

Occupational risk factors and their impact on migration of radiographers from KwaZulu-Natal, South Africa

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Abstract

Radiography is one of the allied healthcare professions known to be stressful. It is often associated with long working hours, ethical dilemmas, high patient demands and frequent disruptions from ancillary departments, which are all known to result in negative physical and psychosocial effects that may motivate migration. In this context, migration means; leaving one health sector to seek employment in another (i.e. private and public), resignation to join other professions or moving to a foreign country to practise radiography. The aim of this study was to identify occupational-risk factors that contribute to the migration of radiographers in order to provide input for mechanisms that can be put in place to alleviate the negative physical and psychosocial effects identified, thereby improving staff wellbeing and service delivery in KwaZulu-Natal. A cross-sectional, quantitative study, using a questionnaire as the data collection instrument was employed. The study targeted three categories of respondents: radiographers who left the profession (n=19), those who emigrated (n=29) and those who were employed in KwaZulu-Natal (KZN) (n=300). The results revealed that of the 348 participants, 221 (63 %) responded. The ages ranged from 19 to 60 (mean 39) years. The common negative occupational risk factors found across the three categories of radiographers included headaches, neck pain and spasms, lower back pain, knee pain and painful feet. The negative psychosocial effects identified were; job dissatisfaction, anxiety, stress, insomnia, depression and a sense of isolation. The study revealed that the identified occupation-related risk factors resulted in negative physical and psychosocial effects that could contribute to the migration of KZN radiographers. The introduction of employee assistance programmes and improved reporting systems are recommended to reduce the negative impact of occupation-related factors on radiographers and thereby improve staff wellbeing and reduce migration.

Keywords: Radiography, workload, physical, psychosocial, migration

1 Introduction

Radiography is an allied healthcare profession with four separate disciplines, namely diagnostic radiography, radiotherapy, ultrasonography and nuclear medicine technology (Durban University of Technology, 2018). Radiographers, by virtue of the nature of the profession, face many occupational challenges during their working life, such as long working hours, a lack of radiation protection devices, cross-infection, poor salaries, ethical dilemmas due to patient demands, frequent disruptions by other departmental staff, and at times, accusing and angry patients (Mark & Smith, 2012; Rajan, 2014). The routine tasks in the radiography profession, such as long working hours in a stressful environment, can increase the likelihood of occupational related diseases, which may indirectly affect the patient (Erondu, Ugwu, & Umeano, 2011; Raj, 2006). The resultant effects of job dissatisfaction, occupational stress and job burnout were found to be possible causes of resignations amongst employees in Germany (Skirbekk, 2004). Literature from Nigeria also indicates that occupation-related morbidity may result in diseases, which can also lead to migration, and in turn result in shortage of radiographers (Luo et al., 2016; Ugwu, Ahamfule & Nwobi, 2008). These occupational-risk factors and the resulting negative physical and psychosocial effects were also found by Gam (2015) to be experienced by radiographers in KwaZulu-Natal (KZN) where similar working environments and conditions prevail. These negative effects are further exacerbated by financial constraints and lack of maintenance of expensive radiology equipment in the public health care system (Gam, 2015).

Data received from the KZN Department of Health Human Resources (HR) office, highlighted that in 2010 there were 7,255 radiographers employed nationally to serve all nine provinces in the country (personal communication HR Manager, KZN Department of Health). According to the Manager, the number of radiographers employed in KZN had not changed from 2011 to 2016, with an average of 582 employed, and an average of 77 vacant posts in the country (email communication from HR Manager, KZN Department of Health). Some posts in KZN public hospitals were frozen during this time period due to financial constraints, thus reducing the number of posts available in radiography to meet patient demands (Erasmus, 2015). The ever-increasing workloads in understaffed hospitals were thus not balanced by the employment of more radiographers. Occupational challenges such as staff shortages and poor working conditions may cause negative physical and psychosocial effects such as job burnout, stress, physical and mental fatigue. These may place employees at risk of making avoidable clinical errors which impact directly on the quality of healthcare and ultimately on the patients (Ugwu et al., 2008). If not managed effectively, the occupational risk factors may also impact negatively on the professional's desire to remain in their place of employment (Erondu, Ugwu, & Umeano, 2011).

In the context of this study occupational risk factors would be those due to the daily work activities in the radiography profession in KZN. Healthcare professionals are known to experience conflicts between physicians, discrimination, high workloads, dealing with deaths in families and terminally-ill patients (Mark & Smith, 2012). These occupational risk factors are also known characteristics of the radiography profession in South Africa and could be resulting in negative physical and psychosocial effects, that prompt radiographers to change their workplace, leave the country or change

professions. KZN is one of the provinces that has experienced critical staff shortages in the public sector due to this “brain drain” (Thambura & Amusa, 2016). Radiographers, in their quest for more favourable working conditions and environments, have changed from public service to private sector, left South Africa for countries such as Australia, United Kingdom and Saudi Arabia, as well as switched their profession (Thambura, Swindon & Amusa, 2014).

It was necessary to address the issues leading to the migration of KZN radiographers in order to improve the quality of healthcare, and the health and well-being of radiographers. Therefore, this study aimed at identifying the occupational risk factors associated with the migration of KZN radiographers in order to provide input on mechanisms to be put in place in order to enhance radiographic service delivery, improve staff wellbeing and reduce migration from KZN.

2 Methods

2.1 Research design

This study was a quantitative, descriptive survey with a cross-sectional design (Kumar, 2011).

2.1.1 Target population and sample selection

The participants from the four disciplines of the radiography profession were targeted and grouped according to; those who had left the profession; those who had emigrated; and those who were still working in KZN (public and private sectors). A convenience sampling method was used to reach a maximum number of participants (Kumar, 2011). In order to maintain confidentiality and protect personal information, the recruitment of participants who had left the profession and those who had emigrated, was achieved through colleagues, known mutual friends, and lecturers who had previously taught them. Those who were still employed in KwaZulu-Natal were approached personally by the researcher at their workplaces after obtaining the relevant permission. The latter group of 300 participants was selected from a representative sample of public and private workplaces throughout KZN.

2.2 Data collection and instrumentation

Primary data were collected using a self-designed questionnaire, which contained closed and open-ended questions. Three separate questionnaires were compiled for each category of group of participants, however the questions relevant to this paper were common to all. The questionnaires comprised of two sections, the first section included questions on demographic information such as age, gender, work experience and type of workplace. The second section contained questions related to working hours, occupation-related clinical symptoms experienced and overall impressions of the profession. See appendix 1 for the questions.

A pilot study was conducted to ensure reliability and content validity. This was achieved using a small group of radiographers who were then excluded from the study. The questionnaires were amended to address the inputs from the pilot study group. Content validity was also ensured by verifying the relevance of the contents with radiographers who had more than twenty years' experience in the profession and with

an academic background. The supervisor, co-supervisor (both experts in the field of study) and a statistician reviewed and critiqued the questionnaires to ensure face validity. Relevant changes were made to the questionnaires.

The questionnaires were made available online to the participants who had emigrated and those who had left the profession via a link sent to their emails. The completed questionnaires were tracked, and follow-up reminder emails were sent to the participants. The researcher personally delivered the questionnaire to the hospitals in KZN, waited for the radiographers to complete them during break time and then collected the questionnaires.

2.3 Ethical considerations

Ethics approval was obtained from the Durban University of Technology's Institutional Research Ethics Committee (*reference number REC 37/12*) and the KZN Provincial Health Research Ethics Committee (*reference number HRKM123/12*).

Access to the online questionnaire was gained after participants had read the disclaimer on the email link which provided information about the study and conditions for consent. Participation therefore indicated that the participant had provided consent. Questionnaires for those working in KZN included an information and consent letter. Signed consent was obtained from these participants. Participants' responses were kept anonymous and confidential and only the researcher had access to the completed questionnaires. The ethical principles of autonomy, beneficence, non-maleficence and justice were observed to protect the participants. Relevant permission was obtained from the various KZN health district offices, the hospital and private practice CEOs and the radiography managers at each radiography department.

2.4 Data analysis

The data were analysed using SPSS version 23.0. Descriptive statistics using frequency, cross-tabulation and bar graphs were used to present the data graphically.

3 Results

Presented in this section are the results for the age and gender, hours worked in a week, negative physical effects experienced by radiographers and the negative impressions of radiography profession.

The largest group of participants between 25 and 29 years of age (41.9%; n=39) were participants currently working at KZN, whilst the greatest number of all participants (n=65) were between 30-39 years of age and the smallest group of all the participants was in the age category ≥ 60 (n=6).

In the category of participants who had left the profession, 81.2% (n= 13) were female whilst all emigrant participants were female. Amongst the participants working in KZN, 82.9% (n = 157) were female and 17.1% (n=32) were male. The total number of female participants across the three categories was 186, which was just over five times that of their male counterparts (n=35).

Table 1. Age and gender representation of participants in the three groups (n=221)

Age	Left profession			Emigrants			Currently working			TOTAL (n)
	Male (% , n)	Female (% , n)	Total (% , n)	Male (% , n)	Female (% , n)	Total (% , n)	Male (% , n)	Female (% , n)	Total (%* , n)	
19-24	0.0	0.0	0.0	0.0	0.0	0.0	12.5 (4)	28.4 (44)	40.9 (48)	48
25-29	0.0	23.1 (4)	23.1 (4)	0.0	43.8 (7)	43.8 (7)	21.9 (7)	20.0 (32)	41.9 (39)	50
30-39	66.7 (2)	7.7 (1)	74.4 (3)	0.0	18.8 (3)	18.8 (3)	37.5 (12)	30.3 (47)	67.8 (59)	65
40-49	0.0	61.5 (7)	61.5 (7)	0.0	18.8 (3)	18.8 (3)	18.8 (6)	8.4 (14)	27.2 (20)	30
50-59	33.3 (1)	7.7 (1)	41.0 (2)	0.0	18.8 (3)	18.8 (3)	3.1 (1)	10.3 (16)	13.4 (17)	22
≥ 60	0.0	0.0	0.0	0.0	0.0	0.0	6.3 (2)	2.6 (4)	8.9 (6)	6
Total % (n)	18.8 (3)	81.2 (13)	100.0 (16)	0.0 (0)	100.0 (16)	100.0 (16)	17.1 (32)	82.9 (157)	100.0 (189)	100 (221)

3.1 Hours worked per week in KwaZulu-Natal

The total number of hours worked in a week are represented in Figure 1.

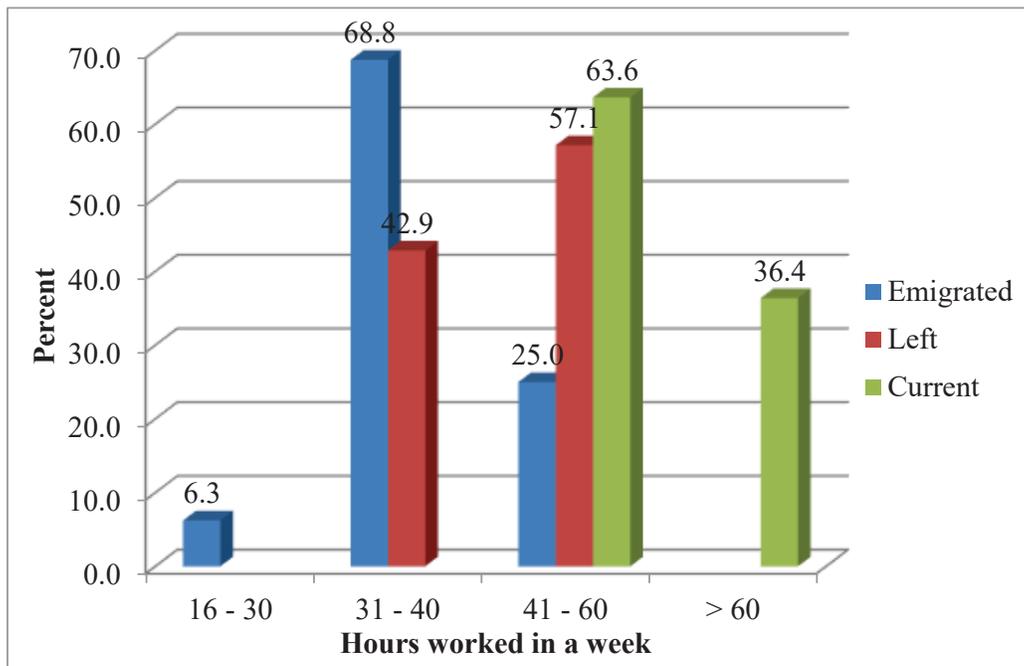


Figure 1. Hours worked by radiographers per week

The majority of the participants (n=7; 57.1 %) who had left the profession worked 41-60 hours per week, while the minority of this group (n=6; 42.9%) worked between 31 and 40 hours. Most of the emigrant participants (n=11; 68.8%) worked 31-40 hours, whereas four (25%) had worked between 41 and 60 hours a week. It was noted that 112

(63.6%) of the radiographers working in KZN worked more than 40 hours a week, while 64 (36.4%) worked more than 60 hours per week.

3.2 Negative physical effects experienced by radiographers

The frequency of the negative physical effects of work-related activities experienced by radiographers is presented in Figure 2.

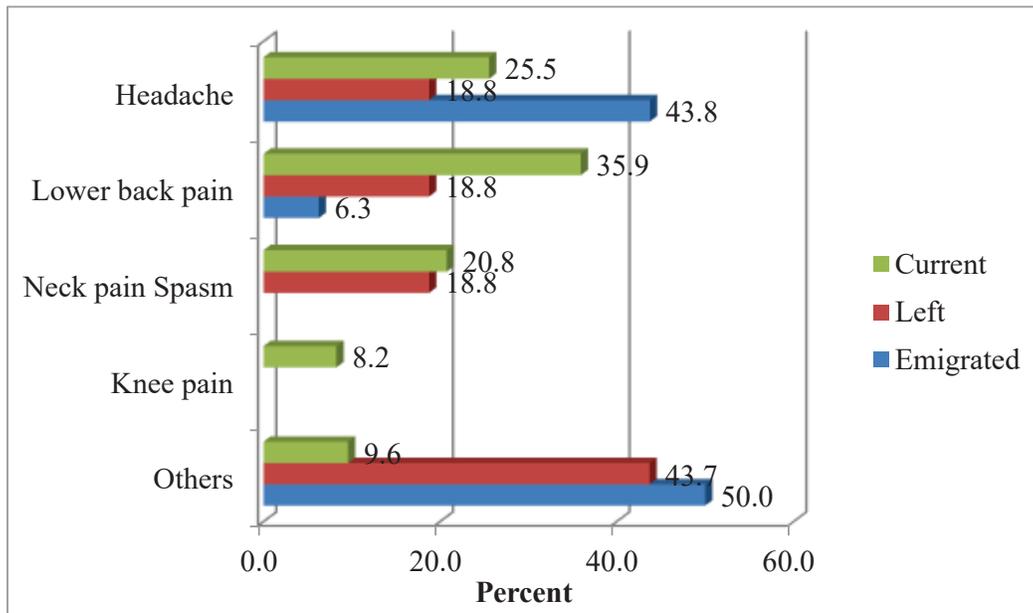


Figure 2. Negative physical effects associated with work-related activities.

Among the participants who had left the profession, (n=7; 43.7%) indicated “other” factors such as painful feet, hernia due to lifting patients, and the loss of eyesight (which could be associated with the effects of radiation), were related to their work. Headaches, lower back pain, neck pain and spasms were indicated by three (18.8%) of the participants to be related to their work. Half of the emigrants, (n=8; 50.0%) stated other factors being muscle spasms, a painful body and physical stress, while seven (43.8%) stated that they experienced headaches, and one (6.3 %) experienced lower back pain. Amongst those who were working at KZN, (n=68; 35.9%) radiographers working in KZN experienced lower back pain (n=48; 25.5%), experienced headaches, (n=39; 20.8%) suffered neck spasms, and (n=15; 8.2%) identified knee pain, while (n=18; 9.6%) stated other factors, such as pulmonary tuberculosis due to poor ventilation, sleeplessness, immunosuppression, wrist, thumb and shoulder pain, as well as psychological and physical strain to be possible work-related symptoms.

3.3 Negative impressions of the profession

The negative features of radiography, as perceived by the participants, are indicated in Figure 3.

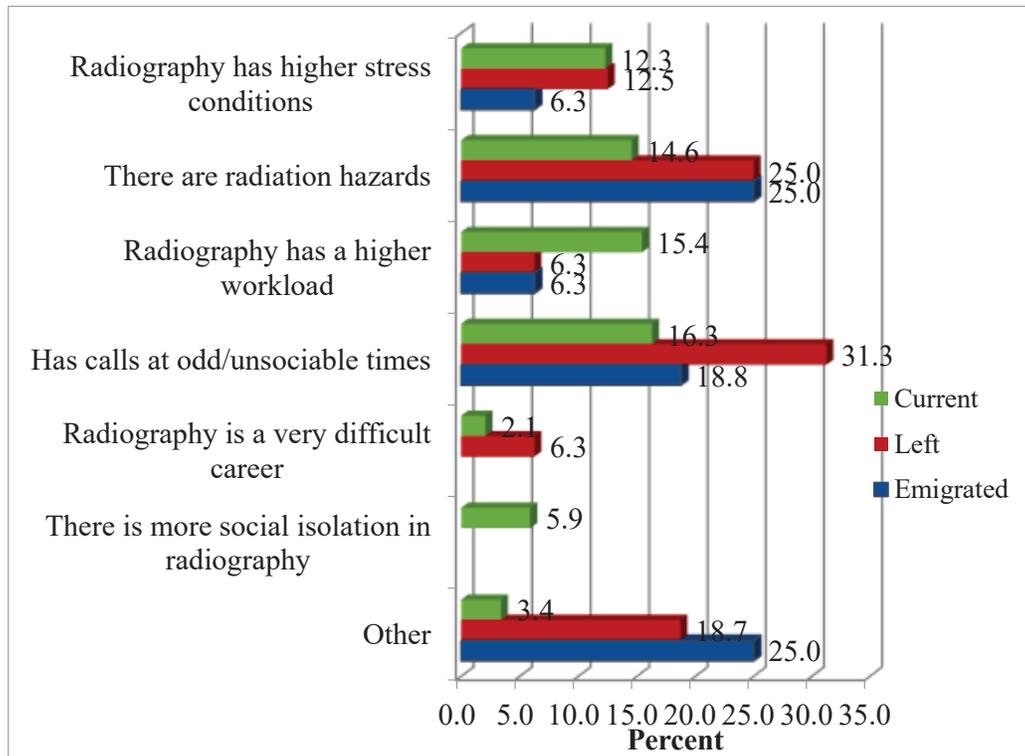


Figure 3. Negative perceptions of the radiography profession

Five participants who had left the profession (31.3%) stated that radiography made demands at odd/unsociable times, while four (25%) stated that radiography has radiation hazards. One (6.3%) participant mentioned that radiography has a high workload and is a difficult career to study. Three participants (18.7%) identified factors such as poor remuneration, demoralisation from peers and understaffing as negative features of radiography, compared to the careers they had since moved to.

Four (25%) of the emigrants identified other negative features such as radiation hazards, high dependency on other professions in decision-making, high workload, lack of career and professional development, and poor remuneration, while three (18.8%) highlighted the unsociable call-out times and three (12.5%) indicated that it was costly to open a private practice.

Forty (17.3%) of the currently working participants stated that it was difficult to open a private practice, while 38 (16.3%) mentioned calls at unsociable hours as challenging factors. Other factors identified were a high workload by 36 participants (15.4%), an over-dependence on other professions in decision-making by 34 (12.8%), and high stress levels by 28 (12.3%). When comparing radiography to careers that participants would consider changing to, 14 participants (5.9%) highlighted radiography's higher level of social isolation, while five (2.1%) mentioned its high degree of difficulty as a career. Eight (3.4%) identified other factors, such as the high risk of nosocomial infections and poor remuneration.

4 Discussion

Migration is the movement of individuals from one place to another (Mohanraj & Manivannan, 2013). In this discussion, age and gender representation across the three categories of the participants, the weekly hours worked by radiographers, and the negative physical effects associated with the daily work activities in radiography are discussed in relation to migration.

4.1 Gender and age

There was gender disparity amongst the participants, with females dominating the profession (Table 1). This was extreme in the emigrant category, where all participants were female, and amongst radiographers working in KZN, where the number of females was almost five times greater than their male counterparts in the profession. Radiography in South Africa is known to be dominated by females. The dominance of females in the profession may impact on productivity, due to factors such as maternity leave and extended leave to raise children. In South Africa, four consecutive months of maternity leave is permitted in terms of the Basic Conditions of Employment Act, 1997 revised in year 2002 (Basic Conditions of Employment Act No.11 of 2002). Similarly, the World Health Organisation (WHO) advises that a pregnant female radiation worker should be accorded alternative working conditions in order to protect the fetus from receiving a radiation dose exceeding 1 millisievert (mSv) which is the maximum amount of radiation that a fetus may be exposed to during the 9 months of pregnancy (Astor et al., 2005). These factors combined may reduce the number of active, practicing radiographers in the workplace, causing an increased workload and stress for the remaining staff as the same workload will then be shared between fewer radiographers that remain. This may then result in dissatisfaction, resignations, career exiting and migration. The profession therefore, needs to address the gender inequality through rigorous marketing strategies that target and attract males to radiography.

In the category of radiographers who were working in KZN, the majority of participants were aged 30 to 39 years, while the emigrants were between 25 and 29 years. It can be deduced that most radiographers had left South Africa soon after graduating and completing their compulsory community service responsibilities as they fall within this younger age group (25 –29 years). Similarly, in a study conducted in 2008, it was noted that the majority of radiographers that had emigrated from Nigeria were also young (Ugwu et al., 2008). Emigration at a young age drains off the professionals who are highly productive at workplaces, which then results in a shortage of radiographers once the majority of the working age group retires. More than half of the three categories of participants in this study were in the 30 to 39 year age group and older. This could possibly be explained by the migration of many KZN radiographers in the 25 to 29 year age group as they seek better working environments and lifestyles in other countries, other professions or other health sectors.

Countrywide, emigration in the healthcare system has resulted in an unequal distribution of human resources between the public and the private hospitals, as well as between rural and urban. By 2015, 70-80% of trained South African health professionals had left the public sector (Econex, 2015). This is evidenced by the decreased number of radiographers in the KZN public sector (Erasmus, 2015). Table 1

shows that majority of the respondents were between 30 and 39 years of age, and due to the belief, that productivity decreases after the age of 50 (Skirbekk, 2004), it would appear that there is a possibility of a future crisis if measures are not put in place to address migration. Therefore, it would seem that productivity within the KZN radiography profession is at risk of decreasing as the younger professionals continue to emigrate or leave the profession.

4.2 Negative features of the radiography profession

Contrary to radiography being their career of choice, radiographers who had emigrated, as well as those who had left the profession, identified occupation-related factors such as poor remuneration, overdependency on other professions, high workloads and understaffing as factors that had motivated radiographers in KZN to consider leaving the profession. Radiography departments are often understaffed, but are still expected to offer high quality services, which leads to negative psychosocial effects such as dissatisfaction and high anxiety levels amongst staff (Ugwu et al., 2008; Rutter & Lovegrove, 2008). Vosper, Price and Ashmore (2005) found in 2005 that radiography graduates in the United Kingdom would not recommend radiography as a career due to having to deal with ungrateful patients and insufficient staff numbers in departments, even though there were adequate jobs available at that time (Vosper et al., 2005). Similarly, a comprehensive report compiled in Northern Ireland as far back as 2002, described radiography as a career lacking opportunities for professional progression, resulting in skills mix (taking on of job tasks other than the normal duties of a radiographer in order to meet the job demand of an organisation) and high workload (Northern Ireland Department of Social Services and Public Safety, 2002; Buchan and Dal Poz, 2002). Similar results were apparent in this current KZN study.

The radiography profession in KZN was highlighted as being stressful, having great social isolation (negative psychosocial effect) and being a difficult career to study due to the stressful academic clinical and theoretical components that are not found in other professions that radiographers have opted for. Other occupational risk factors identified were radiation hazards, a high risk of contact with nosocomial infections, and a lack of adequate remuneration. It has been shown that a high workload and job dissatisfaction tend to trigger negative psychosocial effects (Vosper et al., 2005). Radiographers have been found to experience high stress and anxiety levels due to long working hours, operating heavy equipment that produces harmful radiation, and dealing with ill and stressed patients. It has been found that demanding work schedules and call-outs at unsociable hours are additional to the normal clinical stressors in radiography (Rutter & Lovegrove, 2008; Ugwu et al., 2007). These conditions expose the radiographer to extreme fatigue and the risk of infertility due to the harmful effects of accumulated radiation (Kiah & Stueve, 2012).

There is a need to enhance the image of the profession through improved working hours that will reduce social isolation and exposure to the harmful effects of accumulated radiation. Job satisfaction may motivate radiographers to remain in the country instead of seeking these skills in other countries. This could assist in decreasing the occupation-related risk factors that result in a negative image of the radiography profession.

4.3 Hours worked

A high number [36.4% (n=69)] of radiographers who were working in KZN had worked more than 60 hours per week, whereas the radiographers who had left the profession and some of those who were working in KZN had only worked up to 60 hours (Figure 1). Radiographers working in KZN felt that they were compelled to work long hours due to the critical staff shortages. Employees should ideally not be required to work longer than the scheduled shift, especially in the medical field, as they are required to make important decisions that impact on patients lives (Naicker et al., 2009). The Amended Basic Conditions of Employment Act, 1997 (Basic Conditions of Employment Act No.11 of 2002) states that normally no employer should expect an employee to work more than 45 hours per week or more than eight hours in any one day if the employee works more than five days a week. For shift workers such as radiographers, however, the employer should not permit or require an employee to work more than ten hours overtime in a week, or twelve hours in a day (Department of Labour South Africa, 2004). However, the majority of the radiographers in this study claimed to be working between 41 and 60 hours per week, while others indicated that they worked more than 60 hours per week. It is very possible however, that some of radiographers who were working in KZN could have worked consecutive night duties (12 hours per shift) which is a known and common practice in some institutions.

The nature of radiography requires that radiographers work long hours, which is a source of occupational stress (Mark & Smith, 2012). These extended working hours could cause radiographers to experience extreme fatigue and exhaustion, resulting in dissatisfaction with their jobs. Low job satisfaction is strongly related to stress which can cause psychosocial effects, such as medical unfitness, general unhappiness, anxiety, excessive alcohol intake, divorce and even suicide (Ugwu et al., 2008). The high stress levels in KZN radiography departments could be related to the extended time spent on duty, resulting in dissatisfaction, fatigue, low productivity and poor quality service delivery.

4.4 Physical symptoms associated with daily work activities in radiography

Radiography is known to be a physically demanding profession that requires strength and places great physical stress on the body. Radiographers are required to move patients across beds, position them, carry heavy image receptors and operate large, heavy equipment. The profession also involves ethical dilemmas, frequent interruptions by other departmental staff members as well as dealing with angry patients (Mark & Smith, 2012). This places great psychological stress on radiographers and could result in stress-related illness.

Occupation-related risk factors were high among radiographers who were working in KZN (35.9% had lower back pain, 20.8% had neck spasm, and 8.2% had knee pain). Similarly, headaches (43.8%) were common among radiographers who had emigrated (Figure 2). It is evident that the physical effects experienced by the KZN radiographers occurred mostly at pressure points, such as the knees, lower back, feet and hands. Constant stress and strain of the upper back, such as on the trapezius, rhomboids major and minor, levator scapula and some scalenei muscles, could be caused by the perpetual manipulation of heavy imaging equipment (Vosper et al., 2005). Similarly, the action of repeated lifting of patients onto the examination table could be associated with stress on

the weight-bearing points of the body, such as the lower back and knees (Vosper et al., 2005). Increased stress at the pressure points (knees, feet and lower back) could indicate an increased workload among radiographers working in KZN (Ugwu et al., 2008). Body mechanics is a term relating to the correct body alignment, movement and body balance during the movement of patients and lifting of heavy objects, which minimises the chances of injury at place of work (Ehrlich & Coakes, 2017). For example, bending and twisting the back while lifting a weight is a common cause of back pain due to incorrect body mechanics (Ehrlich & Coakes, 2017). The same authors advise radiographers to work at a comfortable height when lifting a weight and to do this by bending the knees, keeping the back straight, and maintaining the correct posture. Radiographers should avoid lifting heavy weights where possible, and should rather roll or push where possible (Ugwu et al., 2007). The pain in the knees, lower back, feet and hands could be exacerbated by poor body mechanics, high workload and prolonged working hours. These effects could be reduced if the radiographers use appropriate accessories provided in the examination rooms when moving patients, apply the correct lifting techniques that they are taught in their training and call for assistance when dealing with large patients.

The psychosocial effects resulting from stress are recognised as some of the major health hazards of the century and present as diverse conditions, such as psychosomatic diseases and behaviour changes (Ugwu et al., 2008). It could be deduced that the stress mentioned by radiographers working in the KZN radiography departments may be contributing to psychosomatic diseases, which in turn negatively impact on productivity and wellbeing.

It is noted that the factors associated with radiographers who emigrated and those who left the profession were also prevalent amongst radiographers that were working in KwaZulu Natal. Working more than forty hours in week, calls at unsocial hours, radiation hazards, headache and lower back pain were factors that were found to be common across the three groups of participants and should be addressed to limit further staff shortages. Further research is suggested to analyse the current state in the radiography profession with a specific focus on the negative perceptions identified in this study.

5 Limitation of the study

Accessibility to a larger sample size of emigrants was found to be a limitation in this study. The researcher relied on the contacts that the university, colleagues, provided to contact radiographers that had emigrated. Some of the emails sent were undelivered, possibly due to changed contact details that were not updated at HPCSA. Additionally, this research was conducted in KZN and therefore the findings may only be generalised to this province. A study using a larger sample size from a greater geographic area is suggested. The nature of the data collection tool used may have led to some subjectivity depending on the emotional state of mind of the respondents at that time. A repeat study in KZN may yield different results if the occupational challenges in the province are thought to have changed or deteriorated since the original data was collected.

6 Conclusion

Occupational risk factors such as prolonged working hours and heavy workloads, are evident amongst radiographers working in the KZN province and could have resulted in symptoms such as neck spasm and painful knees. These could very likely have been precipitated by understaffing and compromised working conditions. This needs urgent attention in order to reduce migration resulting from the effects of occupational risk factors. It is imperative to implement strategies to address the extent and severity of the migration of radiographers. Budgets and resources need to be prioritised to improve the overall working conditions in radiography departments, especially those in the public-sector. A similar study may be conducted in other healthcare professions as migration is not limited only to the radiography profession, but others as well (Naicker et al., 2009), which ultimately impacts on the quality of the holistic service received by patients. Scientific data can be used to motivate for change and this study thus hopes to initiate some change in the radiography profession in KZN.

7 Recommendations

The following recommendations should be considered in light of the findings of this research:

- The introduction of employee assistance programmes relating to health education regarding coping strategies such as physical exercise, time management, work schedule management and social interaction at the workplace.
- A health and safety officer should be appointed/contracted in each department to regularly evaluate the employees' safety and wellbeing and implement interventions by means of relevant employee assistance programmes, such as counselling services.
- Radiographers' voices need to be heard through effective dialogue at a departmental level with their heads/managers. A reporting system could be introduced where radiographers submit their challenges in writing (into a locked ballot-type box) and then meet regularly with senior staff to discuss possible solutions which can be communicated to the institution's management for consideration in the strategic plans.
- Education institutions need to target males in the marketing and recruitment strategies for their radiography training programmes.

Conflict of interest

The authors declare no conflict of interest

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APPENDIX 1 QUESTIONNAIRE

Instruction:

- This questionnaire must be completed by radiographers working in private and government hospitals and those who had emigrated but had worked at KwaZulu Natal Province in South Africa.
- Fill in the blank spaces and/or place a circle around the number/letter of the most appropriate answer/s.

Section A

1. State your gender? A) Male B) Female
2. State is your age?.....
3. Have you ever worked in a KZN public hospital? A) Yes B) No
4. Have you ever worked in a KZN private practice? A) Yes B) No
5. Did you ever leave the public hospital to work in private? A) Yes B) NO

Section B

6. Did you meet your expectations in your radiography profession? A) Yes B) No
7. How would you compare the following profession impression between radiography and other professions you aspire to switch to? (*you may choose more than one answer*).
 - a) Radiography has higher stress conditions.
 - b) There are radiation hazards.
 - c) Radiography has a higher workload.
 - d) Call is at odd/unsociable times.
 - e) It is expensive to open a private radiography practice.
 - f) Radiography has a high dependency on other professions like radiologists to give reports
 - g) There is more social isolation in radiography.
 - h) Other (be specific)
8. Do you often have to work overtime to complete your work? A) Yes B) No
9. How many hours do you work in a week?
10. If you are dissatisfied with your current job, what are the reasons?
(*You may select more than one answer*).
 - a) Pay is discouraging
 - b) Radiation hazard
 - c) High stress levels at work
 - d) Night calls and working weekends
 - e) Poor teamwork
 - f) Demoralisation from the peer in other professions
 - g) Others (specify).....
11. Which of these symptoms (if any) do you experience and would associate with your work routine? (*You may select more than one answer.*)
 - a) Headache
 - b) Lower back pain
 - c) Neck pain Spasm
 - d) Knee pain
 - e) Others (specify).....

Thank you for taking the time to complete this questionnaire. Your input is very valuable.