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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