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- Southern African Institute for Occupational Hygiene
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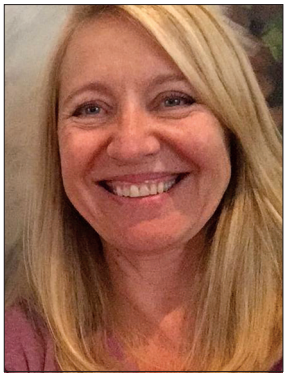
From the Editor . . .



Gill Nelson,
Editor-in-chief

This issue of *Occupational Health Southern Africa* includes two papers that, while not addressing COVID-19 specifically, are certainly relevant as we move out of the 3rd wave of the Pandemic. The first is an analysis of common mental disorders in the workplace, by Charles van Wijk and colleagues from the Institute for Maritime Medicine and Stellenbosch University. The second paper, written by Carmen Whyte et al. from the University of Pretoria, examines risk factors for absenteeism among healthcare workers in two public sector hospitals. No doubt, COVID-19 has increased the prevalence of both common mental disorders and absenteeism, and it is not a stretch to hypothesise that there is an association between the two.

Earlier this month, it was announced that two researchers from the University of the Witwatersrand's Department of Psychology, Tasneem Hassem and Prof. Sumaya Laher, have been awarded R100 000 to "advance the development and commercialisation of the first validated online depression screening tool suitable for the South African context".[1] Hassem developed the tool as part of her PhD by adapting the Centre for Epidemiological Studies Depression Scale (CESD-R). It will help to identify symptoms at home, and "start the treatment conversation without stigma, and without waiting for a professional consultation to interpret screening results". "The user receives instant, downloadable feedback that provides resources for seeking treatment or care and [it] can be used in the comfort of one's home, on any smartphone, tablet, laptop or computer."[1] As many tools that are used in South African studies on depression and other common mental disorders are adapted from other countries, without being validated in South African populations, this will be a useful tool for researchers too.

Kurten et al., from the Tshwane University of Technology, present findings from a study on the anatomical effects of cranial loading – also known as head loading and head porterage. Water and other goods are carried on the head from a very early age, both in rural areas within the family/community environment, and in urban areas as a means of earning money. I recall seeing a young woman walking across the road with a burning brazier on her head, not far from where I live, a few years ago.

Head porterage is practised by many women (and men) in several low- and middle-income countries such as Ghana, Nigeria, India and Nepal. Head porters are commonly seen in sub-Saharan African and west African markets, and play an important role in the informal market economies of many countries, providing a link between wholesalers, retailers, transporters and buyers.[2] In Ghana, those who work as head porters in the narrow aisles of the markets are known as *kayayo* (girl carrier) or *kayayei*. They migrate from poor rural areas in the north of the country to the cities where they earn very little money in return for their hard labour,[3,4] which often involves carrying bales of clothing of 50 kg or more; most earn $10 or less a day.[5] In Nigeria, head porters are known as *alabaru*.[2] Professional porters in Nepal commonly carry loads on their heads that are twice the weight of those carried by the African women.[6] In some cases, they carry up to 120% of their body mass.[7]

Two of the society reports link to papers published in this issue. First, the theme of mental health was raised during the MMPA 2021 annual general meeting (AGM). The MMPA report summarises the presentation given by the keynote speaker, Prof. Zukiswa Zingela, associate professor and head of Psychiatry at Walter Sisulu University and Nelson Mandela Academic Hospital in Mthatha. She discussed the mental health of healthcare workers, with an emphasis on Beck's cognitive triad.[8] We congratulate Dr Dipalesa Mokoboto and Dr Tumi Legobye on their elections as the new MMPA president and deputy president, respectively, as announced at the AGM. Second, the SASOHN report deals with absenteeism, in line with Whyte et al.'s paper, and provides some useful advice to both employers and employees. SASOM reports on the World Health Organization/International Labour Organization Joint Estimates of burdens of ischaemic heart disease and stroke attributable to exposure to long working hours, which was launched in May this year. The SAIOH report is, as usual, full of interesting news and information. Hopefully, many of you are currently attending the 2021 SAIOH annual conference webinars.

As the daily number of COVID-19 cases continues to drop after the 3rd wave, several universities are considering COVID-19 vaccination mandates. Let's continue to do what is right for the 'greater good' and get vaccinated, rather than putting ourselves first. Being vaccinated might not prevent you from being infected but it will reduce your risks of hospitalisation and death, and will protect your loved ones.

REFERENCES

1. Hyman A. Wits researchers get funding for their depression screening app. Times Live; 2021 Oct 12. Available from: https://www.timeslive.co.za/news/south-africa/2021-10-12-wits-researchers-get-funding-for-their-depression-screening-app/ (accessed 21 Oct 2021).
2. Akanle O, Chioma C. Alabaru – head porterage in Ibadan, Nigeria. Asian Afr Stud. 2013; 22(1):49-64. Available from: https://www.sav.sk/journals/uploads/112415083_Akanle_Chioma.pdf (accessed 21 Oct 2021).
3. Dweck J. Head case: the art and science of carrying things on your head. Slate; 2010 Aug 27. Available from: https://slate.com/news-and-politics/2010/08/the-art-and-science-of-carrying-things-on-your-head.html (accessed 21 Oct 2021).
4. Awotwi JE, Ojo A, Janowski T. Mobile governance: head porters in Ghana. United Nations University; 2012 Jan 5. Available from: https://unu.edu/publications/articles/mobile-governance-head-porters-in-ghana.html#info (accessed 21 Oct 2021).
5. Bauck W. Workers who form the backbone of the secondhand market are especially vulnerable in a time of pandemic. Fashionista; 2020 May 6. Available from: https://fashionista.com/2020/05/secondhand-clothing-ghana-kayayei-covid-19 (accessed 21 Oct 2021).
6. Bastien GJ, Schepens B, Willems PA, Heglund NC. Energetics of load carrying in Nepalese porters. Science. 2005; 308(5729):1755. doi:10.1126/science.1111513.
7. Bastien GJ, Willems PA, Schepens B, Heglund NC. The mechanics of head-supported load carriage by Nepalese porters. J Exp Biol. 2016; 219(Pt 22):3626-3634. doi:10.1242/jeb.143875.
8. Beck AT, Brown G, Steer RA, Eidelson JI, Riskind JH. Differentiating anxiety and depression: a test of the cognitive content-specificity hypothesis. J Abnorm Psychol. 1987; 96(3):179-183. doi:10.1037//0021-843x.96.3.179.

Well done to our occupational health professionals working tirelessly in workplace vaccination programmes

Vanessa Govender: Occupational medicine specialist; Occupational Health Division, Wits School of Public Health, University of the Witwatersrand; Masakhane Strategic Health Consulting (Pty) Ltd
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As a proud backliner in the COVID-19 pandemic, I joined our frontliners in the mines of the Northern Cape and Limpopo provinces in August 2021 to witness workplace vaccination programmes in action… all in support of the Government-led vaccination programmes.

I was not prepared for what lay before me. Over the last 18 months, occupational health centres have either transformed into, or provided, the solid foundation for COVID-19 initiatives – from screening and testing to vaccination centres. Armed with counselling stations, emergency equipment, on-site laboratories, vaccination 'Ubers', and electronic and paper systems, driven by genuine, tenacious people, previously unemployed youth, occupational health professionals and clinical associates with robust communication and engagement plans are all contributing to the success of the workplace vaccination rollouts.

The energy from the leadership on the ground was palpable. From dispelling myths about vaccines to creating a sense of 'Ubuntu', it was nostalgic. I clearly remember the days of the HIV/TB struggles when our commitment (and our sense of hopelessness) was, regrettably, not always matched with the requisite leadership and political will. It has taken us decades, and a pandemic, to arrive at this point in the history of occupational health in South Africa – to enjoy seeing health at the top of leadership's agenda at last, and to enjoy the multidisciplinary collaborations and the tripartite partnerships despite our utter exhaustion and grief over all our losses.

Let us not lose this momentum. Let us continue to drive the health agendas – the wellness of our women in workplaces, eradicating TB, silicosis and HIV – and to address non-communicable diseases and mental health conditions; all of which need enthusiastic financial and non-financial investments as we navigate our new reality.

A big shout-out to our occupational health professionals, from the backlines to the frontlines, who continue to serve selflessly. You are true superheroes!

Prof. Mohamed Jeebhay honoured with a Fellowship of the College of Public Health Medicine (Occupational Medicine) by Colleges of Medicine of SA

Prof. Mohamed Jeebhay, head of the Division of Occupational Medicine, School of Public Health and Family Medicine/Department of Medicine, University of Cape Town, was honoured with a Fellowship of the College of Public Health Medicine (Occupational Medicine) by peer review during the ceremony on 7 October 2021. The Fellowship by peer review is an important token of recognition by the Colleges of Medicine of South Africa, and by its constituent colleges, of the scholarship, clinical expertise and high professional standing of the recipient.

The videoclip of Prof. Jeebhay receiving the award can be viewed at https://www.youtube.com/watch?v=UPPz1t_49P8.

Congratulations to Prof. Jeebhay from the occupational health fraternity!

Prof. Mohamed Jeebhay, head of the Division of Occupational Medicine, School of Public Health and Family Medicine/Department of Medicine, University of Cape Town (UCT) *Photograph: courtesy of Division of Occupational Medicine, UCT*

Rogue regulations set to deepen the rot in the Compensation Fund

Tim Hughes: Spokesperson for the Injured Workers' Action Group (IWAG)
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Government has gone rogue. In gazetting draconian, irrational and unreasonable regulations pertaining to the Compensation Fund the day after Parliament rose for recess, the Minister of Employment and Labour has cynically abused his executive power to avoid oversight and evade public scrutiny. By so doing, he has undermined core constitutional principles and legislative good practice. The details of the rogue regulations are simple, but their implications are wide-ranging, not least for medical practitioners. If passed into law, on 30 September, the regulations will effectively remove the right of medical service providers to use the services of banks and third-party pre-funding administrators to ensure that they are paid for treating injured workers.

It is common cause that, due to the structural dysfunctionality of the Compensation Fund, even if medical service providers are able to navigate their way through the 'CompEasy' system, clinicians are forced to wait up to two years for payment. Yet, unlike other state-managed funds, the Compensation Fund is not only solvent, it is bloated with R60 billion in assets and R26 billion in reserves via some R9 billion in annual contributions from 400 000 employers.

The depth of the Compensation Fund's dysfunctionality is borne out, not by hearsay, but rather by other government institutions. For 10 years, the Auditor-General has published disclaimers and adverse opinions about the Compensation Fund. In addition to material non-compliance with legislation, so deep are its pathologies that the Auditor-General this year lamented that, if not required by legislation, she would withdraw from auditing the Compensation Fund.

In May, Parliament's Standing Committee on Public Accounts (SCOPA) expressed its outrage at the collapse of internal controls and 'absolute chaos' within the Compensation Fund. The Minister of Employment and Labour declared that he was 'mad about this' and promised that forensic auditors would be appointed at the end of June to get to the bottom of the rot at the Fund. Accused by SCOPA of not taking Parliament seriously, the Minister, Director-General and Commissioner further promised a slew of improvements and turn-around measures to improve an institution that, while mandated to help vulnerable injured workers, was 'rotten to the core'.

Parliament's Employment and Labour Committee has considered Compensation Fund matters on no less than 12 occasions this year, including a number of virtual appearances made by the Minister, Director-General and Commissioner. Most importantly, the Minister introduced the Compensation for Injuries and Diseases (COID) Amendment Bill, which, after a constitutional court finding and immense public pressure, finally provided for the inclusion of domestic workers as beneficiaries of the fund. Yet, for all its welcome improvements, the COID Amendment Bill embedded a catastrophic and possibly unconstitutional clause that sought, for no given reason, to prevent medical service providers from ceding their claims to third-party administrators for payment by the Compensation Fund.

In response to measured, evidence-based and persuasive presentations by worker, employer, financial and medical bodies, Parliament removed the offending clause from the Bill and instructed the Minister and Department to develop regulations to ensure that those dealing with the Compensation Fund are registered. While Parliament is to be congratulated for its legislative, deliberative and oversight functions with respect to the COID Amendment Bill, at no point was it clarified why the offending clause was included in the original Bill. Nor were reasons provided or justifications made for Parliament directing that regulations be drafted, requiring third-party service providers to be registered with the Compensation Fund.

Yet, on 10 September, even before the COID Amendment Bill was considered by the National Council of Provinces, the Commissioner published regulations that, by 30 September, would result in medical service providers no longer being able to use the services of third-party pre-funding administrators to maintain their cash flow, keep their practices solvent and, in effect, allow them to treat injured workers without having to wait two years for payment. The consequences of the Department's Stalingrad tactic are dire. First, and most important, many medical service providers will reluctantly cease treating injured workers; they simply cannot afford to do so. Consequently, one assumes that trades union and employer bodies will be outraged by the regulations and will lobby intensively to have them removed. Second, Parliament has been outmanoeuvred by the Commissioner, which sets a dangerous precedent that undermines the entire balance of power, oversight and accountability foundations on which our parliamentary democracy is built. Third, one element of the rotten Compensation Fund that works efficiently, namely third-party administrators, risks being put out of business by the regulations, potentially hastening the collapse of the Fund itself.

Speaking of the crisis in the Compensation Fund in April this year, the chair of Parliament's Employment and Labour Committee stated, "This is something that we really have to exhaust our energies on. We should be able to confront the situation; we have to go where eagles dare." For the sake of injured workers, medical service providers, employers and, indeed, national interest, these disastrous, irrational and possibly unconstitutional regulations must be withdrawn before it is too late.

Postscript

Having withdrawn the peremptory regulations published in September, the Department of Employment and Labour published the General Notice 615 of 2021 in the *Government Gazette* (Vol. 676, No. 45344), on 19 October: *Notice on Banking Information Requirements for Occup-ational Injuries and Diseases Related Claims*. The Notice states that the Compensation Fund will no longer accept banking details and nominated bank accounts of agents and other representatives. Only banking details belonging to the medical service provider or relevant healthcare organisation that provided the service to the injured or diseased beneficiary will be accepted. The Notice is available from: https://www.gov.za/sites/default/files/gcis_document/202110/45344gen615.pdf.

Interested parties have 60 days to submit comments in writing, by mail, to the Compensation Commissioner.

Tribute to Johan Jacobs (JJ)

Bertie Brits: SAIOH member

When I was asked to write a tribute to Johan, I had no idea how I would ever be able to capture something that would do him justice. I began with comments and shared memories from colleagues, and a common theme ran through each of the contributions received…

In everything that he did – work, play, and everyday life – Johan knew the secret to having fun. He was a gentle soul, blessed with an excellent sense of humour and a welcoming spirit that made everyone feel right at home. He loved people and it showed – in how he mentored young professionals, interacted with colleagues at all levels during his career, and treated people whom he invited to his house, where there was always good conversation, a drink, and time to braai some fish.

Johan contributed greatly towards the occupational hygiene profession during his career and, over the years, was actively involved in the professional bodies – from the Occupational Hygiene Association of South Africa (OHASA) through to the establishment of the Southern African Institute for Occupational Hygiene (SAIOH) as it is today. He was a true professional who paid attention to detail, analysing problems from all possible angles to ensure that the chosen paths were the most appropriate for the circumstances.

I had the deepest respect for Johan, and I know he left an enduring mark on many, including me. I remember running into him at Cape Vidal while camping with my son and, after a friendly catchup, how he arrived at our campsite later bearing freshly speared fish for dinner. Even in the midst of his cancer treatment, I never heard him complain. He remained upbeat and positive, and kept doing what he could. That is who he was, and how I will always remember him.

Instead of mourning his passing, I know he would rather we celebrate the memories. So, if you had the privilege of knowing Johan, raise a glass in his memory the next time you light a braai fire. To Debbie and family, we can only imagine the hole he has left. Our thoughts and prayers are with you.

Johan Jacobs (JJ) *Photograph: courtesy of SAIOH*

The impact of cranial loading on sagittal plane posture, kinanthropometry and muscle activity of South African female youth

M Kurten, TJ Ellapen, Y Paul

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ABSTRACT

Background: Cranial or head-loading porterage is a popular occupation for many adolescent and young women in South Africa and other developing countries, to secure a paltry wage and/or as a compulsory domestic duty, particularly for female youth in rural South African communities. This has raised concerns regarding postural health.

Objectives: To compare the change in sagittal plane postural heights, manual vertebral angular goniometry and muscle activity of cervical and lumbar flexors-extensors between South African female youth when carrying and not carrying cranial loads.

Methods: One hundred young South African female volunteers (aged 9–17 years) participated in an observational randomised controlled study, involving a pre-test/post-test crossover. The experimental group (n = 50) stood in a cranial loaded position with their habitual head-load mass (8.0 ± 2.5 kg). Participants' body mass, standing vertex, acromion, anterior sacroiliac spine (ASIS) and navicular heights, craniovertebral angle (CVA), craniohorizontal angle (CHA), standing pelvic angle (SPA), and their cervical and lumbar flexors-extensor electromyographic (EMG) activity were measured. The control group (n = 50) was measured without the cranial load. The experimental group crossed over into the control group, and vice versa.

Results: Cranial loading decreased vertex (1.45 ± 0.1 vs 1.44 ± 0.12 m), acromion (1.17 ± 0.11 vs 1.16 ± 0.11 m), ASIS (0.83 ± 0.07 vs 0.82 ± 0.07 m) and navicular heights (0.03 ± 0.2 vs 0.06 ± 0.2 m) compared to unloaded phases ($p < 0.001$). Similarly, CVA (13.7 ± 5.3° vs 19.4 ± 5.8°), CHA (51.9 ± 6.9° vs 54.5 ± 6.6°), and SPA (17.9 ± 7.7° vs 20.5 ± 7.9°) increased during the loaded phase ($p < 0.001$). While the EMG muscle activity of both the cervical (flexors: 3.1 ± 1.9 vs 5.8 ± 3.4 mV and extensors: 4.5 ± 2.6 vs 8.7 ± 4.9 mV) and lumbar (flexors: 3.6 ± 2.4 vs 4.9 ± 3.6 mV and extensors: 5.5 ± 3.5 vs 8.3 ± 4.6 mV) increased during the loaded phase, the extensors were more strongly activated ($p < 0.001$).

Conclusion: Cranial loading changes the sagittal plane posture of female youth by diminishing their height, anteriorly rotating their pelvises, and flattening their feet, potentially causing musculoskeletal problems.

INTRODUCTION

Cranial or head-loading porterage is the physical act of carrying external loads on one's head, which is a popular task allocated to many pubescent, adolescent and young women in India, Nepal, Ghana, Nigeria and South Africa.[1-4] Head porters in these countries typically carry goods in local markets, from wholesalers to sellers, and from sellers to buyers. Many Ghanaian adolescent and adult females leave their rural homes in search of work in the urban centres to work as *kayayo* or head porters carrying heavy cranial loads for a minimal wage.[3] A similar scenario occurs in Nigeria, where adolescent and adult female head-loading porters are referred to as *alabaru*.[4]

Cranial loading is also a common practice assigned to many young African females in rural communities,[1,2] where food, water, and firewood are carried over distances of 10 km or more.[1,2] Head loads have been reported to be as heavy as 35 kg.[2] Female adolescents aged 15 years are capable of carrying a cranial load of 25 kg.[5]

The impact of cranial loading on the development of the adolescent spine has become a worrisome concern of the health fraternity.[6-8] Three empirical investigations have recorded the neuro-musculoskeletal impact of habitual cranial loading on African female porters.[9-11] Only one study was conducted in South Africa, highlighting the paucity of empirical findings.[11]

The existing empirical neuro-musculoskeletal health investigations have revealed that habitual cranial loading causes spondylolisthesis, intervertebral disc compression, and decreased standing vertex height.[9-11] Echarri and Forriol (2002) and Echarri and Forriol (2005) identified intervertebral disc compression and spondylolisthesis among African female adult porters by employing clinical radiography, which requires costly equipment that is scarce in most rural South African communities.[9,10] Affordable but reliable (high external-validated applied research) experimental protocols are required to measure the impact of cranial loading on the posture of head porters.[8]

Ellapen et al. (2009) used manual kinanthropometric measures to identify changes in vertebral posture due to cranial loading.[11] The study described in this paper was an extension of Ellapen et al.'s empirical investigation, and included kinanthropometrical height differential measures, basic manual goniometry and electromyographic (EMG) measures. The aim was to measure the impact of cranial loading on the posture and muscle activity of rural South African head porters.

METHODS

This was an observational randomised control study, involving a pre-test/post-test crossover. All participants were female youth volunteers, aged 9–17 years, who habitually carried head loads, and who resided in the Glendale region of the iLembe district of the province of KwaZulu-Natal. The participants were randomly distributed into experimental (n = 50) and control (n = 50) groups. The control group crossed over into the experimental group approximately two hours later, and vice versa (Figure 1). This allowed both groups to be exposed to the same intervention of carrying their usual head loads. The control was in the unloaded phase without a cranial load, while the experimental group carried the cranial load for a duration of approximately 15 minutes.

Kinanthropometric measurements

Kinanthropometric measurements included body mass and the following heights: standing vertex, acromion, anterior superior iliac spine (ASIS) and navicular heights from 'unloaded' to 'loaded' as per the International Society for Advancement of Kinanthropometry (ISAK) protocol.[12] The cranial loads carried, and participants' body mass were measured on an electronic scale. All measurements were taken on the participants' right sides.

Biomechanical angles

The selected biomechanical angles measured included the craniovertebral angle (CVA), craniohorizontal angle (CHA), and standing pelvic angle (SPA). The CVA and CHA were measured according to the Lau et al. (2009) protocol.[13] The standing pelvic angle (SPA) was measured according to the Kim et al. (2009) protocol.[14]

Electromyographical measures

The cervical and lumbar extensor and flexor anatomical sites were cleaned with alcohol swabs after which EMG electrodes were attached at the belly of the extensor and flexor muscles, respectively. The EMG measurements reflected the changes in voltage during the cranial loading and unloading phases of the cervical and lumbar extensors and flexors, respectively. Lo Martire et al. (2017) reported that surface EMG measures have a reliability score of 0.79.[15] The EMG data were normalised through dynamic maximal forceful cervical and hip flexion and extension, respectively. The maximal cervical flexion trial commenced from an anatomically neutral head position to full flexion, with the chin touching the sternum. Resistance was offered by a thera-band that held the head in a neutral anatomical alignment. Maximal cervical extension was completed to the point of maximal neck extension. Similarly, resistance was offered by a thera-band by holding the head in an anatomically neutral position. Dynamic maximal forceful hip extension was measured when participants held the thera-band with both hands while in a long arc-hip flexion position. The participant stood on the centre of the thera-band with the ends grasped in each hand. When given the command, the participant moved from a long-arch hip flexion position into maximal hip extension. In order to measure maximal voluntary isotonic hip flexion, the participant was required to move from neutral anatomical alignment into maximal hip flexion.

To normalise an EMG signal, the signal obtained during a task was divided by a reference EMG value obtained by measuring the same muscle. This allowed for a relative measure of activation, which is compared to a reference value. A reference value was obtained for the normalisation of EMG recordings by assessing the maximum (peak) activation levels during maximal voluntary isotonic contractions (MVIC).[16,17]

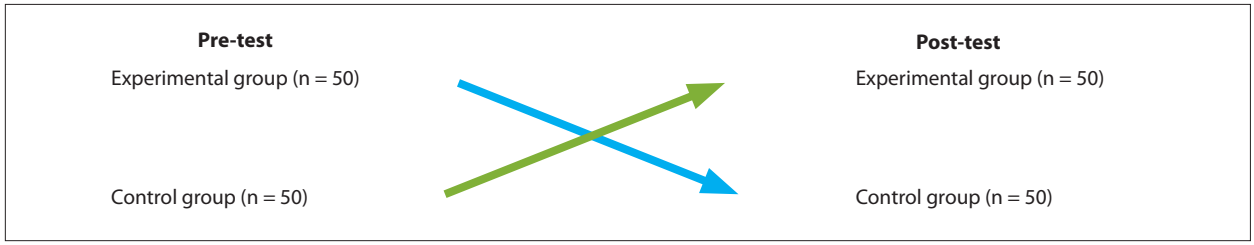

Figure 1. The observational randomised pre-test/post-test crossover design

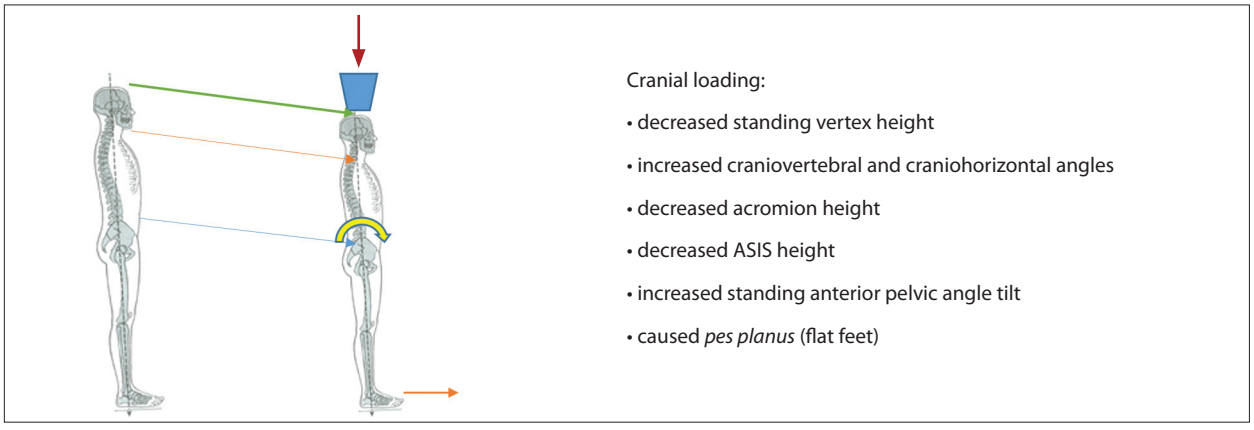

Figure 2. Changes to the musculoskeletal system produced by cranial loading

At least two repetitions of the MVIC were performed to ensure reliability of results. The MyoPlus 4 (Verity Medical, UK) was used to measure muscle voltage changes.

Data analyses

Descriptive analyses included means, standard deviations, and percentage changes in the kinanthropometric measurements, biomechanical angles, and EMG measurements. Changes were assessed using the paired t-test. The unloaded standing vertex, acromion, ASIS and navicular heights' mean scores were compared to the respective cranial loaded differential height mean scores to determine changes in postural heights. Similarly, the average CVA, CHA and SPA unloaded measurements were compared to the respective average cranial loaded measurements to determine changes in postural angles. The mean EMG unloaded cervical and lumbar flexor and extensor scores were compared to their respective loaded cervical and lumbar flexor and extensor scores to determine changes in muscle activity. Significance was set at 95%.

Ethical approval was obtained from the Tshwane University of Technology (REC2020-12-001). Parental informed consent, child assent, and the iLembe Royal ethical consent were granted prior to the commencement of data collection. A member of the iLembe royal staff served as an intermediator and was present during the data collection. The study was conducted in accordance with the Declaration of Helsinki and employed COVID-19 precautionary measures.

RESULTS

The participants were aged from 9 to 17 years (mean 12.3 ± 2.5 years). Mean body index and body mass were 20.5 ± 4.5 kg/m^2 and 44.5 ± 13.7 kg, respectively. The mean cranial load was 17.9% (8.0 ± 2.5 kg) of the mean body mass (percentage cranial load = mean cranial load/mean body mass x 100).

Table 1 shows selected kinanthropometrical heights of participants in the cranial unloaded and loaded phases. Participants' standing vertex, acromion, anterior sacro-iliac spine (ASIS), and navicular heights decreased when the cranial load was imposed on the axial skeleton. Although all heights decreased significantly during the loaded phase, the decrease in navicular height was the most pronounced.

The cranial load produced significant increases in vertebral angles ($p < 0.0001$) (Table 2). The increased CVA and CHA suggest a more erect cervical posture; the increased SPA is suggestive of a greater anterior pelvic rotation (illustrated by figure 2).

The EMG voltage (mV) change showed that cranial loading increased muscle activity ($p < 0.000$) (Table 3). During the unloaded phase, the cervical flexor-extensor percentage ratio was 40.7:59.3, which was similar to the ratio during the cranial loaded phase (40:60). The lumbar flexor-extensor percentage ratio was 39.5:60.5 during the unloaded phase, and 37.1:62.9 during the loaded phase, i.e. there was very little change. The EMG values in Table 3 illustrate that the cervical and lumbar extensor muscles are more strongly activated than the reciprocal antagonist flexors.

Table 1. Kinanthropometrical heights in the cranial unloaded and loaded phases

Kinanthropometrical heights (m)	Unloaded phase (n = 100) Mean ± SD	Loaded phase (n = 100) Mean ± SD	Mean difference* %	p value
Vertex standing height	1.45 ± 0.1	1.44 ± 0.12	-0.6	< 0.000
Acromion height	1.17 ± 0.11	1.16 ± 0.11	-0.8	< 0.000
ASIS height	0.83 ± 0.07	0.82 ± 0.07	-1.2	0.004
Navicular height	0.03 ± 0.2	0.06 ± 0.2	-50.0	< 0.000

* (loaded phase–unloaded)/loaded phase x 100; minus sign (-) indicates decrease

Table 2. Vertebral angular changes in the cranial unloaded and loaded phases (manual goniometry measures)

Vertebral angle (°)	Unloaded phase (n = 100) Mean ± SD	Loaded phase (n = 100) Mean ± SD	Mean difference* (%)	p value
CVA	13.7 ± 5.3	19.4 ± 5.8	+29.3	< 0.000
CHA	51.9 ± 6.9	54.5 ± 6.6	+4.7	< 0.000
SPA	17.9 ± 7.7	20.5 ± 7.9	+12.6	< 0.000

* (loaded phase–unloaded)/loaded phase x 100; plus sign (+) indicates increase

Table 3. Electrical muscle activity changes in the cranial unloaded and loaded phases

Muscle activity (mV)	Unloaded phase (n = 100) Mean ± SD	Loaded phase (n = 100) Mean ± SD	Mean difference* (%)	p value
Cervical flexor	3.1 ± 1.9	5.8 ± 3.4	+46.5	< 0.000
Cervical extensor	4.5 ± 2.6	8.7 ± 4.9	+48.2	< 0.000
Lumbar flexor	3.6 ± 2.4	4.9 ± 3.6	+26.5	< 0.000
Lumbar extensor	5.5 ± 3.5	8.3 ± 4.6	+33.7	< 0.000

*(loaded phase–unloaded)/loaded phase x 100; plus sign (+) indicates increase

DISCUSSION

The main finding from this study was the significant change in vertebral posture of the participants from an unloaded to a loaded position – a finding that concurs with previous literature.[9-11]

Changes in kinanthropometry

The kinanthropometrical findings indicate that cranial loading decreases standing vertex height, as has been reported in previous studies.[10,11] Echarri and Forriol (2005), and Ellapen et al. (2009) reported that cranial loading diminishes cervical vertebral height due to cervical intervertebral disc compression.[10,11] We also showed that cranial loading reduces acromion, ASIS, and navicular heights – novel evidence that the cranial load compresses the intervertebral discs in the thoracic and lumbar vertebrae in the closed-kinetic-chain system. The decrease in the navicular height was the greatest of all changes in heights and suggests that the cranial load flattened the feet (producing *pes planus* or flat feet) by stretching the spring ligament of the foot.

Changes in manual goniometry

Cranial loading increased the CVA, CHA and SPA, which is a novel finding illustrated by figure 2. The increased CVA suggests that the participants adopted a more erect cervical on thoracic vertebral posture, which is contrary to the findings of Echarri and Forriol (2002) and Echarri and Forriol (2005), who reported that cranial loading produces spondylolisthesis – anterior sliding of the superior vertebrae over the inferior vertebrae due to lack of a posterior locking mechanism.[9,10] The anterior translation of the superior cervical vertebrae produces a smaller CVA. It is postulated that the CVA increased in our study because participants habitually adopted a more erect neck posture to balance the cranial load on their heads and reduce the risk of falling. It is possible, however, that the cranial load was not heavy enough to reduce the CVA. It is important to note that participants carried their habitual load masses and not their maximal load masses. The increased CVA reduces the normal anatomical cervical lordotic posture, which produces neuro-musculoskeletal pain. The increase in SPA reflected an anterior rotation of the pelvis – evidence that cranial loading produces greater anterior pelvic rotation, concurring with previous studies.[11] Ellapen et al. (2009) reported that cranial loading does produce greater anterior pelvic rotation and lumbar lordosis (hyperextension of the lower lumbar vertebrae).[11] The increased anterior pelvic rotation produced by the habitual cranial loading has been associated with onset of lower back pain and poor health of head-loading porters.[11,18] The changes in CVA, CHA and SPA are novel findings, but further research is required to validate these findings.

Changes in electrical muscle activity of the cervical and lumbar flexors and extensors

The measurement of lumbar flexor-extensor EMG muscle activity in the loaded and unloaded phases is novel. Cranial loading increased muscle activity in the cervical and lumbar flexors and extensors, from the unloaded phase. These findings suggest that cranial loading over long distances could potentially lead to fatigue of the cervical and lumbar muscles, causing delayed onset of muscle soreness. While the force-couple EMG muscle activity ratio of the cervical and lumbar flexors and extensors remained similar, increased muscle activity was, nevertheless, recorded during the loaded phase. This finding is comparable to that of Shivers (2012) who reported that cranial/head loading increases electrical activity (EMG) in the cervical flexors and extensors in an attempt to support and balance the mass load on the head.[19]

Our findings refute those of Ellapen et al. (2009) who reported increased cervical flexor EMG activity.[11] Even though we recorded an increase in cervical flexor EMG, the cervical extensor EMG activity was stronger. It is postulated that the difference in EMG activity explains the more erect cervical posture.

Head porters are not the only group whose posture is affected by heavy loads. Chen and Mu (2018) reported that children carrying backpacks weighing 15% (and more) of their body mass caused greater anterior pelvic rotation and elicited stronger EMG activity in their lumbar flexors and extensors compared to a lighter load.[18] This supports our finding that load bearing increases lumbar flexor and extensor muscle activity. The stronger loaded lumbar flexor EMG muscle activity supports the finding of increased SPA rotation.

Limitations

We did not measure long-term effects of cranial loading on the postural health of participants, as this was a cross-sectional study.

Recommendations

A longitudinal study should be undertaken to determine the long-term impact of cranial loading on an individual's vertebral column. The effects of different cranial load masses should be measured to ascertain what relative percent body mass of cranial load produces no postural changes. This would reflect the optimal relative cranial percentage mass that can be carried without precipitating deviant posture and neuro-musculoskeletal injury. Youth carrying these cranial loads should be informed of the possible risk of lower back pain. Female head porters should consider wearing a cervical prosthetic brace to combat the abnormal erect cervical posture that they adopt when carrying heavy cranial loads. The cervical prosthetic brace will prevent loss in the normal anatomical cervical lordosis curvature, eliminating neuro-musculoskeletal pain. Similarly, female head porters should wear a lumbar prosthetic brace to reduce the excessive anterior pelvic rotation, thereby reducing the risk of lower back pain.

An alternative and cheaper pragmatic recommendation for head-loading porters is to strengthen their cervical, lumbo-pelvic hip complex and feet muscles. Head-loading porters adopt an erect neck/cervical posture, which reduces the normal cervical lordotic posture – the extreme straightening of the neck, which leads to neck pain. Similarly, head-loading porters adopt an excessively anterior rotated pelvis, which produces hyperextension of the lumbar vertebrae, causing pain. Pelvic stabilisation exercises would strengthen the lower back and hip muscles, preventing excessive anterior rotation. An exercise rehabilitation programme that strengthens ankle and foot muscles is recommended. The increased plantar foot muscle strength will prevent flattening of the feet. Such a home-based rehabilitation programme does not need equipment as it involves simple controlled movements to strengthen muscles, which can be taught by a local community physiotherapist and/or biokineticist.

CONCLUSION

Cranial loading causes changes in vertebral posture and EMG cervical and lumbar muscle activity of female African youth porters. Porters who habitually carry cranial loads adopt a more erect cervical and anterior rotated pelvic posture to support and balance cranial loads. The anterior rotation of the pelvis is a biomechanical change that has been associated with lower back pain.

KEY MESSAGES

1. Cranial loading alters sagittal plane posture, which disrupts the body's normal weight- bearing anatomical strategy, causing cervical and lumbar neuro-musculoskeletal pain.
2. Cranial loading reduces the normal cervical lordotic posture, causing neck and shoulder neuro-musculoskeletal pain.
3. Cranial loading increases the anterior pelvic rotation, causing neuro-musculoskeletal lower back pain.
4. Cranial loading decreases standing heights, leading to intervertebral disc compression.
5. Cranial loading flattens the feet (*pes planus*), which can cause plantar pain and poor balance.

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DECLARATION

The authors declare that this is their own work; all the sources used in this paper have been duly acknowledged and there are no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conception and design of the study: MK, TJE
Data acquisition: MK, TJE, YP
Data analysis: TJE
Interpretation of the data: MK, TJE
Drafting of the paper: MK, TJE, YP
Critical revision of the paper: MK, TJE, YP

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REFERENCES

1. Potgieter C-A, Pillay R, Rama S. Women, development and transport in rural Eastern Cape, South Africa. Cape Town: HSRC Press; 2006.
2. Kurten M, Motaung TG, Paul Y, Ellapen TJ. Cranial loading: the plight of the rural South African female. APhOT. 2020; 3(3). doi: 10.23880/aphot-16000172.
3. Dweck J. Head case. The art and science of carrying things on your head. Slate; 2007 Aug 27. Available from: https://slate.com/news-and-politics/2010/08/the-art-and-science-of-carrying-things-on-your-head.html (accessed 28 Sep 2021).
4. Akanle O, Chioma C. Alabaru: head porterage in Ibadan, Nigeria. Asian Afr Stud. 2013; 22(1):49-64.
5. Porter G, Hampshire K, Dunn C, Hall R, Levesley M, Burton K, et al. Health impacts of pedestrian head-loading: a review of the evidence with particular reference to women and children in sub-Saharan Africa. Soc Sci Med. 2013; 88:90-97.
6. Kurten M, Motaung GT, Ellapen TJ, Paul Y, Muluvhu TC, Barnard M. et al. The effects of cranial loading among bucolic female African children's neuro-musculoskeletal health and well-being: a literature overview (2000-2018). In: Balint G, Antala B, Carty C, Mabiémé J-MA, Kaplánová A, editors. Physical Education and Sport for Children and Youth with Special Needs: Researches – Best Practices – Situation. Bratislava: Slovak Scientific Society for Physical Education and Sport and FIEP; 2021.
7. Kurten M. The biomechanical and electromyographical impact of cranial loading porterage among children residing in the Glendale region (iLembe district) of KwaZulu-Natal. [Masters dissertation]. Pretoria: Tshwane University of Technology; 2021.
8. Kurten M, Ellapen TJ, Paul Y. Inter-tester reliability and validity of manual goniometry versus digital camera versus smartphone technology of postural changes when South African female youth carry head loads (unpublished).
9. Echarri JJ, Forriol F. Effect of axial load on the cervical spine: a study of Congolese wood bearers. Int Orthop. 2002; 26:141-144.
10. Echarri JJ, Forriol F. Influence of the type of load on the cervical spine: a study on Congolese bearers. Spine J. 2005; 5:291-296.
11. Ellapen TJ, Abrahams S, Deasia FA, Van Heerden HJ. Impact of habitual cranial loading on the vertebral column of adolescent African females aged 12-15 years in the Deepvale region of KwaZulu-Natal. Afr J Phys Health Educ Recreat Dance. 2009; 15(4):690-700.
12. Marfell-Jones MJ, Stewart AD, De Ridder JH. International standards for anthropometric assessment. Wellington, New Zealand: International Society for the Advancement of Kinanthropometry; 2012. Available from: https://repository.openpolytechnic.ac.nz/handle/11072/1510 (accessed 20 Feb 2021).
13. Lau HMC, Chiu T, Lam TTW. Clinical measurement of craniovertebral angle by electronic head posture instrument: a test of reliability and validity. Man Ther. 2009; 14(4):363-368. doi: 10.1016/j.math.2008.05.004.
14. Kim W-J, Kang J-W, Kim H-Y, Sung H-I, Park K-Y, Park J-G, et al. Change of pelvic tilt before and after gait in patients with lumbar degenerative kyphosis. J Korean Soc Spine Surg. 2009; 16(2):95-103.
15. Lo Martire R, Gladh K, Westman A, Äng BO. Neck muscle EMG-force relationship and its reliability during isometric contractions. Sports Med Open. 2017; 3:16. doi: 10.1186/s40798-017-0083-2.
16. Criswell E, editor. Cram's Introduction to Surface Electromyography. 2nd ed. Sudbury: Jones & Bartlett Publishers; 2011.
17. Halaki M, Ginn K. Normalization of EMG signals: to normalize or not to normalize and what to normalize to? In: Naik GR, editor. Computational Intelligence in Electromyography Analysis – A Perspective on Current Applications and Future Challenges. Rejika: InTech Open. 2012. doi: 10.5772/49957.
18. Chen Y-L, Mu Y-C. Effects of backpack load and position on body strains in male schoolchildren while walking. PLoS ONE. 2018; 13(3):e0193648. doi: 10.1371/journal.pone.0193648.
19. Shivers BL. Effects of head position and head-supported mass on nerve function of the flexor carpi radialis muscle in healthy individuals [PhD dissertation]. Little Rock: University of Arkansas; 2012. Available from: https://core.ac.uk/download/pdf/84119136.pdf (accessed 4 Oct 2021).

Burden of common mental disorders in South African workplace settings

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ABSTRACT

Background: The presence of common mental disorders (CMDs) in the workplace is associated with high costs. However, there are limited current data available on the mental health disease burden in South African workplace settings. Legislation places a responsibility on employers to monitor and manage workplace health and safety, and mental health surveillance initiatives may be one mechanism to achieve that.

Objectives: The objectives of this paper were 1) to describe the burden of certain CMDs in employees who had participated in a mental health surveillance programme, based on the outcomes of validated psychometric tests for CMDs and 2) to compare the prevalence of CMDs measured using self-report scales with assessments from interviews with clinical psychologists.

Methods: This was a record review of employees from various companies contracted to an occupational health provider that conducts general workplace health surveillance, including mental health surveillance. The records contained data collected using validated psychometric measures, and included responses to four screening scales (PHQ-9, GAD-7, PC-PTSD-5 and CAGE) from 2 068 workers in full-time employment. Cronbach alpha coefficients were calculated to determine internal consistency for each scale. Prevalence of CMDs was calculated and reported by sex, age, and occupational category. Associations between CMDs and sex and age were estimated using multinomial logistic regression analysis. We also explored differences between diagnostic outcomes from the four self-report scales and clinical interview outcomes.

Results: The mean age of the employees was 34.2 years (20–60 years). More than 35% reported two or more CMDs. The prevalences of alcohol-use disorder, major depressive disorder, and generalised anxiety disorder were 3–4% – comparable with, or lower than, that in the general local population.

Conclusion: The relatively high prevalence of some CMDs in this study indicates a need for greater awareness of the importance of effective employee assistance programmes in the workplace.

INTRODUCTION

Mental illness has been described as the 'scourge of our times',[1] with South Africa sharing in the burden. As many as one in six South Africans suffer from disorders such as anxiety, depression or substance use, according to statistics released by the South African Depression and Anxiety Group.[2] Mental health disorders are generally characterised by a combination of abnormal thoughts, perceptions, emotions, behaviour and relationships with others,[3] and are often associated with distress and/or problems participating in social, work or family activities.[4]

Estimates of prevalence of CMDs in South Africa

There are few available large-scale population-based estimates of mental disease burden in South Africa. The South African Stress and Health (SASH) study was a population-based, nationally representative household survey of mental health,[5,6] and provides the most comprehensive prevalence data of CMDs to date. The SASH study reported the most common classes of lifetime disorders to be anxiety disorders (15.8%), substance-use disorders (SUDs; 13.3%) and mood disorders (9.8%). The 12-month prevalence of the most common individual mental disorders were major depressive disorder (MDD; 4.9%), agoraphobia without panic (4.8%), and alcohol-use disorder (AUD; 4.5%). Lower prevalence was reported for panic disorder (0.8%), generalised anxiety disorder (GAD; 1.4%), and post-traumatic stress disorder (PTSD; 0.6%). The 12-month prevalence for any anxiety disorder was 8.1%, and that for any SUD was 5.8%.[5,6] However, it has been suggested that the SASH study may have underestimated the prevalence of CMDs in South Africa.[7]

Others have reported CMD prevalences within defined groups (see Table 1). For example, there has been an array of reports on vulnerable populations, including low-income pregnant women,[8] medical students,[9] HIV-positive patients,[10] and first-year university students from historically marginalised communities.[11] All reported higher prevalences of CMDs than reported in the SASH study, which, as shown in Table 1, vary widely across studies, probably due to differences in the study populations and/or measuring instruments used. Further, international studies provided evidence of over-reporting prevalence of CMDs when using self-report scales, as opposed to clinical interviews.[12,13]

As far as could be ascertained, no general workplace population CMD prevalence estimates are available in South Africa. The small studies that have reported prevalences in defined groups (see Table 1) are often

framed as reports on high-risk (for adverse mental health outcome) occupational groups, including emergency medical personnel,[14,15] police officials,[16] and medical doctors.[17] These high-risk groups are considered to be more vulnerable to psychiatric consequences of (traumatic) workplace exposures, and report high levels of PTSD and AUD. The theme of traumatic exposure has recently been highlighted by reports of increased occurrence of CMDs among frontline medical staff during the COVID-19 pandemic.[18] In general settings, it appears that work characteristics (such as decision latitude and effort-reward imbalance) are more strongly associated with CMDs than is occupational category.[19-20] Broader socio-political contexts also matter. For example, South African reports often highlight the high prevalence of community-level traumatic exposures and associated PTSD, independent of occupational status.[21-23]

There is currently no clear contemporary picture of CMDs in the South African occupational context. The SASH data, based on the DSM-IV diagnostic system, are becoming dated, having been collected in 2003–2004, and some of the other studies cited above had small sample sizes and/or used measures that were not validated locally.

Impact of CMDs in the South African workplace

The human and economic costs of mental illness in the workplace are well documented.[24-27] For example, one report estimated the loss of earnings due to major depression and anxiety disorders at R54 121 per affected adult per year, with the total annual cost to the South African economy amounting to more than R40 billion.[26] It has been estimated that 50% of workplace accidents are related to substance abuse, and that an undetected substance abuser can cost an employer 25% of that person's wages.[28] International data show an increased risk for workplace accidents and injuries where CMDs are present.[29,30] Poor mental health at work also has personal implications, from increased demands to manage the condition, to reduced personal accomplishment and sense of self-worth, and unstable employment.[24,31]

The Occupational Health and Safety Act (Act No. 85 of 1993) places a responsibility on employers to monitor and manage workplace health and safety. Many larger organisations have their own occupational health surveillance programmes in place to achieve this. From a mental health perspective, workplace concerns are bi-directional. First, occupational exposure may pose a risk for mental health injury (either

Table 1. Selection of South African studies reporting prevalence of common mental disorders

			Prevalence of mental disorders assessed with different tools (%)														
			MDD		GAD		PSTD				AUD		Panic disorder	Any anxiety disorder	SUD	
Source	Study population	N	IV	other	IV	other	PC-PTSD-5	IV	other	CAGE	IV	AUDIT	IV	other	IV	other
General population estimates																
Herman et al., 2009 (SASH study)[5]	Population-based sample (12-month prevalence)	4 351	4.9	-	1.4	-	-	0.8	-	-	4.5	-	0.8	8.1	1.4	-
Peltzer, Phaswana-Mafuya, 2018[35]	Population-based survey	26 453	-	-	-	-	-	-	-	-	-	-	-	-	-	4.4
Peltzer, Pengpid, 2019[36]	Nationally representative community-based sample	15 201	-	-	-	-	-	-	2.1	-	-	-	-	-	-	-
Vulnerable groups																
Freeman et al., 2008[37]	People living with HIV and AIDS	900	11.1	-	0.4	-	-	0.7	-	-	12.4	-	0.1	-	1.9	-
Van Heyningen et al., 2017[8]	Low-income, pregnant women, urban setting	376	22.0	-	2.0	-	-	11.0	-	-	13.0	-	3.0	23.0	6.0	-
Kagee et al., 2017[10]	South Africans seeking HIV testing	485	14.2	-	5.0	-	-	4.9	-	-	19.8	-	-	-	-	-
Bantjes et al., 2019[11]	1st year university students from historically marginalised communities	1 402	-	13.6	-	20.8	-	-	-	-	-	5.6	-	-	-	3.1
Van der Walt et al., 2020[9]	SA medical students	473	-	25.0	-	-	-	-	-	-	-	-	-	20.5	-	-
Occupational groups																
Bekker, Van Velden, 2003[38]	SA National Defence Force	618	-	-	-	-	-	-	-	-	-	13.3	-	-	-	-
Ward et al., 2006[15]	Emergency medical service personnel	1 099	-	-	-	-	-	-	2.4	22.5	-	-	-	-	-	-
Rossouw et al., 2013[17]	Medical doctors	132	-	30.0	-	-	-	-	-	-	-	-	-	-	-	-
Van Wijk et al., 2020[14]	Emergency medical service personnel	268	-	12.3	-	-	11.9	-	-	14.9	-	-	-	-	-	-

Notes: PHQ-9 = Patient Health Questionnaire-9; IV = interview; GAD-7 = Generalised Anxiety Disorder scale-7; PC-PTSD-5 = Primary Care Post-traumatic Stress Disorder for DSM-5; AUDIT = Alcohol-use Disorder Identification Test; Other includes various validated/adapted measures

by contributing to mental distress such as PTSD, or by exacerbating existing poor mental health). Second, poor mental health affects workplace safety by increasing the risk of accidents and injuries. Mental health surveillance may provide a mechanism for employers to manage these bi-directional concerns, although there is debate about the degree to which prevalence of CMDs is a good measure of the need for mental health services.[32-34]

It remains largely accepted that mental health surveillance systems, which prompt for the early warning of deteriorating mental health and monitor the effects of workplace exposure on employee mental health, are mutually beneficial to the employer and employee. Early warning systems could assist with both clinical management and workplace accident prevention.

The objectives of this paper were 1) to describe the burden of certain CMDs in employees who had participated in a mental health surveillance programme, based on the outcomes of validated psychometric tests for CMDs and 2) to compare the prevalence of CMDs measured with self-report scales with assessments from interviews with clinical psychologists.

METHODS

Records from an organisation conducting occupational health surveillance, which includes a mental health screen, were reviewed. The records were those of full-time salaried workers from several companies in three provinces, viz. Western Cape, Eastern Cape, and KwaZulu-Natal, who participated in the surveillance programme in 2019. Mental health data from four brief screening scales and a psychological interview were extracted from 2 068 records. The participants comprised semi-skilled and skilled workers who had completed a minimum of Grade 10 schooling (a set requirement to enable meaningful completion of the screening scales).

Measurements

Data were extracted from records of participants who had completed a clinical screen that consisted of four brief scales, viz. the Patient Health Questionnaire-9 (PHQ-9) – a screening, diagnostic, and monitoring tool that measures the severity of depression in primary care settings;[39] the Generalized Anxiety Disorder Questionnaire-7 (GAD-7) – a screening, diagnostic, and monitoring tool that measures the severity of generalised anxiety in primary care settings;[40] the Primary Care Post-traumatic Stress Disorder Screen for DSM-5 (PC-PTSD-5) – developed as a brief screen for PTSD in primary care settings using updated DSM-5 criteria;[41] and the 4-item CAGE to determine problematic alcohol-use.[42] Serious mental disorders (e.g. schizophrenia) were not included due to the lack of locally validated self-report measures to identify such conditions.

Participants were interviewed by clinical psychologists if their responses reached pre-determined scale-total thresholds (i.e. ≥7 for PHQ and GAD, and ≥1 for PC-PTSD-5 and CAGE) to determine the diagnostic likelihood using DSM-5 criteria.

Data analysis

The scores for the four scales and the interview data were analysed. For each scale, participants were categorised into two groups, depending on whether or not their scores met the diagnostic criteria for that scale. Co-morbidity was defined as meeting the criteria for two or more disorders. Prevalences of individual CMDs, with 95% confidence intervals, were calculated. Disease burden, based on scale outcomes (scores) was reported by age, sex, and occupational category; differences were calculated using Chi-square tests. The associations between CMDs and sex and age were estimated using multinomial logistic regression. Only variables where differences, using Chi-square tests, were significant at $p < 0.1$ were included in the regression analysis. Cronbach alpha coefficients were calculated to determine internal consistency for each scale. All analyses were performed using SPSS for Windows version 26.

Ethical approval was provided by the Health Research Ethics Committee of Stellenbosch University (#N20/07/078).

RESULTS

The mean age of the study participants was 34.2 years (± 8.6 years), ranging from 20 to 60 years; 33.5% were women. All 11 official languages were spoken, with English (19.2%), Afrikaans (17.2%), isiXhosa (12%), Setswana (11.7%), and isiZulu (11.6%) being the most common. The mean scores of each scale are shown in Table 2. All scales had high internal consistency, as indicated by Cronbach's alpha.

The prevalences of the four CMDs are presented in Table 3: 4.5% of the workers met the scale threshold for MDD, 5.0% for GAD, 1.9% for PTSD, and 7.2% for AUD. A total of 11% of participants met the criteria for any of the CMDs, as assessed by the four scales. The highest burdens of MDD and AUD were in the 20–29 years age group (6.6% and 10.3%, respectively). Women reported a higher burden of MDD than men (6.3% and 3.6%, respectively), while men reported a substantially higher burden of AUD than women (9.1% and 2.4%, respectively). There were no significant differences in CMD prevalence across occupational categories.

Based on scales totals, 146 employees (7.1%) met the criteria for a single diagnosis, 51 (2.5%) met the criteria for two

Table 2. Employee's scores for the four scales, internal consistency, and threshold for diagnosis of disorder

	Scale			
	PHQ-9	**GAD-7**	**PC-PTSD**	**CAGE**
Associated CMD	Major depressive disorder	Generalised anxiety disorder	Post-traumatic stress disorder	Alcohol-use disorder
Threshold for diagnosis*	≥ 10	≥ 10	≥ 3	≥ 2
Mean ± SD	2.0 ± 3.5	1.7 ± 3.2	0.2 ± 0.6	0.2 ± 0.7
Range	0–25	0–21	0–5	0–4
Cronbach's alpha	0.85	0.90	0.69	0.68

* as determined by the relevant scale

Table 3. Prevalence of common mental disorders, by age group, sex, and occupational category

			Disorder											
	All		Major depressive disorder			Generalised anxiety disorder			Post–traumatic stress disorder			Alcohol–use disorder		
	n	%	n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI
All employees	2 068	-	93	4.5	3.6–5.5	103	5.0	4.0–6.1	39	1.9	1.4–2.7	149	7.2	6.1–8.5
Age group (years)														
20–29	679	32.8	45	6.6	4.9–8.8	47	6.9	4.9–9.4	21	3.1	1.9–4.8	70	10.3	8.1–12.9
30–39	917	44.3	37	4.0	2.9–5.5	39	4.3	3.0–5.9	13	1.4	0.7–2.5	60	6.5	4.9–8.4
40–49	325	15.7	6	1.8	0.7–4.0	10	3.2	1.5–5.9	2	0.7	0.1–2.6	12	3.6	1.7–6.5
50–60	147	7.1	5	3.4	1.1–7.8	7	5.1	2.1–10.3	3	1.8	0.2–6.3	5	3.6	1.0–8.9
Sex														
Female	693	33.5	44	6.3	4.7–8.4	43	6.2	4.4–8.5	19	2.8	1.6–4.6	17	2.4	1.3–4.2
Male	1375	66.5	50	3.6	2.6–4.7	59	4.3	3.1–5.6	22	1.6	1.0–2.4	125	9.1	7.6–10.8
Occupational category														
Administrative/clerical	326	15.8	14	4.3	2.4–7.1	11	3.3	1.6–6.0	10	3.1	1.3–6.0	24	7.3	4.5–11.2
Security services	281	13.6	9	3.2	1.5–6.0	9	3.2	1.5–6.2	4	1.5	0.4–3.7	23	8.1	5.2–12.1
Qualified technicians (mechanical/electrical)	254	12.3	13	5.1	2.8–8.6	10	4.0	1.8–7.4	5	1.8	0.5–4.5	20	7.9	4.8–12.2
Other/unknown	248	12.0	8	3.2	1.4–6.3	17	6.7	3.6–11.2	1	0.4	0.0–2.3	15	5.9	3.3–9.7
Navy personnel	246	11.9	11	4.5	2.3–7.9	7	2.9	0.9–6.6	-	2.0	0.7–4.7	13	5.3	2.9–8.9
Hospitality/catering	131	6.3	10	7.6	3.7–13.6	13	9.6	4.9–16.6	3	2.1	0.3–7.4	6	4.5	1.2–10.4
Marine officers	118	5.7	5	2.5	0.5–7.3	3	3.6	0.7–10.1	0	0	0.0–3.2	2	6.1	2.5–12.2
Technical assistant (not formally qualified)	112	5.4	9	7.1	3.1–13.6	16	13.0	6.4–22.6	4	2.9	0.6–8.1	14	11.4	6.0–19.1
Telecoms technician	111	5.4	7	6.3	2.6–12.6	5	4.9	1.3–12.0	3	2.9	0.6–8.2	9	7.7	3.4–14.6
Professional engineer	103	5.0	3	2.9	0.6–8.3	6	5.7	1.6–14.0	2	2.2	0.3–7.9	9	9.0	4.0–16.9
Firefighter	85	4.1	4	4.7	1.3–11.6	5	6.3	1.7–15.2	2	2.6	0.3–9.2	7	7.9	3.0–16.4
Professional musician	53	2.6	3	5.7	1.2–15.7	3	5.7	1.2–15.7	3	4.9	0.6–16.5	4	7.3	1.5–19.9

CI: Confidence interval

diagnoses, 24 (1.2%) met the criteria for three diagnoses, and 7 (0.3%) met the criteria for four diagnoses. A total of 228 employees met any scale threshold criteria, with 146 (64%) meeting the criteria for a single diagnosis, 51 (22.4%) for two diagnoses, 24 (10.5%) for three diagnoses, and 7 (3.1%) for four diagnoses.

Based on Chi-square test results, age and sex were included in the multinomial logistic regression. As shown in Table 4, the odds of employees being diagnosed with MDD if they were female, using the PHQ-9 scale, were almost twice that than if they were male (OR 1.81, 95% CI 1.19–2.75). There were no significant associations between MDD and age.

There were no associations between GAD or PTSD, and either age or sex (Tables 5 and 6). Although occupational category met Chi-square test criteria for inclusion in the regression model for GAD, no significant associations with GAD were found.

There was a strong association between AUD and both sex and age (Table 7). The odds of employees being diagnosed with AUD if female, using the CAGE scale, were about four times lower than if male (OR 0.23, 95% CI 0.13–0.42). The odds of employees aged 20–29 years being diagnosed with AUD were about three times that of those aged 50–60 years (OR 3.71, 95% CI 1.32–10.42).

Table 4. Association between MDD, and age and sex

Characteristic	n	OR	AOR	95% CI	p value
Age group (years)					
20–29	679	0.62	1.87	0.73 – 4.80	0.196
30–39	917	0.07	1.07	0.41 – 2.79	0.886
40–49	325	0.67	0.51	0.15 – 1.70	0.274
50–60	147	1.00 (ref)	-	-	-
Sex					
Female	693	0.59	1.81	1.19 – 2.75	0.006
Male	1 375	1.00 (ref)	-	-	-

AOR: adjusted odds ratio

A third of employees (n = 697, 33.7%) met the scale criteria for an interview with a clinical psychologist. Two hundred and twenty-eight (11.0%) were diagnosed with one or more CMD, using the scales, but only 145 (7%) were clinically diagnosed with one or more CMD. The prevalence of all four individual CMDs based on the self-report scales was significantly higher than that based on the clinical diagnosis (Table 8).

DISCUSSION

When compared to general population data (SASH study 12-month prevalence), the prevalence of mood and anxiety disorders was lower in this working group. The protective effect of employment on depression has previously been described,[43,44] and could have contributed to the lower prevalence of MDD in our study participants. While the same may apply to anxiety,[44] the lower prevalence of anxiety disorders may be an artefact of data collection, as only certain anxiety disorders were

Table 5. Association between GAD, and age and sex

Characteristic	n	OR	AOR	95% CI	p value
Age group (years)					
20–29	679	0.26	1.30	0.56–3.00	0.539
30–39	917	0.28	0.76	0.33–1.76	0.522
40–49	325	0.54	0.58	0.21–1.60	0.294
50–60	147	1.00 (ref)	-	-	-
Sex					
Female	693	0.42	1.52	0.97–2.36	0.066
Male	1 375	1.00 (ref)	-	-	-

AOR: adjusted odds ratio

Table 6. Association between PTSD, and age and sex

Characteristic	n	OR	AOR	95% CI	p value
Age group (years)					
20–29	679	0.46	1.58	0.36–6.91	0.544
30–39	917	0.34	0.71	0.16–3.25	0.661
40–49	325	1.00	0.37	0.05–2.67	0.323
50–60	147	1.00 (ref)	-	-	-
Sex					
Female	693	0.58	1.78	0.90–3.50	0.095
Male	1 375	1.00 (ref)	-	-	-

AOR: adjusted odds ratio

Table 7. Association between AUD, and age and sex

Characteristic	n	OR	AOR	95% CI	p value
Age group (years)					
20–29	679	1.31	3.71	1.32 – 10.42	0.013
30–39	917	0.82	2.27	0.80 – 6.40	0.123
40–49	325	0.10	1.10	0.34 – 3.60	0.870
50–60	147	1.00 (ref)	-	-	-
Sex					
Female	693	1.45	0.23	0.13 – 0.42	< 0.001
Male	1 375	1.00 (ref)	-	-	-

AOR: adjusted odds ratio

Table 8. Diagnoses of CMDs, determined by screening scales and clinical interview

Mental disorder																Diagnostic tool							
MDD				GAD				PTSD				AUD				Scale				Interview			
PHQ-9		IV		GAD-7		IV		PC-PTSD-5		IV		CAGE		IV		Total diagnoses		Total with ≥ 1 CMD		Total diagnoses		Total with ≥ 1 CMD	
n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
93	4.5	74	3.6	103	5.0	62	3.0	39	1.9	25	1.2	149	7.2	83	4.0	384	18.6	228	11.0	244	11.8	145	7.0

included in the screening scale measurements. The GAD-7-scale identified cases of clinically diagnosed generalised anxiety, as well as panic and post-traumatic stress disorder. This observation that the GAD-7 scale screens for more than GAD follows international findings,[45] and suggests that the scale might serve as a screen for a broader range of anxiety disorders. Further research is needed to explore this. The prevalence of PTSD was comparable to that reported in other population-based studies, while the prevalence of AUD was comparable to that in the SASH study but lower than that reported in other local studies. This was unexpected given the reported increase in alcohol abuse in South Africa since the SASH study was conducted.[46] The context (screening during occupational health surveillance) might have biased responses, resulting in under-reporting of alcohol abuse. The finding that a third of those diagnosed with any CMD had more than one CMD was consistent with recent local studies.[47,48]

The association of increased prevalence of CMD diagnosis with an increase in age, reported in the SASH and other studies, was not seen in our study, perhaps due to the large discrepancies between the numbers of employees in each age group. Nevertheless, the higher prevalence of CMDs in the 20–29 years age group may speak to a need for closer monitoring of new entrants into the labour market.

With regard to sex, South African women tend to report more severe mood symptoms than men, using the PHQ-9,[49] consistent with observations that they are more frequently diagnosed with MDD than men.[50] This was reflected in our study findings. Similarly, South African men tend to report more indicators of problematic alcohol-use on the CAGE than women,[49] and are more often diagnosed with AUD,[5] which is supported by our results.

No data on stressful or traumatic workplace exposures were available, but the finding that there were no significant differences in CMD prevalence across occupational categories suggests that there was little occupation-specific vulnerability in this sample. This finding also provides support for reports that, depending on context, work characteristics may be stronger contributors to CMD than occupation.[20]

For each mental disorder in this study, self-report scale scores suggested a higher prevalence of CMDs than did the clinical interview outcomes. This is not unusual, considering that personnel participating in mental health evaluations have been found to more readily report symptoms of distress when undergoing self-report screening than when participating in person-to-person clinical interviews.[51] It would thus be important to more fully consider the role of screening measures as a valid mode of occupational mental health surveillance, where outcomes would need to be further investigated to determine clinical mental health status.

Some of the scales used here – the PHQ-9, GAD-7, and PC-PTSD-5 – have been validated locally and may be fit for purpose.[49] However, the difference in self-reported and clinical diagnoses of AUD points to the need for a scale with higher specificity than the CAGE. A tool like the AUDIT (Alcohol Use Disorder Identification Test) may be more appropriate for local use.[52] For all four screening scales in this study, further research is required to confirm scale validity in local workplace contexts.

Limitations

The study was a cross-sectional profile of workers who participated in a health surveillance programme, and the findings do not represent any larger community or industry in South Africa. Specifically, these employees were drawn from working environments where a system of occupational mental health promotion was well-established – perhaps informing a relatively higher degree of mental health awareness, symptom articulation, recognition and reporting, as well as mental health-seeking behaviour than that usually found in workplaces in South Africa.[53] In addition, the employees had relatively good access to mental health services (e.g. through the occupational health surveillance referral system from where the data came), which may have resulted in a lower prevalence of CMDs. Given the generally limited access to mental healthcare in the wider South African workforce, the prevalences reported in this study are probably conservative estimates.

Further, although all participants had completed at least 10 years of formal schooling, the role of language remains a challenge. Screening measures rely on respondents' literacy with regard to the semantic descriptions of mental distress. Although most of the scales used have evidence of local validation, language proficiency was not measured, and might have influenced responses.

CONCLUSION

This study provides a description of CMD prevalence in a sample of workers. The relatively high current prevalence of AUD, MDD, and GAD suggests that these CMDs are the most likely to occur in the workforce. Occupational health programmes should take cognisance of mental health aspects, in addition to conditions such as HIV, TB, obesity, hypertension, etc. The study was conducted prior to COVID-19 and thus there may now be a far greater burden of CMDs in workplaces. There is a need for greater awareness of the importance of effective employee assistance/wellness programmes (and other mental health programmes) in the workplace.

KEY MESSAGES

1. Mental health surveillance programmes in the workplace are important.
2. The main CMDs that should be screened for are AUD, MDD and GAD.
3. It is important to use appropriately validated scales for screening CMDs.
4. To mitigate the risk of over-reporting, scales should be used to screen, rather than diagnose CMDs.

DECLARATION

The authors declare that this is their own work; all the sources used in this paper have been duly acknowledged and there are no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conception and design of the paper: CHvW
Data acquisition: CHvW
Data analysis: CHvW, JHM, WAJM
Interpretation of the data: CHvW, JHM, WAJM
Drafting of the paper: CHvW, JHM, WAJM
Critical revision of the paper: CHvW, JHM, WAJM

REFERENCES

1. Pardes H. Mental illness: the scourge of our times. Research America; 2016 Oct 5. Available from: https://www.researchamerica.org/blog/mental-illness-scourge-our-time (accessed 10 Oct 2021).
2. South African Depression and Anxiety Group. Available from: https://www.sadag.org/index.php?option=com_content&view=article&id=2650:not-enough-help-for-people-with-mental-health-problems&catid=61&Itemid=143 (accessed 10 Oct 2021).
3. World Health Organization. Mental disorders; 2019 Nov 28. Available from: https://www.who.int/news-room/fact-sheets/detail/mental-disorders (accessed 10 Oct 2021).

4. American Psychiatric Association. What is mental illness? 2021. Available from: https://www.psychiatry.org/patients-families/what-is-mental-illness (accessed 10 Oct 2021).
5. Herman AA., Stein DJ, Seedat S, Heeringa SG, Moomal H, Williams DR. The South African Stress and Health (SASH) study: 12-month and lifetime prevalence of common mental disorders. S Afr Med J. 2009; 99(5 Pt 2):339-344.
6. Stein DJ, Seedat S, Herman A, Moomal H, Heeringa SG, Kessler DC, et al. Lifetime prevalence of psychiatric disorders in South Africa. Br J Psychiatry. 2008; 192(2):112-117. doi:10.1192/bjp.bp.106.029280.
7. Jacob N, Coetzee D. Mental illness in the Western Cape province, South Africa: a review of the burden of disease and healthcare interventions. S Afr Med J. 2018; 108(3):176-180. doi:10.7196/samj.2018.v108i3.12904.
8. Van Heyningen T, Honikman S, Myer L, Onah MN, Field S, Tomlinson M. Prevalence and predictors of anxiety disorders amongst low-income pregnant women in urban South Africa: a cross-sectional study. Arch Womens Ment Health. 2017; 20(6):765-775. doi:10.1007/s00737-017-0768-z.
9. Van der Walt S, Mabaso WS, Davids EL, De Vries PJ. The burden of depression and anxiety among medical students in South Africa: a cross-sectional survey at the University of Cape Town. S Afr Med J. 2020; 110(1):69-76. doi:10.7196/SAMJ.2020.v110i1.14151.
10. Kagee A, Saal W, De Villiers L, Sefatsa M, Bantjes J. The prevalence of common mental disorders among South Africans seeking HIV testing. AIDS Behav. 2017; 21(6):1511-1517. doi:10.1007/s10461-016-1428-4.
11. Bantjes J, Lochner C, Saal W, Roos J, Taljaard L, Page D, et al. Prevalence and sociodemographic correlates of common mental disorders among first-year university students in post-apartheid South Africa: implications for a public mental health approach to student wellness. BMC Public Health. 2019; 19:922. Available from: https://doi.org/10.1186/s12889-019-7218-y (accessed 10 Oct 2021).
12. Eaton WW, Neufeld K, Chen LS, Cai G. A comparison of self-report and clinical diagnostic interviews for depression: diagnostic interview schedule and schedules for clinical assessment in neuropsychiatry in the Baltimore epidemiologic catchment area follow-up. Arch Gen Psychiatry. 2000; 57(3):217-222. doi:10.1001/archpsyc.57.3.217.
13. Newson JJ, Hunter D, Thiagarajan TC. The heterogeneity of mental health assessment. Front Psychiatry. 2020; 11:76. doi:10.3389/fpsyt.2020.00076.
14. Van Wijk CH, Cronje FJ, Meintjes J. Mental wellbeing monitoring in a sample of emergency medical service personnel. Occupational Diseases and Environmental Medicine. 2020; 8(1):26-33.
15. Ward CL, Lombard CJ, Gwebushe N. Critical incident exposure in South African emergency services personnel: prevalence and associated mental health issues. Emerg Med J. 2006; 23(3):226-231. doi:10.1136/emj.2005.025908.
16. South African Police Service. SAPS Employee Health and Wellness. Presentation to the Parliamentary Portfolio Committee on Police; 17 Feb 2016. Available from https://static.pmg.org.za/160217EHW.pdf (accessed 11 Oct 2021).
17. Rossouw L, Seedat S, Emsley RA, Suliman S, Hagemeister D. The prevalence of burnout and depression in medical doctors working in the Cape Town Metropolitan Municipality community healthcare clinics and district hospitals of the Provincial Government of the Western Cape: a cross-sectional study. S Afr Fam Pract. 2013; 55(6):567-573. Available from: https://doi.org/10.1080/20786204.2013.10874418 (accessed 10 Oct 2021).
18. Gold JA. Covid-19: Adverse mental health outcomes for healthcare workers. BMJ 2020; 369:m1815. doi:10.1136/bmj.m1815.
19. Chamoux A, Lambert C, Vilmant A, Lanhers C, Agius R, Boutaleb M, et al. Occupational exposure factors for mental and behavioral disorders at work: the FOREC thesaurus. PLoS One. 2018; 13(6):e0198719. doi:10.1371/journal.pone.0198719.
20. Stansfeld SA, Pike C, McManus S, Harris J, Bebbington P, Brugha T, et al. Occupations, work characteristics and common mental disorder. Psychol Med. 2013; 43(5):961-973. doi:10.1017/s0033291712001821.
21. Edwards D. Post-traumatic stress disorder as a public health concern in South Africa. J Psychol Afr. 2005;15(2):125-134. Doi: 10.4314/jpa.v15i2.30650.
22. Kaminer D, Eagle G. Traumatic stress in South Africa. Johannesburg: Wits University Press; 2010. doi:10.26530/oapen_626383.
23. Peltzer K, Pengpid S. High physical activity is associated with post-traumatic stress disorder among individuals aged 15 years and older in South Africa. S Afr J Psychiatr. 2019; 25:1329. doi:10.4102/sajpsychiatry.v25i0.1329.
24. Lund C, Myer L, Stein DJ, Williams DR, Flisher AJ. Mental illness and lost income among adult South Africans. Soc Psychiatry Psychiatr Epidemiol. 2013; 48(5):845-851. doi:10.1007/s00127-012-0587-5.
25. Mall S, Lund C, Vilagut G, Alonso J, Williams DR, Stein DJ. Days out of role due to mental and physical illness in the South African stress and health study. Soc Psychiatry Psychiatr Epidemiol. 2015; 50(3):461-468. doi:10.1007/s00127-014-0941-x.
26. Schoeman R. Mental health problems cost SA's economy billions per year. Financial Mail; 2017 Aug 31. Available from: https://www.businesslive.co.za/fm/features/2017-08-31-mental-health-problems-cost-sas-economy-billions-per-year/ (accessed 10 Oct 2021).
27. Stander MP, Bergh M, Miller-Janson HE, De Beer JC, Korb FA. Depression in the South African workplace. S Afr J Psychiat. 2016; 22(1):a814. Available from: http://dx.doi.org/10.4102/sajpsychiatry.v22i1.814 (accessed 10 Oct 2021).
28. McCann M, Harker-Burnhams NH, Albertyn C, Bhoola U. Alcohol, drugs and employment. 3rd ed. Claremont: Juta & Co. Ltd.; 2011. ISBN:978-0-7021-9406-1.
29. Hilton MF, Whiteford HA. Associations between psychological distress, workplace accidents, workplace failures and workplace successes. Int Arch Occup Environ Health. 2010; 83:923-933. doi:10.1007/s00420-010-0555-x.
30. Palmer KT, D'Angelo S, Harris EC, Linaker C, Coggon D. The role of mental health problems and common psychotropic drug treatments in accidental injury at work: a case-control study. Occup Environ Med. 2014; 71:308-312. doi:10.1136/oemed-2013-101948.
31. Kessler RC. The costs of depression. Psychiatr Clin North Am. 2012; 35(1):1-14. doi: 10.1016/j.psc.2011.11.005.
32. Leão LHdC, Gomez CM. The issue of mental health in occupational health surveillance. Cien Saude Colet. 2014; 19(12):4649-4658. Available from: https://dx.doi.org/10.1590/1413-812320141912.12732014 (accessed 10 Oct 2021).
33. Brazilian National Association of Occupational Health, Neto JD, Myung E, Murta G, Viera A, Lima PR, et al. Depression in the workplace: screening and treatment. Rev Assoc Méd Bras. 2019; 65(3):295-315. doi:10.1590/1806-9282.65.3.295.
34. Mechanic D. Is the prevalence of mental disorders a good measure of the need for services? Health Aff (Millwood). 2003; 22(5):8-20. doi:10.1377/hlthaff.22.5.8.
35. Peltzer K, Phaswana-Mafuya N. Drug use among youth and adults in a population- based survey in South Africa. S Afr J Psychiatr. 2018. 24:1139. doi:10.4102/sajpsychiatry.v24i0.1139.
36. Peltzer K, Pengpid S. High physical activity is associated with post-traumatic stress disorder among individuals aged 15 years and older in South Africa. S Afr J Psychiatr. 2019; 25:1329. doi:10.4102/sajpsychiatry.v25i0.1329.
37. Freeman M, Nkomo N, Kafaar Z, Kelly K. Mental disorder in people living with HIV/Aids in South Africa. S Afr J Psychol. 2008;38(3):489-500. Available from: https://doi.org/10.1177/008124630803800304 (accessed 10 Oct 2021).
38. Bekker D, Van Velden DP. Alcohol misuse in patients attending a defence force general medical clinic. S Afr Fam Pract. 2003; 45(2):10-15.
39. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001; 16(9):606-613. doi:10.1046/j.1525-1497.2001.016009606.x.
40. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med. 2006;166(10):1092-1097. doi:10.1001/archinte.166.10.1092.
41. Bovin MJ, Kimerling R, Weathers FW, Prins A, Marx BP, Post EP, et al. Diagnostic accuracy and acceptability of the primary care post-traumatic stress disorder

screen for the diagnostic and statistical manual of mental disorders (Fifth edition) among US veterans. JAMA Netw Open. 2021; 4(2):e2036733. doi:10.1001/jamanetworkopen.2020.36733.
42. Ewing JA. Detecting alcoholism. The CAGE questionnaire. JAMA. 1984; 252(14):1905-1907. doi:10.1001/jama.252.14.1905.
43. Fernández-Niño JA, Bonilla-Tinoco LJ, Astudillo-García CI, Manrique-Hernández EF, Giraldo-Gartner V. Association between the employment status and the presence of depressive symptoms in men and women in Mexico. Cad Saude Publica. 2018; 34(9):e00219617. doi:10.1590/0102-311x00219617.
44. Hiswåls A-S, Walander A, Soares J, Macassa G. Employment status, anxiety and depression in a municipal context. Res Health Sci. 2017; 2(1):12-23. doi:10.22158/rhs.v2n1p12.
45. Kroenke K, Spitzer RL, Williams JB, Monahan PO, Löwe B. Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. Ann Intern Med. 2007; 146(5):317-325. doi:10.7326/0003-4819-146-5-200703060-00004.
46. Peltzer K, Davids A, Njuho P. Alcohol use and problem drinking in South Africa: findings from a national population-based survey. Afr J Psychiatry (Johannesbg). 2011; 14(1):30-37. doi:10.4314/ajpsy.v14i1.65466.
47. Gabriels CM, Macharia M, Weich L. Psychiatric comorbidity among alcohol-dependent individuals seeking treatment at the Alcohol Rehabilitation Unit, Stikland Hospital. S Afr J Psychiatr. 2019; 25:1218. doi:10.4102/sajpsychiatry.v25i0.1218.
48. Nel C, Augustyn L, Bartman N, Koen M, Liebenberg M, Naudé J, et al. Anxiety disorders: psychiatric comorbidities and psychosocial stressors among adult outpatients. S Afr J Psychiatr. 2018; 24:1138. doi10.4102/sajpsychiatry.v24i0.1138.
49. Van Wijk CH, Martin JH, Maree DJF. Clinical validation of brief mental health scales for use in South African occupational healthcare. SA Journal of Industrial Psychology. 2021; 47:a1895. doi:10.4102/sajip.v47i0.1895.
50. Tomlinson M, Grimsrud AT, Stein DJ, Williams DR, Myer L. The epidemiology of major depression in South Africa: results from the South African stress and health study. S Afr Med J. 2009; 99(5 Pt 2):367-373.
51. Lucas GM, Rizzo A, Gratch J, Scherer S, Stratou G, Boberg J, et al. Reporting mental health symptoms: Breaking down barriers to care with virtual human interviewers. Front Robot AI. 2017; 4(51):1-9. Available from: https://doi.org/10.3389/frobt.2017.00051 (accessed 10 Oct 2021).
52. Saunders JB, Aasland OG, Babor TF, et al. Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption – II. Addiction. 1993; 88:791-804.
53. Hamdulay A. Proactive management is the best medicine for mental illness in the workplace. The South African Depression and Anxiety Group; undated. Available from: http://www.sadag.org/index.php?option=com_content&view=article&id=2279:manage-mental-illness-in-the-workplace&catid=61&Itemid=143 (accessed 10 Oct 2021).

Factors associated with sickness absence in healthcare workers in two public sector hospitals in Gauteng province, South Africa

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ABSTRACT

Background: The health workforce is key to service delivery and forms part of the World Health Organization's six building blocks for health systems. It is therefore important to prioritise the health and wellbeing of healthcare workers (HCWs) to maintain their productivity.

Objective: We assessed the association of risk factors for cardiometabolic diseases, such as hypertension, diabetes, and obesity on sickness absence in HCWs, using routine medical surveillance records.

Methodology: Six hundred HCWs' health records were randomly selected from the occupational health clinic at two hospitals in Gauteng province, from 1 April to 30 June 2019. Backward stepwise logistic regression was used to assess the relationships between risk factors for cardiometabolic diseases, including body mass index (BMI), blood pressure, smoking, alcohol intake, regular exercise, and sickness absence.

Results: Four hundred and fifty records (75.0%) were for female HCWs. The overall median age was 37 years (IQR 30–47 years). Most HCWs were nurses (n = 290, 48.3%), followed by service workers (n = 124, 20.7%). Males had lower odds of sickness absence than females (AOR = 0.61; 95% CI 0.40, 0.94; p = 0.024). Compared to HCWs aged 30 years or younger, those aged 31 to 50 years and older than 50 years had significantly higher odds of sickness absence (AOR = 1.87; 95% CI 1.23–2.86; p = 0.004, and AOR = 2.25; 95% CI 1.30–3.89; p = 0.004). For each increasing unit of BMI, the odds of sickness absence increased by 3% (AOR = 1.03; 95% CI 1.00–1.06; p = 0.023).

Conclusion: The presence of risk factors for cardiometabolic diseases and their association with productivity (measured as sick leave) highlight the importance of assessing lifestyle risk factors during medical surveillance for healthcare workers.

INTRODUCTION

Health workers work long hours and busy shifts, in stressful environments. If their diets are lacking in nutrients and they have little physical activity, they are at risk of developing lifestyle diseases such as hypertension and diabetes. Many of these chronic conditions can be prevented by adopting healthy lifestyles, which might be difficult for healthcare workers (HCWs) to follow when busy and stressed. Employers should provide HCWs with opportunities to improve their health within the working environment, as stipulated in the Occupational Health and Safety Act and advocated by the World Health Organization (WHO).[1-3]

A survey on HCWs in the United Kingdom in 2015 showed that they had poor eating habits.[4] Only one out of six ate five or more portions of fruit or vegetables per day, and five out of six reported eating more than the daily-recommended amount of fat and/or sugar. In addition, one out of five consumed more than the recommended amount of alcohol per week, with clinical staff consuming more alcohol than non-clinical staff. Physical activity was also suboptimal; only about half of the HCWs reported moderate or vigorous physical activity. This study highlighted the lifestyle risk factors of some health workers in developed countries and reflected on the need for employee wellness services to be developed to address these health concerns. For example, obesity is a major contributor to the development of cardiovascular risk factors and diseases, including hypertension, metabolic syndrome, diabetes and hyperlipidaemia, and its prevention requires healthy lifestyle choices.[5,6] Other risk factors for chronic diseases include low socioeconomic status and poor education, and lack of knowledge about healthy lifestyles.[7]

One might assume that health workers have the education and knowledge to make healthy choices and lead healthy lifestyles.[8] However, studies have found low levels of awareness amongst HCWs regarding their own health. In Cameroon and South Africa, studies have shown that both doctors and nurses at the forefront of the fight against diseases of lifestyle are not necessarily aware of their own health risk profiles.[8,9] A study in KwaZulu-Natal province in South Africa revealed that, although all participating HCWs were aware of the negative consequences of being overweight or obese, only a few followed a healthy lifestyle. Reported barriers to adopting a healthy lifestyle include institutional and attitudinal factors.[9]

Few studies have assessed lifestyle risk factors and sickness absence (absence from the workplace due to illness) in HCWs, using occupational clinic health data. Authors of a report of a South African study

recommended that healthcare facility employers should invest in their workforces by providing health workers with access to physical exercise facilities and affordable healthy food in the facilities.[9] To motivate the implementation of employee wellness programmes, evidence on the burden of lifestyle diseases and the contribution of chronic conditions and adverse working environments to work absence and reduced workplace productivity is needed. We analysed routinely-collected data of HCWs within the public health sector, who attended the occupational health clinic for routine medical surveillance, to assess the association of lifestyle risk factors with sickness absence.

METHODS

We conducted a retrospective review of health records from the Human Resources and Occupational Health and Safety clinic of two purposively selected hospitals in Gauteng province, for the period 1 April to 30 June 2019. These hospitals are within the same referral cluster but are situated in different health districts; both service large population groups. The one, a tertiary hospital, refers patients to the second, a central hospital.

The study population comprised all categories of HCWs that attended the occupational health services at the hospitals for routine medical surveillance during the study period. During surveillance, blood pressure readings, finger-prick glucose tests, urine dipstick tests and tuberculosis screening were conducted to assess health risks, regardless of chronic disease status and medication taken. Only one of the hospitals routinely tested glucose levels, using finger-prick tests.

The sample size calculation (N = 578) was based on the estimated 24.3% prevalence rate of hypertension reported from a study in Africa.[10] To account for records with missing data, the sample size was increased to 600. Simple random sampling was used to select records for review. A data extraction tool was used to collect data on demographic, clinical, occupational and lifestyle risk factors.

Data analysis

The data were entered into an Excel spreadsheet and analysed using STATA version 16. The outcome variable was sickness absence (yes/no). The sickness absence rate in the three-month period was calculated as total no. of sick days/total no. of participants. Alcohol intake was defined as intake (yes) and no intake (no) of any alcohol during the study period. Regular exercise was defined as exercise for at least 30 minutes, five times per week (yes) and no regular excercise.[11] Body mass index (BMI) was calculated as weight (kg)/height (m^2), and study participants were categorised as underweight (< 18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), obese (30.0–34.9 kg/m^2), and morbidly obese (≥ 35 kg/m^2).[11]

Continuous variables for which data were not normally distributed were summarised as medians and interquartile ranges. Categorical variables were summarised as frequencies and percentages. Chi-square tests were used to assess the relationships between sickness absence (binary outcome variable), and demographic, work and lifestyle characteristics.

Factors associated with sickness absence, as identified in a literature review, that were included in the initial logistic regression analyses were age, sex, smoking, exercise, alcohol, BMI, hypertension, years worked, and urine dipstick test results (blood, ketones, glucose, nitrates, and leucocytes). Variables with p values ≤ 0.25 in the univariable logistic regression were included in the multivariable logistic regression model.[12] Adjusted odds ratios for variables in the final model, where the likelihood-ratio test p values were < 0.05, were considered significant. Using stepwise backward logistic regression, variables with p > 0.05 were removed from the model.

The prediction accuracy of the final model was assessed using the area under the receiver operating characteristic (ROC) curve. Goodness-of-fit of the final model was tested using the Pearson's goodness-of-fit and the Hosmer-Lemeshow goodness-of-fit tests. The latter test was also used because the number of covariate groups in the data were high for the sample size available and the Pearson's goodness-of-fit test might not have been reliable under these conditions. A sensitivity analysis was carried out for the Hosmer-Lemeshow goodness-of-fit test.[13] For these goodness-of-fit tests, p values > 0.05 indicate that deviations of model predictions from the observed outcomes might be explained by sampling error alone (chance). Hence p values > 0.05 are desirable results.

The study was approved by the ethics committee of the University of Pretoria (clearance certificate number 50/2019) and the Gauteng Provincial Department of Health. Permission to conduct the study was obtained from the hospital management.

RESULTS

Six hundred records were reviewed: 240 from the tertiary hospital and 360 from the central hospital. The characteristics of the HCWs are summarised in Table 1. Most were female (n = 450, 75.0%). The median age of the study participants was 37 years (IQR 30–47 years). Most participants worked in the nursing department (n = 290, 48.3%), followed by those in the services (n = 124, 20.7%) and allied departments (n = 77, 12.8%).

Most participants were non-smokers (n = 576, 96.0%), 71 (11.8%) drank alcohol, and 139 (23.2%) exercised regularly. Around a quarter (n = 138, 23.0%) had high blood pressure, and were of normal weight (n = 158, 26.3%); 65.3% (n = 392) were in the overweight, obese or morbidly obese BMI categories.

A total of 1 350 leave days were recorded in the three-month study period. Approximately half of the participants took sick leave (n = 314, 52.3%), at a rate of 2.25 days per person.

In the bivariate analysis (Table 2), there were significant differences in sickness absence by sex, age group, department, number of years worked, blood pressure and BMI (p < 0.05).

Data for the glucose test and employment duration were missing from many of the records (n = 392, 65.3%, and n = 286, 47.7%, respectively). These variables were therefore excluded from the multivariable logistic regression analyses. Alcohol intake and regular exercise were not considered further as their univariable logistic regression p values were > 0.25. The initial full model contained sex, age group, smoking, alcohol intake, blood pressure, BMI, and urine dipstick test result. There were no statistically significant differences between the 31–40 and 41–50 years old age groups, and the 51–60 and > 60 years age groups. As a result, the first two groups were combined into a single group (31–50 years), and the second two groups were combined (> 50 years), i.e. the four groups were collapsed into two.

The adjusted odds ratios (AORs) for sex, age, smoking and BMI were significant (p < 0.15) and were retained in the final multivariable logistic regression model (Table 3). Males had 0.61 times the adjusted odds of sickness absence than females. The adjusted odds of sickness absence increased with age. Compared to participants younger than 30 years, those in the age groups 31–50 years and > 50 years had 1.87 and 2.25 times the adjusted odds of sickness absence, respectively. For each one-unit rise in BMI, the adjusted odds of sickness absence increased by 0.03 (3%).

Table 1. Characteristics of study participants by sex (N = 600)

	Female (n = 450)		Male (n = 150)		Total	
	n	%	n	%	n	%
Demographic/work characteristic						
Age (years)						
18–30	121	26.9	44	29.3	165	27.5
31–40	135	30.0	39	26.0	174	29.0
41–50	104	23.1	39	26.0	143	23.8
51–60	65	14.4	17	11.3	82	13.7
> 60	19	4.2	8	5.3	27	4.5
unknown	6	1.3	3	2.0	9	1.5
BMI (kg/m^2)						
18.0–24.9	111	24.7	47	31.3	158	26.3
25.0–30.0	139	30.9	57	38.0	196	32.7
31.1–35.0	73	16.2	19	12.7	92	15.3
> 35.0	95	21.1	9	6.0	104	17.3
unknown	32	7.1	18	12.0	50	8.3
Department						
Nursing	257	57.1	33	22.0	290	48.3
Clinical medicine	36	8.0	25	16.7	61	10.2
Allied*	58	12.9	19	12.7	77	12.8
Administration†	22	4.9	12	8.0	34	5.7
Services‡	70	15.6	54	36.0	124	20.7
unknown	7	1.6	7	4.7	14	2.3
Years worked						
1–5	134	29.8	50	33.3	184	30.7
6–10	35	7.8	9	6.0	44	7.3
11–20	39	8.7	8	5.3	47	7.8
> 20	33	7.3	6	4.0	39	6.5
unknown	209	46.4	77	51.3	286	47.7
Lifestyle characteristic						
Smoking						
No	441	98	135	90.0	576	96.0
Yes	9	2.0	15	10.0	24	4.0
Alcohol intake						
No	405	90.0	124	82.7	529	88.2
Yes	45	10.0	26	17.3	71	11.8
Regular exercise						
No	343	76.2	118	78.7	461	76.8
Yes	107	23.8	32	21.3	139	23.2
Biological measurements						
Urine dipstick						
Normal	411	91.3	148	98.7	559	93.2
Abnormal	39	8.7	2	1.3	41	6.8
Blood pressure (mmHg)						
< 140/90	347	77.1	111	74.0	462	77.0
≥ 140/90	103	22.9	39	26.0	138	23.0
Urine dipstick						
Normal	411	91.3	148	98.7	559	93.2
Abnormal	39	8.7	2	1.3	41	6.8
Blood pressure (mmHg)						
< 140/90 (normal)	347	77.1	111	74.0	462	77.0
≥ 140/90 (high)	103	22.9	39	26.0	138	23.0
Glucose (mmol/L)						
≤ 5.6 (normal)	76	16.9	36	24.0	112	18.7
5.7–11 (impaired)	51	11.3	13	8.7	64	10.7
> 11.1 (high)	25	5.6	7	4.7	32	5.3
unknown	298	66.2	94	62.7	392	65.3

* Radiography, pharmacy, physiotherapy, occupational therapy, dieticians; † Human resources, finance staff, clerks, and managers; ‡ Cleaning, laundry staff, gardeners, services, infrastructure staff, and logistics staff

Table 2. Characteristics of health workers by sickness absence (N = 600)

Characteristic	Sickness absence: No (n = 318)		Sickness absence: Yes (n = 282)		p value
	n	%	n	%	
Sex					
Female	226	71.1	224	79.4	0.003
Male	92	28.9	58	20.6	
Age group (years)					
18–30	111	34.9	54	19.1	< 0.000
31–40	91	28.6	83	29.4	
41–50	65	20.4	78	27.7	
51–60	30	9.4	52	18.4	
> 60	16	5.0	11	3.9	
unknown	5	1.6	4	1.4	
Department					
Nursing	125	39.3	165	58.5	< 0.000
Clinical medicine	44	13.8	17	6.0	
Allied*	50	15.7	27	9.6	
Administration†	17	5.3	17	6.0	
Services‡	77	24.2	47	16.7	
unknown	5	1.6	9	3.2	
Years worked					
1–5	103	32.4	81	28.7	< 0.000
6–10	15	4.7	29	10.3	
11–20	17	5.3	38	13.5	
> 20	6	1.9	25	8.9	
unknown	177	55.7	109	38.7	
Smoking					
No	308	96.9	268	95.0	0.120
Yes	10	3.1	14	5.0	
Alcohol intake					
No	281	88.4	248	87.9	0.700
Yes	37	11.6	34	12.1	
Exercise					
No	249	78.3	212	75.2	0.290
Yes	69	21.7	70	24.8	
Urine dipstick result					
Normal	28	8.8	13	4.6	0.080
Abnormal	290	91.2	269	95.4	
Blood pressure (mm Hg)					
< 140/90 (normal)	257	80.8	201	71.3	0.010
≥ 140/90 (high)	61	19.2	81	28.7	
Glucose (mmol/L)					
< 5.6 (normal)	70	22.0	42	14.9	0.910
5.7–11.0 (impaired)	38	11.9	26	9.2	
> 11.1 (high)	20	6.3	12	4.3	
missing	190	59.7	202	71.6	
Body mass index (kg/m^2)					
18.0–24.9	96	30.2	62	22.0	0.010
25.0–30.0	103	32.4	93	33.0	
31.1–35.0	49	15.4	43	15.2	
> 35.0	40	12.6	64	22.7	
unknown	30	9.4	20	7.1	

* Radiography, pharmacy, physiotherapy, occupational therapy, dieticians; † Human resources, finance staff, clerks, and managers; ‡ Cleaning, laundry staff, gardeners, services, infrastructure staff, and logistics staff

Table 3. Factors associated with sickness absence in HCWs (N = 539)

Covariate	Crude OR	AOR	95% CI	p value
Sex				
Female	1.00 (ref)			
Male	0.65	0.61	0.40 – 0.94	0.024
Age (years)				
< 30	1.00 (ref)			
31–50	1.38	1.87	1.23 – 2.86	0.004
> 50	1.70	2.25	1.30 – 3.89	0.004
BMI (kg/m^2)	1.05	1.03	1.00 – 1.06	0.023

Crude OR: univariable odds ratio; AOR: adjusted odds ratio; CI: confidence interval
Area under the ROC curve = 0.65; Pearson's goodness-of-fit test p value = 0.108; Hosmer-Lemeshow goodness-of-fit: p = 0.545 (8 groups), p = 0.449 (10 groups), and p = 0.354 (12 groups)

DISCUSSION

In this study, we assessed the associations between several characteristics and sickness absence in HCWs. Over a three-month period, more than half of the study participants took at least one day of sick leave. The overall sickness absence rate was 2.25 days per person. Our main findings were that being female, older than 30 years, and being overweight or obese increased the likelihood of sickness absence.

The proportions of several of the risk factors for cardiometabolic disease (diabetes and cardiovascular disease)[14,15] were high, viz. smoking (4%), overweight and obesity (65.3%), hypertension (23.0%), impaired or high glucose levels (16.0%), and lack of regular physical activity (76.8%). A study conducted in Limpopo province in 2011 showed similar results, with 73% of the HCWs being overweight or obese, and one third reporting that they had obesity-related cardiometabolic diseases such as hypertension (20%) and diabetes 10%).[16]

Male HCWs in our study were less likely to take sick leave than females. These findings are in contrast to those from a study on employees in an organisation in Sweden, which reported significantly more sickness absence in males than females.[17] A survey of 1 800 employees in Norway showed no sex-related differences in sickness absence.[18] In a study in Helsinki municipal employees, women took more sick leave than men; this was attributed to mental and behavioural disorders.[19] These studies show that there are variations in sex-related differences in sickness absence, which also differ by occupational setting.

Most of the HCWs who took sick leave were aged 31 to 50 years, and the odds of sickness absence increased with age. A study in Germany reported similar results, i.e. more sick absence among older workers in stressful working environments.[20] Older, and more experienced HCWs have been shown to be prone to sickness absence or long-term sickness.[21,22] A review of findings from several countries, including Nigeria, Finland and Canada, showed that older healthcare professionals had a higher rate of long-term sickness absence than younger professionals.[23]

Only 4% of study participants were smokers, according to their records. Proportions of HCWs who are smokers differ widely by country. In a study conducted in Spain, 24.9% of HCWs smoked.[15] A meta-analysis of 229 studies from 63 countries, including lower-income countries, showed that the overall pooled prevalence of tobacco use in HCWs was 21% (31% in males and 17% in females). Male doctors in lower-income countries comprised the highest proportion of smokers.[24] The relatively low proportion of smokers in our study might be due to desirability bias and/or inadequate capturing of smoking histories during medical surveillance.[25]

Our findings that increasing BMI increased the odds of sickness absence support those from other studies.[26,27] A longitudinal study in Germany, published in 2018, also showed that high BMI was associated with sickness absence, especially in women.[28] It has previously been recommended that employers address obesity in the workplace.[26]

Only one of the two hospitals conducted finger-prick glucose testing. Almost 11% of the HCWs had glucose levels that indicated impaired glucose tolerance, and 5.3% had high glucose levels, suggesting diabetes mellitus. Regular checking of glucose is important to ensure early diagnosis of diabetes mellitus and to prevent complications such as debilitating diabetic retinopathy and amputations.[29] An epidemiological review of studies showed that positive lifestyle interventions markedly reduce the rate of progression of type 2 diabetes.[14] Thus, employers should pay attention to non-diabetic hyperglycaemic individuals.

Routine health measurements and wellness initiatives may be beneficial to the overall health of workers who work under stressful conditions within an overburdened healthcare system.[15] Occupational health clinics should consider using integrated approaches that are recommended by the World Health Organization and the Centers for Disease Control and Prevention to achieve better health outcomes in workers.[3,30] Cost-effective technologies for monitoring, such as free web-based and telephonic applications, virtual consultations, and wearable technology, can be used to implement and assist occupational health clinics to support the wellbeing of staff. A comprehensive clinic service should include risk assessments, workplace wellbeing assessments, and physical, mental and behavioural support measures to prevent sickness absence associated with lifestyle risk factors.[31]

COVID-19 is considered an occupational disease in HCWs and may increase the sickness absence rate due to compulsory periods of quarantine and isolation. In addition, workers might experience more illness, stress and burnout during the pandemic, and take additional sick leave. COVID-19 is an infectious disease, but the risks of severity and fatality are higher in those with underlying non-communicable comorbidities, such as obesity, diabetes and hypertension, especially in unvaccinated HCWs.[32] A proactive approach is needed and, given the high prevalence of cardiometabolic risk factors in our study, HCWs who are not vaccinated might have a higher risk of developing severe COVID-19 disease, resulting in hospitalisation or death.[33]

A strength of this study was the large sample size. As the data were already available, the study was cost effective. However, a limitation was that many records had missing information. These were excluded in the multivariable analysis, which might have caused bias. Another limitation is that the study focused on lifestyle factors. The causes of sickness absence are complex, and work-related and socioeconomic factors also play a role.[34-36] In future studies, data on all these factors should be collected, using in-depth interviews to ensure that information is complete.

CONCLUSION

The presence of risk factors for cardiometabolic diseases and their association with productivity (measured as sickness absence) highlight the importance of routine medical surveillance and monitoring of lifestyle and other risk factors for HCWs. Better insight into HCWs' overall health is needed to understand and address the causes of sickness absence, and to develop guidelines and policies. The costs of sick leave to the employer are substantial. Therefore, it is important for employers to be proactive and support HCWs in managing risk factors for sickness absence. Employers should work with occupational health clinics to monitor common disease patterns and understand the causes and trends of employees' sick leave.

KEY MESSAGES

1. HCWs who are female, of older age, and overweight or obese, are more likely to take sick leave.
2. It is recommended that occupational health clinics monitor lifestyle risk factors for cardiometabolic diseases in HCWs to reduce sickness absence and improve productivity.

DECLARATION

The authors declare that this is their own work; all the sources used in this paper have been duly acknowledged and there are no conflicts of interest.

AUTHOR CONTRIBUTIONS

Conception and design of the study: CW, DB, DJK, JM
Data acquisition: CW
Data analysis: CW, DB
Interpretation of the data: CW, DB
Drafting of the paper: CW
Critical revision of the paper: CW, DJK, JM, DB

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REFERENCES

1. World Health Organization. Universal health coverage for workers. Geneva: WHO; 2013. Available from: https://www.who.int/publications/i/item/universal-health-coverage-for-workers (accessed 21 Oct 2021).
2. South Africa. Occupational Health and Safety Act (Act No. 85 of 1993). Available from: https://www.gov.za/documents/occupational-health-and-safety-act (accessed 22 Sep 2021).
3. World Health Organization. Occupational Health. Geneva: WHO; undated. Available from: http://www.who.int/occupational_health/en/ (accessed 22 September 2021).
4. Orgel R, Cavendar MA. Healthy living for healthcare workers: it is time to set an example. Eur J Prev Cardiol. 2018; 25(5):539-542.
5. Sobrino J, Domenech M, Camafort M, Vinyoles E, Coca A, ESTHEN group investigators. Prevalence of masked hypertension and associated factors in normotensive healthcare workers. Blood Press Monit. 2013; 18(6):326-231.
6. Miller SK, Alpert PT, Cross CL. Overweight and obesity in nurses, advanced practice nurses, and nurse educators. J Am Acad Nurse Pract. 2008; 20(5):259-265.
7. Pampel FC, Krueger PM, Denney JT. Socioeconomic disparities in health behaviors. Annu Rev Sociol. 2010; 36:349-370.
8. Jingi AM, Noubiap JJN. Cardiovascular risk factors awareness and prevalence among primary care physicians: an insight from the West region Awareness Initiative Survey to fight cardiovascular disease (WAIT-CVD) in Cameroon. BMC Res Notes. 2015; 8:762. doi:10.1186/s13104-015-1747-y.
9. Simfukwe P, Van Wyk B, Swart C. Perceptions, attitudes and challenges about obesity and adopting a healthy lifestyle among health workers in Pietermaritzburg, KwaZulu-Natal province. Afr J Prim Health Care Fam Med. 2017; 9(1):e1-e9. doi:10.4102/phcfm.v9i1.1276.
10. Adeloye D, Basquill C. Estimating the prevalence and awareness rates of hypertension in Africa: a systematic analysis. PloS One. 2014; 9(8):e104300-e. doi: 10.1371/journal.pone.0104300.
11. US Department of Health and Human Services and US Department of Agriculture. 2015–2020 Dietary Guidelines for Americans. 8th ed. USDA; 2015. Available from: http://health.gov/dietaryguidelines/2015/guidelines/ (accessed 17 Oct 2021).
12. Hilbe JM. Logistic Regression Models. 1st ed. Boca Raton: Chapman & Hall/CRC; 2009.
13. Hosmer DW, Lemeshow S. Solutions Manual to Accompany Applied Logistic Regression. 2nd ed. New York: Wiley; 2001.
14. Vanuzzo D, Pilotto L, Mirolo R, Pirelli S. [Cardiovascular risk and cardiometabolic risk: an epidemiological evaluation]. G Ital Cardiol (Rome). 2008; 9(4 Suppl 1):6s-17s.
15. Gaibor-Santos I, Garay J, Esmeral-Ordoñez DA, Rueda-García D, Cohen DD, Camacho PA, et al. Evaluation of cardiometabolic profile in health professionals of Latin America. Clin Investig Arterioscler. 2021; 33(4):175-183.
16. Skaal L, Pengpid S. Obesity and health problems among South African healthcare workers: do healthcare workers take care of themselves? S Afr Fam Pract. 2011; 53(6):563-567.
17. Sörlin A, Öhman A, Lindholm L. Sickness absence in gender-equal companies: a register study at organizational level. BMC Public Health. 2011; 11(1):548. doi: 10.1186/1471-2458-11-548.
18. Løset GK, Dale-Olsen H, Hellevik T, Mastekaasa A, Von Soest T, Østbakken KM. Gender equality in sickness absence tolerance: attitudes and norms of sickness absence are not different for men and women. PloS One. 2018; 13(8):e0200788-e. doi:10.1371/journal.pone.0200788.
19. Laaksonen M, Mastekaasa A, Martikainen P, Rahkonen O, Piha K, Lahelma E. Gender differences in sickness absence – the contribution of occupation and workplace. Scand J Work Environ Health. 2010; 36(5):394-403.
20. Götz S, Hoven H, Müller A, Dragano N, Wahrendorf M. Age differences in the association between stressful work and sickness absence among full-time employed workers: evidence from the German socio-economic panel. Int Arch Occup Environ Health. 2018; 91(4):479-496.
21. Gorman E, Yu S, Alamgir H. When healthcare workers get sick: exploring sickness absenteeism in British Columbia, Canada. Work. 2010;35(2):117-123.
22. Isah EC, Omorogbe VE, Orji O, Oyovwe L. Self-reported absenteeism among hospital workers in Benin City, Nigeria. Ghana Med J. 2008; 42(1):2-7.
23. Belita A, Mbindyo P, English M. Absenteeism amongst health workers – developing a typology to support empiric work in low-income countries and characterizing reported associations. Hum Resour Health. 2013; 11(1):34. doi:10.1186/1478-4491-11-34.
24. Nilan K, McKeever TM, McNeill A, Raw M, Murray RL. Prevalence of tobacco use in healthcare workers: a systematic review and meta-analysis. PloS One. 2019; 14(7):e0220168-e. doi: 10.1371/journal.pone.0220168.
25. Polubriaginof F, Salmasian H, Albert DA, Vawdrey DK. Challenges with collecting smoking status in electronic health records. AMIA Annu Symp Proc. 2018 Apr 16; 2017:1392-1400.
26. Harvey SB, Glozier N, Carlton O, Mykletun A, Henderson M, Hotopf M, et al. Obesity and sickness absence: results from the chap study. Occup Med (Lond). 2010; 60(5):362-368.
27. Neovius K, Johansson K, Kark M, Neovius M. Obesity status and sick leave: a systematic review. Obes Rev. 2008; 10:17-27.
28. Reber KC, König H-H, Hajek A. Obesity and sickness absence: results from a longitudinal nationally representative sample from Germany. BMJ Open. 2018; 8(6):e019839-e. doi:10.1136/bmjopen-2017-019839.
29. Gulley T, Boggs D, Mullins R, Brock E. Diabetes screening in the workplace. Workplace Health Saf. 2014; 62(11):444-446.
30. Safeer R, Bowen W, Maung Z, Lucik M. Using the CDC worksite health scorecard to assess employer health promotion efforts: a case study at Johns Hopkins Medicine. J Occup Environ Med. 2018; 60(2):e98-e105.
31. United States. Centers for Disease Control and Prevention. Workplace health promotion. Atlanta: CDC; 2018. Available from: https://www.cdc.gov/workplacehealthpromotion/index.html l (accessed 22 Sep 2021).
32. Russell FM, Greenwood B. Who should be prioritised for COVID-19 vaccination? Hum Vaccin Immunother. 2021; 17(5):1317-1321.
33. Wolff D, Nee S, Hickey NS, Marschollek M. Risk factors for Covid-19 severity and fatality: a structured literature review. Infection. 2021; 49(1):15-28.
34. Whitaker SC. The management of sickness absence. Occup Environ Med. 2001; 58(6):420-424.
35. Mohanty A, Kabi A, Mohanty AP. Health problems in healthcare workers: a review. J Fam Med Prim Care. 2019; 8(8):2568-2572.
36. Naidoo RN, Naidoo S, Hariparsad S. Disabling health: the challenge of incapacity leave and sickness absence management in the public health sector in KwaZulu-Natal province. S Afr Health Rev. 2016; 2016(1):61-72.

Regional occupational safety and health and tuberculosis technical assistance to the Government of Malawi

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BACKGROUND

Employment is an essential way for citizens to share the country's wealth, through decent job creation and economic growth. However, this is associated with a heavy burden of lung diseases such as tuberculosis (TB) and silicosis, and the spread of COVID-19. This could be attributed to inadequate knowledge and awareness of the prevailing hazards and associated risk factors, which include poor working conditions, such as confined workspaces (in both workplaces and transportation), prolonged exposure to hazards, poor ventilation, and inadequate control of hazards. Adding to prevalent occupational lung diseases, the COVID-19 pandemic has had an unprecedented impact on workplaces in both mining and non-mining industries.

Frontline workers have experienced mental health issues, which have exacerbated already challenging workplace conditions. There has been insufficient integration of COVID-19 workplace responses, the implementation of controls without conducting risk assessments, and poor or no workplace reporting and data management. Interventions are more critical than ever to keep economies open, while controlling the spread of COVID-19, as countries continue to develop comprehensive prevention programmes to reduce tuberculosis among healthcare workers, and miners and other workers exposed to silica dust.

In the past 18 months or so, face-to-face technical assistance has been heavily affected by the COVID-19 pandemic, lockdowns, and travel restrictions as means to control the spread of the virus. With the easing of restrictions, the African Union Development Agency (AUDA-NEPAD) has planned a series of technical assistance interventions from September to December 2021. The first technical assistance activities focus on plans of action presented to the permanent secretaries of ministries in Malawi responsible for health, mines and labour; reviewing of the code of practice on occupational lung diseases; accelerating the establishment of occupational hygiene analysis laboratories and occupational health service centres (OHSCs) to strengthen the occupational health programme; and providing training on COVID-19 workplace responses and private sector engagement strategies in Malawi.

OBJECTIVES OF THE TECHNICAL ASSISTANCE MISSIONS

The AUDA-NEPAD's technical assistance includes:

- To review and adapt the code of practice on the management of occupational lung diseases for Malawi
- To support the ministries responsible for health, labour and mining, and the Public Health Institute of Malawi (PHIM), to strengthen workplace responses to COVID-19 and develop resilient systems
- To initiate the process of adapting standard operating procedures (SOPs) for the OHSC
- To assess the occupational hygiene analysis laboratories and develop SOPs and quality systems
- To undertake a consultative meeting on private sector engagement in health, including presenting the regional private sector study on tuberculosis control strategy to the local experts
- To provide project progress updates and plans of action to the permanent secretaries of the ministries responsible for health, mines and labour in Malawi

SUMMARY OF THE TECHNICAL ASSISTANCE OUTCOMES

Establishment of an occupational hygiene analysis laboratory

The intervention focused on the assessment of the current state of the occupational hygiene analysis laboratory under development. This included a pre-assessment of the newly constructed laboratory at the old offices of the Department of Mines. Gratitude goes to the National Institute for Occupational Health's (NIOH's) occupational hygiene analysis laboratory's technical manager, Jonas Shai. The Malawian Ministry of Natural Resources, Energy and Mining has procured both the occupational hygiene sampling equipment and occupational hygiene analysis instruments. The laboratory has a tabletop Bruker D2 Phaser XRD to analyse crystalline silica. However, the procured sampling filters (37 mm) are not compatible with the sampling holder (25 mm). The laboratory where the instruments are housed is small and not adequately ventilated to house analysis equipment, but will soon move to a refurbished building.

L-R: Dr James Mpunga, NTP manager; Chimwemwe Chamdimba, AUDA-NEPAD principal policy specialist; Dr Charles Mwansambo, Principal Secretary – Ministry of Health; Norman Khoza, AUDA-NEPAD OSH specialist; Brian Ng'andu, AUDA-NEPAD M&E specialist; Julia Kiguru, AUDA-NEPAD projects administrator; and Dr Kruger Kaswaswa, Malawi OSH&TB co-ordinator

Photograph: courtesy of AUDA-NEPAD

L-R: Mphatso Kapokosa, Malawi Inspector of Mines; Brian Ng'andu, AUDA-NEPAD M&E specialist; Norman Khoza, AUDA-NEPAD OSH specialist; Dr Joseph Mkandawire, Principal Secretary of the Ministry of Mines; Chimwemwe Chamdimba, AUDA-NEPAD principal policy specialist; and Burnett Msika, Acting Director of Mines

Photograph: courtesy of AUDA-NEPAD

Review of the code of practice on the management of occupational lung diseases

Regional guidelines need to be reviewed, adapted and ratified by member states and the people who are tasked with implementing them. The Southern Africa Tuberculosis and Health Systems Support (SATBHSS) and Tuberculosis in the Mining Sector (TIMS) projects developed a draft code of conduct on managing occupational lung diseases. Even before this process was completed, several Southern African Development Community (SADC) member states adapted the draft regional guideline document, including Lesotho, Malawi, Mozambique, Namibia, Zambia and Zimbabwe. The document was reviewed by ministries responsible for health, mines and labour, including Malawi's Workers' Compensation Board. The document is critical since Malawi is, for the first time, establishing OHSCs.

Establishment of occupational health service centres

The OHSCs meeting members reviewed the terms of reference for the establishment of the centres in Malawi. After the review, it was apparent that the establishment of the centres should have been preceded by the development of the occupational health services framework and governance documents. The following documents were therefore drafted: i) occupational health service delivery framework; ii) the layout, infrastructure, required equipment, and human resources, and iii) an action plan.

COVID-19 workplace responses

Approximately 20 officials from health, mines, labour, and the PHIM were trained, including inspectors, environmental health officials, and laboratory officials responsible for analysing COVID-19 test samples. The training covered the role of fomite and aerosol transmissions, generic and issue-based risk assessments, pharmaceutical and non-pharmaceutical control measures, and tabletop practical risk assessments. An on-site practical risk assessment was conducted at the TB offices and PHIM offices and laboratory. The risk assessment results were presented to the national TB control programme manager, Dr James Mpunga. He appreciated the risk assessments undertaken in the institutions, and reported that some of the recommendations had already been implemented by the following morning.

Private sector engagement in health and tuberculosis

The meeting members tackled the private sector engagement in tuberculosis control study findings and recommendations; synthesis of opportunities, challenges and risks in private sector engagement in tuberculosis control; private sector engagement in tuberculosis control strategic priorities; the monitoring and evaluation framework for the private sector engagement in tuberculosis control strategy; a framework for excellence award for private healthcare providers; and private sector engagement in health financing.

Update on projects

Three meetings were held with principal secretaries of health and mines, and the acting principal secretary of labour. The principal secretaries were provided with updates and progress on the SATBHSS and TIMS regional projects, the regional baseline study results on occupational health and safety, the code of conduct for managing occupational lung diseases, OHSCs, and the planned Kujenga workshop. The principal secretaries were requested to assist with the legislation review process, and to assist the AUDA-NEPAD to accelerate the implementation of the two projects.

CONCLUSION

The AUDA-NEPAD sincerely appreciates and acknowledges the regional experts who took responsibility for several activities. The mission was a success in positioning the occupational health and safety agenda on member states' agendas. Our gratitude goes to Dr Dingani Moyo, Dr Sibongiseni Myeni, Dr Dave Barnes, Ibrahim O Elim, and Jonas Shai. We would also like to thank the Government of Malawi, especially Dr James Mpunga, SATBHSS project co-ordinator; Arthur Ntandika, Worker's Compensation Commissioner; and Dr Ben Chilima, director of the PHIM.

ACKNOWLEDGMENTS

The World Bank funds the SATBHSS project: P155658 and P173228, and the Global Fund TIMS Project. For more information, visit www.satbhss.org and www.timsa.co.za.

WHO/ILO Joint Estimates of Work-related Burden of Disease and Injury

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The first World Health Organization/International Labour Organization (WHO/ILO) Joint Estimates of burdens of ischaemic heart disease and stroke attributable to exposure to long working hours was launched on 17 May 2021. This was breaking news, receiving global media coverage with WHO media analytics recording over 5 700 news items in newspapers, radio and television, in the two weeks following the launch. Numerous social media posts and opinion pieces were published on the Joint Estimates and many occupational safety and health (OSH) professionals contributed to the global media coverage by sharing the WHO/ILO work with their networks.

A report on the Joint Estimates was published in *Environment International* (https://doi.org/10.1016/j.envint.2021.106595) and as an editorial in *The Lancet Regional Health – Western Pacific* (https://doi.org/10.1016/j.lanwpc.2021.100199).

Following the success of the WHO/ILO Estimates, a joint press conference was held on 17 September 2021 to launch the first set of the WHO/ILO Joint Estimates, covering 19 occupational risk factors. The press conference included addresses by:

- Director-General, WHO, Tedros Adhanom Ghebreyesus
- Director-General, ILO, Guy Ryder
- Director, Environment, Climate Change and Health, WHO, Maria Neira
- Director, Governance and Tripartism, ILO, Vera Paquete-Perdigão

Following the press conference, two reports detailed the first set of WHO/ILO Joint Estimates, as well as the data sources and methods used:

- *WHO/ILO Joint Estimates of Work-Related Burden of Disease and Injury, 2000–2016: Global Monitoring Report*
  https://www.who.int/publications/i/item/9789240034945
- *WHO/ILO Joint Estimates of Work-Related Burden of Disease and Injury, 2000–2016: Technical Report with Data Sources and Methods*
  https://www.who.int/publications/i/item/9789240034921

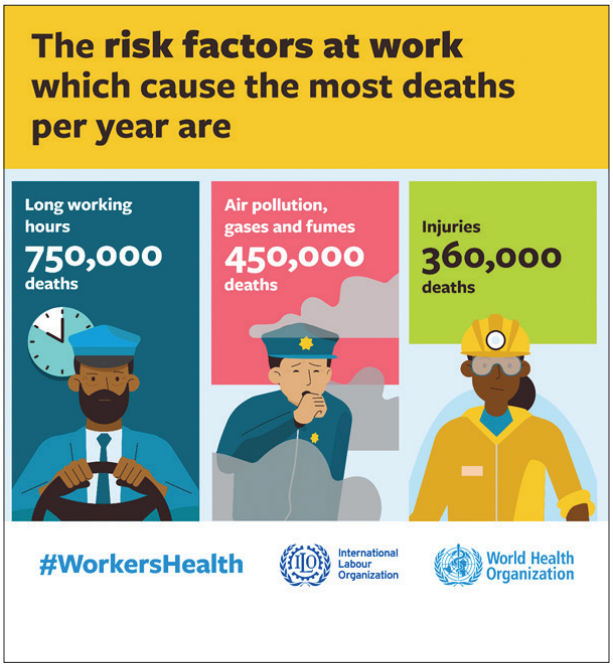
The study considered 19 occupational risk factors, including long working hours and exposure to air pollution, asthmagens, carcinogens and noise, and ergonomic risk factors. The key risk was exposure to long working hours – linked to approximately 750 000 deaths. Workplace exposure to air pollution (particulate matter, gases and fumes) was responsible for 450 000 deaths.

Non-communicable diseases accounted for 81% of the deaths. The most common causes of deaths were chronic obstructive pulmonary disease (n = 450 000), stroke (n = 400 000), and ischaemic heart disease (n = 35 000). Occupational injuries caused 19% of deaths (n = 360 000).

The WHO/ILO developed a communications kit, which includes a press release; infographics (see example below) to share on social media in United Nations languages; and questions and answers. An interactive application to map and download the Joint Estimates is available on the WHO website at https://www.who.int/teams/environment-climate-change-and-health/monitoring/who-ilo-joint-estimates.

The WHO/ILO will be grateful for any support that OSH professionals around the world can provide in terms of dissemination efforts (e.g. circulation of infographics via social media accounts) to improve workers' health in countries, regions and globally.

Source: WHO Secretariat of the WHO/ILO Joint Estimates, Department of Environment, Climate Change and Health Headquarters – Geneva, Switzerland
Web: www.who.int



News from the SASOM national office

The most recent Executive Committee meeting of the South African Society of Occupational Medicine (SASOM) was held on 31 August 2021. Executive Committee members agreed to hold the SASOM annual general meeting and conference on Saturday 27 November 2021, as fully virtual events; these will be organised by the SASOM Western Cape Chapter.

The SASOM Western Cape Chapter hosted a continuous professional development (CPD)-accredited webinar on 14 September 2021. Four speakers contributed presentations under the theme of *Occupational medicine case studies and lessons learnt from the Stellenbosch University Medical School:*

- Dr Jack Meintjes – occupational medicine specialist and head of department: Tygerberg Hospital – Infection Prevention and Control
- Drs Geoffrey Tafaune, Martin Muller, and Fredrick Weinand – occupational medicine registrars

During the month of September 2021, SASOM offered its members a series of free CPD-accredited training webinars on the management of occupational health information under the Protection of Personal Information Act, 2013 (POPIA) and the Promotion of Access to Information Act, 2000 (PAIA). The webinars were facilitated by Dr Jan Lapere (occupational health, safety and medicine consultant; OSH law consultant; SASOM Executive Committee member), and covered the following topics:

- 16 September 2021 – The overall requirements of POPIA and the resulting action plan for occupational health
- 21 September 2021 – The impact of POPIA on the 'medical record' requirements of occupational and health legislation and the Health Professions Council of South Africa (HPCSA) rules
- 28 September 2021 – The action plan for implementation of POPIA in occupational health practices and the changes that need to be made to the occupational medicine practitioner's PAIA Section 51 Manual.

The SASOM webinar recordings are available on the SASOM website under the 'Members Only' category. Only those members who attended the webinars will be awarded CPD points (CEUnits).

Management of absenteeism/presentism due to ill health/injury

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Absenteeism is, without a doubt, one of the most challenging employment management issues with which employers struggle on a continuous basis. According to EOH, one of Africa's largest technology service providers, the cost of sick absenteeism in South Africa is more than R19 billion per annum. This is money paid to employees who are absent due to ill health or injury. In most companies, this can be the determining factor that results in a company heading for bankruptcy or profitability.

The objective of this article is to help you gain a better understanding of the principles and techniques necessary for dealing with employee absenteeism/presentism due to ill health/injury, in the context of current South African legislation. This will allow you to manage the various departments within an organisation more effectively, and avoid unfair labour practices that may result in disciplinary actions being overturned by the relevant legislative bodies.

Absenteeism is seen as any failure to report for, or remain at, work as scheduled regardless of the reason or duration. Even though employees may be physically at work, they may not be able to fully perform their duties and may be more likely to make mistakes on the job. This is presentism, which refers to the loss of productivity as a result of employees that are not fully functioning in the workplace because of illness, injury or other conditions.

The Basic Conditions of Employment Act (BCEA), No. 75 of 1997, states that all employees are 'entitled' to a minimum of 30 days (for a five-day work week) and 36 days (for a six-day work week) paid sick leave. However, during the first six months of employment, the employee is only entitled to one day paid sick leave for every 26 days worked. Many employers believe that they should accept any medical certificate, but this is certainly not the case. Section 22 of the Act enables the employer to manage sick absenteeism in terms of the acceptability of the sick leave notes submitted.

A proactive method for a company to manage absenteeism due to ill health/injury is to implement polices regarding time-keeping arrangements and submission of medical certificates for absenteeism.

- Employees who abuse sick leave or who tender fraudulent medical certificates should be disciplined according to the company's disciplinary code. Usually, these offences are seen as serious enough to justify dismissal.
- Strict control of leave entitlement is a further method of securing regular attendance at work.
- It is a legal requirement that employers keep attendance registers or clock card systems that monitor employees' attendance and record time-keeping offences. An historic view of an employee's time keeping can be used to establish a pattern of abuse when the employee persists with time-related offences.
- The company should consider leave as unpaid if an employee is absent for more than two days, or for one day or more on more than two occasions during an eight-week period, unless the employee provides a sick note once back at work. This sick note must state that the employee was unable to work for the duration of the absence from work.
- Employees who are absent from work on a Monday, Friday or the day prior to/following a public holiday should be required, in terms of company policy, to submit a sick note.
- Employees who fail to submit an appropriate sick note can be charged with unauthorised absenteeism, as well as breach of company policy.
- A sick note must be issued and signed by a medical practitioner or any other person who is certified to diagnose and treat patients, and who is registered with a professional council established by an Act of Parliament.
- A sick note will not be valid if it was issued in retrospect (backdated) or if it does not state that the employee was unable to work on account of illness or injury.
- Legislation has made it possible for employees to seek medical attention from traditional healers and to provide the required proof of their reason for absence in the form of a sick note. Thus, employers are obligated to treat a sick note from a traditional healer in the same way as that from any other medical practitioner. Sick notes can, however, be issued only by those traditional healers who are registered with the Traditional Health Practitioners Council of South Africa.

Cases of absenteeism or presentism in the workplace must be dealt with in a manner that is compliant with statute and case law

Photograph: courtesy of SASOHN

- It is a requirement that the medical practitioner provide his or her telephone number on the medical certificate for confirmation of the reason for the absence.
- Time taken off for medical check-ups and routine medical visits is excluded from the number of allocated sick leave days in terms of the BCEA.

Another method of managing absenteeism is by the employee informing the company about the absence:

- The employee must inform the employer about the intended absence before the commencement of the work day.
- The employee must inform the direct supervisor or line manager in the event of absence due to illness or injury.
- It is a serious disciplinary offence if employees fail to inform the company of their absence on the first day of the absence period.
- Messages should not be left with subordinates or peers as this is not an acceptable communication of absenteeism.

Often, companies are required to take a more serious approach to absenteeism caused by ill health or injury, by means of an incapacity hearing. An employer intending to dismiss an employee due to incapacity must do so in accordance with items 10 and 11 of Schedule 8 of the Labour Relations Act (LRA), No. 66 of 1995, failing which, the fairness of such dismissal may be challenged.

Schedule 8 of the LRA embodies the Code of Good Practice in relation to dismissal. Item 10 of the schedule provides as follows:

10: Incapacity: ill-health or injury

1. *Incapacity on the grounds of ill health or injury may be temporary or permanent. If an employee is temporarily unable to work in these circumstances, the employer should investigate the extent of the incapacity or the injury. If the employee is likely to be absent for a time that is unreasonably long in the circumstances, the employer should investigate all the possible alternatives short of dismissal. When alternatives are considered, relevant factors might include the nature of the job, the period of absence, the seriousness of the illness or the injury and the possibility of securing a temporary replacement for the ill or injured employee. In cases of permanent incapacity, the employer should ascertain the possibility of securing alternative employment, or adapting the duties or work circumstances of the employee to accommodate the employee's disability.*
2. *In the process of the investigation referred to in subsection (1) the employee should be allowed the opportunity to state a case in response and to be assisted by a trade union representative or fellow employee.*
3. *The degree of incapacity is relevant to the fairness of any dismissal. The cause of the incapacity may also be relevant. In the case of certain kinds of incapacity, for example alcoholism or drug abuse, counselling and rehabilitation may be appropriate steps for an employer to consider.*
4. *Particular consideration should be given to employees who are injured at work or who are incapacitated by work-related illness. The courts have indicated that the duty on the employer to accommodate the incapacity of the employee is more onerous in these circumstances.*

When deciding on any steps to be taken after the incapacity hearing, the Code of Good Practice in the LRA requires that the actions are both procedurally and substantively fair.

Substantive fairness

As stated in items 10 and 11 of the Code of Good Practice, Schedule 8 of the LRA, the following must be taken into consideration when determining if a dismissal arising from ill health or disability is fair:

1. *Whether or not the employee is capable of performing the work; and*
2. *If the employee is not capable:*
   a) *The extent to which the employee is able to perform the work.*
   b) *The extent to which the employee's work circumstances might be adapted to accommodate disability, or, where is not possible, the extent to which the employee's duties might be adapted; and*
   c) *The availability of any suitable alternative work.*

Procedural fairness

Before dismissing an employee, an incapacity enquiry/hearing must be held.

- Normal rules apply as to the notice to attend.
- The employee must be granted the right to submit a statement/case.
- The employee has the right to be represented by a trade union representative or fellow employee.

An incapacity hearing is NOT a disciplinary hearing! Incapacity is a 'no fault' process.

In conclusion, understanding the principles and techniques with regard to dealing with employee absenteeism/presentism due to ill health/injury will enable employers to implement the correct procedures in order to address and decrease absenteeism/presentism and ensure a healthy productive working environment.

The staff at LabourGenix seek to assist employers in conducting ill-health incapacity enquiries in a manner that is compliant with statute and case law. We undertake to provide conclusive advice and assistance to employers with regard to ill health in the workplace.

SAIOH newsletter

SAIOH PRESIDENT'S ADDRESS

Hennie van der Westhuizen: SAIOH president
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Having read a short biography of Dr Grigory Perelman – a Russian mathematician – I was struck by his humbleness and integrity, despite his genius. In recognition of his cognitive contributions to geometry, Dr Perelman was offered the Fields Medal (the mathematics equivalent of the Nobel Prize). Verbally denouncing money and fame, he declined the award, which included a minted gold coin with his profile embossed on it. Likewise, in 2010, he declined the Clay Fields Prize of $1 million for his work in proving an almost 100-year-old mathematical theorem. This theorem was conjectured by a French mathematician, Henri Poincaré, in 1904. The reason he gave for declining the prize was that he felt that he worked no harder than any other mathematician did on proving this theorem.

It appears that society places a large premium on success and material gain. With these social values in mind, the question arose as to whether the traits exhibited by Dr Perelman prevailed in the health profession. Although a question like this could be answered by formal research, I believe that these traits do prevail. From my years in the academic environment and the occupational medicine, occupational nursing, and safety disciplines, I recall individuals who selflessly immersed themselves in their proficiencies. Surely this is true of professionals in the other occupational health disciplines? I have witnessed this in our own profession – occupational hygiene – where individuals in the foreground and background passionately slave away to improve their chosen professions. These individuals are either using personal time and declining compensation, or receiving compensation but have dedication, loyalty and integrity way beyond expectations. An example is the many hands through which an article like this passes before reaching publication. Another is the SAIOH National Council members and many individuals, present and past, who give freely of their intellect, time, dedication and integrity. Ultimately, these are the qualities that establish, maintain and promote a profession such as occupational hygiene. If this collegial and serving spirit prevails within and between professions within our cluster, growth and mutual advancement are inevitable, as is promoting our goal of providing healthy and safe workplaces for South Africans. To read more about Dr Perelman, visit https://en.wikipedia.org/wiki/Grigori_Perelman.

INTRODUCTION

The Management Board and the National Council's activities continue to drive the Southern African Institute for Occupational Hygiene's (SAIOH's) goals for 2021. In this newsletter, updates on Council activities, the SAIOH Annual Conference, Professional Certification Committee (PCC) matters, and other aspects of SAIOH, are provided, as is feedback on IOHA matters.

In this newsletter

COUNCIL ACTIVITIES

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1. SAIOH Technical Committee

SAIOH's Technical Committee is up and running. The committee consists of members of all three registration levels and is responsible for researching and drafting all SAIOH position papers and technical papers. Deon Swanepoel is the Council's technical co-ordinator, and he commenced with presentations at the SAIOH Gauteng branches meeting on the workings of the committee and topical occupational hygiene issues, as a soundboard for several technical and position papers.

Make your mark

The SAIOH Council invites topics and inputs to the Technical Committee, from members. If you have any suggestions or contributions in this regard, please e-mail them to our president at president@saioh.co.za or to the chief administrative officer at info@saioh.co.za.

2. SAIOH Annual Conference

The 2021 SAIOH Annual Conference will once again be held virtually from 18 October to 5 November 2021. It will comprise six three-hour webinars over a three-week period (two sessions per week). The conference will be hosted on the National Institute for Occupational Health (NIOH) Zoom platform. The programme and first notification have been issued to members. Professional development courses (PDCs) will also be presented in webinars. Two PDCs will run concurrently in the morning, followed by two in the afternoon. There will be a fee for registration for each webinar (R250 excl. VAT for SAIOH members, and R350 excl. VAT for non-SAIOH members); space will be available for sponsors. Recordings will be available at the end of the conference (R350 excl. VAT).

An appetiser of what is to come

- Theme: *Navigating Occupational Hygiene in unchartered waters*
- Keynote addresses: 6
- Presentations: 23
- PDC sessions: 4 (PCC-identified competency training, globally harmonised system (GHS), ventilation, and implementation of the Health and Safety Guidance (HSG) 248 for Asbestos
- International speakers: 12 (USA, UK, and Belgium)
- Local speakers: 23

The SAIOH annual general meeting will take place on the afternoon of 5 November, coinciding with the closure of the 2021 conference.

Calling all sponsors

- Sponsors/exhibitors: names and contact details will be advertised during each sponsored webinar, followed by a Mailchimp to every participant after each webinar. Sponsors can send advertising material, brochures, etc. directly to SAIOH. Information will be loaded onto the SAIOH website with a hyperlink to the sponsor's website, and will be sent to conference participants, on a separate Mailchimp, together with the presentations and recordings of the webinar.
- Sponsorship: R350 excl. VAT per webinar.
- For more information and assistance, contact Kate Smart at info@saioh.co.za.

3. Continuous education

SAIOH recently hosted two successful training webinars.

- 29 July 2021: Globally harmonised system (GHS) and how this guides the occupational hygiene practitioner's (OHP's) scope of occupational hygiene services
- 25 August 2021: Regulations for Hazardous Chemical Agents and guidance on how to comply with the Regulations

The KwaZulu-Natal branch and Harold Gaze of Occutech started negotiations with Adrian Sims (UK) to host a paid local extraction ventilation (LEV) training course early in 2022. More information on this will follow.

Make your mark… again

The SAIOH Council invites topics for webinars, as well as feedback on previous webinars, from its members. If you have any suggestions or contributions in this regard, please e-mail them to our president at president@saioh.co.za or to the chief administrative officer at info@saioh.co.za.

4. Ethics

SAIOH is entering into an agreement with a well-known legal non-governmental organisation (NGO) to represent SAIOH when required. Their first task will be to review the SAIOH Ethics Policy and Procedure, thus empowering the Ethics Committee under Oscar Rikhotso.

From January 2022, all SAIOH certified members will need to provide proof of ethics training. There will be a two-year phase-in period. SAIOH will facilitate an online test and, on qualifying, members will receive a certificate of recognition, valid for three years. During our upcoming conference, Terry McDonald from the British Occupational Hygiene Society (BOHS) – a world-renowned expert in this field – will facilitate a session on ethics.

5. Administrative and finance matters

SAIOH's financial position is still sound, thanks to the strict management of expenditure and support from members (e.g. attending paid webinars). We thank everyone who played their part in this.

SAIOH engaged website administrators to overhaul our website, while still allowing integration with our Member Management System (MySAIOH). A guidance document has been developed by our administrative team and is undergoing review by Council. Watch this space!

BRANCH ACTIVITIES

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Due to COVID-19, all branch meetings and workshops are currently online. **Virtual meetings and workshops present opportunities for SAIOH members to attend and participate in any branch meeting, regardless of their branch affiliation.** We urge all our members to support their branches and to participate in branch activities. Members can submit topics for discussion to the various branch chairpersons for consideration in future webinars, meetings and/or workshops.

The Gauteng North and South branches hosted their combined branch meeting on 10 September 2021. The Western Cape's branch meeting took place on 17 September 2021. The Northwest and KwaZulu-Natal branches hosted their meetings in August 2021.

During the recent Gauteng branch meeting, Maryke van der Walt (PCC assistant chief examiner) gave an informative and comprehensive presentation regarding the PCC certification process. Deon Swanepoel, the Council's technical co-ordinator, gave a presentation on the technical team set-up and objectives, and another on welding fume compliance. Jaco Pieterse gave a presentation on hazardous chemical agents (HCAs) air sampling planning. Approximately 125 members attended this meeting.

The two Gauteng branches commenced the groundwork to constitute the organising committee to plan their hosting of the 2022 SAIOH Annual Conference. This will be a hybrid conference, i.e. both face-to-face and via live streaming. The theme and venue will be announced in due course.

We need you!

COVID-19 took its toll, and we have several near-stagnant branches. Members who would like to assist with or contribute ideas about reviving some of the SAIOH branches are urged to contact Moses Mokone (branches co-ordinator) or Nico Potgieter (marketing and communication) at info@saioh.co.za.

Table 1. SAIOH PCC certification assessment results for 2021 YTD (as at August 2021)

Certification category	Written assessments (Mar–Jun 2021)				Oral assessments (Mar–Aug 2021)			
	Assessed	Passed	Failed	Pass rate	Assessed	Passed	Failed	Pass rate
	n	n	n	%	n	n	n	%
OH assistant	37	30	7	81.1	37	30	7	81.1
W201 – assistant	36	31	5	86.1	36	31	5	86.1
OH technologist	36	19	17	52.8	32	18	14	56.3
Occupational hygienist	25	12	13	48.0	17	8	9	47.1
Total	**134**	**92**	**42**	**68.7**	**122**	**87**	**35**	**71.3**

FROM THE PROFESSIONAL CERTIFICATION COMMITTEE (PCC)

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Certification assessments

A summary of results of written and oral examinations year-to-date (YTD) is provided in Table 1. The YTD pass rates for registered occupational hygiene technologist (ROHT) and registered occupational hygienist (ROH) levels remain a matter of concern. SAIOH urges prospective ROHTs and ROHs to make use of the SAIOH mentorship programme – Lee Doolan can be contacted at lee@saioh.co.za in this regard.

On Friday 17 September 2021, the most recent electronic written assessments took place with more than 75 candidates across the different registration levels.

The PCC's examination committee is working with the American Industrial Hygiene Association (AIHA), the Australian Institute of Occupational Hygiene (AIOH), and Workplace Health Without Borders (WHWB) to develop and share a single multiple-choice question (MCQ) database for the Occupational Hygiene Training Association's (OHTA's) Foundation Module (W201). Watch this space!

With effect from September 2021, the ROHA written assessment paper will comprise only MCQs. The PCC technical team is hard at work, updating the PCC oral assessment format to align with the requirements in the occupational hygiene self-assessment tool. This is to ensure that the ever-growing field of occupational hygiene is fully addressed in the oral assessments, also addressing the concerns raised about subjectivity and personal bias.

Occupational Hygiene Skills Forum

The SAIOH Occupational Hygiene Skills Forum (OHSF) was introduced to co-ordinate the recognition of occupational hygiene training materials, training providers and institutions, and the development and management of assessment and examination systems, where required. Another function of the OHSF is to evaluate applications from tertiary institutions for recognition of their occupational hygiene-related qualifications. The OHSF is progressing well with these accreditations. A recently-developed matrix was used to evaluate the occupational hygiene qualifications offered (in line with the 50% occupational hygiene content requirement).

Congratulations to North-West University and the Tshwane University of Technology (TUT), whose four-year B-degrees were recognised by the OHSF as meeting the qualification criteria at the ROH level. The University of the Witwatersrand's programmes are currently being evaluated. All tertiary institutions that offer occupational hygiene qualifications are encouraged to contact the PCC administrator, lee@saioh.co.za, for information regarding application for recognition.

The details of recognised training providers and recognised qualifications will be posted on the SAIOH website (www.saioh.co.za). This will enable students and certification candidates to select suitable qualifications that meet SAIOH and international requirements.

INTERNATIONAL OCCUPATIONAL HYGIENE ASSOCIATION (IOHA) FEEDBACK

Deon Jansen van Vuuren: SAIOH general manager
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The IOHA published its latest *Global Exposure Manager* newsletter, which has been e-mailed to all our members and is available on the SAIOH website: www.saioh.co.za.

SAIOH received a request from IOHA to host a face-to-face IOHA meeting in 2022. The SAIOH Management Board and the chairs of the Western Cape and the Gauteng branches agreed to submit a proposal to host their 2023 autumn meeting(s) in October 2023 to coincide with the SAIOH 2023 Annual Scientific Conference. The IOHA board accepted this proposal, and their meetings will coincide with the SAIOH 2023 conference, in the last week in October, in Cape Town. This is cost effective as SAIOH will not have to pay travel and accommodation expenses for the IOHA members. Costs will be covered by IOHA and the IOHA associations, and we will have conference speakers at no cost to SAIOH. Thank you, Wessel and the Western Cape Organising Committee, for again offering to co-ordinate this invaluable conference.

Have your say

The SAIOH Council invites and welcomes your feedback on how this communication is helping you as an SAIOH member, and how we can improve it. If you have any suggestions, inputs, or contributions, please e-mail them to our president at president@saioh.co.za , or to the chief administrative officer at info@saioh.co.za.

Mine Medical Professionals Association AGM

Dipalesa Mokoboto: MMPA president
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INTRODUCTION

The Mine Medical Professionals Association (MMPA) held its annual general meeting (AGM) on 18 September 2021.The past president, Dr Muofhe Murwamphida, resigned in late 2020, and the deputy president, Dr Dipalesa Mokoboto, stepped in as acting president. At the AGM, Dr Mokoboto was formally elected as the president of the MMPA and Dr Tumi Legobye was elected as deputy president.

GETTING TO KNOW THE MMPA PRESIDENT

For the first time in the history of MMPA, a medical professional working for the Government (State) was elected as president. This was a memorable moment for Dr Mokoboto, as she was elected as president in the year when the association is celebrating its centenary.

Dr Mokoboto was appointed as the Medical Inspector at the Department of Mineral Resources and Energy (DMRE) in 2007, in line with requirements of the Mine Health and Safety Act, No. 29 of 1996. Prior to that, she worked as an occupational medical practitioner (OMP) in the mining industry. Dr Mokoboto holds a medical degree (MBChB) from the University of KwaZulu-Natal, Postgraduate Diploma in Occupational Health and an MPhil in Medical Law and Ethics – both from the University of Pretoria. She has successfully completed many courses, including: Advanced Health Management (Yale University); Executive Development Programme (University of the Witwatersrand); Operations Management (University of Cape Town); HIV/AIDS Management from Foundation for Professional Development (FPD); Project Management; and Financial Management and Corporate Governance (University of South Africa (UNISA)). Other certificates obtained are for mining and gender studies from the International Mining for Development Centre in Australia, and an international course in Clinical Occupational and Environmental Medicine (University of Gothenburg in collaboration with the University of KwaZulu-Natal).

Dr Mokoboto worked with the National Institute for Occupational Health (NIOH) and the World Bank on a tuberculosis and HIV survey, requested by the Department of Mineral Resources and Energy (DMRE) Minister, in 2010; the recommendations led to mines reporting tuberculosis and HIV to the DMRE, annually. She has also lectured to Postgraduate Diploma in Occupational Health students at both Pretoria University and the University of the Witwatersrand on several occasions, and has written articles for publication in *Occupational Health Southern Africa*.

Dr Mokoboto is a member of the South African Medico-legal Association (SAMLA) and has served on different tripartite committees: the Mining Industry TB and HIV Advisory Committee (MITHAC); the Mining Occupational Health Advisory Committee (MOHAC); the Mining Qualification Authority (MQA); the Mine Health and Safety Council (MHSC); the South African National Aids Council (SANAC) steering committee; and the Department of Labour Technical Committee on Occupational Injuries and Diseases. With the advent of the COVID-19 pandemic, she was appointed as a compliance officer for the DMRE, to oversee compliance with COVID-19 regulations and protocols. She has recently been appointed as a member of the Tshiamiso Trust Advisory Committee, which deals with compensation of occupational lung diseases for ex-mine workers.

Announcement of deputy president and thanking previous president

The president announced the new deputy president of the MMPA, Dr Tumi Legobye – a qualified occupational medical practitioner (OMP) who holds a position as a health and wellness executive at Harmony Gold Mine. She has 20 years of experience in the health industry, 14 of which are in management of health services. The president thanked the past-president, Dr Murwamphida, for leading the MMPA in 2020 and keeping it afloat, despite the COVID-19 pandemic and lockdown, which made it difficult to hold the MMPA Congress and seminars.

Dr Dipalesa Mokoboto
Photograph: courtesy of MMPA

Dr Tumi Legobye
Photograph: courtesy of MMPA

Prof. Zukiswa Zingela
Photograph: courtesy of MMPA

Intentions of the president

Dr Mokoboto indicated that the MMPA has come a long way and that, as president, she intends to continue raising the profile of medicine in the mining industry and serving the interests of mine medical professionals. She acknowledged that there are many obstacles, but that it is possible to overcome them. She added that it is necessary to commit to keeping the MMPA alive and relevant, and mentioned that her intentions and goals are to ensure that the MMPA's objectives are realised. Dr Mokoboto quoted John C Maxwell, who said, "One is too small a number to achieve greatness", implying that she will be depending on everyone to achieve the objectives of the MMPA. This will ensure that its weight is felt not only locally or regionally, but also internationally. She reminded everyone that more can be achieved as a team, since "none of us is as smart as all of us" (Ken Blanchard).

KEYNOTE ADDRESS

The keynote address was presented by Prof. Zukiswa Zingela, who is associate professor and head of Psychiatry at Walter Sisulu University and Nelson Mandela Academic Hospital in Mthatha. The topic was mental health and healthcare workers. She pointed out that healthcare workers (HCWs) are in a caring profession and spend most of their time in the workplace. To be able to care for others effectively, HCWs should practise:

- Self-care
- Self-awareness
- Self-management
- Self-love
- Self-sacrifice

Prof. Zingela spoke about Beck's cognitive triad, emphasising that it is a useful tool for HCWs to increase awareness of self and enhance coping strategies. The triad illustrates how to use coping strategies to deal with depression and anxiety. The triad starts with a thought, which affects how one feels and this, in turn, affects how one behaves. Entrenched negative thoughts are linked to depression and might lead to negative views about the world and the future. Anxiety starts with self, where one has thoughts of vulnerability, and then perceives the world as being dangerous, resulting in uncertainty and fear about the future.

Application of Beck's triad

To find a solution to depression and anxiety, it is important to undergo self-talk by:

1. Being aware of negative self-talk
2. Being aware of the effect of negative self-talk
3. Taking control of self-talk
4. Deliberately changing the negative narrative in one's head
5. Practising strategies for change
6. Positively re-enforcing strategies to address negative self-talk

Prof. Zingela emphasised the importance of differentiating between:

- Assertiveness and aggression, where one stands one's ground without being rude
- Advocacy and militancy, where one needs to guard against militancy where one's view is the only one that is considered
- A worthy fight and an ego fight, which entails fighting to find a solution versus fighting to prove one is right
- Self-appreciation and self-aggrandisement, where one should avoid boasting about one's achievement, and appreciate oneself instead
- Volunteerism and sacrifice, where one might, for example, sacrifice lunch breaks and work continuously throughout the day

CONCLUSION

The highlights of the AGM were the MMPA's celebration of 100 years in existence, the election of a president from government for the first time in the history of the MMPA, and addressing mental health of HCWs and providing strategies to address issues. The MMPA intends to recruit more members, hold more seminars with interesting topics, and host a golf day to raise funds. In this way, the association will stay afloat whilst dealing with the COVID-19 pandemic and its ramifications.

Clean air means brain power

Poor indoor air quality doesn't just make us unhealthy. A new study from Harvard University shows that it makes us less productive too.[1] The study tracked office workers (with an average age of 33 years) in commercial buildings in six countries – China, India, Mexico, Thailand, the USA and the UK – over a 12-month period. It points to a direct relationship between the amount of fine particulate matter in the air and how people perform in mental tests. The more polluted the air, the worse people perform.

The study used monitors to measure ventilation and indoor air quality in the buildings, including levels of fine particulate matter, known as $PM_{2.5}$. This is made up from dust, bacterial spores, allergens, smoke, outdoor air pollution, etc. The workers were asked to use an app to take regular cognitive tests during the workday. These tests included Stroop colour-word tests and addition-subtraction (ADD) tests to measure working memory and attention.

Higher $PM_{2.5}$ and lower ventilation rates – the latter assessed by CO_2 concentration – were associated with slower response times and reduced accuracy (fewer correct responses per minute) on the Stroop and ADD tests for eight out of 10 metrics. Each interquartile increase in fine particulate matter of just 8.8 micrograms/m^3 was associated with a 0.82% increase in Stroop response time, a 6.18% increase in Stroop interference time, a 0.7% decrease in Stroop throughput, and a 1.51% decrease in ADD throughput. Those percentages quickly escalate as the concentration of particulate matter builds up in a shared office environment.

The findings support an earlier study on the impact of green buildings by the Harvard Center for Health and the Global Environment.[2] It showed that, with better air quality, cognitive scores were 61% higher across nine functional domains, including crisis response, strategy, and focused activity level.

Clean air improves brain power, which in turn boosts retention, output, innovation and strategic decision making. Any investment in clean air is not just about protecting health and preventing sick building syndrome, but also about activating a higher-performing workforce.

Poor indoor air quality is an easily solvable problem. The World Health Organization's (WHO's) updated ventilation recommendations stipulate ventilation rates of 160 litres per second per patient within healthcare settings; and 10 litres per second per person within non-residential indoor environments.[3] If the heating, ventilation, and air conditioning (HVAC) system in a building is unable to achieve the optimum air change rate, the gap must be bridged.

That can easily be done using portable air purification using high-efficiency particulate air (HEPA) filtration to trap fine particulate matter and germicidal ultraviolet (UV) C light to destroy it, as recommended by authorities, including the WHO, Centers for Disease Control and Prevention (CDC), Strategic Advisory Group of Experts on Immunization (SAGE), US Environmental Protection Agency (EPA), Chartered Institution of Building Services Engineers (CIBSE), and the Health and Safety Executive (HSE).

REFERENCES

1. Laurent JGC, MacNaughton P, Jones E, Young AS, Bliss M, Flanigan S, et al. Associations between acute exposures to PM2.5 and carbon dioxide indoors and cognitive function in office workers: a multicountry longitudinal prospective observational study. Environ Res Lett. 2012; 16(094047). doi:10.1088/1748-9326/ac1bd8.

2. The impact of green buildings on cognitive function. Boston: Harvard University; undated. Available from: https://green.harvard.edu/tools-resources/research-highlight/impact-green-buildings-cognitive-function (accessed 22 Oct 2021).

3. Atkinson J, Chartier Y, Pessoa-Silva CL, Jensen P, Li Y, Wing-Hong Seto W-H. Natural ventilation for infection control in health-care settings. Geneva: WHO; 2009. Available from: https://www.who.int/water_sanitation_health/publications/natural_ventilation.pdf (accessed 22 Oct 2021).

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