Government press; 2000. Accessed 15 May 2009. Available at: http://www.doj.gov.za/legislation/acts/acts/2000/2000-04.pdf
9. Messing K, Lippel K, Demers D, Mergler D. Equality and difference in the workplace: physical job demands, occupational illnesses, and sex differences. NWSA Journal. 2000; 12(3):21-49.
10. Kelsh MA, Sahl JD. Sex differences in work-related injury rates among electricity utility workers. Am J Epidem. 1996; 143(10):1050-1058.
11. Woods V, Buckle P. Work, inequality and musculoskeletal health. Health and safety executive, contract research report 421/2002. Norwich: St. Clements House; 2002.
12. Messing K, Őslin P. Gender equality, work and health: a review of the evidence. Geneva: World Health Organization; 2006.
13. Kroemer K, Kroemer H, Kroemer-Elbert K. Ergonomics: how to design for ease and efficiency. 2nd ed. Eaglewood Cliffs: Prentice Hall; 2001.
14. Kumar S, editor. Biomechanics in ergonomics. London: Taylor and Francis; 2001.
15. Smith PM, Mustard CA. Examining the associations between physical work demands and work injury rates between men and women in Ontario, 1990-2000. Occup Environ Med. 2004; 61(9):750-756.
16. Falkel JE, Sawka MN, Levine L, Pandolf KB. Upper and lower body muscular strength and endurance ratios for women and men. Ergonomics. 1985; 28:1661-1670.
17. Lubbe JPH. Die verband tussen fisieke vermoëns, veroudering en werkspesifieke taakprofiele van manlike werkers in 'n elekterisiteitsvoorsieningsmaatskappy. [Dissertation]. Potchefstroom: PU vir CHO; 2003.
18. Mac Duff L, De Ridder JH, Malan DDJ. Anthropometric, biomechanical strength and aerobic characteristics of humans and other influences that affect manual handling performance. Ergonomics SA. 2005; 17(1):25-40.
19. Shepherd RD, editor. Gender, physical activity, and aging. Boca Raton: CRC press; 2002.
20. Matheson LN. Functional capacity evaluation. In: Demeter SL, Anderson BJ, Smith GM, editors. Disability evaluation. Missouri: Mosby; 1996. p. 168-188.
21. Kriek N. Biokinetics: periodic physical ability surveillance. Eskom Distribution standard. Document number DISASADK7. Johannesburg: Eskom Holdings (Pty) Ltd.; 2004.
22. Biokinetics Association of South Africa [Home page on internet]. What is a Biokineticist?; 2007 [cited 2007 June 1]. Available from: http://www.biokinetics.org.za
23. Statsoft, Inc. STATISTICA (data analysis software system), version 7 [CD-ROM]. 2002. Available from: http://www.statsoft.com.
24. Thomas JR, Nelson JK. Research methods in physical activity. 2nd ed. Champaign: Human Kinetics; 1990.
25. Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. Eaglewood Cliffs: Erlbaum; 1988.
26. Steyn HS (Jr.). Handleiding vir die bepaling van effekgrootte-indekse en praktiese betekenisvolheid. Potchefstroom: Northwest University; 2005 [cited 2006 Aug 12]. Available from: http://www.puk.ac.za/fakulteite/natuur/skd/index.html
27. Lubbe JPH, Kriek N. Women in physical demanding occupations: discrimination through minimum physical ability requirements (Paper presented to Distribution recruitment personnel of Eskom Holdings Pty Ltd.). Johannesburg; Unpublished 2004.

Effective & ***hygienic*** pulmonary filtration ensures infection control in compliance with **OHS Act Section 8** and **9**, **ATS-ERS 2005** and **SANS 451:2008** spirometry standards

SPECIAL OFFER
Quote ref no. **008JK** on all your orders to qualify for a special DISCOUNT!
This offer is valid until the 31st August, 2009

It's all about INFECTION CONTROL

SPECIFICATIONS AND FEATURES OF ViBAC PULMONARY FILTERS

Colour-coded ViBAC Bacterial Viral Filters and nose clips

- Effective and hygienic filtration efficiency of 99.273% @ 12L/s.
- Bi-directional through non-woven electrostatic filter media with hydrophobic membrane.
- Non-allergic and latex free.
- Disposable, single patient use, individually packed, labelled and sealed with easy tear, and ready for use.
- Resistance of 1.04cmH20/L/s @ 12L/s and dead space of 80ml with weight of 40gm complies fully with the ATS-ERS guidelines.
- Filters are colour coded for easy identification and re-order.
- Full range of filters to fit various models of spirometers in the marketplace.

ViBAC Pulmonary Viral Bacterial Filters
Single-use ViBAC bacterial filters packed and sold in boxes of 50. Priced per each.

Nose Clips available in Re-Usable and Disposable
Re-Usable Nose Clips packed and sold in packets of 25. Priced per packet.
Disposable Nose Clips packed and sold in boxes of 100. Priced per box.

ViBAC Bacterial Viral Filters are a vital component in ensuring an infection free, hygienic environment during pulmonary testing. Besides compliance with South African spirometry health standards, they achieve immediate benefits for the subject, operator, clinic and company:

- Protects the subject and health workers by minimizing the possibility of cross-contamination
- Ensures accurate test results as the filter prevents saliva, excessive moisture, and sputum from loading onto the pneumotach affecting the flow and resistance
- Keeps pneumotach screen clean, thereby reducing the time and cost of frequently sterilizing the pneumotach
- Subject performs better with a safe, clean, spirometer and mouthpiece. In addition, it makes it easier for the operator to coach the subject
- Ensures the cleanliness of the 3 litre calibration syringe during the compulsory calibration procedure.

SSEM Mthembu
Medical Equipment, Supplies & Logistics

Sharecall: **086-111-7736** Email: judyk@ssemmthembu.co.za Web: www.ssemmthembu.co.za

Drugs of abuse

Dr Melissa Yssel, MBChB, FC Path(SA) Chem, DOHM, Specialist Consultant, Chemical Pathology, Toxicology & Occupational Health, Lancet Laboratories, +27 (0)11 242 7033 or +27 (0)11 358 0800; E-mail: myssel@lancet.co.za

Part 2

This second article in the series on drugs of abuse (DAU) presents some of those frequently used and describes their common names, ingredients, effects and appearance. They are also used as club drugs. The next article will provide similar descriptions of further DAUs.

The term 'club drugs' refers to drugs being used by young adults at all-night parties such as "raves" or "trances", dance clubs and bars. MDMA (ecstasy), GHB, Rohypnol, ketamine, LSD and metamphetamine are some of the club and party drugs gaining popularity.[1,2] National Institute on Drug Abuse (NIDA) supported research has shown that use of club drugs can cause serious health problems and, in some cases, even death. Used in combination with alcohol, these drugs can be even more dangerous. Uncertainties about the drug sources, pharmacological agents, chemicals used to manufacture them and possible contaminants make it difficult to determine toxicity, consequences and symptoms that might be expected in a particular community.

"No club drug is benign."[1]

Methylene-Dioxy-Metamphetamine (MDMA) – Ecstasy[2-5]

Streetnames

Adam, XTC, Pill, E, MDMA, Clarity, Lover's speed.

Ecstasy (MDMA) is a so-called "designer" amphetamine. MDMA was developed and patented in the early 1900s as a chemical precursor in the synthesis of pharmaceuticals. Chemically, MDMA is similar to the stimulant amphetamine and the hallucinogen mescaline. MDMA can thus produce both stimulatory and psychedelic effects.

"Ecstasy is like LSD without the hallucinations".[3]

Methylene-dioxy-amphetamine (MDA) and methylene-dioxy-ethyl-amphetamine (MDEA) are drugs chemically similar to MDMA.

MDMA is taken orally, usually in tablet form or as a capsule. MDMA's effects last for approximately 3–6 hours, though confusion, depression, sleep problems, anxiety and paranoia have been reported to occur even weeks after the last dose. MDMA produce significant increases in heart rate and blood pressure and a sense of alertness like that associated with amphetamine use. The stimulatory effects of MDMA, which enable users to dance for extended periods, may also lead to dehydration, hypertension, heart and kidney failure. MDMA can be extremely dangerous in high doses. It can cause a marked increase in body temperature (malignant hyperthermia) leading to muscle breakdown, kidney and cardiovascular failure. MDMA use may also lead to heart attacks, strokes and seizures in some users.

MDMA is neurotoxic – chronic use was found, first in laboratory animals and more recently in humans, to produce long-lasting, perhaps permanent, damage to the neurons that release serotonin with consequent memory impairment.

Appearance

Capsules (yellow, clear, red-and-black, green-and-yellow, red-and-yellow) or pills (brown, white, pink). The S.A. Narcotics Bureau says they can come in any colour, especially because the manufacturers are trying to fool them.

Ingredients

In its purest form the compound is called MDMA. There are about 55 different types available at the moment, all varying in strength; about 80% are mixed with other dry ingredients, including strychnine, pool acid, starch, sugar, chalk, diazepam (a tranquilliser - Valium), ketamine (a hallucinogenic anaesthetic), ephedrine (an appetite suppressant) and powdered heroin.

Gamma-Hydroxy-Butyrate (GHB)[2,4]

Streetnames

Grievous Bodily Harm, G, Liquid ecstasy, Georgia, Home boy.

GHB can be produced in clear liquid, white powder, tablet and capsule forms, and is often used in combination with alcohol, making it even more dangerous. GHB has been increasingly involved in poisonings, overdoses, "date rapes"[1] and other fatalities. The drug is used predominantly by adolescents and young adults, often when they attend nightclubs and raves. GHB is manufactured in homes with recipes and ingredients found and purchased on the Internet.

GHB is usually abused either for its intoxicating, sedative and euphoric properties or for its growth hormone releasing effect, which can build muscles. Some individuals are synthesizing GHB in home laboratories; ingredients in GHB, gamma-butyrolactone (GBL) and 1,4-butanediol, can be converted by the body to GHB. These ingredients are found in a number of dietary supplements available from health food stores and gymnasiums where they are used primarily to induce sleep, build muscles and enhance sexual performance. GHB is a CNS depressant that can relax or sedate. At higher doses it can also slow breathing and heart rate to dangerously low levels.

GHB's intoxicating effects start 10–20 minutes after oral administration. The effects typically last up to 4 hours, depending on the dosage. At lower levels, GHB can relieve anxiety and produce relaxation; however, as the dose increases, the sedative effects may result in sleep and eventual coma or death. Overdose of GHB can occur rather quickly with signs that are similar to those of other sedatives: nausea, vomiting, headache, loss of consciousness, loss of reflexes, impaired breathing and ultimately death.[1]

GHB is cleared from the body relatively quickly, so it is sometimes difficult to detect it in the emergency room or other treatment facilities.

Ketamine[2]

Streetnames

Special K, Vitamin K, Cat valiums K.

Ketamine is an injectable anaesthetic that has been approved for both human and animal use in medical settings since the 1970s. About 90% of the ketamine legally sold today is intended for veterinary use. It gained popularity for abuse in the 1980s, when it was realized that large doses cause reactions similar to those associated with use of phencyclidine (PCP) i.e. dream-like states and hallucinations.[1]

Ketamine is produced in liquid form or as a white powder that is often snorted or smoked with marijuana or tobacco products. It can also be injected intramuscularly.[1]

At higher doses, ketamine can cause delirium, amnesia, impaired motor function, high blood pressure, depression and potentially fatal respiratory depression.[1]

Low dose intoxication results in impaired attention, decreased learning ability and memory loss.

Rohypnol[2,4]

Streetnames

Roofies, Rophies, Roche, Forget-me-not pill.

Rohypanol (flunitrazepam) belongs to the class of drugs known as the benzodiazepines (BZD). It is not approved for prescription in the US, although it is approved in Europe and is used in more than 60 countries as a treatment for insomnia or as a pre-surgery sedative before anaesthesia.

Rohypnol is tasteless and odourless, and it dissolves easily in carbonated beverages.[1] The sedative and toxic effects are aggravated by concurrent use of alcohol. Even without alcohol, a dose of Rohypnol as small as 1 mg can impair a victim for 8–12 hours.

Rohypnol is usually taken orally, although there are some reports that it has been ground up and snorted. The drug can cause profound "anterograde amnesia"; that is, individuals may not remember events they experienced while under the effects of the drug.[1] This may be why one of the streetnames of the drug is the "forget-me-

not pill" – it is often used in sexual assaults.[1]

Other adverse effects associated with the use of Rohypnol include decreased blood pressure, drowsiness, visual disturbances, dizziness, confusion, gastrointestinal disturbances and urinary retention.

Amphetamine / Metamphetamine[4,6]

Streetnames

Speed, Ice, Uppers, Whites, Base, Doe, Crystal, Bennies, Dexies, Dexedrine, Methedrine, Chalk, Crank, Fire, Glass.

Amphetamine and metamphetamine are CNS stimulant drugs that have limited legitimate pharmacological use – they are used to treat narcolepsy, obesity and attention-deficit hyperactivity disorder (ADD). However, they can produce an initial euphoria and thus have a high abuse potential. For this reason, their use for appetite suppression should be discouraged.

In addition to the initial euphoria, amphetamine and metamphetamine produce a feeling of increased well-being and self-esteem with heightened mental and physical capacity. Appetite is suppressed. This initial state may be followed by restlessness, irritability and, especially in chronic users, paranoid psychosis. These unpleasant responses reinforce the continued use of the drug to maintain the "high". In extreme cases, addicts may have "speed runs", in which large intravenous doses are used for several days during which they do not sleep or eat until exhaustion intervenes. Then they sleep for 1–2 days (or longer) and awaken hungry but depressed leading to repetition of the cycle. Tolerance and psychological dependence develop with repeated use of amphetamines.

The CNS stimulatory effects of amphetamine and metamphetamine result from their ability to enhance the release of the neurotransmitter catecholamines (norepinehrine and dopamine).

In overdose, amphetamine and metamphetamine cause dizziness, tremor, irritability, hypertension, diaphoresis, mydriasis, cardiac arrhythmias, and if severe, hyperpyrexia, convulsions, coma and cerebral haemorrhage.

Treatment involves general supportive measures.

In addition to hepatic metabolism, amphetamine is eliminated as unchanged drug in the urine; the extent of such elimination is dependent on urine pH. Normally, about 30% of a dose is excreted unchanged, but this may vary from as much as 70% in acidic urine to as low as 1% in alkaline urine. The elimination half-life (renal excretion and hepatic metabolism) also varies with urine pH from 7–14 hours at acidic pH to 18–34 hours at alkaline pH.

Immunoassays for amphetamine and metamphetamine have variable cross-reactivity with other sympathomimetic amines e.g. ephedrine and pseudoephedrine, phenylpropanolamine, phenteramine and the so-called "designer" amphetamines (methylene-dioxy-amphetamine (MDA) and methylene-dioxy-metamphetamine (MDMA)). Confirmation of positive test results determined by immunoassay is therefore mandatory. Moreover, chiral discrimination of metamphetamine isomers may be necessary to distinguish use of non-prescription nasal inhalants (R[-]metamphetamine) from illicit use of S[+]metamphetamine. This may be resolved using conventional GC/MS.

Several prescription drugs are metabolised to amphetamine and to metamphetamine (and subsequently to amphetamine).

The CNS effects of S[+]metamphetamine are about 10x greater than those of R[-]metamphetamine, but the latter drug has greater vasoconstrictive properties than the former – because of the minimal CNS activity and thus the low abuse potential, R[-]metamphetamine is included in some non-prescription nasal inhalants (e.g. Vicks) for its vasoconstrictive properties.

Appearance

As a street drug, amphetamine is usually a white, grey, yellowish or pinkish powder.

It is odourless, bitter-tasting and dissolved easily in beverages.

Ingredients

The purity rate of street powder is less than 10%; the rest is made up of milder stimulants such as caffeine, drugs such as paracetamol or substances such as glucose, dried baby milk, flour or talcum powder.

LSD[4,7]

Streetnames

Acid, A, Microdot, Tab, White lightning, Boomers, Yellow sunshines.

LSD shares structural features with serotonin (5-hydroxy-tryptamine), a major CNS neurotransmitter and neuromodulator. LSD is an extremely potent psychedelic indole-alkylamine. The drug LSD binds to serotonin receptors in the CNS and acts as a serotonin agonist.

The principal physiological effects of LSD are perceptual distortions of colours, sound, distance and shape, depersonalisation and loss of body image and rapidly changing emotions from ecstasy to depression or paranoia. There has been a re-surge in the use of LSD, previously popular as a drug of abuse during the 1960s.

The physiological effects of LSD are related to its sympathomimetic actions and include mydriasis (most frequent and consistent), tachycardia, increased body temperature, diaphoresis and hypertension; at higher doses, parasympathomimetic actions may be observed (e.g. salivation, lacrimation, nausea, vomiting). Neuromuscular effects may include paresthesia, muscle twitches and incoordination.

The most common adverse effects of LSD are panic attacks. In addition, unpredictable recurrence of hallucinations ("flashbacks") may occur weeks or months after last drug use and LSD may elicit psychotic reactions (thought disorders, hallucinations, depression, depersonalisation). LSD is used illicitly because of its hallucinogenic effects. There is no evidence that repeated LSD use results in dependence or withdrawal symptoms.

The drug is rapidly absorbed from the GI tract; the effects begin within 40–60 minutes, peak at about 2–4 hours and subside by 6–8 hours. The elimination half-life is about 3 hours.

The clinical effects of LSD ingestion are usually benign and require no medical intervention. However, panic attacks may be severe and require treatment. Few, if any, well documented deaths related to LSD ingestion have been reported. Currently investigations are being done on the effects of LSD on the virility of males.

LSD may be detected in urine by immunoassay. At the typical cut-off concentration of 0.5 ng/mL, LSD may generally be detected for 24–120 hours after ingestion. For confirmation by GC/MS, LSD is converted to the N-TMS derivative.

Appearance

A liquid, on its own or on printed / filter paper cut into tiny squares or on postage stamps. Popular dosage forms also include powder, gelatin capsules / tablets or LSD-impregnated sugar cubes.

Ingredients

Lysergic acid diethylamide (LSD) was originally derived from wild fungus. Known to be sold in pill form mixed with ecstasy or amphetamine and sold as ecstasy.

References

1. National Institute of Drug Abuse. NIDA InfoFacts: Club Drugs (GHB, Ketamine, and Rohypnol). U.S. Department of Health and Human Services, National Institutes of Health, NIDA. Updated August 2008. Accessed 25 May 2009. Available at: http://www.nida.nih.gov/infofacts/clubdrugs.html
2. Gahlinger PM. Club Drugs: MDMA, Gamma-Hydroxybutyrate (GHB), Rohypnol, and Ketamine. American Family Physician. 2004; 69(11):2619-26. Accessed on 25 May 2009. Available at: http://www.aafp.org/afp/20040601/2619.pdf
3. Drug and Alcohol Addiction Treatment. Ecstasy (XTC) (MDMA) drug addiction treatment. Accessed on 25 May 2009. Available at: http://www.addiction-treatment-central.com/Drug-Information/Drug-Information/ecstasy.html
4. American Council for Drug Education. Basic facts about drugs. Brooklyn, New York: American Council for Drug Education. Accessed on 25 May 2009. Available at: http://www.acde.org/health/Research.htm
5. Kant, H. The pharmacology and toxicology of "ecstasy" (MDMA) and related drugs. CMAJ. 2001; 165(7):917-28. Accessed on 25 May 2009. Available at: http://www.cmaj.ca/cgi/content/full/165/7/917
6. California Department of Alcohol and Drug Programs/ University of California, Los Angeles Integrated Substance Abuse Programs. Methamphetamine treatment. A practitioner's guide. California: CDADP/UCLA ISAP; 2007. Accessed on 25 May 2009. Available at: http://www.adp.ca.gov/Meth/pdf/MethTreatmentGuide.pdf
7. US Drug Enforcement Agency. LSD. US/ DEA; 2006. Accessed on 25 May 2009. Available at http://www.usdoj.gov/dea/concern/lsd.html

This article is sponsored by Lancet Laboratories.

Naude B, MSc (Physiotherapy)[1]
Mudzi W, MSc (Physiotherapy)[1]
Mamabolo MV, BSc (Physiotherapy), MPH[1]
Becker PJ, PhD[2]

[1] Lecturer: Department of Physiotherapy, Faculty of Health Sciences, University of the Witwatersrand

[2]Statistician: Biostatistics Unit, Medical Research Council of South Africa

Corresponding author: Benita Naude, Physiotherapy Department, Faculty of Health Sciences, University of the Witwatersrand, 7 York Road, Parktown, 2193
Tel: +27 (0)11 717 3702
Fax: 086 663 5776
E-mail: benita.naude@wits.ac.za

Low back pain among hospital employees in Gauteng, South Africa: Point prevalence and associated factors

Abstract

Low back pain can be influenced by demographic, lifestyle and co-morbid factors, but there are few studies on the relationship between these in South African hospital employees. This cross-sectional study aimed to determine the point prevalence for low back pain and the factors associated with its presence amongst staff employed at a district hospital in Gauteng, South Africa. A self-administered questionnaire was used. Results indicated a point prevalence of 47.46%. Only female gender was associated with increased risk of low back pain (OR 1.67 CI 1.04 ; 2.69) while for the lifestyle factors, participation in physical activity especially in the form of group exercises was a protective factor (OR 1.66 CI 1.02 ; 2.70). Stress experienced at work all the time increased the risk (OR 3.47 CI 1.46 ; 8.23). Clinical recommendations include special occupational adaptation for females and the incorporation of physical activity, especially group exercise, and stress management strategies into low back pain management programmes.

Key words: low back pain, risk factors, hospital staff

Introduction

Low back pain (LBP) remains a major health problem not only in high income countries but in low income countries as well, with major cost implications.[1] World over, the one year prevalence of LBP ranges between 22% and 65% while the lifetime prevalence of LBP ranges from 11–84%.[2] In Africa, the one year prevalence of LBP among adolescents is 33% and 50% among adults.[3] Van Vuuren et al. found a LBP point prevalence rate among South African steel plant workers of 35.8% with the lifetime prevalence rate being 63.9%.[4] In South African government hospitals in the Gauteng Province, a total number of 5727 LBP cases were seen by 152 physiotherapists between the 1st of January and the 30th of August 2006.[5]

LBP influences the quality of life and causes physical and psychological distress.[4] Its consequences are far reaching and lead to a negative economic impact, including an increased absence from work and lost productivity.[4] Back pain has been found to place an enormous load on healthcare resources in the National Health Service in the UK.[6] Combined direct and indirect costs associated with LBP were more than the estimated costs for lower respiratory tract infections, Alzheimer's disease, stroke, diabetes, multiple sclerosis, and epilepsy combined.[7]

Many factors are thought to have an effect on the prevalence of LBP. The effect of gender has produced conflicting results. Burdorf and Sorock[8] reviewed 35 publications on work-related disorders and found that gender was not associated with the presence of LBP. In contrast, Alcouffe

et al.[9] reported that symptoms of LBP were more prevalent in women (58.2%) than in men (52.7%), although women seemed to be less exposed to known occupational risk factors. Kwon et al.[10] postulated that LBP in women might be associated with gynaecological conditions, and that it is important to study males and females separately. It was also shown that women tended to take longer to return to work than men after an episode of acute LBP.[11] The reason why more women than men suffer from LBP could be due to their higher reporting of somatic symptoms, better ability to recall previous incidences of LBP, poorer perceived physical health, increased pain perception and decreased inhibition.[12] In a South African study the 12 month prevalence of LBP among female nurses was 11.5% and among male nurses it was 38.9%.[13] The higher prevalence of LBP among male nurses may have been because males are perceived to be stronger and are expected to assist with lifting and transferring of heavy patients. This result could not be found elsewhere in the literature.

A sedentary lifestyle and insufficient physical activity is another factor that appears to be associated with the presence of LBP. People who exercised three to four times per week as well as those who exercised five to six times per week, had a lower chance of developing LBP than those who exercised one to two times per week and those who did not exercise at all.[10] Strengthening and mobilisation exercises of the back are believed to protect the back by increasing blood supply to the spine muscles and joints, and intervertebral discs. This minimises injury and enhances repair. Exercises are also believed to alter the perception of pain by encouraging a positive frame of mind.[14]

A relationship was found between psychological stress in the workplace and LBP.[15,16] Unexpected events, dependence on others, negative perceptions of support, low job satisfaction, time pressure and deadlines were identified as work-related stressors in a South African study.[17] On the other hand, taking unscheduled breaks was found to be preventative in the development of LBP. Psychosocial factors may cause increased muscle tension which may in turn lead to altered spinal loading. As a result of the latter, nutrition of the intervertebral discs, nerve roots and other spinal tissues are affected.[18,19] It was postulated that raised plasma cortisol levels may leave muscles vulnerable to injury due to mechanical loads and hence increased susceptibility to LBP.[20] It is also believed that pain tolerance may be decreased due to stress among people living in poor psychosocial environments, and those affected may be inclined to take more sick leave due to LBP.[21,22]

Returning patients to optimal function after a LBP episode can be done by incorporating important changes into their lifestyle.[23] These include goal setting, activity pacing, exercise, ergonomics, education about the detrimental effects of rest and general deconditioning, and stress management.[23] Lifestyle changes are important and patients should be encouraged to participate actively in taking control of their pain in order to reduce disability and psychological distress, improve general health, improve coping mechanisms, and return to work and activities of daily living. In short, patients should be equipped with the ability to manage their own pain in everyday situations.[24] These changes can be accentuated once the role-playing lifestyle factors are determined.

A number of studies on the prevalence and determinants of LBP have been done in high income countries but little has been done in low income countries.[25] A few studies have been conducted on the incidence of LBP the South African nursing sector.[13,26] No studies on the association of LBP and demographic, lifestyle and co-morbid factors on a population of South African district hospital employees, including health and support staff, were found. Given the significance of LBP as a health problem in the workplace, it is important to search for a possible LBP high-risk population. In this regard, certain demographic, lifestyle and co-morbid factors may be the key factors for spotting such a target group.[25] If this is so, LBP prevention programmes could then be incorporated into occupational health services for these high-risk employees. In view of the lack of such studies, it was decided to mount such an investigation in the health services in South Africa. Therefore, the aim of this study was to determine the point prevalence for LBP and the factors associated with its presence amongst staff employed at a district hospital in Tshwane in Gauteng, South Africa.

"A sedentary lifestyle and insufficient physical activity is associated with the presence of LBP..."

Method

This cross-sectional study, conducted in 2007, used a self-administered questionnaire. All health care and support staff employed at a district hospital in Gauteng, South Africa were approached to participate. Only permanently employed staff were included in order to minimise the influence of activities performed when involved in other employment as well. Staff members who were not willing to participate in the study, students and casual workers were excluded. The total number of participants was 354, which

was 77.80% of the total number of permanently employed hospital employees. Reasons for non-participation included not being available as a result of leave, absence from work and refusal to participate.

The development of the self-administered questionnaire was based upon known risk indicators for LBP as described by Kwon et al.[10] The questionnaire contained questions under the following topics: demographics, recreation, occupation, perceived stress experienced at work, general health and the presence of LBP. To establish the presence of stress experienced at work, participants had to answer the following question: "In your personal opinion, do you experience stress at work?" Information on the presence of LBP was gathered by asking participants whether they were experiencing LBP at the time of the study. This section also sought information on how the pain was managed. A "mannequin" with a shaded area between T12 and above the gluteal fold was used in order to help define LBP visually.[27]

The questionnaire was validated for its content by having it scrutinised by "physiotherapy experts" in the field of back care and management and being based on literature. The repeatability of the questionnaire was established using the test re-test method for intra-rater reliability. The English questionnaire was translated into Tswana by three translators, and back translated into English again by two other translators.

Ethical clearance was granted by the University of the Witwatersrand Human Research Ethics Committee (Number M070359). Permission to conduct this study was obtained from the Hospital Superintendent. Participants were asked to voluntarily sign the consent form and were told that refusal to take part in the study would not prejudice them in any way.

The Stata Release 8.0 statistical software was used in the analysis of the data. Categorical variables were summarised using frequencies, percentages and cross-tabulations. Means and standard deviations were determined for the following demographic factors: height, weight and body mass index (BMI) (continuous variables). Fisher's exact test was used for comparison between LBP categories with respect to categorical variables and tests for trends in odds ratios employed Pearson's chi-square test. Univariate analysis (independently) and odds ratios for potential risk factors for LBP were determined and tested for trend, i.e. if prevalence of LBP increased with an increase in severity of risk (exposure).

Results

The point prevalence of LBP among the 354 participants in this study was 47.46% (n=168). Nursing staff comprised 37.57% (n=133) of the participants (Table 1) and 58.65% (n=78) of nurses suffered from LBP. Frequency distributions for the factors in relation to the presence of LBP are provided in Tables 2 and 3.

Only gender, participation in group exercise and stress perceived at work all the time were found to be statistically significantly associated with LBP (Table 4). More women than men suffered from LBP in this study and females were at greater risk of developing LBP than men (OR 1.67 CI 1.04 ; 2.69).

Participation in group exercises or team sport was found to reduce the chances of developing LBP (OR 1.66: CI 1.02 ; 2.70). It was interesting that of those who did group exercises, only 38.30% (n=36) had LBP and this was the lowest proportion of participants who had LBP for all the exercise categories. It should be noted however, that 84.04% (n=79) and 56.38% (n=53) of those that participated in group exercise or team sport also engaged in walking and running respectively. The association between frequency of physical activity and LBP was not statistically significant.

The study established that 40 (65.57%) of the 61 participants who experienced stress at work all the time, had LBP. The risk to develop LBP for this group was also elevated (OR 3.47: CI 1.46 ; 8.23) and a positive association which was statistically significant (p=0.001) was found between stress at work and the presence of LBP in this study.

Co-morbidities and time spent sitting, standing and

Table 1. Distribution of occupations in the study population (N=354)

Occupations	Males n (%)	Females n (%)	Total n (%)
Administrative staff	15 (4.24)	41 (11.58)	56 (15.82)
Nursing staff	5 (1.41)	128 (36.16)	133 (37.57)
Allied health practitioners	0 (0.00)	11 (3.11)	11 (3.11)
Medical practitioners	10 (2.82)	18 (5.08)	28 (7.91)
Drivers	3 (0.85)	1 (0.28)	4 (1.13)
Porters	10 (2.82)	5 (1.41)	15 (4.24)
Security officers	12 (3.39)	2 (0.56)	14 (3.95)
Cleaners	7 (1.98)	9 (2.54)	16 (4.52)
General assistants	16 (4.52)	36 (10.17)	52 (14.69)
Maintenance	21 (5.93)	4 (1.13)	25 (7.06)
Total n (%)	99 (27.97)	255 (72.03)	354 (100.00)

"Psychosocial factors may cause increased muscle tension which may in turn lead to altered spinal loading."

Table 2. Age, gender, body mass index, heavy physical duty and perceived stress at work in relation to low back pain (N=354)

Factor	LBP n (%)	No LBP n (%)	Total n (%)
Age			
Younger than 25	25 (7.06)	37 (10.45)	62 (17.51)
26 to 40	107 (30.23)	109 (30.79)	216 (61.02)
41 to 60	33 (9.32)	36 (10.17)	69 (19.49)
Older than 60	3 (0.85)	4 (1.13)	7 (1.98)
Total n (%)	**168 (47.46)**	**186 (52.54)**	**354 (100.00)**
Gender			
Male	38 (10.73)	61 (17.23)	99 (27.97)
Female	130 (36.72)	125 (35.31)	255 (72.03)
Total	**168 (47.46)**	**186 (52.54)**	**354 (100.00)**
Body mass index (BMI)			
< 19	7 (1.98)	4 (1.13)	11 (3.12)
19 to 27,4	76 (21.47)	106 (29.94)	182 (51.41)
27,5 to 40	74 (20.90)	68 (19.21)	142 (40.11)
> 40	11 (3.12)	8 (2.26)	19 (5.37)
Total n (%)	**168 (47.46)**	**186 (52.54)**	**354 (100.00)**
Heavy physical duty (lifting)			
No	20 (5.65)	36 (10.17)	56 (15.82)
Yes	148 (41.81)	150 (42.37)	298 (84.18)
Total n (%)	**168 (47.46)**	**186 (52.54)**	**354 (100.00)**
Perceived stress at work			
Never	15 (4.24)	28 (7.91)	43 (12.15)
Sometimes	89 (25.14)	113 (31.92)	202 (57.06)
Often	24 (6.78)	24 (6.78)	48 (13.56)
All the time	40 (11.30)	21 (5.93)	61 (17.23)
Total	**168 (47.46)**	**186 (53.54)**	**354 (100.00)**

Table 3. Low back pain in participants engaging in different types of physical activity (N=354)

Type of exercise	LBP n (%)	No LBP n (%)	Total n (%)
Walking	133 (37.57)	147 (41.53)	280 (79.10)
Running	40 (11.30)	58 (16.38)	98 (27.68)
Group exercise/sport	36 (10.17)	58 (16.38)	94 (26.55)
Other exercise	31 (8.76)	31 (8.76)	62 (17.52)
No exercise	40 (11.30)	33 (9.32)	73 (20.62)

(not mutually exclusive)

Table 4. The relationship between the presence of low back pain and other factors (n=168)

Factor	Category	LBP n (%)	Odds ratio (OR)	(95% Confidence interval)	p-value Test for trend
Age	<25	25 (14.88)	1.00		0.52
	26–40	107 (63.69)	1.45	(0.82 ; 2.58)	
	41–60	33 (19.64)	1.36	(0.66 ; 2.73)	
	>60	3 (1.79)	1.11	(0.23 ; 5.46)	
	Total n (%)	168 (100.00)			
Gender	Male	38 (22.62)	1.00		0.03
	Female	130 (77.38)	1.67	(1.04 ; 2.69)	
	Total n (%)	168 (100.00)			
Body mass index (BMI)	<19	7 (4.17)	2.44	(0.68 ; 8.71)	0.04
	19–27,4	76 (45.24)	1.00		
	27,5–39	74 (44.05)	1.52	(0.97 ; 2.37)	
	≥40	11 (6.55)	1.92	(0.73 ; 5.03)	
	Total n (%)	168 (100.00)			
Walking	Yes	133 (79.17)	1.00		0.98
	No	35 (20.83)	0.99	(0.59 ; 1.66)	
	Total n (%)	168 (100.00)			
Running	Yes	40 (23.81)	1.00		0.12
	No	128 (76.19)	1.45	(0.90 ; 2.33)	
	Total n (%)	168 (100.00)			
Group exercise	Yes	36 (21.43)	1.00		0.04
	No	132 (78.57)	1.66	(1.02 ; 2.70)	
	Total n (%)	168 (100.00)			
Other exercise	Yes	31 (18.45)	1.00		0.66
	No	137 (81.55)	0.88	(0.51 ; 1.53)	
	Total n (%)	168 (100.00)			
No exercise	Yes	40 (23.81)	1.00		0.16
	No	128 (76.19)	0.69	(0.41 ; 1.16)	
	Total n (%)	168 (100.00)			
Daily time spent sitting at work (hours)	0–1	93 (56.36)	1.00		0.55
	2–4	43 (25.60)	0.90	(0.55 ; 1.48)	
	5–6	17 (10.12)	1.19	(0.57 ; 2.49)	
	>6	15 (8.93)	1.29	(0.58 ; 2.86)	
	Total n (%)	168 (100.00)			
Daily time spent standing at work (hours)	0–1	15 (8.93)	1.00		0.26
	2–4	35 (20.83)	0.97	(0.44 ; 2.17)	
	5–6	43 (25.60)	1.30	(0.59 ; 2.89)	
	>6	75 (44.64)	1.39	(0.66 ; 2.94)	
	Total n (%)	168 (100.00)			
Daily time spent walking at work (hours)	0–1	28 (16.67)	1.00		0.04
	2–4	40 (23.81)	1.18	(0.63 ; 2.22)	
	5–6	42 (25.00)	1.61	(0.84 ; 3.09)	
	>6	58 (34.52)	1.72	(0.93 ; 3.19)	
	Total n (%)	168 (100.00)			
Heavy physical duty (lifting)	No	20 (11.90)	1.00		0.06
	Yes	148 (88.10)	1.78	(0.98 ; 3.22)	
	Total n (%)	168 (100.00)			
Stress perceived at work	Never	15 (8.93)	1.00		0.001
	Sometimes	89 (52.98)	1.47	(0.74 ; 2.93)	
	Often	24 (14.29)	1.87	(0,79 ; 4.41)	
	All the time	40 (23.81)	3.47	(1.46 ; 8.23)	
	Total n (%)	168 (100.00)			
Diabetes	No	167 (99.40)	1.00	(0.02 ; 1.53)	0.08
	Yes	1 (10.60)	1.18		
	Total n (%)	168 (100.00)			
Hypertension	No	156 (92.86)	1.00	(0.57 ; 3.22)	0.49
	Yes	12 (7.14)	1.35		
	Total n (%)	168 (100.00)			
Arthritis	No	157 (93.45)	1.00	(0.76 ; 5.84)	0.15
	Yes	11 (6.55)	2.10		
	Total n (%)	168 (100.00)			
Other conditions	No	137 (81.55)	1.00	(1.13 ; 3.96)	0.02
	Yes	31 (18.45)	2.11		
	Total n (%)	168 (100.00)			

walking at work were not statistically significant in the association with LBP (Tables 5 and 6).

Discussion

The participation rate in this study was 77.80% of the total number of permanently employed health and support staff. As a result of this high response rate, the introduction of bias is unlikely.

The LBP point prevalence rate of 47.46% found in this study is higher than the LBP point prevalence rate of 35.8% reported by Van Vuuren et al.[4] in another South African study. However, the population in that study was drawn from the semi-automated steel industry[4] and it is possible that working in this industry is less physically and emotionally demanding when compared to the tasks in a hospital setting. Naidoo et al., in another South African study on nurses, identified a similar prevalence to this study of 44.33%.[26] The incidence of LBP found in Uebel et al.'s[13] study was low (13.1%) compared with the finding for our study. This may have been because it only included nursing staff with a clinical diagnosis of mechanical LBP, whereas our study selected participants based on a self report of LBP. Since it was a prevalence study, it would also have excluded nurses who already had LBP at the start of the study and who did not seek medical attention at the staff clinic and injury-on-duty unit of the hospital. Finally, it did not investigate the psychosocial aspects such as perceptions of work stress, so the work environment may have been different.

High LBP point prevalence rates, as found in this study, may negatively impact on human resources and associated productivity at work.[4] This issue is also germane when looking at the essential human resources required in a hospital setting. The associated decrease in productivity as a result of a high prevalence of LBP may have detrimental consequences on direct and in-direct patient care in a district hospital.

The high prevalence of LBP among women found in this study is a finding supported by Burdorf and Sorock.[8] Possible explanations are the influence of gynaecological conditions,[10] domestic activities[9] and the higher reporting of symptoms by women.[12] Occupational adaptation in the form of ergonomics and kinetic handling in the hospital environment is of even more importance when one considers that female employees who suffer from LBP, tend to experience more severe symptoms[8] and take longer to return to work after an acute episode.[28] The vast majority of nursing staff were female (96.24%) and LBP in this occupational group was also much higher (58.65%) than the general point prevalence of LBP found in this study. Nursing staff are commonly seen as vulnerable to LBP given then the nature of their work.[29] Heavy physical duty, including lifting, stooping over patients and transferring patients, is part of the nursing staff's occupational activities hence the importance of proper kinetic handling and ergonomics cannot be overemphasised.[30,31] In contrast to the findings in this study, Uebel et al.[13] found that far less female (11.5%) than male nurses (38.9%) suffered from LBP. However, this study examined all categories of staff, and only five male nurses participated.

Most of the participants who took part in group exercises also took part in other activities like walking and running. Due to the physical as well as psychologically beneficial effects of physical activity on the lower back,[14,32] it should be included in LBP prevention programmes. The reason for the low percentage of LBP sufferers among those who did group exercises (38.30%) may be that group exercises are more motivating and encourage participation, and this in turn may ensure better compliance with exercise in LBP prevention programmes.

In this study perceived stress at work was not assessed by using a standardised outcome measure but by self-reporting on a four-point scale. This method was found reliable by Warming et al.[33] Hartvigsen et al.[34] also identified a similarly significant effect of work stress on LBP as found in this study. The lack of control over time as well as lack of control over stressful events is a major source of stress experienced in the hospital environment.[35] Stress causes raised blood cortisol levels which has an influence on muscle function and in this way leaves the body vulnerable to injury. Although stress management strategies may be deficient, one can easily be taught how to appropriately cope with stress. Stressful situations may also happen outside the workplace and may influence the stress experienced at work and in general. What could not be derived from this study is whether it was stress that was experienced at work which increased LBP, or if increased stress was experienced as a result of LBP. Kwon et al.[10] argued that mental symptoms such as depression occurred with chronic diseases. For this reason they doubted that mental stress is a cause of LBP, but may be a result of chronic suffering from LBP.

The study had some limitations. An in-depth exploration of household chores and leisure activities were not included in the

Table 5. The distribution of co-morbidities in the study population (n=95)

Co-morbid factors	LBP n (%)	No LBP n (%)	Total n (%)
Diabetes	1 (1.05)	6 (6.32)	7 (7.37)
Hypertension	12 (12.63)	10 (10.53)	22 (23.16)
Arthritis	11 (11.58)	6 (6.35)	17 (17.89)
Other conditions	31 (32.63)	18 (19.95)	49 (51.58)

(not mutually exclusive)

Table 6. Hours spent sitting, standing and walking by participants with and without low back pain (N=354)

Hours	Sitting n (% of N)		Standing n (% of N)		Walking n (% of N)	
	LBP	No LBP	LBP	No LBP	LBP	No LBP
0–1	93 (26.27)	104 (29.38)	15 (4.24)	20 (5.65)	28 (7.91)	43 (12.15)
2–4	43 (12.15)	53 (14.97)	35 (9.89)	48 (13.56)	40 (11.30)	52 (14.69)
5–6	17 (4.80)	16 (4.52)	43 (12.15)	44 (12.43)	42 (11.86)	40 (11.30)
>6	15 (4.24)	13 (3.67)	75 (21.19)	74 (20.90)	58 (16.38)	51 (14.41)
Total n (% of N)	168 (47.46)	186 (52.54)	168 (47.46)	186 (52.54)	168 (47.46)	186 (52.54)

questionnaire and may have influenced the presence of LBP. Self-reporting of health and the presence of LBP may influence the accuracy of information given by participants. A standardised outcome measure to clinically confirm LBP was not used. This study does not distinguish between recreational and occupational LBP, nor does it distinguish between accidental and overuse injuries. Health and LBP could have been underreported by staff for fear of negative repercussions from the employer with regards to job promotion and being prejudiced against.

Conclusion and recommendations

The point prevalence of LBP at 47.46% was high. Among the demographic factors, only female gender was associated with the presence of LBP. Among the lifestyle factors, participation in physical activity especially group exercises was a protective factor against LBP while perceived stress at work all the time was associated with the presence of LBP.

Clinical recommendations are that special adaptation of the occupational environment with regards to goal setting, activity pacing, ergonomics and stress management should be considered for females in order to curtail the development of lower back problems as females are at a greater risk of developing LBP. Physical activity especially in the form of group exercises should be encouraged in the prevention and long term management of LBP. Stress management strategies and relaxation techniques should be included into LBP prevention and management programmes. Future research should include household activities and other recreational activities when studying the influence of physical load on the lower back.

Lessons learned

- Female staff were at increased risk for LBP.
- Structured LBP prevention programmes for hospital employees should be put in place.
- Special occupational adaptation is needed for females.
- Physical activity especially group exercise should be encouraged.
- Stress management and relaxation should be part of LBP treatment programmes.

References

1. Dagenais S, Caro J, Haldeman S. A systematic review of low back pain cost of illness studies in the United States and internationally. Spine J. 2007 Jan-Feb;8(1):8-20.
2. Walker BF. The prevalence of low back pain: A systematic review of the literature from 1966 to 1998. J Spinal Disord. 2000 Jun;13(3):205-17.
3. Louw QA, Morris LD, Grimmer-Somers. The prevalence of low back pain in Africa: A systematic review. BMC Musculoskelet Disord. 2007 Nov;1(8):105.
4. Van Vuuren BJ, Becker PJ, Van Heerden HJ, Zinzen E, Meunisen R. Lower back problems and occupational risk factors in a South African steel industry. Am J Ind Med. 2005 May;47(5):451-7.
5. Gauteng Department of Health. Physiotherapy Statistics. Jan-Aug. Summarised by Retha Jacobs. Pretoria: Gauteng Department of Health; 2006.
6. Klaber Moffett JA, Richardson G, Sheldon TA, Maynard A. Back pain: Its management and cost to society. York: Centre of Health Economics, University of York; 1995; p.1-67.
7. Maniadakis N and Gray A. The economic burden of back pain in the UK. Pain. 2000: 84(11):95-103.
8. Burdorf A, Sorock F. Positive and negative evidence of risk factors for back disorders. Scand J Work Environ Health. 1997 Aug;23(4):243-56.
9. Alcouffe J, Manlillier P, Brehier M, Fabin C, Faupin F. Analysis by sex of low back pain among workers from small companies in the Paris area: severity and occupational consequences. Occup Environ Med. 1999 Oct;56(10):696-701.
10. Kwon MA, Shim WS, Kim MH, Gwak MS, Hahm TS, Kim GS, et al. A correlation between LBP and associated factors: a study involving 772 patients who had undergone general physical examination. J Korean Med Sci. 2006 Dec;21(6):1086-91.
11. Steenstra IA, Verbeek JH, Heymans MW, Bongers PM. Prognostic factors for duration of sick leave in patients sick listed with acute low back pain: a systematic review of the literature. Occup Environ Med. 2005 Dec;62(12):851-60.
12. Barsky AJ, Peekna HM, Borus JF. Somatic symptom reporting in women and men. J Gen Intern Med. 2001 Apr;16(4):266-75.
13. Uebel KE, Rae W, Joubert G, Hiemstra L. Reported low back pain amongst nurses at a district hospital: incidence, profile and risk factors. Occupational Health Southern Africa. 2009 March/April;15(2):8-15.
14. Burton AK, Balague F, Cardon G, Eriksen HR, Henrotin Y, Lahad A, et al. COST B13 Working Group on European Guidelines for Prevention in Low Back Pain. How to prevent low back pain. Best Pract Res Clin Rheumatol. 2005 Aug;19(4):541-55.
15. Chen WQ, Yu I, Wong TW. Impact of occupational stress and other psychosocial factors on musculoskeletal pain among Chinese offshore oil installation workers. Occup Environ Med. 2005 Apr;62(4):251-6.
16. Linton SJ. Occupational psychological factors increase the risk for back pain: A systematic review. J Occup Rehabil. 2001 March;11(1):53-66.
17. Van Vuuren B, Zinzen E, Van Heerden HJ, Becker PJ, Meeusen R. Work and family support systems and the prevalence of lower back problems in a South African steel industry, J Occup Rehabil. 2007 Sept;17(3):409-21.
18. Bongers PM, De Winter CR, Kompier MA, Hildebrandt VH. Psychosocial factors at work and musculoskeletal disease. Scand J Work Environ Health. 1993 Oct;19(5):197-312.
19. Bergenudd H, Johnell O. Somatic versus nonsomatic shoulder and back pain experience in middle age in relation to body build, physical fitness, bone mineral content, gamma-glutamyltransferase, occupational workload, and psychosocial factors. Spine. 1991 Sept;16(9):1051-5.
20. Theorell T, Nordemar R, Michelsen H. Pain thresholds during standardized psychological stress in relation to perceived psychosocial work situation. J Psychosom Res. 1993 Apr;37(3):299-305.
21. Nachemson AL. Newest knowledge of low back pain. A critical look. Clin Orthop Rel Res. 1992 Jun;(279):8-20.
22. Burton AK, Erg E. Back injury and work loss. Biomechanical and psychosocial influences. Spine. 1997 Nov 1;22(21):2575-80.
23. Frost H, Lamb SE, Shackleton CH. A functional restoration programme for chronic low back pain: A prospective outcome study. Physiotherapy. 2000 June;86(6):285-93.
24. McKenzie RA. The cervical and thoracic spine. Mechanical diagnosis and therapy. Spinal Publications: New York; 1990.
25. Hestbaek L, Leboeuf-Yde C, Kyvik KO. Are lifestyle-factors in adolescence predictors for adult low back pain? A cross-sectional and prospective study of young twins. BMC Musculoskelet Disord. 2006 Mar;15(7):27-34.
26. Naidoo R, Coopoo Y. The health and fitness profiles of nurses in KwaZulu-Natal. Curationis. 2007 June;30(2):66-73.
27. Eriksen W, Natvig B, Bruusgaard D. Smoking, heavy physical work and low back pain: a four-year prospective study. Occup Med (Lond). 1999 Apr;49 (3):155-60.
28. Mogren I. Perceived health, sick leave, psychosocial situation, and sexual life in women with low-back pain and pelvic pain during pregnancy. Acta Obstet Gynecol Scand. 2006;85(6):647-56.
29. Violante FS, Fiori M, Fiorentini C, Risi A, Garagnani G, Bonfiglioli R, et al. Associations of psychosocial and individual factors with three different categories of back disorder among nursing staff. J Occup Health. 2004 Mar;46(2):100-8.
30. Sun J, He Z and Wang S. Prevalence and risk factors of occupational low back pain in IC U nurses. Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zh. 2007 Aug;25(8):453-55.
31. Engels JA, van der Gulden JWJ, Senden TF, Van't Hog B. Work related risk factors for musculoskeletal complaints in the nursing profession: results of a questionnaire survey. Occup Environ Med. 1996 Sept;53(9):636-41.
32. Tveito TH, Hysing M, Eriksen HR. Low back pain interventions at the workplace: A systematic literature review. Occup Med (Lond). 2004 Jan;54(1):3-13.
33. Warming S, Precht DH, Suadicani P, Ebbohoj NE. Musculoskeletal complaints among nurses related to patient handling tasks and psychosocial factors – based on logbook registrations. Appl Ergon. 2009 Jul;40(4):569-76. Epub 2007 Sept 11.
34. Hartvigsen J, Lings S, Leboeuf-Yde C, Bakketeig L. Psychosocial factors at work in relation to low back pain and consequences of low back pain; a systematic, critical review of prospective cohort studies. J Occup Environ Med. 2004 Jan;61(1):e2.
35. Elfering A, Grebner S, Semmer NK, Gerber H. Time control, catecholamines and back pain among young nurses. Scand J Work Environ Health. 2002 Dec;28(6):386-93.

Reasonably practicable

When the Occupational Health and Safety Act[1] (OHSAct) and the Mine Health and Safety Act[2] (MHSAct) were introduced in 1993 and 1996 respectively they required employers to provide employees with a working environment that is safe and without risk to their health, "as far as is reasonably practicable". This suggests that the employer does not have to provide absolute protection but can use reasonable practicability to judge how far to go to achieve compliance with the law.

Definition

In terms of the OHSAct[1] "reasonably practicable" means practicable having regard to:

a) the severity and scope of the hazard or risk concerned;
b) the state of knowledge reasonably available concerning that hazard or risk and of any means of removing or mitigating that hazard or risk;
c) the availability and suitability of means to remove or mitigate that hazard or risk; and
d) the cost of removing or mitigating that hazard or risk in relation to the benefits deriving therefrom.

The MHSAct[2] has an almost identical definition.

What is involved?

Reasonable practicability involves weighing-up the risks and balancing these against the resources necessary to control them. Anyone who is required to do something, as far as is reasonably practicable, must assess, on the one hand, the risks associated with a particular work activity and, on the other hand, the physical difficulties, time, trouble and expense that would be involved in taking steps to avoid those risks. This is, however, subjective and often gives rise to uncertainty about what exactly is required.

If, for example, the risks to health and safety of a particular work process are assessed as being low, and the cost or technical difficulties of any proposed methods of avoiding those risks are high, it might not be reasonably practicable to take those steps. However, if the risks are very high, then less weight can be given to the costs involved in implementing the measures needed to avoid the risks.

It should be noted that the financial standing of the employer does not come into this comparison. A precaution which is reasonably practicable for a prosperous employer is equally reasonably practicable for the impoverished. It is the safety or health of the employee which must be the dominant concern.

How can employers be sure they are doing all they need to?

Should a workplace incident resulting in injury or illness come to court, the odds are stacked against the accused since the evidence will, almost invariably, tend to suggest that there were reasonably practicable simple and straightforward measures that could have been taken. The enforcement authorities and the courts have the wisdom of hindsight. In order to avoid this, the employer requires foresight. How then can employers be sure they are doing all that they need to?

Obviously all absolute requirements (i.e. appointments, supervision, reporting, providing information, etc.) must be met first.

Any relevant health and safety standards or codes that have been incorporated into the OHSAct[1] MHSAct[2] or their regulations should also be followed carefully. If enforcement action follows a workplace incident involving injury or illness, it might be difficult to argue successfully that any alternative or replacement method was satisfactory. Also, it is unlikely that the enforcing authorities would lay charges against anyone following their own guidance.

Health and safety concerns will never improve without active intervention. An occupational health and safety management action plan should be prepared, just as for every other management activity. These plans need not be over-complicated. However, the reasonably practicable steps that should be taken and monitored include:

- identifying all existing hazards;
- noting any existing protective measures and controls;
- determining legal requirements and duties;
- assessing remaining health and safety risks;
- instituting prevention policies and control measures; and
- establishing effective monitoring, reviews and audits.

It is vital that the Health and Safety Committee, Health and Safety Representatives and, where possible, the employees affected are fully engaged in this process. This assists in getting "buy-in" to the findings and any resulting actions.

While the management action plan should be developed by management, in consultation with the employees or employee representatives, it is often helpful to have this process facilitated by a professional health and safety adviser. This helps to ensure that hazards are not missed and that all the available control options are considered.

Good occupational health and safety is reasonably practicable!

References

1. Department of Labour, South Africa. Occupational Health and Safety Act, No. 85 of 1993, as amended by the Occupational Health and Safety Amendment Act, No. 181 of 1993. Available at http://www.labour.gov.za/downloads/legislation/acts/occupational-health-and-safety/
2. Department of Minerals and Energy, South Africa. The Mine Health and Safety Act, No 29 of 1996 (as amended). Available at http://www.dme.gov.za/mhs/documents.stm
3. Farmer D. So far as is reasonably practicable. Kingston, UK: Croner Publications Ltd; 1989.

Rob Ferrie,
National Institute of Occupational Health,
PO Box 4788,
Johannesburg 2000
E-mail: rob.ferrie@nioh.nhls.ac.za

SASOHN 4th Academic Day

Vulnerable and neglected workers – Making a difference?

Why vulnerable workers?

The protection of employees from hazards associated with their employment is one of the key objectives of occupational health. As occupational health professionals (OHPs) it is our duty to ensure that we advocate for the client and none more so than in the case of the vulnerable or neglected worker. This protection is particularly important in Third World countries where family wellbeing and survival may be dependent upon the health of the employee. Who then are these vulnerable employees? An accepted definition of a vulnerable employee is "someone working in an environment where the risk of being denied employment rights is high and who does not have the capacity or means to protect themselves from abuse. Both factors need to be present. A worker may be susceptible to vulnerability but this is only significant if the employer exploits that vulnerability" (CONIAC, HSE, 2009).

Factors that cause vulnerability

The profile of vulnerable and neglected worker populations has increased in past years. Activities that have increased the awareness of these groups and their needs include: more research, policy development at international and local level, numerous specific interventions such as the dissemination of information to employers and stakeholders and the writing of specific legislation to protect these employees (e.g. Code of good practice for pregnant women). Factors that make these employees vulnerable include: age (young and the old), gender (women), race, disability and the work patterns associated with the employment (contractors, migrant and immigrant workers, and health care workers).

Speakers share their experiences

The speakers were approached based on their expertise and research into the plight of vulnerable workers. Dr Andre Louw spoke from his personal experience of the unique situation of contract workers. Rachel Lockyear used examples to show how disabled workers could be accommodated in the workplace and explained what made them vulnerable at work. The challenges facing miners, shift workers, drivers and health care workers as well as the role the OHP could take in improving their working experience were covered by Victoria Mathibeli, Barbara Zumani, Dr Robin George and Karen Michell (Johannesburg) and Penny Orton (Durban) respectively. Issues associated with women in the workplace were covered by Dr Danuta Kielkowski (Johannesburg) and Dr Saloshni Naidoo (Durban). Both workshops were closed by Dr Thérèse Maarschalk who kept the audience on their toes until the last minute with very interesting information regarding the traveller and associated risks. For the fourth consecutive year the audience rated the events as a success stating they need more of these events to increase their knowledge base. Many stated that their increased awareness of the employee's plight would now effect a change in service delivery to address these needs.

Vulnerable groups not covered

Much information was shared on why employees are considered vulnerable and what health care professionals can do to enhance the work experience of these employees and ultimately the quality of their lives. It is important to remember that not all vulnerable groups were covered in these presentations and that it is our responsibility to ensure that we are aware of the discrimination that often faces the groups not presented. For example, employers may perceive the employment of older workers as a draw back because they cannot keep up with the pace, may be set in their ways and resistant to change. It may well be true that a candidate does not have the physical strength to complete heavy manual labour at age 58, but the experience this employee has can be used in other less vigorous ways to the benefit of the employing organisation i.e. mentorship of younger employees. Failure to protect the vulnerable employee will result in a domino effect down to the family and conversely taking cognisance of their plight will result in a better quality of life for the employee and the employee's dependants, with an increase in productivity from the employee.

Meeting objectives

It should be remembered that the primary objective of the academic day is to take professional development to the regions. In addition, it is an opportunity to "grow" practitioners who may present papers for the first time or even take a role in function organisation for the first time. Thank you to all those involved in the organisation of both events and who contributed to the success of this 4th Academic Day. The speakers were remarkable and in Johannesburg, where technical problems caused a 40 minute delay, the audience asked that the talks not be cut short as they were so interesting and informative. Exhibitors were once again out in full force to support SASOHN, and on behalf of SASOHN I want to thank them.

Karen Michell, SASOHN Education representative

Delegates at the SASOHN 4th Academic Day in Johannesburg.

First announcement

SASOHN Eastern Cape invites you to join them from 4–6 November 2009 for the Annual SASOHN Conference at the Boardwalk Casino, Port Elizabeth. The theme "Conducting the Occupational Orchestra" pays tribute to the OHNP's important role in conducting and coordinating all the role players in occupational health and safety. For further information contact: Maggie Clack on +27 (0)41 581 0965/ 082 783 7431. Information is also available on the SASOHN website: www.sasohn.org.za

SAIOH President's page

Dear Colleagues

As incoming President I would like to take this opportunity to thank Sibongiseni (Seni) Myeni for his commitment and guidance during his term in office as President.

As newly elected SAIOH President, I believe there are a number of challenges and objectives to meet over the next few months. In no particular order:

- Active SAIOH branches.
- Market our profession – Growing the occupational hygiene profession.
- Set up a platform for members to gain CPD points (i.e. seminars, workshops, etc.).
- Streamline the certification process.
- Liaison with government departments i.e. DoL, DME, DOH.
- Liaison with other associations i.e. SASOHN, SASOM, IoSM, SAPEMA, MVSSA.
- Website (update and maintain).

In order to achieve the above, we will need commitment from all (SAIOH Council and SAIOH members). We should focus on why we are in the business of occupational hygiene and concentrate on ensuring better working environments. We should adhere to our Ethical Code and provide professional services.

The council started off its term with a number of meetings with stakeholders. The Executive team met with Department of Labour's newly appointed Executive Manager: Health and Hygiene, the Department of Minerals and Energy Affairs and the Mine Ventilation Society of SA (MVSSA). A number of issues were raised and discussed and all the parties are looking forward to a continuous working relationship.

The Certification Board is also in the process of reviewing the certification process, examination and oral assessments.

The SAIOH website (www.saioh.co.za) is under construction and should be up and running soon.

As part of building a better relationship with government, I accepted an invitation to be a speaker at the Department of Labour's World Day for Safety and Health at Work held on the 8th of May 2009 at the Mangaung Outdoor Sport Centre in Bloemfontein. The event was a joint initiative by the DoL, International Labour Organization (ILO), organised labour and business. Aimed at raising awareness regarding health issues in the workplace, it was attended by over 4000 delegates. The message below was shared with the attendees:

It is my privilege as SAIOH President representing SAIOH members to share in, and contribute to this National Health and Safety Day.

SAIOH (The Southern African Institute for Occupational Hygiene) is an expert body committed to the prevention and reduction of ill health at work through the dissemination of knowledge and good practice. Membership is available to persons who practice or have an interest in the field of occupational hygiene and who subscribe to the aims and objectives of the Institute and may include applicants from numerous sectors, such as industrial, mining, chemical and electrical. SAIOH also formally certifies occupational hygienists who meet recognised ethical and technical standards of occupational hygiene practice.

The professional organisation celebrated its 25th anniversary during October 2008 with a formal function during March 2009.

As the topic for today is Health and Life at Work: A Fundamental Human Right – Do you all know your rights and obligations towards occupational health at your workplace?

As we speak, people are dying all over the world because of occupational diseases. Some have been diagnosed with occupational diseases and might have received compensation but these people are dying because they were exposed to health hazards that were not controlled and affected their health.

Work-related illnesses and injuries are costing South Africa billions every year. We strongly believe that if all stakeholders – government, labour and business – play their respective roles this amount could be saved and ploughed back into the economy to address the basic needs of the citizenry like housing, schools and clinics. We, as social partners, have to come to accept the fact that occupational health is not a nice to have activity but a matter of life and death.

Our slogan should be: Health and Safety is my business!

In South Africa we have the Occupational Health and Safety Act (OHS Act) and Mine Health and Safety Act (MHS Act) with the main purpose of ensuring a healthy and safe work environment. Employers are responsible to provide a workplace that is safe and free from hazards to health. Employees however also have duties when it comes to occupational health and safety.

Workplaces have many visible and hidden health hazards such as:

- Chemical hazards: dust and solvent.
- Physical hazards: noise, heat, vibration and radiation.
- Biological hazards: bacteria and viruses.
- Ergonomics hazards: poor posture, awkward posture and manual material handling.
- Psychosocial hazards: stress, trauma, violence and bullying.

Occupational hygienists (that register with SAIOH and act as approved inspection authorities (AIA's)) help to protect the health of people at work. They are trained to recognise hazards to health, they understand how to assess and evaluate (measure) the risks that might arise from these hazards and they know how to control the risks. Many companies do not employ full-time occupational hygienists. However, SAIOH can put you in touch with a certified occupational hygiene consultancy.

Very few occupational diseases can be cured or treated, so the only way to achieve a better occupational health situation is to adopt the occupational philosophy: prevention is better than cure. Occupational hygiene is crucial in establishing workplace conditions that improve wellbeing. Wellbeing in turn raises employee confidence, generating industrial co-operation and increased efficiency.

Good occupational health is good business. Effective management of workplace health risks will help to:

- Maximise the wellbeing and productivity of employees.
- Stop people getting ill through their work.
- Attract and retain high quality employees.
- Prevent damage to the company's reputation in the eyes of customers, competitors, suppliers, other stakeholders and the wider community.
- Avoid damaging effects on turnover and profitability.
- Encourage better relationships between employers and employees.
- Minimise the likelihood of prosecution and consequent penalties.

I would like to summarise, make the slogan: 'Occupational Health and Safety is my business' part of your daily routine. Let's prevent employees from getting occupational health related illnesses and diseases from work.

During this event the Minister of Labour, Membathisi Mdladlana, also had a message for the crowd: "The attitude of South African employers towards safety and health in the workplace is worrying" and went on, "South Africans are taking safety and health quite easily." Mdladlana said something "dramatic and extraordinary" had to happen to address the situation. The chief inspector of occupational health and safety, for example, should be more visible and do more inspections, he said. Mdladlana also suggested that the Department of Justice should play a role. (Sapa, *Business Day*, 8 May 2009).

I would like to close off by saying that we need to ensure professional services – we are holding the lives of people in our hands.

Till next time,

Melinda Venter, SAIOH President
E-mail: melindav@lantic.net

Bernardino Ramazzini Works

SASOM
South African Society of Occupational Medicine
FOUNDED IN 1948

Edited by Franco Carnevale, Maria Mendini and Gianni Moriani. 2009

Each delegate at the 29th ICOH International Congress on Occupational Health (ICOH2009) in Cape Town received a recently edited and translated English collection of the most important works of Bernardino Ramazzini from the International Commission on Occupational Health (ICOH). This is acknowledged as one of the best translations to date and is a wonderful way to spread the works of the founder of modern occupational medicine.

South African students in occupational health are taught about the 'Father of Occupational Medicine' who was born in Italy in 1633 where he lived and worked until his death in 1714. We know that he published the first systematic study of trade diseases entitled 'De Morbis Artificum Diatriba' or Diseases of Workers, in the year 1700. However, few have actually read the earlier translations in which Ramazzini recommended questioning patients about their occupations and living conditions and advocated personal prophylaxis.

The two volumes that we received make delightful reading. In an easy flowing style we read about the man who qualified in philosophy and medicine in Parma and then went to Rome to learn practical medicine before suffering a bout of malaria, which greatly influenced his practical approach to medicine. While offering his services to peasants in rural areas he realised the impact of living conditions and environmental exposure on health. Acting on his observations made during visits to different workplaces, Ramazzini became an epidemiologist and public health scientist who believed that individual persons suffered individual diseases.

The fact that he documented his findings so that others may learn from his approach, made his work so valuable and despite different medical theories over the years his work persistently influenced the approach to medicine and is still relevant today.

Of the two volumes of Bernardino Ramazzini Works that were presented at ICOH2009, the first is entitled 'The Diseases of Workers' and describes diseases of fifty-six different types of workers, recommending methods of prevention and treatment.

In the introduction to this volume Ramazzini's 'method or the organisation of his work' is explained. Firstly, the hazardous features of the substance being worked with, either as raw material or as a result of the process, are identified, and secondly, the posture and the actions of the worker are observed. By using intuition and logical deduction he always followed ten steps in his method:

1. Description of the work process.
2. Study of the *modus operandi* and raw materials used.
3. Clinical examination of the worker (and previous workers).
4. Review of existing literature – also non-medical writings.
5. Discussion of reduction of exposure through preventive techniques.
6. Protective measures used by the workers.
7. Simple affordable treatment of conditions.
8. Environmental control where possible after inspection of the work site.
9. Recommended work organisation and methods and a healthy lifestyle.
10. Identification of all persons exposed to hazards of work including royalty!

This volume includes a description of Ramazzini's life, his Bibliography and some interesting illustrations.

The second volume includes his work 'The Health of Princes', which deals with the same effects of aspects of lifestyle that we are addressing today – incorrect diet, lack of exercise, obesity, sleep disorders, rules for conserving health in old age and so on. Ramazzini states 'The excessive obesity and corpulence of princes is no less pernicious than it is unseemly' on page 93.

Also in this volume is 'Notes on a sober life', 'Epidemic Constitutions of Modena' 1691 to 1694 and sixteen Inaugural Orations with some intriguing titles such as 'The art of medicine is similar to that of navigation', 'The physician of frail health is more suited to practising medicine than one of excellent health', and more.

Despite different medical theories over the years, his works have survived and are still relevant today, as you will read. Although 28 Latin editions of the original work and 49 translations have been published between 1701 and 2007, they were not freely available in South Africa. This shortcoming in our education has now been addressed with this gift from ICOH, who can be contacted through their website http://www.icohweb.org

Together with the excellent keynote addresses and both oral and poster presentations, these volumes by Bernardino Ramazzini have left a lasting impression of an exceptional Congress – ICOH2009!

Jenny Acutt, E-mail: sasomdm@iafrica.com

Mine Medical Professionals' Association

Report-back of Eighty-eighth Annual General Meeting

The Mine Medical Professionals' Association hosted their Eighty-eighth Annual General Meeting on the 24 April 2009 at Gold Reef City. Dr Jim (James Patrick) Murphy delivered a very interesting and lively ethics discussion on 'Ethics and the Mine Health Care Professional' which was enjoyed by all present.

Dr DB De Villiers delivered salient points from the Annual Report to members and went on to announce the Office Bearers and Executive Committee for the year ending 31 March 2010.

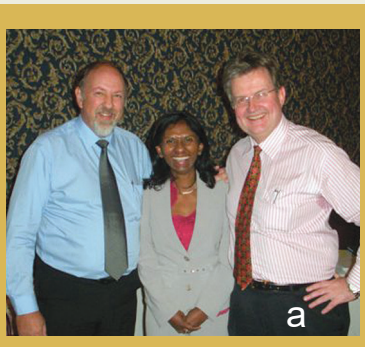
Dr Vanessa Govender was duly elected the Association's new President and following her induction she proposed the Association name change to the Mine Medical Professionals' Association, which was adopted. The motivation for the change was:

The abbreviation on the current logo, namely MMOA, does not reflect the name of the Association as it currently stands. With the anticipated name change to Mine Medical Professionals' Association the abbreviation on the logo will be changed to MMPA. This will once again bring the name and the logo into alignment with each other.

A splendid four-course dinner in the Gold Room followed and guests were treated to entertainment provided by the very talented duo, Heidi Bower on vocals, saxophone and violin and Corné Dannhauser on vocals, trumpet, flute and electric solo bass. Their large repertoire included jazzy music from the 1930s and '40s and light classical music. The photographs show some of the guests enjoying themselves.

The new President paid tribute to Dr DB De Villiers, who played an active supportive role during his term as President of the Association for 2008/2009. DB, as he is fondly known, joined the mining industry in 1986 working at St Helena as Medical Officer, later CMO and then Head of the Hospital. In 1994 he moved into full time occupational medicine at the current AngloGold Ashanti Health, first at Ernest Oppenheimer Hospital, then consulting to Samancor and various other mining companies in South Africa and Africa, and since 2002 at the Vaal River Operations of AngloGold Ashanti at Orkney. He has established and managed several large occupational health services and has always been involved in projects on occupational health, mostly as a team player – from managing new initiatives to research. He is married to Yolanda, has raised 'a host of sons' (his words) and is a proud young grandfather of two little girls. "He truly is a wonderful, humble human being."

Shirli Geere, Secretary, MMPA
E-mail: sgeere@bullion.org.za



Seen at the AGM...

a. Dr DB De Villiers (Past President), Dr Vanessa Govender (President), Dr Jim Murphy (Presenter)
b. Dr Eric Geddes, Dr Don Emby, Dr DB De Villiers, Shirli Geere (Secretary)
c. Dr Fiona Robinson (Past Editor of OHSA) and partner
d. Dr Don Emby and wife
e. Dr Eric Geddes, Dr Don Emby, Dr Vanessa Govender, Dr DB De Villiers

Subscription Application

Southern Africa's leading occupational health journal.

All subscribers qualify for free access to the website www.occhealth.co.za

occupational health SOUTHERN AFRICA

Simply complete the form below and fax it to us on +27 (0)31 764 0386

Step 1

Details of person paying for subscription (i.e. billing details)

First name		Surname		Mr/Mrs/Dr/Ms etc	
Position/Title		Department		M/F	
Company name					
Address 1					
Address 2					
City		Postal code		Province/State	
Country		Telephone:	( )		
Fax:	( )	e-mail:			

Step 2 – Tick where applicable

Occupational Health SA (6 issues)	
Delivery within South Africa – R270	
Delivery into Southern Africa (other than South Africa) – R407	
Delivery to Northern Africa and Rest of World – R437	
Total	

All non-South African subscription prices are for surface mail only - up to 6 weeks delivery. Contact the subscription manager for international airmail pricing. All prices in ZA Rands and include VAT

Step 3 – Payment

Payment method: MasterCard ☐ Visa ☐ Diners Club ☐ American Express ☐
Postal order ☐ Cash ☐ Cheque ☐ Direct Bank Deposit ☐

Cheques payable to: Technique Publishing

Direct bank deposit details: *Name of account*: Technique Publishing; *Bank*: Standard Bank of SA; *Branch code*: Kloof Branch 045526; *Account number*: 051992450**. Please CLEARLY indicate subscriber's surname on the deposit slip. Please submit a copy of the deposit slip with the subscription form.**

Credit card payments:

Cardholder name:_____

Card Number:_____

CVC (Card Verification Code – on rear of card):_____

Expiry date:_____

Cardholder's signature:_____

Step 4

Signature of applicant:

_____

Date of application:

_____

WRITE TO:
Technique Publishing,
Box 626, Kloof, 3640, South Africa
e-mail: jennyg@dbn.technews.co.za
Telephone: +27 (0)31 764 0593
Fax: +27 (0)31 764 0386

For office use only

Ref no: _____

Reg. date: / /

Payment: Code: _____

Knowledge is power – subscribe today!

Please note: For audit reasons, all 4 steps of the form MUST be completed before your application will be processed!